

CQ

“The Commercial Radio Operators’ Magazine”

Price 15c
Per Copy

\$1.50
Per Year

VOL. II

NOV.-DEC., 1932

No. 4





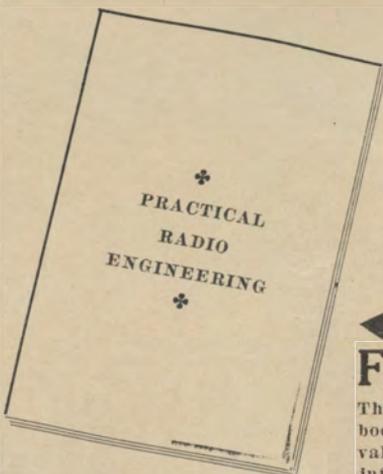
Don't Stop Now

ADVANCE YOURSELF in radio!

Trained men are worth more money! Not only in radio . . . but in every business or profession. It's the TRAINED man who gets the job and the promotions. Our ADVANCED engineering course gives you a better understanding of RADIO and TELEVISION ENGINEERING, so that you will be able to enter the highest technical fields at once!

WANTED! EXPERIENCED MEN ONLY

This course is prepared only for EXPERIENCED RADIO MEN . . . men who realize that scientific, ADVANCED training is necessary for advancement! Capitol Radio Engineering Institute is NOT a trade school—neither is it a college—It is a special technical school offering an ADVANCED COURSE IN RADIO ENGINEERING prepared by nationally famous Radio Engineers!



Free—

This 28-page booklet with valuable radio information.

● MAIL COUPON BELOW FOR FREE BOOKLET ●

CAPITOL RADIO ENGINEERING INSTITUTE, Inc.

Riggs Bank Bldg., 14th and Park Road, N. W.
Washington, D. C. Dept. CQ 11

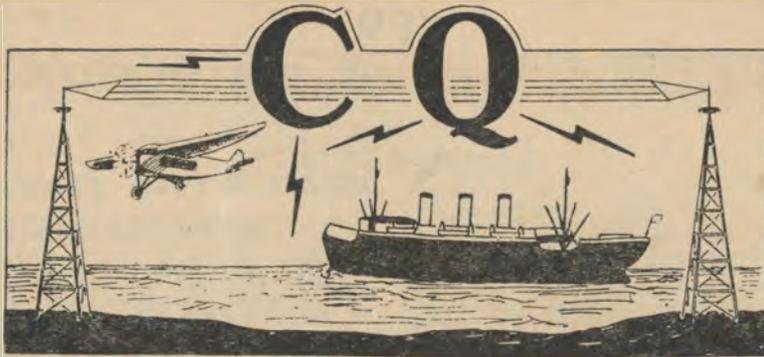
Please send me, without obligation, your new book explaining your advanced course in Radio and Television Engineering:

Name

Address Position

ATTENTION! To Ship Operators landing in New York! See MR. SCHATT
New York Manager, 200 Broadway, Phone Cortland 7-3579

"I SAW YOUR AD IN CQ." Tell this to our advertisers, it helps all of us



A Magazine OF, BY and FOR Commercial Radio Operators and Technicians

BUSINESS OFFICE:

112 West 13th St.

New York, N. Y.

L. D. McGEADY, Bus. Mgr.

EDITORIAL OFFICE:

20 Irving Place

New York, N. Y.

JAMES J. DELANEY, Editor

VOL. II

NOV.-DEC., 1932

No. 4

PAINFUL BUT NECESSARY!

A short time ago at one of the regular meetings of the A. R. T. A. it was suggested that in the next issue of CQ members should have an appeal made to them for payment of dues. This is a most disagreeable task but quite a necessary one. Although the A. R. T. A. has steadily increased in membership and the tendency for delinquent members to pay dues is most noteworthy, there are still hundreds of "Good Intentions" members who have not met their obligations. Many of those whose initiation fees are paid are also delinquent. If these dues can be brought up to date the Association will have a very substantial treasury, and more than enough money to carry on our campaign for an eight-hour day at this session of Congress will be available.

Therefore, it is urged that every member in arrears, if employed, send in his dues at the very earliest date possible.

There is no reason why the A. R. T. A. can not be the strongest organization of its kind. Nearly every country has an efficient association to protect the rights of its radio operators. In this issue the work of the I. F. R. at the Madrid Conference is shown. Everybody will agree that it is most praiseworthy. Is America, then, to be the only nation without adequate protection for its radio-operators? The work of the committee on legislation is outlined herein and the Association must have the support it needs to put it forward.

It might be well at this point to recall the message of the Honorary President, Dr. Lee DeForest, to the American Radio Operator which appeared in the May issue:

"I am convinced that every operator worthy of the name should support this undertaking and join the Association, of which I am Honorary President."

secure economic security and uphold the glorious traditions of their profession is by carry-

"... The only means by which operators can ing on that spirit of 'all for one and one for all,' which characterized the pioneers."

CONTENTS:

	Page
Interesting Facts	4
Where Is That "Prosperity"?!	4
The U. S. Radio Air Service, by H. Hollinger	5
Pioneer Radio Operators, by Lee de Forest	7
An Outpost Station of a Great Airline	8
Sparks	8
Book Review	8
Crosley 500 KW Broadcasting Transmitter, by J. A. Chambers	9
V. W. O. A. Notes	10
Ship Radio at the End of the Crystal Detector Era	10
A. R. T. A. Buttons	10
The Madrid Conference	11
Early Radio History, by L. D. McGeady	12
Down the Stairway of Radio Wavelengths Goes Transoceanic Communication	13
New York Notes	14
Boston Notes	14
West Coast Notes	15
Great Lake Notes	15
Dutch Officers and Seamen Effectively Resist Wage Cut	15
Caracas Rescues New York	15
Notice to Members of A. R. T. A.	15
Association News	17
Radio Schools—Good and Bad	18
Correspondence	19
The Midnight Watch	28
WOR Located	28
Luckenbach Passenger Service	28
Election Campaign Brings Revenue	29
Conference Results	29
Foreign Notes	29
A Steamship Line Writes	30

Bear down a bit harder then, brothers, and bring your dues up to date. Those of you who have not already taken out your cards, write for an application blank and mail your initiation fee of five dollars to the American Radio Telegraphists Assn., 20 Irving Place, New York City.

