



October, 1933

C
Q

ROBERT W. ENNIS
120 WASHINGTON AVE
PITMAN, NEW JERSEY

COMMERCIAL RADIO

20
CENTS

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FICTION, NEWS, NEW
APPARATUS, HOOK-
UPS, ALL IN THIS
ISSUE.



Society of Wireless Pioneers - California Historical Radio Society



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- (4) Questions which cover the design of equipment cannot be answered free of charge.
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JAMES J. DELANEY, Editor

L. D. McGEADY, Bus. Mgr.

VOL. III

OCTOBER, 1933

NO. 2

OUR OWN "MARCH OF TIME"

The loose ends are slowly knitting together, and your Editors are gratified.

We want to take this opportunity to thank those of our readers who have put us "on the air." From every direction come reports that the reader was made aware of our publication through the ether. Not through our own efforts, but through the efforts of our friends, as it should be.

Our book... or shall we say, your book is making rapid strides of progress. Much of our editorial material depends on the kind services of our readers. As this is rapidly developing, it becomes a most valuable service. An exchange of engineering material, local news, and even international news, that through the happy medium of inspired contributors becomes universally available to all.

Bigger and broader our sphere develops. Better and better our service to readers. Ready and enthusiastic acceptance by an ever multiplying number. This represents something more than just the usual entertainment reader interest. Active, passing, it only requires the measure of time when it shall burst through its present limited form into a bigger light of progress and form.

We invite you to come closer to our fire-side. Come in where the spirit is warmer. Your problems become ours, though they may be varied in form. If you do not find what you want in our pages, it is only because we may have in the rush of things been forced to overlook them. The easiest way to remedy that is to tell us about your needs. Others may be thinking along the same channels as yourself, but, remember too often the shared ones are forgotten... so become an active one.

THE EDITORS

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Veteran Wireless Operators Association News

(Note: All communications to the V. W. O. A. should be addressed to WILLIAM J. McGONIGLE, Office of the Secretary, 112 Willoughby Ave., Brooklyn, N. Y.)

GALA RECEPTION FOR MARCONI

On Wednesday, September 28, 1933, the Marchese Guglielmo Marconi, world renowned radio engineer and inventor, arrived in New York aboard the Italian Liner Conte de Savoia on one of his infrequent visits to this country. The Veteran Wireless Operators Association welcomed the opportunity of extending felicitations to the inventor of wireless in the form of a radio broadcast greeting, which was participated in by the Mayor of the City of New York, who finding it impossible to be present in person at the broadcast studios sent his message of greeting to be read over the air. The program of greeting was broadcast by station WOR of the Bamberger Broadcasting System. A copy of the program is herewith presented for the benefit of those who were unable to hear it via the air waves.

ANNOUNCER: Ladies and gentlemen, tomorrow the City of New York is to be favored with a visit from one of Italy's most illustrious sons, the world renowned inventor of wireless, the Marchese Guglielmo Marconi, who arrives in the morning on board the Italian Liner Conte de Savoia. Tonight, far out at sea he is listening into this program arranged in his honor by the Veteran Wireless Operators Association. As a prelude and musical salute WOR presents the spirited Fascist hymn "Giovinezza."

ANNOUNCER: Ladies and gentlemen, it was to our pleasure to present on this Marconi program tonight the Honorable John P. O'Brien, Mayor of the City of New York. Pressure of official duties, however, precludes his being here in person at this moment but he voices the greeting of the municipality in the following message:

"As the Mayor of the City of New York it has been my privilege to welcome to this great metropolis many distinguished citizens of this and other nations but on no occasion has the key to the city been offered with more willing hands, or ever to one whose work has meant more to the welfare of mankind. The name of Marconi is synonymous with progress. Your handiwork has quickened the pulse of brotherhood and commerce. The scope of your genius has spanned alike the barren desert and trackless ocean and has placed in man's hands the power to circle the globe in a flash.

"We welcome you, Marchese Guglielmo Marconi, and your charming wife to our great metropolis again. We do so fittingly enough over your very own medium, the radio, through the night and out to sea. When your ship arrives in the morning you will find a city eager to salute you."

JOHN P. O'BRIEN, Mayor

ANNOUNCER: Out to sea and over the ether waves we waft now the beautiful Italian love lyric, "Lungi Dal Caro Bene," sung by Verónica Wiggins.

ANNOUNCER: It is our pleasure at this time to present the President of the Veteran Wireless Operators Association, Mr. Fred Muller, who conveys a welcome to the great Italian inventor on behalf of the wireless men of America, Mr. Muller.

MR. MULLER: "Ladies and gentlemen, tomorrow morning the Italian Liner Conte de Savoia will bring to New York a most distinguished passenger, the greatest figure in the world of wireless, the illustrious Marchese Guglielmo

Marconi. Tonight it is my privilege to greet him, as is proper, out on the Atlantic Ocean over the same ether waves that he, himself, conquered over thirty years ago.

"In fact it is more than thirty years since that memorable December 12, 1902 when he received the letter 'S' in St. Johns, Newfoundland, as it was transmitted from the bleak coast of Ireland. Would you folks in the radio audience like to hear what the signal sounded like? Well, we have a surprise for you. Here in the studio is an ancient piece of Marconi transmitting apparatus which is now a museum exhibit. WOR engineers have it connected up and I shall now let you hear the famous letter 'S' as it sounded to Marconi at St. Johns in 1902. . . . There it is! The famous letter 'S', three dots.

"And now to our renowned member of the craft of wirelessmen, I extend on behalf of the Veteran Wireless Operators Association, a most hearty welcome to these shores again.

"Everyone who goes to sea nowadays feels a new security as a result of this man's discoveries. When you go to sleep in your cabin, you know that a wireless operator is on constant duty to flash a signal in whatever emergency occurs. As these wireless waves leap to their destination across continents or seas they spell, each time, the magic of Marconi.

"We wireless men have a regard not only for Marconi the inventor, but for Marconi the tireless explorer, penetrating deeper and deeper into the mysterious hinterlands of high frequency waves. His very recent discoveries parallel in importance his earliest work, when as a youth he went from his home in Italy to give his immortal demonstration before officials of the British Post Office.

"I am very happy to have the opportunity of voicing this welcome from the widespread membership of our Association. Marconi, we salute you."

ANNOUNCER: Thank you Mr. Muller. Ladies and gentlemen, you have been listening to Mr. Fred Muller, President of the Veteran Wireless Operators Association.

And now we are to hear the beautiful Venetian Serenade.

ANNOUNCER (Conclusion). (Close with Star Spangled Banner.)

Ladies and gentlemen, you have been listening to a program of welcome to the world-renowned Italian inventor, the Marchese Guglielmo Marconi, who arrives in New York tomorrow morning on board the Italian Liner Conte de Savoia. The Marchese was listening in and, we hope, enjoyed the program. Bon voyage.

This program was presented under the auspices of the Veteran Wireless Operators Association.

The October meeting of the Veteran Wireless Operators Association will be held at Paul's Restaurant, 30 Lafayette Street, New York City at 6:30 P. M. on October 11, 1933. At this meeting plans will be discussed for a proposed Beer Stag to be held in the latter part of November. All members and non members alike—are cordially invited to attend. The stag in May, we believe, is sufficient evidence as to what can be accomplished along this line. We look forward to a large attendance at the November affair. Further details may be obtained from the Secretary.

"CQ" Commercial Radio

OPERATOR LICENSES

REVISED TO OCTOBER 3, 1933

Amateur stations may be operated only by licensed amateur operators. (See Amateur Rules).

Commercial Extra First Class.—To be eligible for examination, an applicant for this class of license must hold a radiotelegraph operator first class license and must have been actually engaged as an operator at stations open to public correspondence for at least 18 months during the two years previous to his application and must not have been penalized for violation of any radio act, treaty, or regulation binding on the United States. An applicant must pass code tests in transmission and reception at a speed of not less than 30 words per minute in Continental Morse Code and 25 words per minute in American Morse Code, five characters to the word. The written examination covers the same subjects required for the radiotelegraph operator first class license and the radiotelephone operator first class license.

Radiotelegraph Operator First Class.—To be eligible for examination, an applicant for this class of license must have had at least one year of experience as a radiotelegraph operator on board a ship or in a coastal telegraph station. An applicant for this class of license must pass code tests in transmission and reception at a speed of at least 20 words per minute in Continental Morse Code, code groups, and 25 words per minute in Continental Morse Code, plain language, (5 characters to the word).

(1) The practical and theoretical examination consists of comprehensive questions under the following headings:

- (a) Diagram of radio installation: An applicant is required to draw a complete wiring diagram of a modern marine radio installation as used aboard American vessels. The applicant may be required to draw either a spark, arc, or vacuum tube transmitter (with radiotelephone attachment).
- (b) Theory, adjustment, operation and care of modern radiotelegraph and radiotelephone transmitting apparatus.
- (c) Receiving apparatus.
- (d) General principles of electricity.
- (e) Operation and care of storage batteries.
- (f) Power supply apparatus.
- (g) International regulations governing radio communication and the United States Radio Laws and Regulations.

Radiotelegraph Operator Second Class.—An applicant for this class of license must pass code tests in transmission and reception at a speed of not less than 15 words per minute in Continental Morse Code, code groups, and 20 words per minute in Continental Morse Code, plain language (5 characters to the word). The practical and theoretical examination covers the same subjects as for the radiotelegraph operator first class license.

Radiotelegraph Operator Third Class.—An applicant for this class of license must pass a code test in transmission and reception at a speed of not less than 15 words per minute in Continental Morse Code, plain language (5 characters to the word). The practical and theoretical examination covers the same subjects as for the radiotelegraph operator first class, but not so comprehensive in scope.

No code test is required for the radiotelephone classes of licenses.

Radiotelephone Operator First Class.—An applicant for this class of license must pass a theoretical examination covering the following:

- (1) Diagram of modern broadcast installation.
- (2) Theory, adjustment, operation, and care of modern radiotelephone transmitters.
- (3) Receivers.
- (4) General principles of electricity.
- (5) Operation and care of storage batteries.
- (6) Power supply apparatus.
- (7) Radiocommunication laws and regulations.

Radiotelephone Operator Second Class.—An applicant for this class of license must pass an examination similar to that required for the radiotelephone operator first class license, but not so comprehensive in scope.

Radiotelephone Operator Third Class.—An applicant for this class of license must pass an examination covering laws, regulations, and operation of radiotelephone stations for which this class of license is valid.

The percentage that must be obtained as a passing mark in each examination is 75 out of a possible 100.

No credit will be given for experience in the examination for any class of license. All examinations, including the code tests, must be written in longhand by the applicant. Licenses, except for amateur operators, are not valid until the oath of secrecy has been executed and the signature of the issuing officer affixed thereto.

When the holder of a radiotelegraph class license has qualified for a radiotelephone class license, the radiotelegraph license shall be endorsed as follows:

(1) Radiotelephone First Class

"The holder of this license has also qualified for the radiotelephone first class license and the additional privileges authorized under this class license are hereby granted.

Date

Examining Officer"

(Continued on Page 17)

October, 1933

NBC STUDIO READY SOON



Martin H. Aylesworth, President of The National Broadcasting Company

On November 15, 1933, the National Broadcasting Company expects to officially open its new quarters in the Radio City section of Rockefeller Center.

NBC will occupy some 400,000 square feet of the building located at 50th St. and 6th Ave., New York.

Here will be housed the stations WEAF and WJZ. The main offices of the Radio Corporation are already in this building. Much publicity to the building has been attracted by the dispute between the Rockefeller interests and the Mexican artist who was employed for the lobby decoration of the building. Communist inclination was averred to the artist in using the head of Lenin for the center of a group fantasy. The artist was paid off and dismissed, and of



Auditorium studio nearing completion in Radio City. Height 3 stories, length 152 feet, width 78 feet.

course the picture of objection is gone. A new artist was engaged to finish the work, and there was later charges that there was objection to his work in that he wanted the face of Christ to appear in his work. Those under whom he was working claimed that the only reason for this was that no universal thought attached to just what the features of Christ were.

One of the outstanding points of the NBC quarters is the huge Auditorium Studio. It is 78 by 152 feet, and three stories in height. This it is claimed has been designed with a view of the advent of television. It is equipped with a gallery on the second floor level where a large number of observers may be accommodated, or to be exact 250 persons, comfortably seated. A semi-elliptical stage will be located in the center opposite the gallery large enough to seat a 100 piece orchestra. The floor of the studio will be large enough when something is going on the stage to seat an additional 1,000 persons. It is claimed, making a total visitor possibility of 1,250 persons watching a broadcast.

A new "overhead-direct-diffused" lighting system is to be used in the large studio with which it is claimed if necessary a light equal in power to sunlight may be had. All lights are embedded in ceilings and walls with lens covering to prevent glare.

There are 16 studios already provided for the opening. This if necessary can be increased to 35 if later necessity requires. A total of 250 microphone outlets are provided for.

All studios are of course heavily surrounded with rockwool, and covered by transite, so as to be free from any communicating sound from the building frame of steel. On account of the glass size used in studios a special air pressure control was devised for the space between the three ply glass insulating the studio from outside noise where outside observation is provided.

ed. It was thought that the pressure varying on the surface either inside or outside the studio, and not being compensated for by the space between that and the middle glass would cause breakage of the glass from either side. So a pressure changing arrangement was inserted where otherwise it would have been sealed, between the three ply glass.

In addition to the larger studio described there is another also unusual in size being 50 by 80 feet, and two stories in height. There are two more 50 by 80 foot, four 30 by 50 foot, and two 25 by 40 foot, all two stories in height. Spectator galleries are provided outside of each.

Since there are no windows in the studio section a problem of air conditioning was presented. It is believed that the largest air conditioning plant in the world is installed here. A huge panel of sixty four dials indicates the temperature in every section of the building. A total of 162,000 gallons of water per hour will be required for the air conditioning plant, which will when required pump over twenty million cubic feet of air per hour. All of the air conditioning system is of automatic operation, controlled by thermo devices, to maintain an even temperature in all parts of the ten stories of the building occupied by the NBC.

Fifteen different kinds of wood have been used in the paneling and decorative scheme of the offices, studios, corridors, etc. Fabrics are used on the walls of studios, corridors, reception, waiting and dressing rooms, and a total of forty different kinds of fabrics are represented in this work.

The man, or men who pay the bill for the broadcasts have not been forgotten, and special observation points outside studios of sponsored programs have been provided, separate and away from the points available for other spectators, giving them that feeling of privacy which may either encourage or sustain their spending proclivity.

The wiring of this enormous project was a complicated one. It is estimated that 20,000,000 wiring connections were made by the six hundred or more electricians employed on the work. Twelve thousand five hundred miles of electric wire, and one hundred and twenty-five miles of electric conduiting give some idea of the requirements. There are cables of twenty pairs of wires, ten pairs of wires, and five pairs used.

This represents the very latest in the development of studio work. The present facilities of the two local stations WEAF and WJZ are not planned for any immediate change in the transmitter end. No word is at present available as to whether visitors will eventually be asked to pay admission to view the broadcasts going on. In New York visitors are asked admission charges to view the City from the tops of the larger buildings, and it is not beyond expectation that if a large amount could be collected for a comfortable evening watching performances by visitors that the temptation would be ignored, even though it

were a crystal studio and the performer would be heard only by loud-speaker effect.

Mr. M. H. Aylesworth, President of the National Broadcasting Company, promises something of an unusual evening for the official opening program.

A battery room of unusual proportions goes to make up the new quarters. In the event of loss of power for one reason or another the stations can be kept "on the air" by this unusually large battery storage. Master control located on the fifth floor with studios both above and below, other separate control rooms, the battery room, and the power room are located on the fifth floor also, which was decided as the ideal spot for the rooms.

The opening of the new ten story section of Radio City building will be National Broadcasting's biggest step to supply the largest chain of stations with the best and most elaborate headquarters in the radio field. It is another symbol of progress of radio in the line of "big business." It will be another cementing factor in chain broadcasting, as opposed to individual



Control panel for large air conditioning plant in NBC's section of Radio City

small station effort. It will be another step in the way of encouraging broadcast advertising as opposed to printed advertising, and give the already hard pressed advertising managers of newspapers and magazines a greater fight for the securing of the advertising appropriation.

Stations already affiliated to the NBC throughout the country will very likely be closer drawn to the parent organization than ever, as it will make available to them a higher grade of

program with which to fill their application blanks when asking for greater power from the Radio Commission.



Radio City Building of Rockefeller Center.
New NBC Studio Section in Circle

THE AUTOMATIC DISTRESS ALARM ON AMERICAN SHIPS

By RICHARD GOLDEX

The improved automatic alarm apparatus for the reception of distress calls when no operator is on watch is proving efficient on many foreign ships and indications are that the system will soon be tried out on American vessels.

The inception of any automatic device generally means replaced man-power. If the automatic alarm could take the place of a radio operator, steamship companies, ever on the alert to reduce operating costs, would adopt it speedily enough. Such, however, it cannot do.

The automatic alarm performs one function only. It indicates, by a flashing light or a ringing bell, that a ship in the vicinity is in distress and requires immediate assistance. A radio operator must be on board the vessel receiving the call to ascertain the stricken vessel's position and so forth. For this purpose a deck officer or other member of the crew possessing a radio operator license might possibly answer, although it would be extremely dangerous business to allow anyone but a competent radio operator to perform the duty of answering distress calls. At such a time hundreds of lives and thousands of dollars worth of property may

depend upon a radio operator's skill and knowledge. However, on no American ship does the radio operator perform the sole duty of listening for distress calls. His duties are manifold and can not be performed with any degree of efficiency by a person in conjunction with duties in another department.