Published Monthly by CQ Magazine Company, 112 West 13th Street, New York, N. Y. Yearly subscription rate \$1.50 in U. S. and Canada; \$2.00 foreign. Make all checks, drafts and money orders payable to the Company. Single Copies, 15 cents. Text and illustrations of this Magazine are copyright and must not be reproduced without permission.

INTERESTING FACTS

By C. D. GUTHRIE

(Editor's Note: Mr. Guthrie was Supervisor of Radio at New York for the U. S. Shipping Board from 1919 until recently, when the office was abolished. Prior to that time he was one of the senior U. S. Radio Inspectors at New York, after a long period of service with the U. S. Navy. He now holds a Lieutenantcy in the U. S. Naval Reserve.)

BELIEVE IT OR NOT, one of Mr. Marconi's early assistants is living here in Little Ole New York and for a number of years past has had charge of U. S. Shipping Board "Spot Ships," that is, vessels broken out from the Reserve Fleet and prepared to be placed into active service.

He is Captain Arturo Hugo and he served in the Italian Navy as a Signal Quartermaster on board the battleship "Alberto Carlo" in 1896 and assisted Marconi at the time he was carrying on his first experiments for the Italian government. Captain Hugo at the time had just taken his examination for and received a mate's license. When his time in the navy expired he entered the Italian Merchant Marine.

He later came to America, served on American ships, became an American citizen, and later joined the U. S. Shipping Board.

BELIEVE IT OR NOT, the first four letter call used on any ship was in the U. S. Navy, due to a very unusual situation. While serving on board the U. S. S. Kentucky as an Electrician (Wireless) 1st Class, we were in the Norfolk Navy Yard in the summer of 1906 and lying near by was the U. S. S. Wasp, a yacht converted into a gunboat. This vessel did not rate a wireless installation, nor were there any call letters assigned to her in the U. S. Navy Call Letter Book of 1903 where all the larger ships were listed under two letter calls.

A young Electrician 2nd Class from the Wasp came aboard the Kentucky to beg, borrow, or steal any radio parts that might be available, as he stated that he wanted to build a wireless set. What we gave him I do not recall, but he said he was going to visit the other battleships and cruisers and must have made quite a collection in addition to what he had to make up himself.

Several weeks later this little vessel sailed and we were amazed to hear her call the Norfolk Navy Yard Wireless Station and send an official message and sign WASP WASP. In view of the circumstances, his call was really the first four letter call, and considering what few parts he was able to gather, and the parts

he had to make up, the lack of radio books on how to build a radio set, whoever this young fellow was, he must have been a man of exceptional ability considering the time it took place and what he had to work with. It would be interesting to know who he is if still alive.

WHERE IS THAT "PROSPERITY"?

By GERALD MATHISON

Against the advice of the President of the United States—against the advice of many leading economists—against the utmost urging of organized labor, the great non-union industrial corporations have time and time again cut wages. Then came reduced prices to entice buying by people who had no money with which to buy. Following failure to entice the buying—more wage cuts and lower prices; then, of course, less buying and less profits for the seller; again wage cuts to supply money for dividends not payable because of drop in profits. Most of the leading steamship companies have cut wages from 20 percent, to 40 percent, and several of these companies are spending millions of dollars for the construction of new vessels all at the expense of the employee.

The excuse for cutting wages was alleged to be necessary. Necessary for what? To pay dividends to the stockholders who contribute no personal service to the success of the business? To assure stability to industry? To bring back prosperity? Well, how about it? A few dividends are being paid—some on watered stock and blue sky. Many more dividends are being passed. The wage-cutting policy has failed in producing the anticipated result. Business in general is more unstable than when the wage-cutting started.

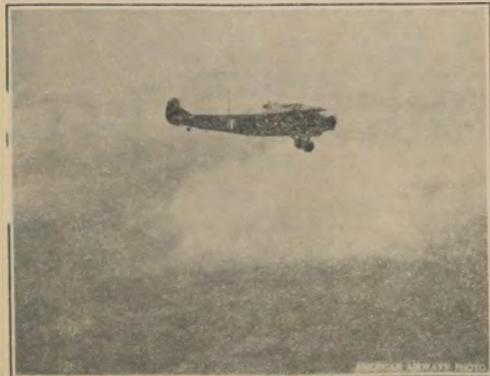
The alleged influence of the wage-cutting policy in bringing back prosperity is still alleged by the wage cutters in the face of the most miserable failure of the policy. What are they talking about when they refer to prosperity—and for whom? Even if they mean prosperity for the stockholders only they are greatly in error. In so-called prosperous years (for profits and dividends) labor has never received more than a living wage.

What is called "the depression" is in reality either the complete and abject failure of alleged brains in high places in the industrial and financial world or else the most gigantic conspiracy to enslave the working people that was ever conceived.

Starvation wages, charity (fast growing weaker), despair through loss of a job and home, loss of hope for the future at seeing the results of years of labor disappear through foreclosure and garnishee, decrease in the standard of living (never high enough) and business constantly getting worse instead of better is the record of those in control of our industrial system.

When the truth dawns on the people of the country they will take charge of the political machinery of both parties, elect men to office pledged to a platform of amending the Constitution of the United States so as to permit Congress to control industry and agriculture in the interests for the people and eliminate the domination of the shylocks now taking not only their pound of flesh but getting ready to pick the bones clean.

Branch offices of RCA Communications, Inc., and Western Union in New York City, Boston, Washington, and San Francisco have become one by a late agreement between the two firms. In the same agreement both organizations benefit either by better land office facilities and by the other radio circuits to 30 countries some of which were not direct previously.



THE U. S. RADIO AIR SERVICE

By HENRY HOLLINGER

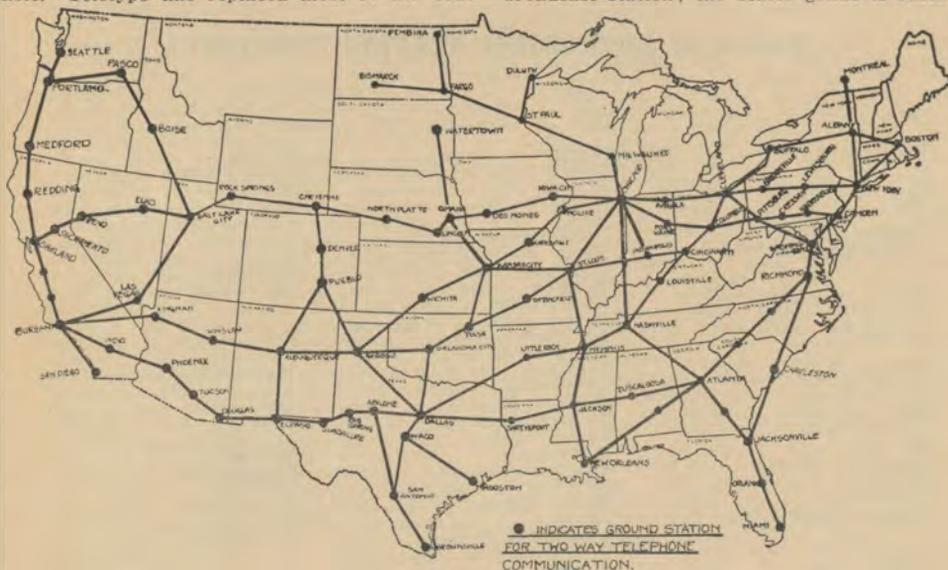
The beach would be a great deal more crowded today, if aviation had not provided so much promise—and as far as operator employment is concerned, produced results. The largest employer of operators in the aeronautical service is the U. S. Dept. of Commerce which is now utilizing the modern Marconi efforts of 500 operators.

According to the needs of a particular station, an operator may devote his entire time to any one, or to a combination of the various types of duty: Broadcast, teletype, range, and weather observation. Weather observation has been mostly reserved for weather bureau personnel, but provision has been made for operators to make surface observations at intermediate points where regular observers are not available. Teletype has replaced most of the code

is headed by an assistant airways traffic supervisor, and to each of which are attached at least one electrician, the required operating personnel, and a general utility operator.

Until the latter part of 1929 there were two grades of operators: Operator in charge, and radio operators; the next civil service entrance group received a lower rate of salary and were classed as assistants; and similarly in 1930, the grade of junior was established with a further decrease in entrance salary.

Tables of reorganization, issued last month, provide authorized personnel quotas within the various grades, for all stations. In general, the grade of operator in charge is authorized only at broadcast stations or at points where other operating facilities are grouped with a broadcast station; the senior grade is reserved



United States Airways Telephone Network

work, and bears most of the point to point traffic; in time and with sufficient appropriations, teletype will replace code work.

Two-way communication with planes is almost entirely covered by airtransport company stations, because few planes operated by individuals are equipped with transmitters. The main traffic of the airways division stations is weather reports and other information of aid to air navigation; the weather reports are prepared, distributed and broadcast on regular schedules, or immediately if the conditions warrant priority. Radio range operation is co-ordinated with the speech broadcasts, so that pilots may be guided along an airway when weather conditions are unfavorable for landmark check. The range sets the airway course, and the broadcasts supply timely data as to weather conditions along that airway.

The airways division is divided into 13 component administrative divisions, each of which

for assignment to the more important broadcast stations or to teletype centers; assistant grade is allotted to points where four or more operators are stationed; and juniors are stationed at all points except those where independent range stations are now in operation but where future duties will, with expansion, include teletype operation and weather reporting.

Seniority is reckoned by comparison of entrance on duty dates, or by date of promotion to a higher grade; the priority of grades, in ascending order, is: junior, assistant, senior, and operator in charge. Where operators are at present in excess for their particular grade, they are obliged to either request transfer at their expense to another station possessing a vacancy in grade held, or be demoted to next lower grade at present station. In the latter case, the demoted operator replaces the less senior operator and takes his rate of pay; if the replaced operator is not then within his

grade quota at present station, he is subjected to a similar rearrangement. Excess juniors who do not apply for transfer to another station where junior vacancy exists, are subject to transfer at government convenience and expense. Promotions are proposed to fill certain vacancies in the higher grades in which there is a national shortage of rated personnel.

All operators enter the airways division via Federal Civil Service examination, and notices of the holding of such examinations are posted on Civil Service bulletin boards throught the U. S. A. At present, the few vacancies for new men are being filled by transfer from other government agencies, or from Civil Service registers listing the successful applicants in previous examinations.

The tables below show the number and grade of operators authorized for the various stations.

At top of each table is a figure group designating the complement quota for each station in that table; the first figure is for operator in charge, the second for senior operators, the third for assistant operators, and the fourth for junior operators. In the figure groups giving no operator in charge designation, the senior operator present acts in charge. The present station complements do not all agree with these tables—the rearrangement plans are just now being worked out. For example, the present complement of Boston is 1521, of Cleveland 1191, and Seattle 1211; in the Boston instance, the authorized complement is 1243 which means that 3 seniors are subject to rearrangement as explained above, and that vacancies exist at Boston for 2 assistants and 2 juniors. The vacancies will be filled by voluntary demotion or transfer of assistants or juniors which are in excess at other stations.