On British ships of certain classes a radio "watcher" is required by law. This individual eventually may be replaced by the automatic alarm. A "watcher" is a purser or steward or other member of the crew who possesses a document certifying him as competent to distinguish the distress call and the radio call letters of the vessel on which he is employed. He is not qualified to operate the radio transmitter. His duty is to stand watch on 600 meters to listen for distress calls at such times when the radio operator is not on duty.

The British radio watcher is not a radio operator or an apprentice radio operator. Investigation would prove that in a great many cases actually he does not know the distress call or his ship's radio call and never enters the radio room except, if he is a steward, to clean it. His presence on board is of no value as far as the safety of life at sea is concerned although it covers the British law requiring a continuous radio watch. The replacement of the radio watcher by an automatic alarm would be a vast improvement, even though it would not compare in safety and efficiency with an additional radio operator.

On American ships there are no radio watchers. Ships of a class requiring the maintenance of a continuous radio watch must have at least two radio operators. One of these men can not be replaced by an automatic alarm, for a continuous watch on a vessel requiring such service is maintained for the vessel's own safety. An automatic alarm adds nothing to the safety of the vessel on which it is installed.

Approximately ninety percent of American ships equipped with radio apparatus are voluntarily equipped. That is, there is no law requiring them to carry radio of any description. A vessel of this class employs one radio operator. A single operator may be sufficient for the safe navigation and to conduct the normal radio business of such a ship, but the protection afforded other shipping by this vessel, as far as its radio apparatus is concerned, is limited to the hours during which its radio operator is on duty. A distressed vessel twenty miles away may be sending frantic calls for help but if the radio operator is not on watch, the calls are in vain. Here, apparently, is where the automatic alarm would be of service.

There is, then, a place for the automatic alarm in the American merchant marine. If all vessels carrying but one radio man were equipped with the device the safety of life at sea would be vastly increased. It is not to be expected, however, that shipping companies will immediately embrace the distress alarm. They readily adopted radio operators without legislative prodding because they found it profitable to do so. It may take an act of Congress to persuade them to install the automatic alarm.

Local brothers in fields afar... Earnest Gannett, on the inter-coastal freighter William A. McKenney, seldom sees his Dorchester home... Gunnar Russell was last heard from running between Honduras and New Orleans on the Standard Fruitier Masaya... according to last reports the Maltran was carrying Brother Sam Parsons and large quantities of potatoes back and forth between Bucksport, Me., and New York... the team of Ken Moores and Ted Hemmis on the Eastern Steamship flagship Acadia, running between New York and Yarmouth, Nova Scotia, is seldom heard from... who knows where Francis Bearse, formerly of WIM, KSOC, and WDOL, is now?

"CQ" Commercial
Radio

A SOFT GRAFT

By VOLNEY G. MATHISON

WOMAN is a deceivin' animal," sourly stated Samuel Jones, as he sat before Cunningham's office window moodily watching the white and the buff-colored ferryboats stringing off across San Francisco Bay to the Oakland mole. "I don't see how ya can stand bein' married all th' time to one of 'em."

"Oho! I thought so!" chuckled Cunningham, with a knowing smile. "It's almost three months since you blew in from Alaska and went around into the Atlantic on the 'Western Glen'; and I saw in the paper that you arrived in New York over six weeks ago—six weeks to make a train trip back to Frisco that other people manage in five days! I suppose you played pullman

cilled on th' sides an' ends who got me into it," at length vouchsafed the shellback operator, becoming dourly reminiscent. "He got into the same pullman with me in th' Rock Island station at Chicago; an' when th' train pulls out, we discover we're allocated to the same berth. He starts to raise a hullabaloo with th' pullman conductor, but bein' such a p'aye-lovin' human, I agrees to take an upper. This causes him to get real friendly, an' he treats me to somethin' he was carryin' on his hip. He begins tellin' me all his private business, from which I gather that he owns a corn-an'-h-gs ranch at Pilcher's Corners;—an' then he wants to know all of mine.



"Couldn't ya tell me from a sk-kunk!"

cavaller to some fair dame, and got vamped again—as usual."

The veteran brasspounder grunted, and noded a smoke.

"You know me pretty well," he observed, gloomily; "but it wasn't no railroad cavalierin' racket this time."

With a judgment acquired from long experience, Cunningham waited; while Samuel Jones smoked and frowned at the pretty movie girl's face on the lithographed bill-board down on the opposite side of the street.

"It was a long, lanky old hick with a dusty-lookin' sky-blue an' luggin' a battered-up old pasteboard suit-case with th' name 'Timothy Tuggle' an' 'Pilcher's Corners Kansas' gitten-

"When I informs him of my method of defraudin' th' poor ship-owners for a livin' he seems to get a lot interested."

"Ye're one o' them wile-as he-roes, what git famous by gettin' drowned, air ye?" he exclaims. "By jing, '—an' then he stops an' begins stakin' his rangy coat, like he was doin' some tall thinkin'."

"Say—air ye in any big rush about gettin' to whur ye're goin' ter," he asks, after a while, as if he was turnin' somethin' over in his mind. "Well, I guess the hills won't fall if I don't get to Frisco, just on time," I answers, wonderin'.

"Old Timothy sits an' thinks some more. 'Yep, by gum—ye're jist th' feller to cure Marry,' he says, at last, half to himself. 'Marry?' I exclaim. 'Who's she?'

October, 1933

"Margy's my datter," he replies. "A silly-brained, senseless young-un. Here a while back she runned off with a pumpkin-headed dunce round our way named Eusebius Ames—an' would'a married him, only Zoroaster Sims, th' preacher, wouldn't do it, 'count she bein' only seventeen."

"After that me an th' missus was keepin' a purty sharp eye on her, until one day we thought we was shet o' that consarned Eusebius. He druv up Logan Hill with a load o' hay, an' comes to a truck full'a cream belongin' ter Ebenezer Pitts, what was standin' acrost th' railroad track. Zachary Bilgiks was under th' truck fixin' suthin'; but Eusebius didn't see him, an' shoved th' truck off'n th' track—an' it run off backwards all th' way down th' hill an' went siam-bang against Leander Blagan's hen-house, whur it upset an' spilled all th' cans o' cream. Zachary up an' hammers th' stuffin' out o' Eusebius; an' meanwhile a bobtailed freight-train come along an' hit Eusebius's hay-wagon, an' smashed it all ter smithereens. Fancy Margy wantin' ter marry a dum fool like that!"

"Never can tell about 'em," I agrees. "They're all nuts."

"They took th' durned fool t' court," resumes Timothy. "He gits sentenced to pay a hundred dollars ter Pete Hankins fer th' hay-wagon, an' two hundred an' thirty ter Ebenezer Pitts fer th' cream an' th' banged-up lizzie-truck."

"Eusebius not havin' th' money, he had to work it out fer Pete at a dollar a day; then Ebenezer sent him ter his rockquarry, up t' Stonefield to work out his time fer th' cream an' th' truck. Stonefield's nigh onto a hundred miles from Pilcher's Corners, so we cal'lated we was rid o' Eusebius—but we ain't, by heck!"

"How's that—does the girl keep mopin' over him?" I asks, wonderin' what in blazes he's drivin' at.

"Well, she was nigh ter bein' over it, fer a while," says Timothy. "One day she runned acrost a wireless magazine, an' right off she wanted ter git a outfit. Me an' th' missis thought as how it'd be a fine thing fer to help her fergit about that durned Eusebius, so we let her buy a big transformer an' a rack o' copper-bound kittles, an' a sparkin' wheel, an' an' a foun' an' truck—cost a pile o' money, too, by gum—an' now th' hull farm's full o' oscillations an' burn-outs, an' somebody is nigh ter gettin' kilt every day."

"She put one o' them gold-durned ground wires onto th' pump, an' Jerry Mooly, who is one o' th' hired hands, didn't know what it was, an' took it loose. Jist as he was draggin' it off, almin' ter nail it over a busted place in th' back fence. Margy started up that consarned sparkin'-jenny—and Jerry ain't bin right sence. Then she put a telegraph on th' fence-wires over ter Sally Spiker's house; an' when old Ezekiel Gibbs come an' set up on the fence ter gas with th' hands plowin', like he allus does, Margy put th' sputterin' juice-squilter onto th' wires, an' old Ezekiel keeled over into th' ditch, with a big hole burnt clean through his best pants. He allows he kin feel th' fire flyin' up an' down his back-bone yet—an' I had ter pay fer th' pants. We kept puttin' up with it, anyhow, honin' fer th' best;—an' then whut do ye s'pose we found out?"

"Search me," I answers, puzzled.

"Why, ding bust it, she'd read a fool yarn in them wireless magazines about a gal named Lizzie Pratt, or suthin' like that, who uster talk ter her feller by wireless—an' here Margy is doin' th' same durned thing with that gosh-danged Eusebius! Seems like some good-fer-nothin' young upstart up ter Stonefield is lettin' Eusebius use his outfit—or I guess th' kid's runnin' it fer him, 'cause that dum-headed fool couldn't wind up a kitchen clock 'thout bustin' it! But that Margy—"

"That's just like 'em," I sympathizes. "Did you tear down her outfit?"

"Crickety, no!" Timothy exclaims. "Twouldn't be sate ter handle a lively, high-strung gal like Margy that way. She might go an' do suthin' despril. But now, I was jist a thinkin' if we could git a reg'lar wireless feller like you ter come an' stay awhile with us, 'thout lettin' on ter Margy who ye be, ye could likely cure her. Ye could slip around an' keep her wireless contraption bunged-up, so's she'd hev a peck o' trouble with it;—then mebbe after while she'd git sick o' th' durned thing an' give it up. Now, if ye'll come—"

"No—I don't think I want that kind of a job," I tells him, promptly. "I'd be sure to land in all kinds of cussed complications—like I always do."

"But we kin say ye're a friend o' my nephew Cornelius in Chicaggy," replies Timothy, eager-like. "There won't be no complicated bizness about it. Ye jist hev ter try t' cure up Margy's danged wireless fever—an' I'll give ye a hundred dollars, if ye kin do it or no. Ye kin cancel ye're ticket at Kansas City, an' I'll pay th' difference on a new one from Pilcher's Corners to that Indian camp whur ye're goin' ter."

"No, I don't want a fool with it," I tells him. "Plenty trouble comes my way without me huntin' fer it."

"Tain't goin' ter be no trouble," insists old Timothy. "It'll be jist like a vacation fer ye. Th' missis'll have reg'lar Sunday dinner fer ye every day, with fried chicken an' apple dumplin's an' rhubarb pie, an' ye kin hev a fine colt ter ride, an' there's a crick ter go fishin' in—an', by gum, ye kin use th' fambly Ford any time ye want ter!"

"Well, I don't know," I says. "I had a vacation once—"

"I'll give ye a hundred an' fifty dollars—pay yet right now!" breaks in Timothy, hopeful-like. "I hev ter do suthin' ter cure up Margy."

"I was kind'a weakenin'; but then I feels my old reliable hunch comin' on, an' my mind is made up, 'No,' I tells him. 'Absolutely no. Nothin' doin'."

"By gum, that's too darned bad!" says Timothy, real disappointed-like. "But hev a little nlp, anyhow,—an' he produces his flask."

"I takes the nlp, an' another one, an' the flask is dry; but Timothy breaks out a second;—an' then I gets to feelin' hard boiled an' foolish, an' th' next thing I clearly knows, I've got off my train at Kansas City an' am sittin' in a dusty day-coach on a bangety-clatter old milk-can railroad, with Timothy's hundred an' fifty in my pocket, an' chuck full'a determination to bust up Margy's wireless fever, if I have to break my neck."

"Late in the afternoon, th' train stops out in a field, alongside a post with th' name 'Pilcher's Corners' painted on it, an' we disembark. A hired man is waitin' fer us with th' lizzie; in which we jounces up th' dusty road a couple miles to Timothy's farm. It was a fine-lookin' farm, too, though I mostly observed the small aerial which was strung between the house and the nearest barn, with th' lead-in runnin' down into a wood-shed about half-way between."

"As we turn into the drive-way, I notices a big white-an'-yellow cat sittin' up on the top of a telephone pole along-side the road."

"By Jingo, that looks like our tomat, Perseus," says Timothy, puzzled-like. "Wonder what"—he stops talkin' all of a sudden, an' I see he's starin' at a big bay horse who is gallopin' round an' round in a circle out behind th' barn, snortin' an' kickin' up his heels like a young colt."

"What in tarnation's got into old Independence ter make him go gallivantin' round like that?" mutters Timothy. "Crickety—what's happened 'round here, anyhow?"

"The lizzie stops alongside the house; an' a

(Continued on Page 22)

"CQ" Commercial Radio

ANNUAL NAB CONVENTION

The eleventh annual convention of the National Association of Broadcasters was held at White Sulphur Springs, W. Va. from October 8 to 11 inclusive.

Judge E. O. Sykes, Chairman of the Federal Radio Commission, addressed the convention.

A president, vice president, treasurer and five directors were elected, to fill the expiring terms.

Officers for the past year handed in their reports, and many subjects were discussed. Chief among the topics of conversation were the copy-right controversy, the N.R.A. and other subjects vitally touching the broadcast field.

The Convention was held at the Greenbrier Hotel, a beautiful spot, in the resort.

Many of the members were well pleased with the general trend, and of course many of them took home with them matters in the way of news and necessity which was not to their satisfaction.

The representatives arrived with many matters on their minds, and left for home with not all of these cleared up to their entire satisfaction.

The hard fight put up at Washington by the radio operators on the N.R.A. code so far as pay and hours were concerned was a distinct surprise to the members of the N.A.B. This was never looked for or expected, and what news the members got was not entirely to their liking for the future in this direction.

The standardization of the business of selling space is a touchy one that came in for much discussion.

More profitable operation seemed to be the paramount subject of discussion. This is a subject that every member seemed most interested in.

As is usual in the Annual Conventions engineering discussions came in for their own. Or, at least, a part of their own.

At least it can be said that all members enjoyed their trip to the fine region of White Sulphur Springs, and had a fine time just when they needed the bracing air that was plentiful both at sessions, as well as outside in the open.



Hotel in which NAB Convention was held, Virginia Hot Springs, W. Va.

October, 1933

WHO IS WHERE

Enrique Gorbea arrived in port ill and immediately left the SS Gatun to be cared for in the hospital. His friends will be pleased to learn that he is thoroughly recovered.

James Hodges, SS El Occidente, is now on a vacation. He is being relieved by B. Tempest.

A. Sopko took out the SS New Orleans. He wishes to thank all his friends who wished him a speedy recovery from his recent illness.

A. Charman sends regards to all his friends. He has been spending several months with his folks near Los Angeles, but expects to be back at the key around the first of the year.

We hear that friend McGrath in "trying his hand" at painting fell and broke his arm. May we suggest, Howard, that you stick to brass pounding, for we fear for your neck, if you try this often? He is now on the Caracas.

And after many months ashore, who is back on the air but our old friend, Michael J. McDonough! Listen for him on the SS Birkenhead.

We are sorry to learn that Orman Sands is ill and now confined to the hospital. A speedy recovery, Orman.

Roy H. Robinson seems to be setting a record for the number of ships he takes out. He is now on the Alaniac, what next, Roy?

Well, J. Bamberg and T. Sirolis, what do you have up your sleeves? The SS Excambion sailed without them this trip, so what?

Albert Darlington has attached himself to the American Importer. Hope you like it, Al.

Move over, you fellows on the beach, and make room for another, Simon Golden wishes to join your ranks.

All of you who frequent the Lynmore will be sorry to learn that Mr. and Mrs. J. De La Hunt have departed. We wish you both all happiness, and we'll be "listening fer you," Del.

Niel Beck isn't feeling so well these days and is seriously considering moving into the Marine Hospital. Hope you have a pleasant stay, Beck.

You who have been inquiring for Ray Meyers should listen for KJAO; it is none other than he.

Herbert Martin is relieving on the SS Commo.

A. W. Nelson (NX), Chief, SS Lurline.

Bert Hagan, 2nd, SS Lurline.

George King (KG), Chief, SS Monterey.

J. Wall (JW), 2nd, SS Pres. Garfield.

L. Snow (LS), trying his hand on freighters after three years on the Malolo.

R. Pyle (RP), SS Maliko.

R. C. Campbell (RC), 2nd, SS Malolo.

F. C. Dixon (DI), Chief, SS Malolo.

O. Johnson (JO), Chief, SS Santa Lucia.

Roy Woods, Chief, SS Santa Ana.

Al. Maisonneuve (BZ), SS Santa Cecilia.

Dave Gibbons (GI), SS Santa Elisa.

C. F. Cagavsky (CC), Frank G. Drum.

W. E. Bowen (WB), NBC San Francisco.

Frank Barron (BF), NBC San Francisco.

Jack Hymes (HY), T. W. A. Burbank, Calif.

C. M. Morrison (CM), T. W. A. Burbank, Calif.

C. C. Cunningham (Cny), T. W. A. Burbank, Calif.

Don Jones (DA), helping hold down the beach.

Walter Summers (WS), T. W. A. Albuquerque, N. M.

(Continued on Page 16)

A PRECISE RADIO-FREQUENCY GENERATOR

By H. J. SCOTT

Member of Technical Staff, Bell Telephone Laboratories

If a quartz plate is vibrating at a frequency of a million cycles per second, and is illuminated by a neon lamp flashing a million-and-one times per second, the surface of the plate can be viewed stroboscopically, and the complex and beautiful pattern of its vibration can be observed as it goes through all its phases. By flashing the neon lamp a million times per second instead of a million-and-one, the shift of the pattern can be arrested and the stationary pattern can be critically examined at leisure.