TABLE OF AUTHORIZED STATION PERSONNEL

1562	1013	0013
Oakland	Seattle Medford Fresno	Camden Indianapolis Evansville
1561	Reno Elko	Detroit Chattanooga
Kansas City Cleveland	Rock Springs, Wyo. North Platte, Nebr. Kingman, Ariz. Winslow, Ariz. Yuma, Ariz. Tucson, Ariz.	Columbus Toledo Oklahoma City San Diego
1262	Big Spring, Tex. Little Rock	0010
Chicago	Memphis Shreveport	Burlington, Iowa Columbia, Mo. Des Moines
1261	Jackson, Miss. Birmingham	Erie, Pa. Harrisburg
Portland, Ore. Los Angeles Salt Lake Albuquerque El Paso Dallas-Ft. Worth Washington Cheyenne Newark-Hadley, N. J.	Spartanburg Greensboro San Antonio Houston New Orleans Mobile Charleston, S. C. Titusville, Fla. Miami Key West Spokane	Raleigh Syracuse Tacoma Terre Haute Milwaukee Sweetwater
1243	Pasco, Wash. Boise Butte Idaho Falls Milford, Utah Pueblo Fargo, N. D. Buffalo Springfield, Mo. (Unchosen)	0001
Boston St. Louis Omaha Atlanta		Doner Summit, Calif. North Dalles, Ore. Alma, Ga. Rockford, Ill. Texarkana Wellton, Ariz. Shasta Springs, Calif.
1121		0211
Albany Jacksonville Richmond Cincinnati Nashville Pittsburgh Minneapolis Wichita Bellefonte, Pa. Tulsa Jackson, Mich. Amarillo Iowa City		Special Detail, Washington, D. C.

PIONEER RADIO OPERATORS

By DR. LEE DE FOREST

As a direct result of the record-breaking wireless work performed by the high-power apparatus and the loyal, enthusiastic operators in charge of it at the Worlds' Fair at St. Louis in 1904, the United States Navy that fall awarded to the American DeForest Wireless Telegraph Co., a contract for five of the most powerful stations which up to that date had ever been constructed anywhere on earth. San Juan, Porto Rico, Key West, Pensacola, Florida, Guantanamo, Cuba, and Colon, Isthmus of Panama, were the designated points. All transmitters were to be of 25 KW, input power, save at Pensacola where 10 KW, was deemed sufficient power for reaching its only regular corresponding station, Key West.

There two ship-rigged masts supporting a double fan antenna were erected by Navy contractors, following plans drawn up by my company's engineers. While at each of the four other stations triangularly spaced wooden towers of square timber construction were raised to a height of 250 ft., to support an inverted pyramid of three fan antennae.

Well-designed "shacks" for wireless operators, engine and generator buildings, were constructed by the Navy's builders.

Even before the Fair closed its alluring gates I was busy with some of the Old Guard, as well as some of the newly trained operators, in laying out the equipment for these new wireless "giants." Based upon our experience with the first 25 KW, 60 cycle transmitter by the tall Jerusalem crossarm mast we specified similar equipment, with kerosene-engine driven generators and exciters for some points. In others, like Key West, the generator (gigantic in the eyes of all those old wireless experts!) was installed in the Navy powerhouse, and motor driven. Frank Butler was sent to Pensacola, Mac Horton there and thence to Key West. These were to be our first Navy stations—the more distant ones to be equipped later, after we had learned from these first, relatively near stations how more surely to tackle those longer range, more puzzling jobs.

But meantime inland and Atlantic coast wireless matters of the American DeForest Co. were by no means idle, nor neglected. At West Chicago a duplicate of the big St. Louis pioneer was nearing completion. Likewise a similar one at Kansas City. For fortunately (and also unfortunately, as it later proved) that summer of 1904 produced comparatively little static. Our initial success between the Worlds' Fair and Chicago was so gratifying that we saw immediate possibilities of successful overland competition with Western Union and Postal for commercial business traffic, at really "wireless rates"—not the almost identical tariffs with which present day radio "competes" with wire and cable traffic. With Wm. Acker at "Chi," Billy Fennell and F. J. Taggart at "K. C.," Charley Cooper at Springfield—Frank Butler and later Acker's brother at East St. Louis ball park (whither, shortly after the Fair closed, the "Jerusalem" transmitter was removed) we soon saw actually realized my early dream of commercial wireless telegraphy overland; not restricted, as the European pioneers had done, to over-water communication.

The DeForest wireless apparatus was always plain, simple, easy to operate or service—built up largely of standard parts which could be procured locally—plate glass, tinfoil, wooden tanks, kerosene oil, condensers; lighting or

power transformers, spark-gaps readily constructed and assembled, etc. Only the electrolytic receivers, the two or three-coil tuners, the head-phones need necessarily come from the Jersey City factory, on Montgomery street.

But our New York office was equally as active as our St. Louis headquarters—erecting Atlantic shore stations, from Maine to Cuba, and driving hard after coast vessel equipment. Our able and genial vice president, Charley Galbath, had a winning way with skippers and fleet owners, most of whom were in those days stark skeptics as regards the possible need or utility of wireless. And the skippers, inured to gratifying isolation and independence of their New York office as soon as Sandy Hook was left astern, groused aplenty at the mention of wireless aboard. "The noise of that spark would disturb sleepy passengers—we don't want it!"

But what with Hughes and Barnhart, Wallace, Curtis, Cooper, Fennell (our three original "Canucks")—rushed from the West to temporarily man a coaster, or help erect a stick on a strategic sand bar; to break in green men as to how to insulate an antenna, or bring in a "rat-tail," how to toughen rebellious ears to tight-clamped "cans" all day and all night; how to see-saw on the slide-tuner, to read whispering Morse in buzzer signals, to "get under the table" and read a fist full through "growling static"—to keep the skipper pacified and "sold" on the value of wireless—even though it made him goddam the New York office—American wireless grew apace on the Atlantic Seaboard in 1904-05. And ere many months every coast city, Coney Island, Atlantic Highlands, Galilee, Atlantic City, Cape May, Norfolk, Charleston, Hatteras, Savannah, Jacksonville, Key West, and finally Havana—boasted of a single tall spar, pricking the barred clouds at sunset and pinning down to earth an invisible etheric mantle, of comfort and protection, spread over the mariner far out on the dark waters.

On Jan. 1, 1905, I began at Pensacola my first tour of inspection of our growing Navy stations. There was Frank Butler, already adopted by some fine young gobs at the Navy yard. He was sleeping on a bunk, and eating his meals with the "Jack Tars" in their mess hall. The station was nearly ready for test out by the time I reached Key West "PN." But little did Butler, nor I, then realize the months of baffling difficulties which must be fought through before Key West should hear the first peep out of PN. More of that anon. I zigzagged across Florida and finally reached Key West, where Horton and Cris "the terrible Swede" Oleson, mast rigger extraordinary, greeted me on the dock.

Ensued weeks of wireless work and experimenting, the most fascinating and delightful in all my life's experience—lost to the hectic existence of northern cities, in that indolent Island of Delight—a sub-tropic sanctuary from the wintery blasts I had left behind. With the willing aid of Horton and the Navy ops—ever eager to be of service and to learn the secrets of this new wonder, was established the first really high-power wireless station in America, in the world for that matter, if one overlooked the clumsy lumbering "limy" outfit at Földé, whose cannonade of spark could be heard by ear almost as far as its wireless signal reached.

Two delightful weeks spent in the little Navy shack in the grove of coconut palms, hewn partly away to clear space for our antenna wires, borne aloft by three slender white masts overlooking waters painted in such soft and vivid hues of green and violet as any eyes saw never before. And then, having mapped out the work ahead for Horton and his Navy aids, Watts, Mariott, and the others, I fled that sub-tropic paradise for the chill north. My route thence lay through Washington, New York (where old "42 Broadway" station was just completing) Boston, Buffalo, Chicago, Kansas City, St. Louis—watching the work of installation and the new ops. in training at all these points—and then again south. Hard work, a multiplicity of tasks, voluminous correspondence accompanied me, followed me everywhere, night and day. Ah but it was Wireless—it was Life!

"AN OUTPOST STATION OF A GREAT AIRLINE"

The Transcontinental & Western Air, Inc., radio station located at Cresson, Pa., is perhaps interesting to show the relation of radio and weather in the airways. The station is located on Cresson Ridge of the Alleghenies, which is the highest point on the eastern division of the line. Since there is no landing field adjacent, this link in the airline communications system is probably the only one in the country established primarily for a weather lookout.

Allegheny Mountain weather is probably the most changeable on the coast to coast route. As an added safety factor to operation Cresson can keep a continuous watch on planes flying this sector and communicate with the pilots to give the latest weather reports of the divisions. A complete observation station is located in the station which is connected with the U. S. Weather Bureau teletype chain.

Duties of the operators consist of keeping a log of all company planes flying this sector, sending hourly weather observations and taking upper air observations. These latter observations are made by releasing a large balloon and watching its drift and speed through a surveyor's instrument or theodolite and taking readings each minute. The balloon is followed to an altitude of ten thousand feet, and the wind directions and velocities at each thousand feet are calculated from the readings. These observations are valuable in helping the pilots to find the most favorable winds. Three of these runs are made each day, and at night small flashlight bulbs and batteries are attached to the balloon in order that its course may be followed.

A regular airplane type fifty watt transmitter is employed which gives excellent results working as a ground station. Two receivers are in use, one a short wave for regular communication, and the other a long wave receiver for receiving weather broadcasts and for checking beacon station signals.

All operators in the company are able weather observers and can assist pilots by making observations immediately when called for.

If airways radio operators can be a help to the pilots by their knowledge of meteorology, this knowledge should likewise be valuable to marine operators. If a marine operator can copy the government weather reports, fill them in on a blank weather map and then draw the isobars, he can learn by studying these maps just where a storm area may be found. The course of a wind shift line can be determined and valuable information presented to the skipper or navigating officer in the form of this map and an explanation. Surely this would show that the operator is wide awake and interested,

and should aid in restoring him to the proper place of respect aboard the ship. Radio and weather go hand in hand in the airways, and both are just as important to ships at sea.

KEITH SINGER

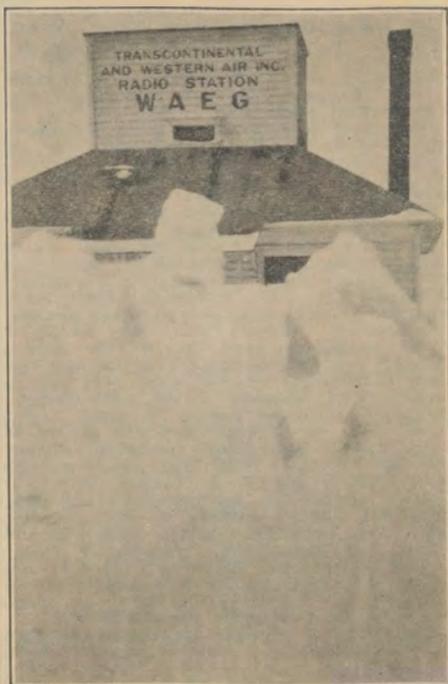
BOOK REVIEW

The Radio Manual, by G. E. Sterling, is a new book published by D. Van Nostrand Company, Inc., 250 Fourth Ave., New York City.