Such a procedure would be merely pastime if the rotation of the dial controlling the flashing lamp were not accompanied by the assurance that the lamp was really doing what the dial said it was. To give such assurance in this and many less spectacular methods of studying the behavior of quartz plates, a variable high-frequency generator of great accuracy was designed and built in these Laboratories. The principal frequency source is a temperature-controlled, quartz-plate oscillator. Sub-harmonics of this appropriately combined with one another and with the output from an audio-frequency oscillator, as shown in Figures 1 and 2, produce a frequency which can be continuously varied over the range from 400 to 1,200 kilocycles.

In generating 1,135,475 cycles for example, this frequency is considered as the sum of three frequencies: 3,475 cycles, 32,000 cycles, and 1,100,000 cycles, obtainable from the audio-frequency oscillator, the low-frequency generator and the high-frequency generator respectively. The two lower frequencies are combined in modulator A to produce 35,475 cycles, which in turn is combined in modulator B with the higher frequency to produce the required 1,135,475 cycles.

In general, the quartz oscillator supplies 1,000 kilocycles from which sub-harmonic generators derive 100 kilocycles and one kilocycle. The one-kilocycle output controls the low-frequency generating unit, which can produce all the multiples of two kilocycles between twenty-four and fifty kilocycles. The 100-kilocycle output controls the high-frequency generating unit, having an output range from 400 to 1,200 kilocycles in steps of fifty kilocycles. Independent of these is an audio-frequency oscillator. One modulator combines the outputs of this oscillator and the low frequency generator, and another combines the output of the first modulator with the output of the high-frequency generator. Thus it is possible to produce any desired frequency within the range of the apparatus.

The accuracy with which these frequencies can be produced is very high. The frequency

of the audio oscillator can easily be adjusted to within one cycle. Since the frequency of the quartz oscillator can be maintained to within three parts in ten million, the overall accuracy of any single reading is of the order of ± 1.3 parts in a million.

The million-cycle frequency source is similar to that used in the radio-frequency measuring equipment at Holmdel, but incorporates two quartz oscillator units instead of one. The two are adjusted to zero beat at the beginning of

TO BELL LABORATORIES
STANDARD FREQUENCY
SOURCE

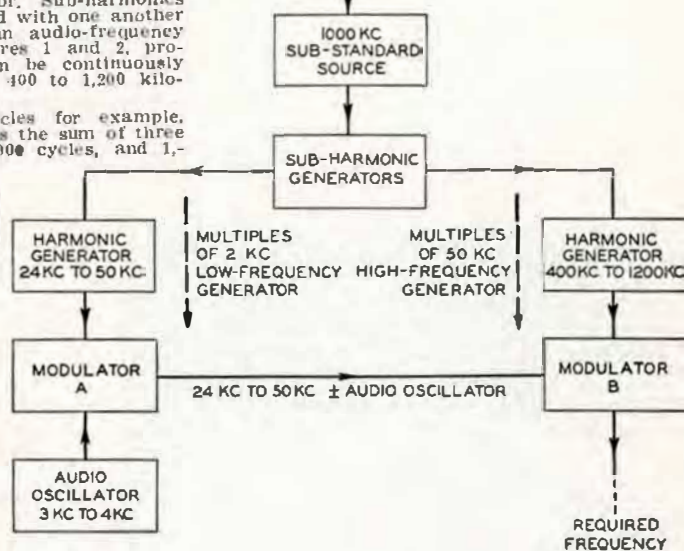


Fig. 1—The major steps in the generation of a desired frequency.

any series of measurements, and a vacuum-tube voltmeter maintains a continual check between them. Thus any slight variation of one or the other is visible immediately. This frequency source is checked daily against the Bell Telephone Laboratories' 100-kilocycle standard, by observing the beat between the fundamental of the oscillator and the tenth harmonic of the standard frequency.

The production of 100 kilocycles and one kilocycle from the million-cycle source is accom-

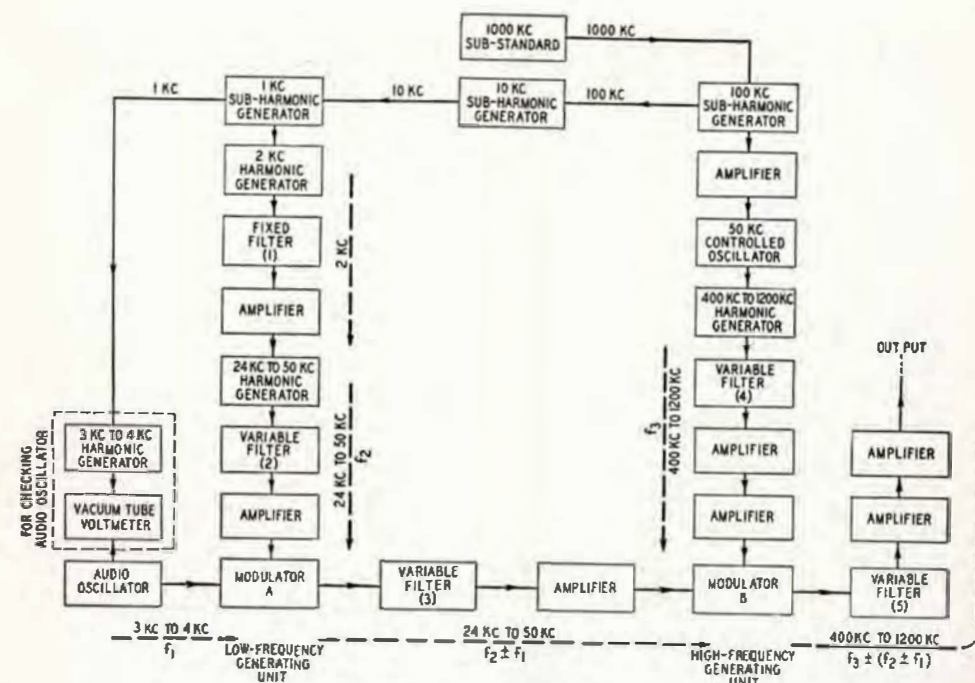


Fig. 2—The complete system of generation.

plished in three steps of 10-to-1 frequency reduction, providing 100, 10 and 1 kilocycles. The sub-harmonic generators are of the "unsymmetrical" type (Figure 3), which may be considered as a two-stage resistance-coupled amplifier, with the output of the last stage feeding into the input of the first. Oscillations are thus produced, the frequency of which is dependent upon the resistance in the grid and plate circuits and the coupling capacities. By making the external plate resistance of one tube much greater than that of the other, one acts as an ordinary amplifier while the other operates over a very wide range of its characteristic and

acts as a control tube. The frequency may then be controlled within certain limits by introducing a voltage whose frequency is any multiple of that of the sub-harmonic generator into the common plate lead.

In the low-frequency generator, the one-kilocycle voltage is impressed on the input of a harmonic generator whose output is passed through a single-frequency filter which passes two kilocycles and attenuates all the remaining harmonics 120 db. The two-kilocycle output is first amplified and then applied to the principal low-frequency harmonic generator which supplies all the integral multiples of two kilocycles.

Since only one such frequency is wanted at any one time, and only those between twenty-four and fifty kilocycles are ever wanted, a variable band-pass filter, operable in this range, is used to select the desired multiple of two kilocycles and attenuate all others 76 db (Figure 4).

This filter is so built that the impedance and the width of the pass band (500 cycles) are approximately constant regardless of the position of the band. It consists of two filter sections of a type in which only the condensers need be varied to vary the position of the pass band.

The high-frequency generator is similar to the low in principle. The 100-kilocycle voltage holds in step a 50-kilocycle oscillator whose output feeds into a harmonic

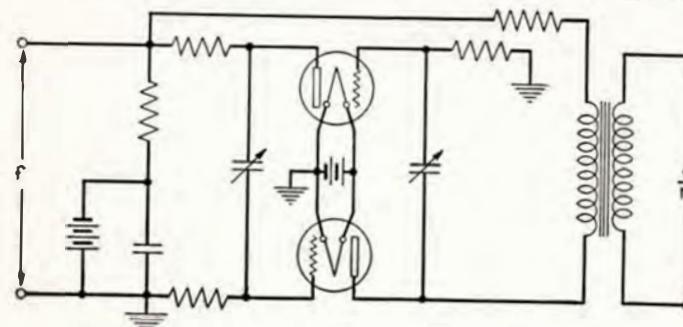


FIG. 3—When the external plate resistance of the upper tube is made much greater than that of the lower, an input of frequency f will accurately control the output at a sub-multiple frequency f/n whose value is approximately determined by the circuit constants.

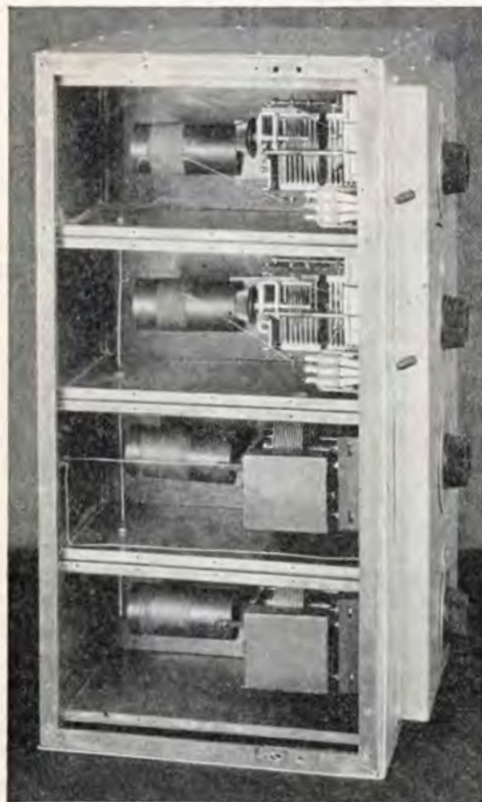


Fig. 4—Variable-frequency band-pass filter, designed and built by the Transmission Apparatus group for use with the radio-frequency generator.

million-cycle frequency source as indicated by zero beat on a vacuum-tube voltmeter. The dial is then turned to four kilocycles, and the reading is similarly checked with 4,000 cycles from the frequency source.

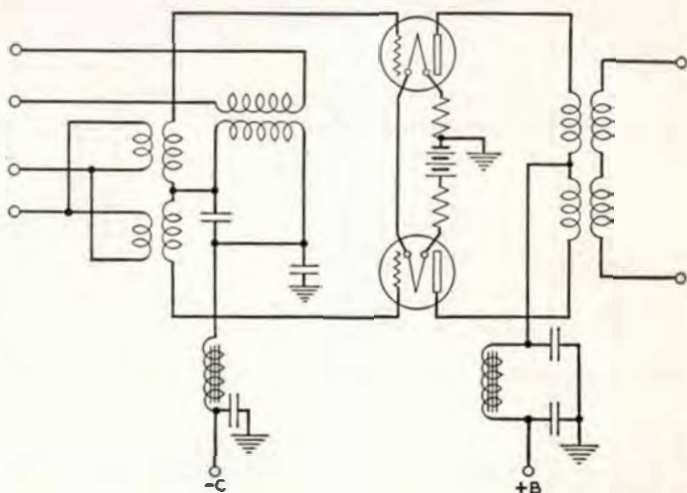
The modified 13-A oscillator consists of two high-frequency oscillating circuits. One circuit generates a frequency of 100 kilocycles and except during preliminary adjustments is held fixed. The other generates a frequency which is variable between 96 and 97 kilocycles.

The outputs of both circuits are impressed on the grid circuit of a balanced modulator in whose plate circuit the modulation products appear. The desired product, whose frequency is the difference between the two oscillator frequencies, is impressed on a two-stage push-pull amplifier. An output transformer, shielded and carefully balanced to ground, reduces the impedance looking backward into the oscillator to between 500 and 600 ohms.

Throughout the 13-A oscillator precautions are embodied to purify the final output. The output of the fixed oscillator passes through a low-pass filter which eliminates harmonics of 100 kilocycles. With these harmonics suppressed, the harmonics in the output of the variable oscillator encounter no frequency in the modulator with which they can combine to produce frequencies less than 100 kilocycles. Acting in conjunction with a shunting condenser, a transformer between modulator and amplifier forms a low pass filter which efficiently reduces the magnitude of fundamental frequencies of the two oscillators and other high-frequency products of modulation before they reach the amplifier. The balanced, or push-pull, design of the amplifier balances out the second harmonic inherently generated in each amplifier tube, and thus keeps the percentage of harmonics in the output of the oscillator as a whole at a minimum.

The frequency from this oscillator, and the frequency selected by the filter from the low-frequency generator, are applied to the input circuit of modulator A (Figure 5). Since the output contains sum and difference frequencies

(Continued on Page 30)



generator producing all the integral multiples of 50 kilocycles. As before, a variable band-pass filter is adjusted to select the particular multiple desired between 400 and 1,200 kilocycles and attenuate the others 76 db. Except for its range and the width of its pass band (3,000 cycles), this filter is closely similar to the other.

The audio frequency oscillator is of the Western Electric 13-A type which has been slightly modified so that, instead of operating between 20 and 3,500 cycles, it operates between three and four kilocycles, and this range is spread out over the whole scale of the variable condenser. To check the frequency of the output, the dial is set to three kilocycles, and the fixed oscillator is adjusted until the three-kilocycle output coincides with 3,000 cycles derived from the

Fig. 5—The modulators are of the familiar balanced type.

“CQ” Commercial Radio

SIMPLIFIED TYPE DIRECTION FINDER FOR AIRPLANES

RECENT flight tests of an improved type of airplane radio direction finder developed by the Research Division of the Aeronautics Branch have shown the complete practicability of the device. The earlier model has been considerably improved by tuning the loop antenna and by combining the input and output units into one. The direction finder uses visual rather than aural indication and has no moving parts except the rotatable loop antenna. Positive visual indication right and left of course is given as well as direction sense (i.e., freedom from 180° ambiguity), without special manipulation by the pilot. The characteristics of the incoming signals are not destroyed by the electrical switching arrangement employed, thereby permitting

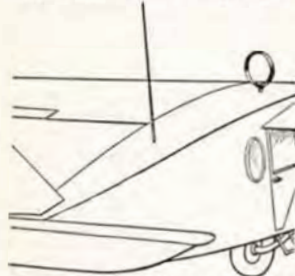


Figure A.—Diagram of installation of the radio direction finder's loop antenna.

simultaneous utilization of the incoming signals for messages as well as for direction determination. There is no distortion of the course indication at any volume level (including complete overloading of the radio receiver).

This direction finder operates on any received station and uses any receiving set, which may be the regular receiving set already carried by the airplane. It is only necessary to supply a small loop antenna and a compact converter unit.

An interesting feature of the direction finder is its operation under conditions of bad atmospherics (static) and ignition interference. When on-course signals are received, there is little effect, and when off-course signals are received, any change in the indication tends toward an on-course indication. No violent kicking of the course indicator occurs.

PURPOSE OF DEVELOPMENT

The development of this direction finder was begun in recognition of the need for providing directional guidance for civil aircraft not flying the regular airways (along which radio-beacon service is available).

Other agencies also have studied the problem and have radio direction finders under development. Distinctive and advantageous characteristics of the device developed by the Research Division of the Aeronautics Branch are as follows:

- (1) Only a single loop antenna is required.
- (2) The portion of the circuit required for securing direction is very simple and may be readily added to available aircraft receiving sets. The unit to be added weighs about six pounds. Its operation does not depend upon the balance amplification of tubes nor upon the maintenance of a particular wave form.

(3) Particular attention was given to its design to permit simultaneous use of the incoming signal for messages as well as for direction indication.

The direction finder was installed and tested on an airplane at the College Park, Md., experimental field. A diagram of the installation of the loop antenna on the airplane is given in figure A. Test flights were made between Washington and Baltimore, observing on the broadcasting stations of those two cities. In these test flights the direction finder was used as a homing device. The operation of the direction finder was entirely satisfactory, indications right and left of the heading of the aircraft being very steady and definite. On passing over the stations toward which the flights were made, positive localizing action was given by the reversal of the action of the course indicator. The pilot experienced no difficulty either in accurately following the indications of course, or in locating the transmitting stations, although the

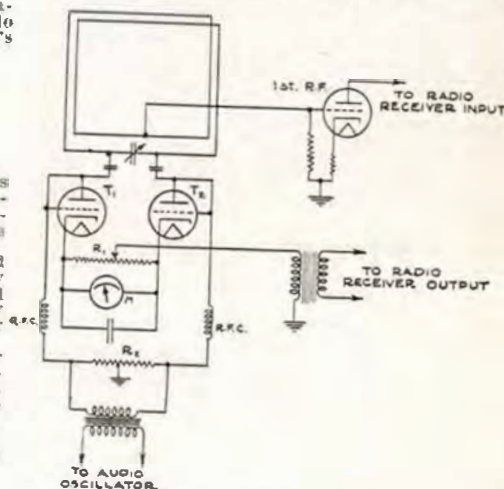


Figure B.—Electrical circuit arrangement for the radio direction finder.

locations of the stations toward which the flights were made were unknown to him. At normal volumes a 10° variation of heading right or left, produced full-scale readings right or left on the course indicator; this variation can be readily increased or decreased as desired.

CIRCUIT ARRANGEMENT

The electrical circuit arrangement is given in figure B. The direction finder depends for its operation upon the production of 2 modified figure-of-eight patterns from 1 loop antenna. For a given position of the loop antenna with respect to an incoming radio wave a zero-center course indicator is made to deflect to the right in proportion to one field pattern and to the left in proportion to the other field pattern. The method of accomplishing this follows:

The field pattern of the loop antenna is both modified and reversed by rectifier tubes T_1 and T_2 which are operated alternately. Equal alternating voltages opposite in phase are applied to the plates of these rectifiers by an audio oscillator. When one of the rectifiers passes current, its resistance is low, and the loop antenna is effectively grounded at that end. When the other rectifier passes current, the loop antenna is effectively grounded at the other end. The loop antenna is tuned, and the antenna effect, due to the unsymmetrical ground, is made largely aperiodic by the resistance of the rectifiers. Thus two field patterns are produced, of the general type shown in figure C. The voltage developed in the loop antenna by an incoming radio wave is applied to the grid of a radio-frequency amplifier, the output of which is applied to the input of a radio receiver.

The zero-center course-indicating meter is connected across a resistor having a variable center tap, and between the cathodes of the rectifier tubes. The center tap of the resistor furnishes the ground return for the rectifier tubes through the secondary of an audio output transformer.

DIRECTION OF CURRENT

From figure B it will be seen that the currents at T_1 and T_2 produced by the voltage of the audio oscillator pass through the course indicator in opposite directions. Since the voltage of the audio oscillator is applied equally to these rectifiers, the currents are equal, and the course indicator reads zero. Remembering that when T_1 passes current one loop antenna field pattern is produced and current passes through the course indicator in one direction, and when T_2 passes current another field pattern is produced, and current passes through the course indicator in the other direction, consider the effect of an incoming radio wave. When the loop antenna is grounded at one end, the signal at the output of the radio receiver is proportional to the field pattern for that condition, and the current through the course indicator is proportional to the voltage of the audio oscillator and the output signal voltage. When the loop anten-

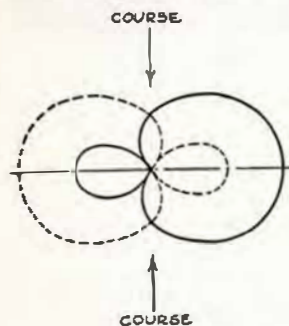


Figure C.—Field patterns are equal at two points.

na is grounded at the other end, similar conditions hold, but there is a reversal of current in the course indicator. Since the currents through the course indicator due to the audio oscillator voltage are equal and opposite, they cancel. Currents deflecting the course indicator right and left are then directly proportional to the difference between the signals due to each field pattern. This gives zero-center indication of the heading of the aircraft.

Figure C shows that at two points the field patterns are equal. These two points are at right angles to the plane of the loop antenna and are 180° apart. It can be shown that the action of the course indicator for one course is the reverse of its action for the other course, giving automatic direction "sense."

BOSTON VESSEL ASSIGNMENTS

VESSEL	OPERATOR
Trawler	
Dartmouth	Joseph Doyle
Cornell	Tim Collins
Amherst	C. Muldoon
Harvard	Richard Golden
Holy Cross	J. Dollorf
Georgetown	C. W. Lundquist
Boston College	Richard Blake
Notre Dame	Bartlett Bibby
Fordham	Arthur Cormier
Breeze	Robert Miller
Billow	J. Regan
Ebb	H. B. Whipple
Flow	Harding E. Hull
Foam	William Doyle
Ocean	R. R. Downing
Saturn	Frank O. Goodwin
Spray	C. Hemingway
Wave	J. Lehan
Whitecap	T. O. Spank
Cormorant	Fred E. Zahn
Fabia	Ralph Pizzano
Wm. J. O'Brien	Carleton Coleman
Winthrop	George Steele
Quincy	Henry McCallis
Dorchester	George Ashenden
Newton	J. Palmer
Brookline	Philip Rowe
Cambridge	J. Donahue
Heckla	Nicholas Tucci
Maine	Chester MacDonald
Illinois	H. Stanley (relief)
Yankee	J. H. Simpson
SS Boston	S. Elliott and Wm. Reid
SS New York	H. J. Munroe and C. W. Saunders
SS Acadia	K. B. Mooers and R. T. Hemmils
SS St. John	Edgar U. Stewart and C. W. Marsh
SS Yarmouth	G. Travis and E. H. Vatcher
SS Evangeline	Robert Philbrook and Edmund Drozek
SS Camden	J. Sabrant
SS Belfast	Louis Pinkerton
SS Lemuel Burrows	A. Livsey
SS Lewis K. Thurlow	O. Bottelsen
SS Swalls Point	Ralph O'Brien
SS Wm. N. Page	Walter B. Driscoll
SS Welhart	Louis Salamone
SS Berwindgen	A. W. Haskins
SS Berwindvale	Harold Worthley
SS Black Point	E. S. Pitman
SS Middlesex	R. E. Smith
SS Coastwise	G. W. Noid
SS Plymouth	Theron Copeland
SS Severance	W. R. Pickard
SS Hampden	R. Chislett
Yacht Vanda	Charles F. Murray

WHO IS WHERE

(Continued from Page 11)

O. Pope (BX), T. W. A. Kansas City, Mo.
 Art Semrau (SM), T. W. A. Wichita, Kans.
 (and is he homesick).
 Melvin Ellison, Dept. Commerce, Elko, Nev.
 Nick Loewen (NL), Dept. Commerce, Tucson, Ariz.
 Ted Kelso (TK), T. W. A. Amarillo, Texas.
 Midkiff (HM), T. W. A. Kingman, Ariz.

"CQ" Commercial Radio

OPERATOR LICENSES

(Continued from Page 5)

(2) Radiotelephone Second Class

"The holder of this license has also qualified for the radiotelephone second class license and the additional privileges authorized under this class license are hereby granted.

Examining Officer"

(3) Radiotelephone Third Class

"The holder of this license has also qualified for the radiotelephone third class license and the additional privileges authorized under this class license are hereby granted.

Examining Officer"

Where the holder of a radiotelephone license subsequently qualifies for a radiotelegraph license, the radiotelephone license shall be cancelled and a radiotelegraph license issued endorsed for the proper class of radiotelegraph license.

435. It is not mandatory for the holder of a radiotelegraph second class license to have his license endorsed by the Commission to authorize him to act as chief operator on a vessel of the second class; the service record on the reverse side of the license, when attesting to six months or more satisfactory service on board a ship and certified by the operator's employer, will suffice.

However, upon renewal it becomes desirable for the renewal license to indicate in some manner that the holder is entitled to act as chief operator on a vessel of the second class (if he is so entitled because of service gained under his previous license), since this information would not otherwise be readily available. Therefore, such renewal radiotelegraph second class licenses shall have inserted in the space provided on the license form after "Special Endorsement," the following endorsement:

"Authority is granted the holder of this license to act as chief operator in a ship station of the second class.

Date Examining Officer"

The holder of a radiotelephone third class license engaged in operating aircraft radio equipment may, upon passing a code test in transmission and reception at a speed of not less than 15 words per minute in the Continental Morse Code, plain language (5 characters to the word), be granted the following code proficiency endorsement:

"The holder of this license has passed a code test at the required speed of fifteen words per minute and is also authorized to operate licensed aircraft radiotelegraph stations.

Date Examining Officer"

When licenses are endorsed for an additional class of license, both classes shall expire three years after the date of issuance of the main document on which the endorsement is entered. Therefore, both the main license and the class shown in the endorsement will run concurrently and expire at the same time without regard to the date of the endorsement.

If an applicant should qualify for additional privileges within six months of the expiration of the license sought to be endorsed, the old license shall be cancelled and a new license issued for both classes so as to expire three years from the date of issuance of said joint license; provided, however, if the old license sought to be endorsed has more than sixty days to run before expiration and does not fulfil the service requirements of Rule 439 (service requirements suspended until January 1, 1935) the applicant shall elect as to whether he desires

(1) the old license endorsed, in which case both the old and the new classes will remain valid only for the duration of the old license.

(2) to have the old license cancelled and a new license document issued for the full three year term for the new class only, or

(3) to take the examination for the old class license as a substitute for the required service.

439. The following rules governing the renewal of operator licenses are hereby suspended until January 1, 1935, in so far as service, employment, or examination is a condition precedent to obtaining renewal of an expiring license.

(1) **Commercial Operator Extra First Class:** These licenses may be renewed without examination provided the service record shows 12 months' satisfactory service at licensed radio stations, at least six months of which must have been during the 12 month period prior to the date the application for renewal of license is due to be filed.

Provided further that the holder of these licenses employed as radio inspectors, radio instructors, or in similar occupations requiring exceptional qualifications, where the duties and the telegraph codes, may be renewed or otherwise using commercial radio apparatus and such employment has covered a period of two years out of the three-year license period. Where the applicant has not regularly used the telegraph codes, he will be given the code examination as for an original license, and if he has used only one code, he will be examined in the code not used.

(2) Other licenses, except amateur, may be renewed without examination, provided (a) the applicant has had ninety days satisfactory service during the six month period prior to the date the application for renewal of license is due to be filed, namely, sixty days prior to the expiration date, or

(b) the applicant has had at least twelve months satisfactory service during the license term prior to the date the application for renewal of license is due to be filed.

(3) No credit will be allowed for service unless it appears that such service was obtained under conditions that required the employment of a licensed operator.

(4) Holders of radiotelegraph licenses endorsed for operation of radiotelephone stations whose service has been wholly at radiotelephone stations will be required to pass the code

(Continued on Page 32)

USES OF TRANSMISSIONS OF

PART 2. CHECKING BROADCAST FREQUENCY STANDARDS

(Continued from September Issue)

A. Integral Sub-multiples of 5000 kc.

The frequencies which are integral sub-multiples of 5000 kc. are most easily measured. There are only two broadcast frequencies, 1000 and 1250 kc, which bear this relation. The fifth harmonic of 1000 kc is 5000 kc. If a 1000-kc oscillator, whether a transmitting set or frequency standard, is coupled to a radio receiver tuned to 5000 kc at a time when the standard signal is being received, a heterodyne note will be produced which is equal to the frequency difference between the 5th harmonic of the 1000-kc oscillator and the standard signal. Assuming that the nominal value of the 1000-kc oscillator is known, all that remains in order to measure the frequency accurately, is to determine the frequency of the beat note and whether the frequency is higher or lower than the standard signal. This is done when the radio receiver is not in the generating condition. The most convenient method, if the beat note is in the audible range, is to match it with a known audio frequency produced by a calibrated audio-frequency oscillator. The direction of the deviation is most easily determined by making a slight change of known direction in the unknown frequency. If an increase in the unknown frequency increases the audio-frequency beat note the frequency is high. If an increase in the unknown frequency decreases the audio-frequency beat note, the frequency is low. Conversely, if a decrease in the unknown frequency

See reference (69), part 3.

increases the audio-frequency beat note the frequency is low, and if a decrease in the unknown frequency decreases the audio-frequency beat note, the frequency is high. If the audio frequency to be measured is between 5 and 200 cycles per second, the audio-frequency arrangement described in a previous Bureau publication by N. P. Case can be used with a very high degree of accuracy. If the audio frequency is still lower and goes below the range of the audio-frequency amplifier, it is necessary to provide a carrier for this audio-frequency note. This is done by making the radio receiver generate and adjusting the resulting beat note so that it is approximately 1000 cycles per second. A fluctuation in the amplitude of this 1000-cycle note, which has a frequency equal to the frequency difference between the two radio frequencies, will then be heard. If it is only desired to readjust the unknown frequency to agreement with the standard signal, it is a simple matter to adjust to zero beat. The same method can be used for a frequency of 1250 kc. Precaution must be taken to make it possible to combine the signals with approximately equal intensity. Some difficulty in this respect may be expected if measurements are made when the transmitter is operating unless the harmonics are very completely suppressed.

A station frequency monitor which utilizes a piezo oscillator having a frequency of 1000 or 1250 kc can be measured or adjusted to frequency in a similar manner. If the radio transmitter is operating, the measurement can be made indirectly in terms of the transmitter in the following manner. Measure the frequency of the radio transmitter in terms of the 5000-kc

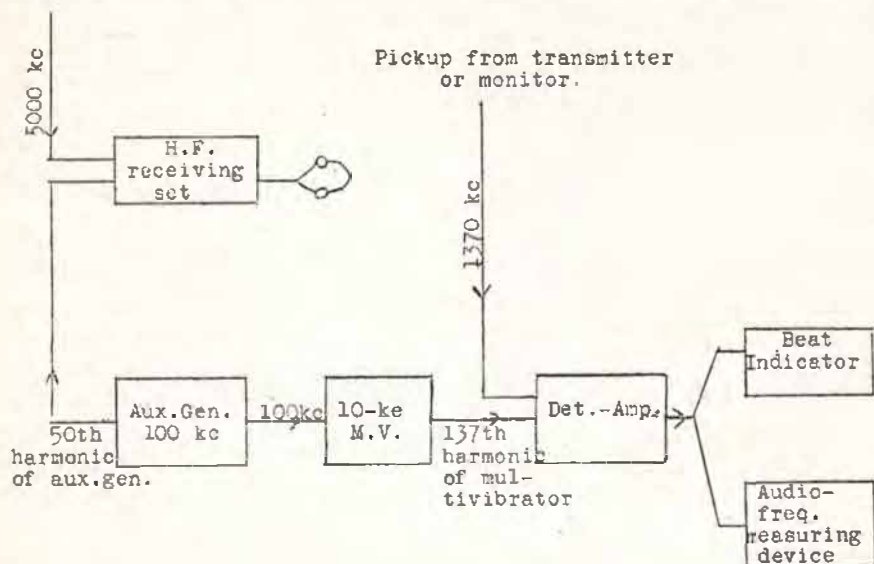


Figure 4

"CQ" Commercial Radio

STANDARD RADIO FREQUENCIES

signal and simultaneously read the frequency as indicated by the frequency deviation meter on the monitor. The two frequencies should agree. If they do not, adjust the frequency monitor until the deviation meter indicates the correct frequency deviation. It may be desirable to measure the frequency monitor directly against the standard signal at a time when the radio transmitter is not operating. If the frequency monitor is of the type which is adjusted to exactly 1000 or 1250 kc, the measurement can be made the same as in the case of the radio transmitter. However, if the monitor is set high or low by 500 or 1000 cycles, it will be necessary to make use of an audio-frequency oscillator to determine the value of the audio beat frequency. In the case of a monitor which has a frequency of 999,500 or 1000,500 kc, the beat note to be measured would be 2500 cycles per second. As five cycles variation in the beat note is only 1 part in 10, any audio-frequency oscillator which would be constant to 5 or 10 cycles per second would be adequate. In the case of a monitor which has a frequency of 999,000 or 1001,000 kc a 5000-cycle note would be produced. Similarly for 1250 kc, audio frequency beat notes of 2000 and 4000 cycles per second would have to be measured. The general relation is that the audio-frequency note produced by heterodyning the monitor frequency and the 5000-kc standard signal is equal to the product of the number of cycles the monitor is set high or low and the ratio of 5000 to the nominal value of the monitor.

B. Measurements with Auxiliary Generator for Frequency Multiples of 50

Measurements of any of these frequencies require the use of an auxiliary generator in addition to the high-frequency receiver. The auxiliary generator may be a piezo oscillator or it may be a manually controlled oscillator. If a piezo oscillator of the desired frequency is available, it is desirable to use one. In this case a distorting amplifier is necessary in order to bring out the harmonics so that the beat against the 5000-kc standard signal can be easily heard. This piezo oscillator should be provided with a vernier frequency adjustment so that it can be readily adjusted to agreement with the 5000-kc standard in the manner previously described. After this is done the monitor or radio transmitter can be measured in terms of harmonics of the auxiliary generator. If a manually controlled generator is used, the L/C

ratio must be low so that the frequency can be easily adjusted to zero beat with the standard frequency, and readily held on that frequency.

There are two main factors which determine the frequency to which the auxiliary generator

should be adjusted. The first is that its frequency must have an integral relationship with the standard frequency and the frequency to be measured. The second is that the harmonic which is heterodyned with the standard frequency must be of sufficient intensity to produce a beat note which is easily recognized. Taking both factors into account the best result is attained if the frequency of the auxiliary generator is the highest common factor of the standard frequency and the frequency to be measured. There is one other consideration in the case of a manually controlled auxiliary generator and that is, the lower its frequency, the less trouble is experienced in holding it at zero beat against the standard frequency. The following table indicates the broadcast frequencies which can be measured in terms of the 5000-kc standard frequency transmission by means of a high-frequency radio receiver and an auxiliary generator. It will be understood that the table gives all broadcast frequencies which are multiples of 50, but does not indicate more than one generator frequency for these frequencies except for 1000 and 1500 kc.