Edited by Robert S. Kruse, formerly technical editor of QST, who needs no introduction to our readers, the purchaser of the book which lists for \$6.00 will have a surprisingly large volume of very valuable information, in all 805 pages. Mr. Sterling is a former radio inspector and examining officer of the U. S. Dept. of Commerce. Motors and generators, storage batteries, vacuum tubes, transmitters, treatment of field strength surveys, marine radio on all wave lengths, interference, television and moving pictures are some of the subjects treated at length. The book size is 5 7/8" by 8". Bound in Flexible Fabrikoid.

SPARKS

When you're sailing o'er the ocean
And you know that all is well
On the giant ocean liner,
That's half ship and half hotel,
Remember, that among the guards
That save the ship from wreck
In a crowded little cabin
Half hidden on the deck,
Where working single-handed,
And exchanging his remarks
With the snips that pass beyond your sight
Sits operator "Sparks."



Crosley 500 KW Broadcasting Transmitter

By J. A. CHAMBERS

Technical Supervisor Stations WLW, WSAI, W8XAL

Station WLW in Cincinnati has always pioneered in broadcast progress, being one of the first broadcast stations on the air, always being the first commercial station on each stage of increased power. It was the first station to locate a high powered transmitter in the country away from thickly populated sections, and first in many other important innovations in the broadcast art. The aim of its owner, Mr. Powell Crosley, Jr., has always been to increase and improve radio broadcasting service and to this end he has continually led the field.

Recently the Crosley Radio Corporation applied for and was granted a construction permit to develop, install and operate experimentally a broadcasting transmitter with power of 500 KW—ten times the power of WLW. Since no broadcast station has ever operated on a power approaching this, this transmitter will be operated under an experimental license to determine the actual results that will be obtained from this power. WLW's cleared channel frequency of 700 KC would be used for the experiments and full advantage is taken of this excellent frequency and the excellent location now used by WLW. It is expected that the tests will be conducted between 1 and 6 in the morning and that very complete measurements will be made on the coverage, fading, attenuation and other transmission characteristics of this powerful transmitter.

It is generally conceded that the only effective "static eliminator" is the use of high powers for broadcasting. Every previous increase in power had very materially increased the service rendered by the broadcast station. We feel assured that the increase in power to 500 KW will make possible much improved service in the present service area. This will be especially noticeable in those areas where the station can now be received but where noises and interference are objectionable.

It is not expected that the range or signal strength of the station will increase in the same ratio as the power. However, we believe that the increase to 500 KW will improve the service to our present listeners and will increase the audience sufficiently to justify the expense of more than one-half million dollars required to install the transmitter, and \$150,000 a year operating cost for the transmitter alone.

An increase in power from 50 to 500 KW should result in an increased signal strength of about 350%. This increase will not be very evident in the present primary coverage areas

since volume controls, either automatic or manual, will handle signals of great intensity as local stations and are not highly sensitive to a four to one change. In this area there being no interference level to use as a standard, listeners will not be aware of the increased power. However, where the signal strength at present approaches the noise level and where noise is objectionable and the signal fades to a low value the increase in power will very much improve reception conditions.

Increasing the power in itself will not eliminate fading. However, on present day sets using automatic volume control, the fading is automatically corrected by the receiver unless it falls to such a low value that it does not operate the control. An increase in signal strength even in this area will materially improve the service and to a large extent remedy the fading.

Although not directly connected with the 500 KW experiments we intend to utilize a new 325' vertical radiator for WLW. This will result in increased efficiency which will further increase our signal both on 50 KW and on the experimental transmitter. Furthermore, it will reduce the distortion fading area and move this area further away from the station.

Several years ago when WLW went to 50 KW the fear was expressed that "high power" would interfere with the reception of other stations. It was quite definitely proven that even with the receivers in vogue in 1928 no interference resulted from the increased power. Any interference from this source would be directly proportional to the signal ratios. Since that time the stations which feared interference have increased their powers, in most cases ten to one. Therefore, even with the 1928 type of receiver, no more interference would be expected from the 500 KW transmitter than was experienced with WLW when it went to 50 KW. When it is considered that present day receivers, in most cases superheterodynes, are far more selective, it can readily be seen that no interference will result.

With our standard Crosley receivers located in Cincinnati only twenty miles from the 50 KW WLW, it is possible to tune to WOR's 5 KW transmitter in New York City operating on a frequency of 710 KC, without interference from WLW. The normal static and noise interference eliminates adjacent stations before any interference from a high powered station would be noticeable. Therefore, we have no fear of experiencing any interference with other stations.

The development of such a powerful broadcast transmitter presents many difficulties not experienced in lower powers. Elaborate precautions are required to assure continuous operation and continuity of power supply. It is expected that it will require eight to ten months to develop and construct this power transmitter. We do not, therefore, expect to put any test programs on the air until some time next summer. Many entirely new development ideas will be worked out and it is expected that this transmitter will have performance characteristics far superior to any existing broadcast station, and that it will materially improve the service and enjoyment afforded the radio listeners.

V. W. O. A. Notes

The Veteran Wireless Operators Association has moved its headquarters from 154 Nassau street, to Pier 3 North River. The move was for economy purposes and new quarters will no doubt be selected early in the year where club-room facilities may be arranged.

The association is making a drive towards contacting members in arrears for yearly dues. A special inducement is made to those concerned, that paid-in-full cards will be issued for 1933 to those remitting. Where members are suffering financial difficulties due to unemployment the association asks them to advise the secretary. These members will be retained on the active list and receive all rights and privileges.

Secretary A. F. Wallis has returned to the Tropical Radio commercial department, a berth which he formerly occupied for several years.

Alonzo S. Carroll, of the U. S. Coast Guard Radio Station, Winthrop, Mass., life member and director of the association, has recently become a benedict and advises that the bassinet is being prepared to receive a prospective young radio opp. What if it's a girl?