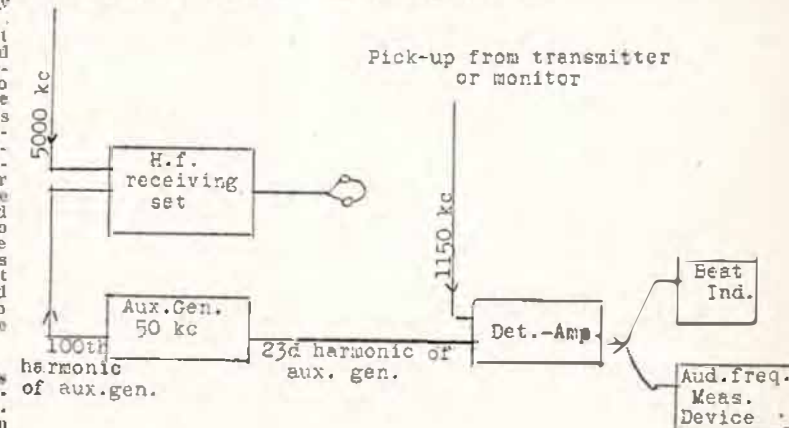


Figure 5

Frequency of Auxiliary Generator

500 kc	200 kc	100 kc	50 kc
1000	600	700	550
1500	800	900	650
	1000	1100	750
	1200	1300	850
	1400	1500	950
			1050
			1150
			1250
			1350
			1450

As an example of this method of measurement, assume the frequency of the radio transmitter to be 1150 kc. The radio receiver, in the generating condition, is tuned until the 500 kc standard frequency signal is heard. The auxiliary generator, set on approximately 50 kc, is then turned on and the frequency varied until a second audio frequency is heard on the out-

(Continued on Page 32)



BROADCAST STATION NEWS

Charles G. Myers, of WCOD has a hobby that pays money. He is known all around Harrisburg for the transmitting sets he designs for paying customers.

B. E. Stahl, ex-Navy is Station Engineer at WRC. He fills in spare time as Naval Reserve Ensign.

Bilj Ranft, old time Marconi, is Chief Engineer at WFBR. He was formerly with WMH, but has been in present post for six years now.

Jim Schultz is having fierce fun at WCAO. "Just getting the boys together," at Baltimore. He expects 100 percent of all Baltimore stations on their little get togethers.

S. E. Newman reveals that he was the original "Scotch Band" transmitter designer. Any of you old time ship men remember it in Wire-less Age. Hi!

C. P. Holloway at WFBR was formerly on the Great Lakes. Before that he was in the Far East. That shows how he has worked up, from the lowly regions.

Arthur Poorman, who spends his time grinding crystals, is in charge of Pennsylvania State Police transmitter at Harrisburg, WBAK and WBA. Private Hoffman ably assists him in this.

Clyde J. White, who is a former army radio man, is now Assistant Engineer at WGN.

Paul Le Van, of WHP is a short wave "bug," and has lots of company in his hobby these days.

T. R. Schreyer is Assistant Engineer for the NBC Chicago station, and of course, as popular as all NBC men with the other operators.

Aug. Sadlon is the baby of the KDKA family.

W. Etter is Transmitting Engineer at WIND. The transmitter by the way is over at Gay Mill, Miller, Ind.

Pat Wyman, former marine operator in the China field, is control man at WJJD.

George Severs is putting in time at WCAE and has a reputation of being a fine fellow.

George W. Lang is at the Elgin, Ill., transmitter of WGN. Keeping him company on the transmitter job are Everett E. Blackman, James Turner, and Clarence Matheny.

Martin Jones of WCAO spends a lot of time going to Virginia in his red roadster. Wonder why?

D. W. Lewis, old time United Fruit man, and present beer guzzler is at WRC.

Ed. Stover at the transmitter of WFBR is an old Gulf Dist. ship man. Gave up the idea of being a tug skipper when he left Sabine line, but may write a book some day.

Jack Fricker of WCAO is going in for photography in a big way. Sick of ham stuff says Jack.

Herbert Irving has more than five years at KDKA.

William Wolfe is Chief Op. at WHP, and spends a great deal of his time working up two sustaining programs for Columbia. Speech inputs equipment is his specialty.

Carl J. Myers is Chief Engineer of WGN, and what a time he has between the transmitter at Elgin, the Drake Hotel where control is, and his office in the Tribune Building further down town.

Tod Sloan is on control at KDKA. It's just one thing after another as far as Tod is concerned.

C. F. (Rango) Rothery at WRC is an old Navy man, and carries the tradition of the Navy with the ladies.

Harold Reed, WOL man, found radio work more attractive than running his own electric shop.

H. A. Wadsworth, Station Engineer at WMAL, set up and designed the entire equipment of the station. Good work Waddy, old boy.

Bob Brockway now with Columbia at Chicago says he is writing a good story for our book. Bob was formerly with WKBF. Come on, Bob send it in, we can't wait.

Teddie Belote of WMAL is a former Jenkins Television boy. Broadcasting looks better just nows says Teddie.

Ted Ostenkamp formerly at Lynchburg, Va., and later WTAR Norfolk, is announcer and program director at WOL. Amalgamated looks good says Ted.

Eddie Burg of WMAL old time ship man just bought a house and is settling down with speed.

Clyde Reed, ex A. T. & T. man, is occupying a berth at KDKA.

Wendell Guenther is settled with WJJD. He was formerly with WIND, which gives him the nick-name "Windy."

W. A. Parks of WMAL has a new fish story every day. He spends his spare time raising fish, so he gets them first handed.

John Mark of WOL is one boy that is sure of his job. He is the boss's son, and that's security de toto.

Here is a peach from the Chicago Columbia outlet. Dick Hallett just got back from a Boston honeymoon, and his better half is sister to the wife of Lee Hon. Is that a Hon and Dearie? What say, Lee, put that in your pipe and smoke it.

Here is a travelogue John Gantt, now at WOL was formerly with WZO, KOVR, KDBB, WREI, WXB, Western Union, Postal Telegraph, et al.

Charles Bickerton is the veteran of KDKA. As far as anyone remembers he has been with the station since it first opened and KDKA is the pioneer station you know.

Donald King now with WJJD was formerly a KYW boy.

Charles Fischer former United Fruit ship man now with WMAL is setting the pace for the boys in being the station champ in moral ethics. Stick to it, Charles, it will only be a hundred years or so.

E. L. Landon has only been with KDKA about eleven years. That's all.

Bernard T. Marshall spends his outside time servicing sets, when he is not busy, and can he tell of good old 3XAN. He is Chief Op for Pennsylvania National Guard now and has a 1st prize to show it. In between times he still gets a look in at WCOD.

Charlie Shearer of WHP also does a little something in the way of servicing sets on the outside.

Robert L. Sibold, John M. Pearce, Eddie Carstens, Marshall Jewell and Freeman Hurd are the boys at the Drake Hotel that keep WGN doing its stuff.



CORRESPONDENCE SECTION

Gentlemen:

On September 20, 1933, an organization of Radio Broadcast Technicians was formed in the State of California. It is named the Association of Radio Broadcast Technicians (A. R. B. T.), Northern California Chapter. The Southern California Chapter is within that territory south of Bakersfield, Calif.

The organization is at present under a Temporary Charter from the A. F. O. L. with the intention of later affiliation with the I. B. E. W. or the I. A. T. S. E.

The wish of the majority of the ARBT membership is that we withhold affiliation with the IBEW or IATSE until such time as the A. F. O. L. in session on October 2nd., renders a decision as to which of these two organizations should have jurisdiction over Radio Broadcast Technicians.

A National Radio Network has approached some of its Technical Employees with the suggestion that it would be much more receptive to an Association within the Company. A poll of the employees of this company who are members of the ARBT, indicates that they place little value on the bargaining power of an Employees Association in future years when the NRA is no longer felt necessary in its present form. This National Network states that its Technical Employees in New York and Chicago are 100 percent signed up and committed to exclusive membership in their Employees Association.

We, the ARBT, are desirous of learning the type and extent of organization in other sections of the country with a view to shaping our course of future action on a parallel with other units of Technical Radiomen.

Very truly yours,

ASSOCIATION OF RADIO BROADCAST
TECHNICIANS.

(Northern California Chapter)
1819 Jackson St.
San Francisco, Calif.

Dear Editor:

Last night, Thursday, September 14th, a meeting was held at the offices of the United Licensed Officers Association, 15 Whitehall Street, for the purpose of adopting a "code" under the NRA, suitable to all licensed officers on board ships in the American Merchant Marine.

As a licensed Radio Operator with years' experience, but unemployed at present, I attended this meeting with the anticipation of learning what was being done towards improving

conditions in our field, and what a shock I received!

The representation was mostly engineers, deck officers, mates and other ship officers from various departments, but NO RADIO OPERATORS represented exclusive of myself and another operator.

Inspirational talks were given by a number of fine speakers, their ideas and ideals were absolutely in accordance with those of every working man . . . better working conditions, higher wages, recognition of the union and shorter hours . . . just the things we, as Radio Operators have been fighting for for years and yet, here was a golden opportunity to incorporate in the "code" all the things we've been wanting . . . if all other officers can get together why not the Radio Operators?

Not only that, but no doubt because of the lack of representation, the president of the organization remarked that they, in their by-laws etc. of the union, agreed to include all officers except Wireless Operators, Doctors and other "pests!" Imagine, we Radio Operators are "pests!" . . . and since when have we lost our status of "Officers"? And if we have lost the respect of the captains, mates and engineers, for what reason, and why?

Taking this entire situation by and large, I have come to the conclusion that the MAJORITY of employed operators are afraid . . . they're being bull-dozed by the operating companies and by the ship owners and they haven't the "guts" to come out and speak for themselves like the others have done and are doing!

To prove this, I have spoken to a number of operators, not those on the "beach" but those with jobs. They seemed to agree unanimously that they had "good" jobs, were being treated well by the ship company and that there were damn few jobs ashore equal to theirs.

Now I know for a fact, and I believe the records will substantiate my statements, that the Radio Operators as a whole, and by that I mean at least 95% of them are of a more intelligent class than most of the other employees on the ship with the possible exception of the captain and chief engineer.

They weren't born with that knowledge of the profession, no, they spent good money, sometimes deprived themselves of food and clothing to get the money to pay tuition at some radio school with the goal in view of a fine, clean job as Radio Operator!!

And yet today they will go out and accept a pay that not even a dumb, uneducated, illiterate boiler maker would accept! \$45, \$50 and \$60 a month for a ship's officer . . . 12 to 14 hours a day . . . seven days a week . . . stinky food . . . lousy bunks and yet that's supposed to be a "good" job!

If any language seems a bit too strong, believe me, it is not because I am trying to be "wise" but rather it is because as an ex-operator and one with principle I sincerely believe that the profession needs to be aroused NOW . . . not a week from now but RIGHT NOW!

The shippers present their code in Washington by October 1st . . . they will try to slip over as low a scale as they can possibly think of, and if we, the Radio Operators of this country, and more particularly of this city, the greatest harbor in the world, allow the ship owners to put it over on us we're lost.

In closing, I wish to thank the CQ Magazine for its gallant fight for better conditions for our profession, hoping that nothing will dismay its editors from expressing their frank and unbiased opinion of conditions existing and further hoping that there will be a representative down in Washington to protest when the ship owners present their code.

If I can be of any service, in fostering this movement, please do not hesitate in calling on me, and I remain,

F. D. S.

A SOFT GRAFT

(Continued from Page 10)

motherly-lookin' old missis, with good ample beam, breezes out to meet us.

"My land, it's about time you was gettin' home!" she says, mighty relieved, after she'd smacked old Timothy, an' I'd been introduced as a city-weary side-kicker of Cousin Cornelius; 'that girl Margy an' her wireless is jist got me worried clear to death. Three days ago some-body took that awful groundwire of hern off the pump again, an' Perseus got hisself tangled up in it, an' it burnt most all his fur off! He runned up the telegraph pole out on the road, an' he's bin up there ever since. Then this mornin' one of her antenner wires broke an' fell down on old Independence, an' now he thinks he's a merry-go-round or a jumpin'-jack, heaven knows which. Nother part of the wire hit poor Jerry Mooly, who was sleepin' out in the sun, bein' it was Sunday, an' he skeddaddled under the cow-barn an' won't come out no more. I even offered him a lemon-custard pie; but he won't budge. He says he's kilt."

"Bout time ter do sumthin', by gum!" Timothy mutters under his breath, lookin' at me.

"Just then I hears a laugh an' a patter, an' about five foot four inches of smiles an' curls comes skippin' up an' throws her pretty arms around old Timothy's neck.

"Oh, I'm so glad you're back, Pa—did you bring my new audions?" she gurgles smackin' him first on one cheek an' then on the other. She was a mixture of sweetness an' mischief all through; she showed it in her black eyes an' her thick heavy curls—a little sweetie, an' a little devil. No wonder old Timothy didn't smash up her wireless—how could he with a girl like that?

"When she gets through huggin' him, he introduces me; an' before I know what's comin' off, she puts her arms around my neck an' goes through the same performance as she had with Timothy. I begins to think maybe I haven't landed such a bad job after all—an' I feels sure I haven't when we have supper—roast duck an' jellies an' layer-cake, an' all the rest. It made me feel sad to think of all th' raw fish an' burnt cow-hide I'd eat in my time on ship-board, when there was grub like this in the world."

"After supper Margy drags me off to the wood-shed to see her wireless outfit. She had the gear for a first-class one-kilowatt set, but it was all lashed together in a tangle of wires like a pile of boulders overgrown with ivy. The shed was littered up with pieces of telephones, an' clocks, an' phonographs, an' tools scattered all over—a regular dump.

"Of course I'm s'posed to know nothin' about wireless; so Margy hands me a spiel that for humpin' an' hot-air would make the worst stuff I ever slipped to green steamer-passengers sound about as original an' clever as the jokes a ten-cent variety-show actor hands out to the crowd on a rainy Monday night.

"I've been reading some stories about a wireless operator by the name of Samuel Jones," she tells me, pickin' up a familiar-lookin' magazine. "He's jist the awfulest boob, and he does the craziest things. You ought to read about him."

"I politely declines.

"Pa says my poor Eusebius boy is a dunder-head," she remarks with a sigh; "but he's smart as a whip compared to this silly Samuel Jones that puts his stories in the magazines."

"Durin' the next few days Margy keeps me pretty busy. First she takes me around to be exhibited to all th' neighbors; then she drags me off in the lizzie to a Sunday-school picnic; next I have to go out an' pick black-berries with her—an' while I got all scratched up on

brriers an' bit up by ants, I stood for it jist the same, because I figured that she had to have some one to take her mind off that donkey of a Eusebius, an' I might as well be the goat as anybody.

"For the first week, I didn't try to tamper with her wireless set; but one night when she is moneyin' around in the wood-shed, I reads on the spark-gap a kind of a half-coded spoony message, which I figures must be for that confounded clodhopper, Eusebius; an' right then I resolves it's time for action. Of course I wasn't jealous or anything—an' you don't need to smile that way neither—I had to do what old Timothy had hired me for.

"Pretty well after midnight, that same night, when everybody was asleep, I puts on my clothes; then slips downstairs, an' out into the yard. It was a queer night, even for Kansas. A strong dry wind was sweepin' in from the south, swishin' through the sycamore trees around the house; an' the low barns an' the fields were splashed with flyin' streaks of pale moonlight, for the sky was full of rollin' clouds, through which the moon was scootin' like she was scared somethin' was after her. It was one of them nights like you read about in a story-book, when there's goin' to be a murder."

"In th' wood-shed, it was pitchy dark. Th' first thing inside the door, I steps on Perseus, the family cat, who lets out a yowl that makes me jump half out of my shirt. Somehow I have a hunch that somethin' is wrong. Fumblin' around in th' dark, I can't see nothin'; but I feel as if there is some darned thing slinkin' around in th' wood-shed that doesn't belong there. Every time the wind moans outside it makes me shiver, an' I get so nervous an' jumpy that I begin to wonder if all th' fine grub I've been stuffin' myself on has give me a sleep-walkin' nightmare, my system not bein' used to anything richer than moldy sea-bread an' soggy spuds; so I pinches myself hard to make sure I'm awake, which I am.

"Havin' brought some matches with me, I was about to strike one; but jist then I hears a cicky rasping noise, and right after that a groan—a gaspin, horrible groan like somebody scapped an' bleedin' to death—right at my feet! Froze stiff as a icicle an' my hair standin' on end, I holds my breath an' hugs myself, wishin' to heaven I could remember where th' blasted door was—which I couldn't.

"Finally I manage to get up against the wall, where I stand tense as a steel spring, and listen. Everything is still as death now, except for the whining of the wind outside, and a low, gurglin' sound, like the gushin' of blood. Just as I am makin' up my mind to start creepin' along the wall and try to find th' door, all of a sudden there begins right in the same place beside me a terrible, blood-curdlin' scream, 'Yar-r-r-oo-oo-o-o-o-o!'—half howl an' half shriek—that sends me flyin' straight across th' wood-shed, leavin' behind my suspenders an' half of my pants, which got caught on a nail in th' wall. Makin' a whizzin' spurt to where I hoped th' door was, I trips up on a blasted grocery box full of scrap-iron an' junk, and sprawls flat on my face, diggin' my nose half way through th' floor. I bounces to my feet an' makes another dash, but I comes so fast that I runs my head against th' wall with a k-r-r-rump! that sends a million stars shootin' in front of my eyes. Findin' myself at the door, I yanked it open so hard I tears th' door-knob off, an' suckin' in my breath like a gas engine, I catapults out into th' yard.

"Gettin' half-way to th' house in two jumps, I puts th' breaks on again an' comes to a skiddin' stop as old Timothy comes dashin' out onto th' back porch in his night-gown, carryin' a lantern an' a double-barreled shot-gun. The instant he sees me out in th' dark, he winks his blunderbuss an' blazes away in my direction with a

(Continued on Page 24)

International Brotherhood of Electrical Workers

Address all communications for International Brotherhood of Electrical Workers, Radio Division, to: Mr. Thomas R. McLenn, Special Representative, International Brotherhood of Electrical Workers, 1200 Fifteenth St., N. W., Washington, D. C.

REPORT ON BROADCAST CODE

Station Classification

A hearing of the Radio Broadcasting Industry started Wednesday, September 27, 1933 at 10 A. M. sharp in the ballroom of the Hotel Raleigh, Washington, D. C. Mr. S. A. Rosenblatt was the Deputy Administrator. The National Association of Broadcasters, Inc., presented their case with the wage suggestion so distressing to all of us. Flossy language was freely used but all the decorations around that minimum of \$15 and \$20 failed to throw dust in anyone's eyes.

Various other people including advertising agencies, concert bureaus, Actors Equity, etc., presented their objections and corrections.

The International Brotherhood of Electrical Workers next presented their brief containing objections, with our idea of what really was wrong with radio broadcasting as an industry. Figures and facts were clearly set forth. One of the points brought out which gave the Administrator food for thought was a table of figures showing clearly that in the case of a medium powered radio station employing ten operators "on the air" 16 hours per day, each operator given a \$10 per week increase in salary would only reflect 90c extra upon the costs of each operating hour. Other examples were given. Your special radio representative with other experienced officers of the International Office sat in conference with N. A. B. representatives until midnight Wednesday and refused to budge from the \$40 minimum on a 40 hour week for ordinary commercial broadcasting stations with \$25 minimum for the little flea power stations in the villages. The I.B.E.W. from this point (in all negotiations) was the only organization representing the radio operator.

At a late hour Thursday the deadlock continued, the N. A. B. claiming such terms would wreck the industry.

We want to take this opportunity to thank those energetic local business managers who helped out in the rush by enlisting the radio operators in their territories in answer to our appeal. Our authorization list built up remarkably well. We represented somewhat less than 200 of the larger stations and I venture to say, more wattage than that of N. A. B. Our list of applicants is increasing daily.

Don't let the ship sink now after realizing what organization can do for you. Without the I. B. E. W. the \$12-\$15 and \$20 scale would certainly have gone through.

It is now squarely up to the operator to get behind the organization which has stood by him in the past. Get your applications in as fast as you can. Our fight has only just started. A solid organization is rapidly being formed and centers established throughout the country.

The chains are strenuously objecting to a 40 hour week and Thursday evening the hearing broke up in disorder, all agreeing to disagree. The administrator threatened to write a code for the industry and make them like it. In all probability this would mean 40 or even a 36 hour week.

Our last word before parting 7:20 P. M. Friday, September 29th.

1. Clear Channel.
2. High power regional.
3. Clear channel part-time.
4. Low power regional.
5. Low power regional part-time.
6. Local unlimited.
7. Local part-time.

Hours and Wage Scale

1. Employment on no station shall be more than 40 hours per week or 8 hours per day.
2. Clear channel—high power regional—clear channel part-time—low power regional—low power regional part-time, \$10 for 40 hours, with understanding that owners subject to the code and operating stations classified as part-time regional low power shall have the privilege of appearing before the Administrator or Code authority to show cause why they cannot pay the minimum \$40 rate but in no instance shall the revisions downwards of this scale be less than \$30 minimum for 40 hours.
3. Local unlimited and local part-time stations \$30 for 40 hours, except where two or less technicians were employed as of Sept. 15th then \$25 for 40 hours.

The hearing will be resumed October 4th or 5th. Maybe this will go through, maybe not, but let us have the radio operators organized 100% nationally before January 1, 1934. Keep sending in your applications, and spread the news. As a last warning, lay out of company unions or you'll harm the cause.

Without the backing of the International Brotherhood of Electrical Workers and the influence of the A. F. of L. the radio operator certainly would have lost out at the Code hearing. We must also thank W.C.F.L. and the Chicago Federation of Labor for backing us to the limit.

If you want to be in the swim SIGN UP NOW!

We invite the readers of this page, especially those living in Chicago, Cleveland, St. Louis, San Francisco, Dallas, Birmingham, Boston or Philadelphia, to forward data on their stations with a view toward establishing regular schedules between New York and those points. Address: Roger Checbe, 1905 Boulevard, Jersey City, N. J. His call letters are W2BWZ. Power 500 watts C.W. 3500 K.C. 150 K.C. or 14360 K.C. Mostly on 3500. On the air every Friday night from 7 P. M. to midnight open for other schedules. He pulls 'em in with a Comat Pro. No matter what your location try to contact W2BWZ.

Out to the Golden West

Thomas Stevens, General Superintendent of the Radiomarine Corporation of America, was recently transferred to the West Coast to assume charge of Radiomarine activities there. While on the West Coast he will represent the Association and will endeavor to line up the local V. V. O. A. membership in the formation of a San Francisco Chapter.

A SOFT GRAFT

(Continued from Page 22)

fire-b'chinn bang! like a bustin' cannon. A piece of burnin' was stings me on th' cheek, out th' charge of buck-snot goes by. This was too much for me. My knees cave clear in, an' I sag'd down on th' grass.

"I got him! hot durn his onery hide—I got him!" Yells old Timothy; an' he comes gallopin' at me with his night-gown flappin' in th' wind like a mainsail gone adrift, an' his second shotgun barrel ready for business;—but when he recognizes me, he stops, astonished-like.

"Goshamighty tunkets!" he ejaculates, "I thought ye wuz th' goldurned skunk agin!"

"Sk-sk-skunk!" I mumbles, staggerin' weakly onto my feet. "Couldn't ya tell me from a sk-skunk?"

"No—thur* some low-down thievin' amachoor bin gettin' away with Margy's aouns an' things—I thought sure I'd got him, by gum! Timothy pants, kind'a disappointed-like.

"Well—well, wh-what's that cursed thing in th' wood-shed?" I gasps.

"That's Margy's bug'lar-scarer," answers Timothy. "She's got a 'lectric bizness rigged up so if anybody opens th' door at night, it starts off a old phonygratt hid down under th' noor with a home-made record on it whut sounds like somebody was bein' burnt t' death by Californian Indians. We made it by gittin' Jerry Mooley, th' hired hand, ter try t' sing 'Rocked in th' Cradle of th' Deep,' when he was full a' Jim Hogan's moonshine."

"I got back to bed without Margy findin' out who'd been shot at. Next day she has me help her rig up another contraption in th' wood-shed, so that if anybody tries again to sneak in there, three flat-irons an' a topmaul will come crashin' down on his neck. So far as I was concerned, there was no need of riggin' anything. I was through with night-hawkin' around that place.

"One afternoon, though, I manages to slip into the shed with a handful of carpet-tacks, which I dumps into the cells of Margy's flammant-current storage battery. I sees next day that they're puttin' th' battery on th' blink, all right; so a while afterward I hunts up old Timothy to tell him the good news. I finds him standin' out in th' yard alongside his Ford, in his town clothes, lookin' peeved as blazes.

"Margy's storage-battery's gone up the spout, somehow," he nuther, he tells me. "I had to give her th' battery out o' th' ottymobile, an' take th' bunged-up one. Zachary Bilgiks sez as how th' price o' butter hez riz two cents down ter Rapsville, an' I got ten pounds I hev ter take down, right away. I wish y'd try an' see if ye kin doctor up this durned battery a little."

"I fixer th' battery—an' if I didn't say nothin' I thought plenty.

"I leave th' wood-shed alone for a while, after that, but a few evenings later I over-hears Margy sendin' another of those confounded half-coded notes to somebody, an' I'm feelin' sure it must be for that homely worm of a Eusebius. I gets pretty wrathful.

"As I said before, I wasn't jealous; I'd been hired to stop this foolishness an' I was determined I was goin' to do it, if I had to burn down th' whole darned ranch.

"The next morning, I manage to get away from Margy while she is busy washin' th' breakfast dishes; an' hikin' out into the wood-shed. I hunts up a spool of fine magnet-wire—about number thirty. Taking this, I goes out an' twists the end onto the ground wire of the wireless set, an' runs it up th' wall of th' shed, pushin' it under a battin when it couldn't be seen; then I climbs up onto th' roof, figurin' to bring the wire up onto the aerial lead-in.

"After spendin' quite a lot of time workin' the wire into small cracks an' crannies, at last I

have the upper end ready to twist onto the lead-in. To do this I have to hang way out over th' end of th' roof an' reach down;—an' just while I am hangin' in this neck-breakin' position, tryin' to make the connection, I hear th' confounded rotary-gap down in th' shack beginnin' to hum. Before I can let go of that blasted tangly lead-in th' spark crashes out with a terrinc whr-roo-oo-o-o!—and th' next thing I know, I'm lyin' flat on my back down on th' ground, tryin' to get my breath.

"A few minutes later, Margy comes out, and sees me lyin' in the grass.

"Takin' a sun-bath, aren't you?" she chirps, trippin' up alongside.

"Yes, it's right pleasant lyin' here," I answers, tryin' to look drowsy an' contented; but swearin' to myself that I'd never try that stunt again.

"That was the last time I ever fooled around that wood-shed. There didn't seem to be any need of it, anyway; because Margy an' I were gettin' to be better pals every day. We were goin' skylarkin' in the lizzie pretty frequently now; we sit together in the hammock on the front porch every evening; and we even begin to hold hands under th' post-card album when old Timothy butts into th' parlor after supper to read th' 'Corn Planters' Journal."

"Margy keeps gettin' more sweet an' cuddly every day, and sometimes I would find her gazin' at me with a kind of starlight dancing in her black eyes that—well, after sittin' down one day an' thinkin' it all over for a long time, I finally comes to the conclusion that the only thing left for me to do is to marry her. I hadn't fell for her or anything—you want to understand that—but she was too sweet an' pretty a girl for that codfish of a Eusebius to get away with, and it was up to me to save her, even if I had to dig up th' price of a wedding-ring. Course old Timothy hadn't hired me to go quite so far as that, but th' ranch cookin' seemed to agree with me, and it was up to me to save her. I believe in always doin' a little more than just what I'm paid to do; I never was a work-pinner or a clock-watcher.

"So one evening out on the lawn, it comes to a show-down. I hands Margy th' old spiel, orates the only-girl-in-th'-world mush with all th' trimmin's, an' waits for th' answer.

"Ask pa," she says, looking up shyly from under her dark lashes; an' then she runs away.

"I breezes up to old Timothy while my courage is up, an' asks him.

"He looks kind'a surprised, an' strokes his goatee awhile.

"Well, I reckon it's all right," he says, at last. "I'd let her marry a Chinaman, 'fore I'll see her spliced up ter that durned Eusebius!"

"The wedding is set for Margy's eighteenth birthday, which is due in two weeks,—an' then there begins th' greatest stewin' an' preparations you ever saw. Th' whole darned farm was turned upside down with dress-makin', cake-bakin', red an' green paper balls; and invitations to all th' farmers in th' state of Kansas. I was a happy imbecile until two days before th' big day when trouble lands on me with both feet.

"As I was sittin' out in the shade on the front porch dreamin' about the girl an' the home-cookin' I was goin' to have all th' rest of my life, Margy comes cryin' an' all upset and tells me that it's all off. At first she wouldn't say what was th' matter; but after a lot of honey-fussin' around, she takes me out to the wood-shed an' shows me a bunch of old bills for wireless instruments.

"I'd forgot!" she sobs, like she was clean heart-broke. "It was about three months ago—I sent for a lot of apparatus collect on delivery—and pa was so mad that time because he'd

(Continued on Page 28)



American Radio Telegraphists Association News

All communications for The American Radio Telegraphists Association should be addressed to Hoyt S. Haddock, President of the Association, 20 Irving Place, New York City.

Authorized representatives are as follows:

Boston, Richard J. Golden, Local No. 1, Box 1426.

Great Lakes, Arthur Freitag, Box 1076, Ash-tabula Harbor, Ohio.

Hialeah, Fla., E. F. Bourne, Box 91.

Fort Wayne, Ind., Bruce H. Ratts, 328 West Deward St.

Philadelphia, Pa., Charles W. Thumm, 2445 No. 27th St.

New Orleans, Ralph Stobel, 512 St. Peters St.

San Francisco, Wayne P. Paschal, St. James Hotel.

We have been kicking for years and years about wages, and hours, and conditions on ships. Now the government, thru the National Recovery Administration, is giving us a chance to do something about it. The Labor Board of the NRA is eager to aid us in our fight for shorter hours and increased wages. However, they are naturally interested in what percentage of the licensed operators we represent. We would like to tell them we represent ALL the licensed operators or certainly as many of them as possible.

It is very discouraging after a delegate or a member has given a long talk about the ARTA and the need of organizing to some nonmember, to be given the answer, "Yes, I'm very much in favor of it, but think I'll wait till next trip to join." Next trip may be too late. Why make your fellow-operators bear the whole burden? Many of us, altho employed, claim we are hard up for money, or can't afford it right now. What foolishness and shortsightedness most of this is! Now is the time to sacrifice a little! What is the small sum for initiation and dues compared with the large increase in wages you will receive even if only part of our demands are granted by the NRA?

The NRA has requested the ARTA to speak for the marine radio operators. The more members we have the more weight our demands will carry. We have every argument we could ask for. The spirit of the NRA is to raise wages so as to increase purchasing power.

Fact Concerning the Protest and Submissions as Presented to the NRA by Association

In making this protest against the paragraph entitled "Radio Operators, Service Mechanics, Field Clerks" of tentative code No. 392-B submitted by the Aeronautical Chamber of Commerce of America for the Air Transport Industry, we do so in a spirit of cooperation with the NRA and the Aeronautical Industry.

The American Radio Operators are, as are all other Radio Operators in the world, licensed by the Federal government. The Federal Radio Commission is in charge of licensing Radio Operators in the United States, and only persons holding valid licenses can lawfully operate certain radio equipment. The Federal Radio Commission is performing a great work for not only our nation but is endeavoring to set an

example for other nations of the world. If the Federal Radio Commission is to keep the profession apace, with research and technique it will be necessary for certain selfish interests to co-operate with them in every way possible, instead of working against the Commission as in the past on different occasions.

The paragraph referred to in tentative code No. 392-B sets the minimum wage for Radio Operators at \$80.00 per month. It appears, on the face of this submission that the persons who entered such a ridiculously low minimum wage for Radio Operators are not only failing to bring back prosperity, but are showing absolutely no consideration for the technical training necessary in the profession and the responsibility of the Radio Operator as a SAFETY OF LIFE FACTOR.

WE THE AMERICAN RADIO TELEGRAPHISTS ASSOCIATION, INCORPORATED, here-with file protest against tentative code No. 392-B, submitted by the Aeronautical Chamber of Commerce of America for the Air Transport Industry. This protest applies to the paragraph entitled "Radio Operators, Service Mechanics, Field Clerks" of Article III.

In protesting this paragraph we wish to submit to the administration for approval, the following paragraphs which are to be applied to the code for the Air Transport Industry.

Submissions

1. The maximum number of hours of service of any Radio Operator engaged or employed at any mobile station of the aircraft type shall be eight in each calendar day, and such hours of service are to be consecutive.

2. The maximum number of hours of service of a Radio Operator engaged or employed at a fixed station shall be thirty-six hours in each calendar week, which hours of service shall be so arranged that no Radio Operator will be required to perform more than eight consecutive hours of service in any period of twenty-four hours.

3. The minimum compensation which shall be paid by any employer to any Radio Operator engaged or employed at a fixed station of the airways shall be at the following rates:

(1) Chief Radio Operator \$250.00 per month.

(2) Second Radio Operator \$230.00 per month.

(3) Third Radio Operator \$225.00 per month.

(4) Subsequent Radio Operators \$200.00 per month.

4. A Radio Operator engaged or employed on any aircraft shall receive in addition to his regular salary a subsistence and quarters allowance which shall not be less than that received by others employed aboard such aircrafts, such as pilots, and the minimum compensation which shall be paid by any employer to any Radio Operator engaged or employed at any mobile station aboard any aircraft shall be \$165.00 per month, in addition to subsistence and quarters allowance.

5. No Radio Operator shall pur-sue or be required to pursue any duty or duties whatsoever at any mobile station at any time aboard any aircraft, nor at any fixed station of the air-

(Continued on Page 31)

THE FIND-ALL PENTAGRID A.C.-D.C. SHORT WAVE CONVERTER

By H. G. CISIN, M. E.

Intensified interest in short wave reception has created a substantial demand for converters which can be used to transform the faithful broadcast receiver into an efficient short wave set.

And that is exactly what the Find-All Pentagrid Converter does. It makes no difference whether the broadcast receiver is a super-het or a tuned r.f. set—the converter works just as efficiently in either case.

In principle, the Find-All Converter consists of a super-heterodyne first detector tuned to the short wave band, and oscillator and an intermediate frequency stage. Connecting this circuit ahead of a tuned r.f. broadcast receiver, converts the latter into a super-heterodyne set. When the converter is connected ahead of a super-het, it merely adds an extra oscillator stage and another i.f. stage, with detection at short wave instead of at broadcast frequencies.

Through the use of the new 6A7 Pentagrid tube, the functions of detector and oscillator are combined in a single tube. This new tube is a five-grid electron coupled detector-oscil-

lator to its variable mu and other favorable characteristics.

Both the antenna coupling coil (3) and the oscillator coil (8) are standard Alden plug-in short wave coils. Direct antenna coupling is employed, so that the primary is disregarded in the case of coil (3). In order to cover the short wave band from 15 to 200 meters, four different coils are required both at (3) and at (8). The coils are color coded, the green coils covering the band from 80 to 200 meters, the yellow coils from 40 to 80 meters, the red coils from 20 to 40 meters and the blue coils from 15 to 20 meters. A dual Cardwell "Midway" variable condenser (4,9) tunes both (3) and (8).