At the recent meeting of the association on November 2, at Teutonia Hall, a new plan of procedure was inaugurated. Parliamentary proceedings were dispensed with and the meeting was thrown open to real get-together spirit. Past Vice President G. H. Clark gave a burlesque on "election speeches" which was enjoyed by all. The several candidates were represented by various members. Hoover by C. S. Anderson, Roosevelt by Eddie Kaminsky, and the Socialists by A. F. Wallis. The program was broadcasted via a dilapidated Mike, tied up with a red ribbon and connected to, "no-where." Many new faces were noted and it is quite obvious that VWOA meetings are becoming more popular.

In accordance with the association's by-laws, nominations for officers and directors will be made by the chairman of the board at the next meeting on the 7th. These nominations will be placed before the membership by mail and ballots will be tabulated at the January meeting. The results will indicate the stewardship of the association for 1933.

The next meeting of the V. W. O. A. will be held at Teutonia Hall, 16th street and Third avenue, N. Y., December 7th, at 6 p. m.

Harry R. Chetham, the well known old timer, has encountered difficulties on his recent Civil Service examinations. Having qualified the professional portion he was turned down on the physical test. As it appears that injustice is being done in the matter, the association addressed a communication to the governor of Massachusetts who replied that an investigation would be made in the case.

A. R. T. A. Buttons

Suggested by STEPHEN ROVACS

Here is a suggestion for a button of the ARTA. The sine wave for modern radio and radio telephone, the spark for the old and modern radio telegraphist and the straight line for the directness of our purpose.

Would be good with gold lines and maroon back ground. I would rather have it without the letter ARTA in it but it may be OK with it.

How is it?

SHIP RADIO AT THE END OF

THE CRYSTAL DETECTOR ERA

(The following is an account of the routine experience of a radio telegrapher on shipboard in the year 1919, on a trip from New York to Denmark and return. The article was written by Donald McNicol, fourteen years ago.)

During the first one hundred miles outward from New York, the radio operator who has a standard crystal receiving set and ordinary ship's aerial, hears practically all of the New York stations and stations in that vicinity—even the amateurs are heard fairly well at night. After the one hundred mile point is passed Brooklyn Navy Yard (NAH) and the Bush Terminal station (WCG) are still loud and plain. The Radio Communication Company's station (WHB) is readable through other traffic. At 125 miles NAH, WCG and the other stations fade out and can be read only with difficulty, but the Navy station (NAF) at Newport, R. I., comes in strong.

From Ambrose Channel, outside of New York, to beyond 100 miles therefrom, the Navy station at Cape May (NSD) is fairly bright, and the Navy's Boston station (NAD) may be read plainly if New York stations are not interfering seriously. The Cape May station is easily tuned to selectivity if there are no nearby overpowering signals being transmitted. The Bush Terminal station (WCG) of the International Radio Telegraph Company also is easily read through other traffic, as the note is high and clear.

At a point about 200 miles from New York, Cape May (NSD), and the International Radio Telegraph Company's stations at New London, Conn., (WLC) and at Newport, R. I., (WCI) are fairly strong and readable, continuing so until the ship has reached a point about 350 miles from New York. At 400 miles out Bar Harbor, Me., (NBD) is the station whose signals are loud enough to be recognizable, and at 500 miles Cape May (NSD) is again heard. At this point the Newfoundland station at Cape Race (VCE) comes in, also the station at Cape Sable off the coast of Nova Scotia (VCT). The last American stations heard are at about 700 miles out of New York. These are Bar Harbor (NBD), Cape May (NSD) and Boston (NAD).

It should be understood, of course, that although no mention is made of signals passing between the high-power stations of the Radio Corporation of America (Marconi Company) in New Jersey and in Massachusetts, these stations are continuously handling regular traffic all the way across the Atlantic, but on very long wavelengths, and are not heard on ordinary ship's sets.

During the trip across the Atlantic the operator on a ship can hear other ships receiving radiograms from land stations, and there is a certain amount of traffic between passing ships, and ships from 100 to 500 miles apart on the ocean, the distance covered being generally dependent upon the range of the ship's transmitting outfit.

After the American land stations are no longer to be heard on the eastward journey it is not long before British and French land stations are audible on shipboard. For the purpose of the present little story, however, it may be best to record the signaling ranges of the European stations as they are observed on the return trip.

On the return trip from Denmark the station

(Continued on Page 30)

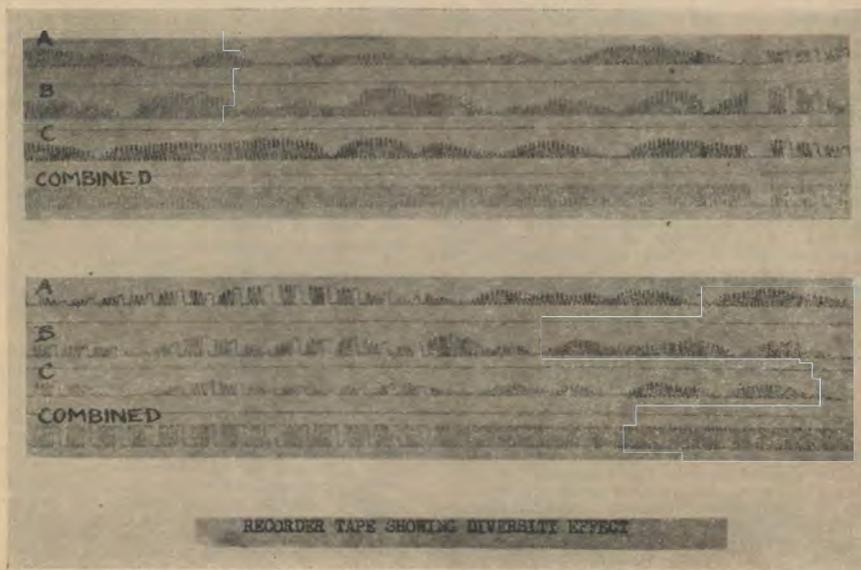
Down the Stairway of Radio Wavelengths Goes Transoceanic Communication

Accomplishments of a Dozen Years in Long Range Radio Service a Saga of Science Struggling With Shorter and Shorter Waves

The increasing use of radio for international communication and the establishment since the war of radio circuits which link the United States with more than thirty-five foreign countries have moved the center of world communications activities to this side of the Atlantic after several decades of European domination. New York is now the communications capital of the world and the radio circuits operated by R. C. A. Communications, Inc., the international radiotelegraph communications subsidiary of the Radio Corporation of Amer-

hour schedule every day. This remarkable system has been created since 1920, when RCA entered the field as a new company, inheriting at its inception a few very limited facilities of uncertain operation.