The Find-All Pentagrid Converter uses the Clisin A.C.-D.C. circuit (U. S. Patent Application S. N. 592, 586). Hence, it dispenses with the customary power supply transformer and will work equally well, whether the power source is a.c. or d.c. A 25-Z-5 tube (34) is used as a half-wave rectifier. Adequate filtering is accomplished by means of the choke (32), by-passed on either side by the dual Aerovox electrolytic condenser.

Antenna control is provided by the 5 to 25 mmfd. condenser (2), permitting the converter to operate efficiently on any length antenna. The Electrad volume control (24) is placed in the cathode circuit of the 78 tube. With only three tubes and with a minimum number of parts, the Pentagrid Converter can be completed with ease and rapidly and without the necessity of previous set building experience. Corwico Braidite is recommended for all wiring.

Constructing the Converter

First, the five sockets are mounted. Next the audio choke and the dual variable condenser (4, 9) are fastened on top of the chassis as shown. The condenser may be fastened directly to the panel, if preferred. The I.F. transformer is then fastened in place. The Electrad volume control-switch and the "Balancer" condenser are fastened to the front chassis wall. Antenna condenser (2) is mounted on the rear chassis wall. A 5/8" hole is drilled to permit adjustment of (2) from the rear of the chassis. The three binding posts are mounted next, all being carefully insulated from the chassis. Resistor (20) is mounted under the chassis on a right-angle bracket. It is held 1 1/4" from the under deck. R.F. Choke (26) is similarly mounted on a right-angle bracket and held 1 1/2" from the deck. The dual electrolytic condenser is fastened to the under side of the chassis. The two triple section metal-case Aerovox condensers may be fastened to the inside front chassis wall or to the under-deck of the chassis. The two mica condensers and the I.R.C. fixed resistors are soldered in place during the wiring. The panel is then fastened to the front of the chassis by means of the mounting nuts on the volume control (24) and the condenser (25).

transformer is then fastened in place. The Electrad volume control-switch and the "Balancer" condenser are fastened to the front chassis wall. Antenna condenser (2) is mounted on the rear chassis wall. A 5/8" hole is drilled to permit adjustment of (2) from the rear of the chassis. The three binding posts are mounted next, all being carefully insulated from the chassis. Resistor (20) is mounted under the chassis on a right-angle bracket. It is held 1 1/4" from the under deck. R.F. Choke (26) is similarly mounted on a right-angle bracket and held 1 1/2" from the deck. The dual electrolytic condenser is fastened to the under side of the chassis. The two triple section metal-case Aerovox condensers may be fastened to the inside front chassis wall or to the under-deck of the chassis. The two mica condensers and the I.R.C. fixed resistors are soldered in place during the wiring. The panel is then fastened to the front of the chassis by means of the mounting nuts on the volume control (24) and the condenser (25).

Finally, the dial and the two knobs are fastened in place, completing the assembly.

The set should be wired with Corwico Braidite hook-up wire. It is suggested that the filament circuits be completed first. In making connections to the tube sockets, note that each terminal shown in the top view is lettered to correspond with the lettering on the schematic diagram. After completing the filament wiring, the various grid circuits should be wired, then the plate circuits, next the cathodes, and finally the by-pass condensers, the filter condensers, etc. Looking at the bottom of the Alden socket (8), with the larger holes at the right, the terminal at the top right connects to the chassis. The small terminal at the top left is connected to the stator of condenser (9). The large terminal at the lower right connects to the rotor of condenser (15), while the small terminal at the lower left goes to resistor (20), choke (32), etc. Looking at the bottom of socket (3), with the socket in the same position (with the large holes at the right), the small hole at the top left connects to the cap "H" of tube (10). The large hole at the upper right connects to the chassis. The following color code may be used for connecting the Find-All I.F. transformer. Yellow to plate "F" of tube (10). Red to plate winding of coil (8). Black to chassis. Green to cap "G" of tube (25).

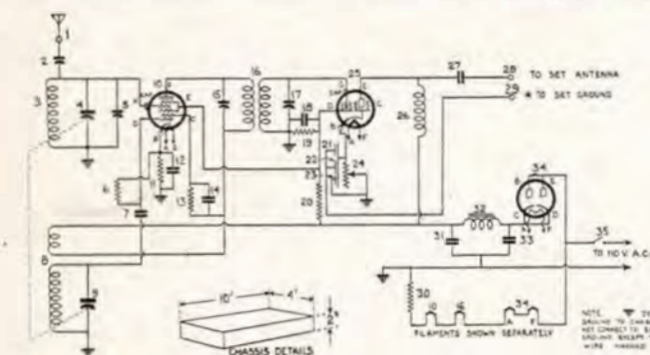
After the wiring has been carefully rechecked, the external antenna is connected to post (1), the set antenna to post (28) and the set ground post to post (29). No external ground is connected to the converter, but the external ground is left connected to the radio receiver.

The tubes are put in their proper sockets, and the green coded short wave coils are plugged into sockets (3) and (8). The volume controls of set and converter are turned full "on." The converter and the broadcast set are plugged into a 110 volt power source and the power switches are turned "on." The set is then tuned to approximately 550 kc. The tuning condenser of the radio receiver is then turned slightly until a rushing noise is heard. The tuning condensers (15) and (17) on top of the I.F. transformer (16) should then be adjusted to the point where this noise is loudest. A short wave station should then be tuned in on the converter and (15) and (17) should then be readjusted for loudest signal. Condenser (2) should also be adjusted at this time. The converter may then be tested out on the other wave bands by changing the coils at (3) and (8).

This self-powered three tube converter changes any broadcast receiver into an efficient short wave set. Through the use of Alden plug-in short wave coils, the band between 15 and 200 meters may be covered. One of the features of this converter is the use of the new 6A7 Pentagrid tube, which combines the functions of detector and oscillator. A second feature is the fact that the converter uses the "Clisin" a.c.-d.c. circuit and hence dispenses with the customary power transformer and will work equally well whether the power source is a.c. or d.c. The Find-All Pentagrid Converter is simple in design and construction, hence it is easy to build. It can be used either with tuned r.f. or with super-heterodyne sets.

Complete List of Parts Required for the Find-All Pentagrid A.C.-D.C. Converter

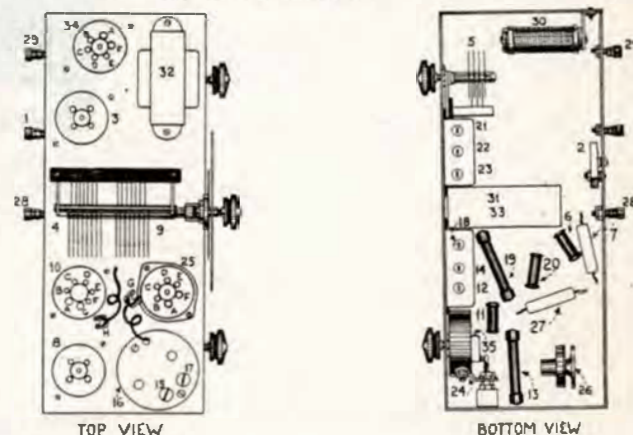
- 1—.000025 mfd. Variable Condenser, type 607-A (5).
- 1—.00015 mfd. (ea. section) Two-gang Variable Condenser, type 405-B Dual (4, 9).
- 2—Sets of Alden Plug-in Short Wave Coils, four coils to each set, covering short wave band from 15 to 200 meters, type 704 SWS (3, 8).
- 1—Antenna Tuning Condenser, 5 to 25 mmfd., type No. 2881 (2).
- 1—Electrad 25,000 ohm Potentiometer, type RI-280-P (24) with Switch (35).
- 1—Electrad Truvolt 300 ohm, 25 watt wire-wound Resistor, type B-3, with sliding clip set at 275 ohms (30).
- 1—Electrad Wire Wound Pig-tail Resistor, 350 ohms, 1 watt, type PG350 (11).
- 1—Aerovox Mica Condenser, .0001 mfd., type 1467 (7).
- 1—Aerovox Mica Condenser, .00037 mfd., 1460 (27).
- 2—Aerovox Triple Section Metal Case Condensers, .1 mfd. ea. section, type 260-31, (12, 14, 19) and (21, 22, 23).



SCHEMATIC DIAGRAM OF THE FIND-ALL PENTAGRID A.C.-D.C. SHORT WAVE CONVERTER.

lator, especially designed for use in super-heterodyne circuits. Acting in the place of separate conventional oscillator and detector tubes, the single tube offers several worthwhile advantages. First, the translation gain (i.f. voltage divided by r.f. signal voltage) is greater in the 6A7 than in the case where separate tubes are used. Second, more complete isolation is secured between the r.f., the oscillator, and the i.f. circuits. Third, the frequency of oscillation is much more stable with the 6A7, due to the fact that it is independent of the load on the oscillator portion of the tube. This is a characteristic common to all electron-coupled oscillators. A fourth advantage, more mechanical than electrical, consists in the simplification of the circuit through the use of one less tube, thus making the converter easier to assemble and wire.

The output of the 6A7 tube is coupled to the 78 i.f. tube by means of a 465 kc. Find-All intermediate frequency transformer. The 78 pentode tube is well adapted for use in the i.f. stage due



THE FIND-ALL PENTAGRID A.C.-D.C. SHORT WAVE CONVERTER.

- 1—Aerovox Dual Section Electrolytic Condenser, Cardboard Container small-size, 4 mfd. ea. section, type PJ-44 (31, 33).
- 1—20,000 ohm, 1/2 watt Metallized Resistor, type F-1 (20).
- 1—30,000 ohm, 1 watt Metallized Resistor, type F-1 (13).
- 1—30,000 ohm, 1 watt Metallized Resistor, type F-1 (19).
- 1—50,000 ohm, 1/2 watt Metallized Resistor, type F-1 (6).
- 1—Find-All R.F. Choke (26).
- 1—Find-All Shielded Intermediate Frequency Transformer, 465 kc., (16) with Tuning Condensers (15, 17) within same shield.
- 1—Audio Choke, 30 henry, 250 ohms, No. 2505 (32).
- 3—Binding Posts, No. 5678 (1, 28, 29).
- 2—Alden Four-Prong Moulded Sockets, type 124 (3, 8).
- 2—Alden Six-Prong Sockets, Moulded, type 436 (25, 34).
- 1—Alden Seven-Prong Moulded Socket, type 437-A (10).
- 1—6A7 Pentagrid Tube (10).
- 1—78 Triple Grid Variable mu Tube (25).

- 1-25-Z-5 Rectifier Tube (34).
- 1-Roll Corvico Braidite Hook-up Wire—Solid Core.
- 1-Drilled Metal Panel, 10" x 7" x 1/16" thick.
- 1-Drilled Metal Chassis, 10" x 4" x 2" high.
- 2-Screen Grid Clips, No. 4173.
- 2-Knobs, No. 4123.
- 1-"Univertler" Dial, No. 4117.
- 1-Screen Grid Shield, No. 7173.

NOTE: Numbers in parentheses refer to corresponding numbers on diagrams.

A SOFT GRAFT

(Continued from Page 24)

found out I was using my wireless to talk with Eusebius. I was afraid to ask him to pay for it. I—I told Eusebius I'd wait for him to work all his time for old Ebenezer Pitts if he'd pay for it—and he did."

"That was a stunner; but after thinkin' it over awhile, I sees a way out.

"How much was it?" I asks her.

"A hundred and forty-nine dollars and fifty-three cents, altogether," she says, wipin' her pretty eyes, an' lookin' at me, hopeful-like.

"I was determined I wasn't goin' to let a little thing like that get between me and strawberry short-cake for life. Next mornin' I takes possession of Timothy's lizzie, tellin' him I'm goin' down to Rapsville to buy some new togs. I rambles all the way up to Stonefield, and after doin' some inquiries, I finally locates Eusebius—a fat-faced idiotic-lookin' cross between a donkey an' a clod of dirt.

"I'm tyin' up with Margy Tuggle," I informs him, right square off the bat. "Here's your blasted hundred an' forty-nine bucks an' fifty-three cents for that wireless gear of Margy's you paid for, an' a note from Margy—and now we're clear of you! If I ever catch you hangin' around Pilcher's Corners, I'll rip you inside an' throw you to th' buzzards!"

"I departs, leavin' th' rubs standin' there with his mouth gapin' wide enough for a elephant to have shoved his foot in it.

"The old lizzie had run all right comin' up to Stonefield; but she bucks all th' way back like a' omery broncho. Tires blow out; the gas-tank springs a leak; the radiator goes dry; th' timer falls to pieces; an' every other blasted thing breaks down.

"As I crawl up alongside th' house, where the engine gives a last wheezin' gasp an' dies a long-deserved death, I can smell calamity in th' very air. Timothy meets me on the runnin' board, his gaiter standin' out stiff, like a typhoon-warnin'. He shoves a note into my hand.

"Read it!" he jerks out. I reads it.

"Don't you think I saw what you were doing the day you fell off the wood-shed? You are the awfulest boob," Margy.

"Huh!" I gasps, clean dazed. "What—where—" "She's gone!" raves Timothy. "Some guldarned skunk gave that dum Eusebius a lot of money, an' he paid off his debt t' Ebenezer Pitts—an' early this mornin' he comes with a weddin'-license an' sneaked off with Margy! Margy was eighteen at half-past six—an' that cussed ol' Zoroaster Sims married 'em three minnts after! Said he bated ter do it, but Eusebius had ten dollars, an' butter's riz agin. If I kin ever find out who gave Eusebius that money, I'll bust his rotten head—hot dum 'im!" "Well," I sighs, jugglin' some forty-seven cents in my left-hand pants pocket; "you sure ought to."



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SHIPPING INDUSTRY CODE

The "PROPOSED CODE OF FAIR COMPETITION FOR THE SHIPPING INDUSTRY," as submitted on September 25, 1933, has not as yet been approved. Up to October 1st hearings were not held. This Code was submitted by ship owners, and operators.

The Code submitted provides for general practices in Article 1, 2, 3, 4, and 5. Article 6, Sec. 8 to 17, refers to labor in general.

There are several very objectionable points in the Shipping Code so far as the radio man is concerned.

The following will give a good idea of the Labor section:

Sec. 8 (a) Members of the Industry shall comply with the following requirements of Section 7 of Title I of the National Industrial Recovery Act: (1) Employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) no employee and no one seek-

ing employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and (3) employers shall comply with maximum hours of labor, minimum rates of pay, and other conditions of employment approved or prescribed by the President.

(b) Except as otherwise in this Article provided, nothing in this Code shall be deemed to control negotiations between employers and employees as provided in the National Industrial Recovery Act.

Sec. 9. No minor under the age of 16 years shall knowingly be employed in the industry. Sec. 10. Hours of labor and conditions of employment on board American vessels shall be as prescribed by the Navigation Laws of the United States.

Sec. 11. (a) The Basic minimum rates of pay

(Continued on Page 31)

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A PRECISE RADIO-FREQUENCY GENERATOR

(Continued from Page 14)

Settings Apparatus	Harmonic Gen.	Filter 2	Audio Filter Ocs.	Filter 3	Harmonic Gen.	Filter 4	Filter 5
24 kc to 50 kc.	32 kc.	32 kc.	3.475 cycles	35 kc.	1,100 kc.	1,100 kc.	1,140 kc.

Table 1—Settings for Producing an Output of 1,135,475

plus all the other products of modulation, a variable band-pass filter is again employed to select the proper sideband from the modulator. Between 24 and 50 kilocycles, this filter will transmit any 500-cycle band and attenuate by 66 db the unwanted frequencies three kilocycles or more from the edge of the selected band.

The output of this filter is amplified and applied, along with the filtered and amplified output of the high-frequency generator, to the input of modulator B, whose output contains the desired final frequency. To isolate this frequency from the other products of modulation, a variable band-pass filter is used as before. This filter has a band width of ten kilocycles and

a range of 400 to 1,200 kilocycles. Frequencies 25 kilocycles or more from the center of the band are attenuated at least 66 db.

The output of this filter is finally amplified through two stages of screen-grid amplification. The low impedance of the final output circuit facilitates transmission of the desired frequency to the place where it is wanted, with minimum attenuation and freedom from extraneous pick-up. The adjustments of the equipment which are required to produce 1,135,475 cycles are shown in Table 1.

This apparatus has been particularly useful in the study of phenomena associated with piezo-electric crystals where a frequency of great stability, variable in very small frequency increments, is required. With its aid the response spectra and temperature coefficients of quartz plates have been determined, the characteristics of quartz-plate filters have been studied, and unknown frequencies have been measured with very high precision.

At Conference

Charles W. Horn, Life Member of our Association and General Engineer of the National Broadcasting Company recently returned from the Mexico City Conference.

William E. Beakes, Life Member of the V. W. O. A. and Vice President of Tropical Radio, who has attended numerous conferences, was in Mexico City at the North American allocation conference. A. J. Costigan, Traffic Superintendent of Radiomarine Corporation of America was there also. He is a Veteran Member of our Association.

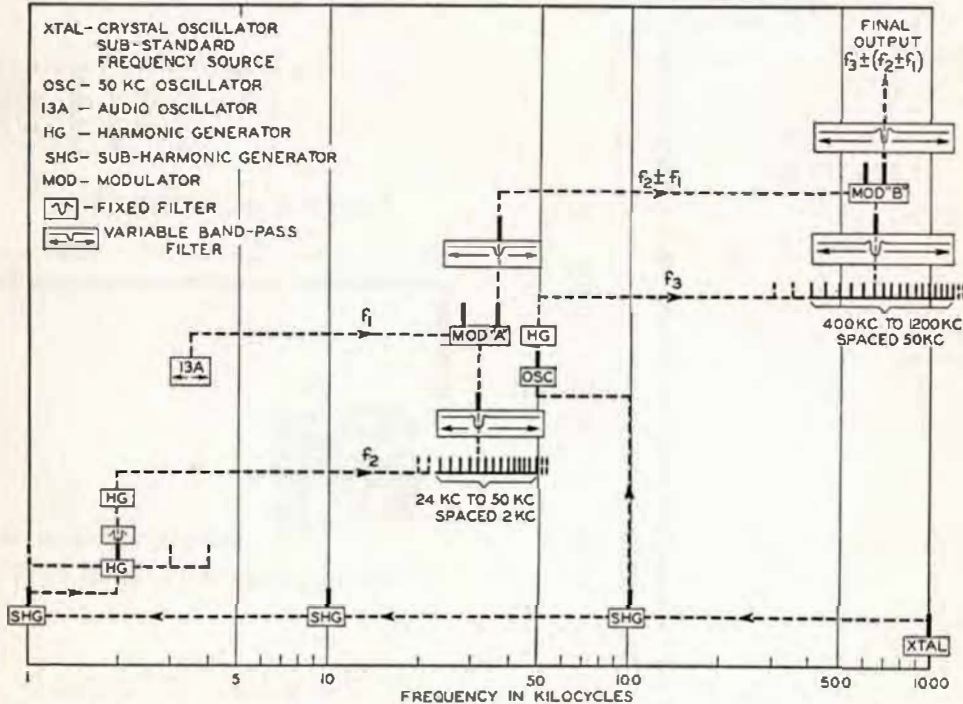


Fig. 6—The operation, throughout the frequency range, of the component parts of the generator when producing a particular frequency.

SHIPPING CODE INDUSTRY

(Continued from Page 29)

per month for American personnel on board vessels not engaged in foreign trade, including quarters, subsistence and maintenance and cure, as customary, shall unless otherwise provided in a Division or Subdivision Code, be as follows:

1st Officer	140
2nd Officer	120
3rd Officer	105
Boatswain and Carpenter	50
Seamen A. B.	40
Seamen O	30
1st Asst. Engineer	140
2nd Asst. Engineer	120
3rd Asst. Engineer	105
Others	50
Firemen	40
Wipers and Coal Passers	30
Chief Steward	100
Combination Steward-Cook	75
1st Cook	70
2nd Cook	50
Messboys and Galley-men	30
Cabin Stewards and Waiters	35
Senior Wireless Operator	75

(b) The hours of labor, minimum rates of pay, and conditions of employment shall not apply to sea-going personnel on ships in the foreign trades, except as otherwise provided in a Division or Subdivision Code.

Our chief objections to the Code as outlined are: 1. No mention of other than Senior Wireless Operator is made. This should read "Wireless Operator" not Senior Wireless Operator.

2. A maximum number of hours for Wireless Operators per week averaged over a period of one month should be 44, which is four hours more than originally intended by the president.

3. The Code should specify that no wireless operator under the age of 21 shall be employed on a boat, unless already employed as of September 15th.

4. Senior Wireless Operator pay should be at least \$100 a month, and no man's pay shall be fixed at less than he was receiving as of September 15.

Further we want to say to the men who are not already represented either by proxy or actual membership in labor organization, that unless you take immediate steps in this direction, there is absolutely no means of getting your consideration at the hearings to be held. Under the emergency of the moment labor organizations will be satisfied to have your proxy for representation at the hearing in the absence of your actual membership. This is the only means possible to get a fair consideration for both their own members and yourself where industries are not 100 percent organized. Act now if you have not already done this. All it requires is a letter with your signature stating: "I am at present engaged as a wireless operator at and hereby authorize you to act in my place and stand at the hearings on the Code referring to my division." There is absolutely no charge of any kind for this, ACT NOW, or repent later.

AMERICAN RADIO TELEGRAPHISTS ASSOCIATION NEWS

(Continued from Page 25)

ways except radio operating and specifically the Radio Operator shall not be engaged or employed as a departmental operator such as pilot-operator, co-pilot operator, clerk operator, steward operator, etc.

6. Two weeks leave of absence with full wages as per scale shall be due and payable upon completion of one full year's service at all fixed stations and yearly thereafter.



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Famous COMET "PRO" Receiver Now Available With CRYSTAL FILTER

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Then, by a mere flip of a front-panel switch the crystal filter is brought into the circuit for either CW or PHONE work—instantly sharpening the tuning curve to a needle-point.

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Uses of Transmissions of Standard Radio Frequencies

(Continued from Page 32)

put of the high-frequency receiver. If the radio receiver is then adjusted so that it does not generate, the auxiliary generator can be set to zero beat with the standard frequency signal. If the radio receiver is again made to generate, the auxiliary generator can be easily set to agreement with the standard frequency signal as previously explained. The rough adjustment to zero beat must be made when the radio receiver is in the non-generating condition, otherwise there is danger of setting to zero beat between the two audio frequencies or harmonics of the audio frequencies. If a piezo oscillator is used, this precaution is unnecessary. A detector-amplifier is set up so as to receive portions of the outputs of the auxiliary generator and the 1150-kc radio transmitter, Fig. 4. The output of the amplifier will give the audio beat frequency between the 23d harmonic of the auxiliary generator and the 1150 kc of the radio transmitter. If this audio-frequency is reduced to zero as indicated on a visual beat indicator the transmitter frequency will be in exact agreement with the standard frequency signal. One person can make this adjustment, as an aural indication may be used for the auxiliary generator and a visual one for the transmitter adjustment.

If a piezo oscillator is used as the auxiliary generator, it need only be checked against the standard frequency signal at intervals.

C. Measurement of Any Broadcast Frequency

The methods of measurement given in the preceding paragraphs are applicable to twenty of the frequencies in the broadcast band. The highest common factor of 5000 kc and the remaining broadcast frequencies is 10 kc. The frequency of the auxiliary generator must therefore be 10 kc if the other broadcast frequencies are to be checked readily in terms of the 5000-kc transmissions. The beat note between the 500th harmonic of the 10-kc generator and the 5000-kc transmission would not be loud enough to be heard distinctly. The simplest solution, therefore, is to set the auxiliary generator on 100 kc and let it control a 10-kc multivibrator. The beat against the standard frequency signal could then be heard easily and the harmonics of the 10 kc would heterodyne equally well with frequencies in the broadcast band. It is evident that with this equipment all assigned frequencies in the broadcast band can be checked against the 5000-kc standard frequency signal, Figure 5.

There are some cases in which a frequency can be measured by more than one of the methods indicated. The question arises as to the advantages and disadvantages of the various possibilities or as to how existing equipment might be brought into use. The first method is applicable to only two frequencies. It provides the most accurate check for frequencies which are very near the harmonic value. For monitors, however, which are set high or low by 500 or 1000 cycles per second, the audio frequency which must be measured is so high that it is very difficult to determine its value. This method is further handicapped by the fact that if the measurements are made in the transmitting station when the power amplifier is operating, the harmonic which is picked up on the receiver may be so strong that it will block the receiver. If that is the case it would be necessary to locate the receiver at some distance from the transmitter and use a line between transmitter and receiver.

The second method requires an auxiliary generator and detector-amplifier in addition to the equipment used in the first method. A small amount of error may be introduced in this method in the adjustment of the auxiliary generator. If a piezo oscillator is used this error is negligible. The error is much greater if a manually-

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controlled oscillator is used. In either case, however, it should not be more than a few parts in a million. This method is applicable to 20 of the broadcast frequencies, and is much more satisfactory for checking monitors which are set off frequency because the audio frequency to be measured equals the amount the monitor is set high or low. If a harmonic amplifier is coupled to the auxiliary generator so that sufficient voltage is provided, the measurement of the monitor can be read directly on the visual indicator provided with that unit.

It is necessary to use the third method in checking the remaining 76 broadcast frequencies. This method requires a high-frequency receiving set, auxiliary generator, 10-kc multivibrator, detector-amplifier, and audio-frequency measuring equipment. The accuracy of this method is the same as of the second method.

OPERATOR LICENSES

(Continued from Page 17)

test for the class of license held, and failing this, will be issued a radiotelephone operator's license of the class corresponding to the endorsement on the license sought to be renewed. In cases where it is impossible for the applicant to appear for the code examination when making application for renewal, he will be issued a radiotelephone operator's license as above. However, in such cases the applicant may appear for code examination within six months after the date of the issuance of the radiotelephone license and be issued a license of the class formerly held, provided he passes the code examination. Failing to appear or failing to pass the code test during the six month period, the applicant forfeits this privilege.

(5) Renewals may be issued at any time within six months of the date of expiration of the license sought to be renewed, but shall bear the exact date of issue. In any event, the application for renewal of license shall be filed not later than sixty days prior to the expiration of the license sought to be renewed.

(6) If, because of circumstances over which the applicant has no control, an operator is unable to apply for renewal of license on or prior to the date of expiration, an affidavit may be submitted attesting to the facts. After consideration by the Commission a decision will be made in regard to the issuance of a renewal of the license.

(7) Service records must be completed and signed only by masters, employers, or the duly authorized agents of either.

Operators who have operated at more than three stations in the aviation service and who apply for renewal of licenses may indicate service on the reverse of their licenses by giving the name of the aviation chain or company where employed in lieu of listing the call letters of all stations. When this is done, the employer shall sign the license opposite the service entry, indicating whether or not the service performed is considered satisfactory.

When the service has been at three or less stations in the aviation service, it will be necessary that the call letters as well as the station locations and signatures of employers be obtained.

Any improper alteration of the service record or the forgery of the master's or employer's signatures, or any attempt to obtain a license by fraudulent means, or by attempting to impersonate another, or copying or divulging questions used in examinations, will constitute a violation of the regulations for which the operator may suffer suspension of license or debarment from further examination for a period not exceeding two years at the discretion of the licensing authority.

Duplicate licenses.—Any operator applying for a duplicate license to replace an original which has been lost, mutilated, or destroyed, will be required to submit an affidavit to the Commission attesting to the facts regarding the manner in which the original was lost. The Commission will consider the facts in the case and render a decision in regard to the issuance of a duplicate license. Duplicates will be issued upon the condition that if and when the original license is recovered, it or the duplicate license will be returned for cancellation. Duplicates, when authorized, shall bear the same serial number and date as the original and will be marked "duplicate" in red on the face of the license.

Reexamination.—No applicant who fails to qualify for an operator's license will be reexamined within ninety days from date of the previous examination. However, when an applicant for an amateur or radiotelegraph class license fails in the code examination, he may be reexamined the same day for any other class of license desired.

Radio operator licenses are valid for the operation of radio stations except amateur, as follows: (See also Rules 44 to 47).

- (1) **COMMERCIAL EXTRA FIRST CLASS.**—Any station.
- (2) **RADIOTELEGRAPH OPERATOR FIRST CLASS.**—Any station except as follows:
 - (a) Broadcast stations.
 - (b) The position of chief operator at stations (not including mobile and fixed stations in the international service) using type A-3 emission with licensed power in excess of fifty watts.
- (3) **RADIOTELEGRAPH OPERATOR SECOND CLASS.**—Any station except as follows:
 - (a) Broadcast stations.
 - (b) The position of chief operator in mobile stations of the first and second classes open to the international service of public correspondence.
 - (c) The position of chief operator at stations (not including mobile and fixed stations in the international service) using type A-3 emission with licensed power in excess of fifty watts.

Operators of this class are eligible to act as chief operator at ship stations of the second class after the service record has been endorsed, certifying to six months service as a radiotelegraph operator on board a ship. (See Rule 435)

- (4) **RADIOTELEGRAPH OPERATOR THIRD CLASS.**—Any station except as follows:
 - (a) Broadcast stations.
 - (b) Mobile stations open to the international service of public correspondence.
 - (c) The position of chief operator at stations using type A-3 emission with licensed power in excess of fifty watts.
- (5) **RADIOTELEPHONE OPERATOR FIRST CLASS.**—Any station using type A-3 emission.
- (6) **RADIOTELEPHONE OPERATOR SECOND CLASS.**—Any station using type A-3 emission except broadcast stations.
- (7) **RADIOTELEPHONE OPERATOR THIRD CLASS.**—Any station except broadcast, using type A-3 emission, which is licensed to use a maximum power of fifty watts; provided however, this class of license shall also be valid to operate stations using type A-3 emission (except broadcast stations), which are licensed to use power in excess of fifty watts if the chief operator regularly employed at such stations holds a radiotelephone second class license or higher, and that at least one operator holding a radiotelephone second class license or higher is available immediately on call in case of emergency. When this class of license is endorsed showing proficiency in the Continental code at a speed of fifteen words.

per minute such license will also be valid for the operation of aircraft stations using Type A-1, A-2, or A-3 emission.

444. In all cases where not specifically provided otherwise, operator licenses permit employment as chief operators.

445. Any person holding a valid operator license of any class may operate any station in the experimental service licensed for and operating on frequencies above 30,000 kilocycles. (See Rules 302 to 324 inclusive, which govern the experimental service.)

446. Upon passing the required examination (Rules 426 to 428), a radiotelegraph class license may be issued to include a radiotelephone class endorsement, in which case the license will be valid for radiotelegraph privileges and radiotelephone privileges for the two classes indicated.

447. The following classes of licenses are no longer issued but are valid until expiration and may be renewed if the service requirements of Rule 439 are fulfilled (service requirements suspended until January 1, 1935), in accordance with the following:

(1) **COMMERCIAL FIRST CLASS.**—Shall be considered as the equivalent of the radiotelegraph first class with radiotelephone first class endorsement.

(2) **COMMERCIAL SECOND CLASS.**—Shall be considered as the equivalent of the radiotelegraph second class with radiotelephone first class endorsement.

(3) **COMMERCIAL THIRD CLASS.**—Shall be considered as the equivalent of the radiotelegraph third class.

(4) **BROADCAST CLASS AND BROADCAST LIMITED CLASS.**—Shall be considered as the equivalent of the radiotelephone first class.

(5) **RADIOTELEPHONE CLASS.**—Shall be considered as the equivalent of the radiotelephone third class.

(6) **AERONAUTICAL CLASS.**—Shall be considered as the equivalent of the radiotelephone second class.

(7) **RADIOTELEPHONE SECOND CLASS (VALID ONLY FOR TELEPHONE OPERATION OF STATIONS IN THE AVIATION SERVICE).**—This class of license is valid until expiration for the operation of any station, except as follows:

(a) Broadcast station.

(b) The position of chief operator at stations using type A-3 emission with licensed power in excess of fifty watts and not licensed in the aviation service.

(c) Stations using other than type A-3 emission.

Licenses of this class, or any other license bearing this class of endorsement, may be renewed without examination provided the service requirements of Rule 439 are fulfilled, as a radiotelephone second class license, or a license bearing a radiotelephone second class endorsement, as the case may be.

448. Application Form No. 756 for operator's license, except amateur, may be obtained from the Commission or from the office of any inspector. Upon completion of the forms they shall be returned either in person or by mail to the Inspector in Charge of the radio inspection district in which the applicant desires to be examined, where the final arrangements shall be made. If the applicant desires to be examined in Washington, the form shall be returned to the Commission, at Washington, D. C. If the application is for renewal of license, and the service requirements of Rule 439 are fulfilled (service requirements suspended until January 1, 1935), the renewal license may be issued by mail from the office which originally issued the license sought to be renewed. Applications for renewal of license may also be obtained and submitted by personally appearing at any point where examinations are being held; and the renewal license subsequently issued by mail. Any applicant may submit himself for examination at the time regular examinations are being conducted, either at a field office or an examining point, in which case the application Form No. 756 may be filled out and filed at the time and place of examination.

Q R N

By MARK CONEY

WAS MY FACE RED?

This one has gone the rounds of the static rooms, but it merits perpetuation in print.

A brasspounder who is generally considered a big shot was temporarily on his uppers. He lurked in a static room awaiting the arrival of some generous soul from whom he could chisel a lunch. In came a likely prospect and our financially embarrassed friend broached the subject.

"O. K.?" agreed the cautious philanthropist, "I'll take you to lunch, but don't eat more than thirty-five cents worth."

In a classy restaurant where our impecunious brother was well known, but certainly not known to be impecunious, the two sat, scanning the menu.

"Look here," said the gent with the funds in a voice loud enough to be heard by the beautiful blond waitress and half the patrons in the place. "You can eat more than thirty-five cents worth. I've been hungry myself! I know what it is."

Opera stars, accustomed to bellowing in mammoth auditoriums, do not pick up studio technique very quickly. And you can not talk to a prima donna as you would to Jennie the hash slinger down in Joe's Lunch Cart. These simple facts were learned at considerable cost by the chief operator of a certain small radio station.

The soprano of a visiting opera troupe, who had repeatedly refused to sing over the radio, was enticed with considerable difficulty to the station for an audition. The chief op, whose job included many duties, made several attempts to teach the gal to draw away from the microphone when she hit high C. Finally, after nervously watching his meter panel during a rendition, he lost his patience and strode over to her with blood in his eye.

"Listen, Mary Garden," he cried. "How many times must I have to tell you to haul your ugly pan away from that mike when you feel you have to screech!"

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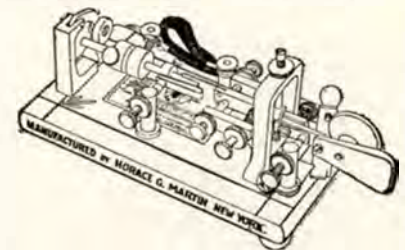
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