Between 1920 and 1925 the radio communications companies of the world struggled with wavelengths of 10,000 to 25,000 meters to produce a satisfactory radiotelegraph service over long distances. The radio companies employed these frequencies of 12 to 30 kilocycles for the very good reason that this was the only band



HOW DIVERSITY RECEPTION SMOOTHS OUT FADING

ica, give the United States direct contact with the important trade centers of the world. Today, forty-five direct circuits speed messages across thousands of miles to their destinations, without relay and free from any considerations of international boundaries.

The story of the development of this vast network of long range radio circuits is to a large degree the chronicle of continued and progressive exploration of new areas in the spectrum of radio frequencies. It is solely as a result of constant engineering and research effort that it is now possible to transmit radio messages to every part of the world on a twenty-four

which gave results with the apparatus then in use. The vacuum tube in 1920 had not yet been mastered to the extent of continuous use in high power, long distance transmission on an economical basis. The so-called high frequency alternator was at that time the only practical means of transmission and designers used the comparatively low frequency band because the properties of the high frequency band above 3000 kilocycles were unknown. Moreover, if their usefulness had been known, there was no apparatus available with which to generate them.

(Continued on Page 22)

New York Notes

Joe Gately, after a short stay on the beach, after his trip in the J. M. Danziger was awarded the Empire Arrow of Socony.

Alex Vadas took out the Polarine of the Standard Shipping.

Bill Kirchhoff interrupted a four years' stay on the beach with an intercoastal trip in the Sea Thrush and will doubtless give the ladies of Seattle a fine treat. He has been rehearsing an entirely new set of lies during his year's hangout with the A. R. T. A.

Otto Theiss managed to grab another Bull Line ship—this time the Delisle.

Roy H. Roberson is back with us awaiting an assignment after undergoing two successful operations at the Marine Hospital, Staten Island.

Herman G. Mickelson is now recovering after a long siege of illness at Ellis Island, Marine Hospital.

Joseph P. De La Hunt went out in the Bridgetown, sold by the Columbian Line to the government of Columbia and renamed the Boyaca. It seems they are having a little political difficulty in Columbia and the vessel is to be used as a troop transport. He will return to New York as a passenger.

Vernon Minzey, after an extended stay on the beach, landed the City of Dalhart of the Roosevelt Line.

Karl K. Steiner, formerly of the Jefferson Myers (Quaker Line) tied up with the Wisconsin of the States Steamship Line, out of Portland, Ore., and will now be in the Oriental run. He was on the beach in Portland for quite a spell.

T. W. Braidwood is in the Yacht Caroline.

J. H. Livingston is operator of the Velma Lykes out of Galveston. Reports at this writing indicate the Velma is in difficulty in the Gulf and several days overdue without having been heard. As a matter of fact, four vessels in that area are reported in distress due to the twister now raging.

Rodney Cross is now serving in the Albert Hill, sailing out of Port Arthur.

Abe Goldwetz was discharged from the Marine Hospital at Staten Island after recovering from a short siege of illness.

The Lynmore is giving Saturday night shindigs quite regularly. After attending two in succession Ye Ed has decided to call it a day. With Mr. De La Hunt in charge of refreshments on the last two occasions, these parties proved to be quite merry. Quite merry, indeed! Especially around two in the morning, I think there should be a law against grape juice.

After a protracted absence, Charlie Seibert returned to New York and announced that he had been shifted to the Wichita. He is about to embark on a voyage to the Far East via intercoastal. On the occasion of his visit this time, our old shipmate was in exuberant spirits, having successfully completed negotiations with the War Department for a much overdue compensation for disability.

Joe Perlman, who was going strong on the ponies during the early part of the season, reports they have been lying to him lately. Joe is thinking seriously of taking up radio again and is a daily visitor at 75 Varick. Better luck next season, Brother.

C. D. Guthrie, who received thousands of applicants for radio jobs while presiding as supervisor of radio for the U. S. Shipping Board in this port, was a visitor at headquarters on two occasions and has kindly contributed a bit to CQ in this issue.

I. Margolis, who left the Scanmail some time ago, is still with us on the beach, as is J. Dudor, formerly of the same vessel. For some reason

(Continued on Page 28)

Boston Notes

The regular fall shake-up and lay-off of the Eastern Steamship Lines has added a few familiar figures to the Boston beach. The fair-haired boys of the Eastern (i.e. survivors of this autumnal debacle) are as follows: Chief fair-haired boy Jerry Travis and E. Vatcher in the "Yarmouth," Boston to Yarmouth; Ed Stewart and Charlie Marsh (that handsome couple) in the "Evangeline," Boston to Saint John; Munroe and Saunders in the "Acadia," Boston to New York; Gordon Glenn and William Reid in the "Saint John," Boston to New York.

Ed Russek, still in charge of radio communications on the collier "Walter D. Noyes," insists the Personal Mention columnist in the September CQ misrepresented him regarding his alleged delight in breathing coal dust. Paraphrasing Sophie Tucker, a good job is hard to find, declares Edmund. Hence his devotion to WJCY.

According to the Boston Post, T. Van Norman, Boston brasspounder, will soon be sauntering along Atlantic Avenue sporting a swanky cane fashioned of the vertebrae of a ten foot shark. The cane is being made for Mr. Van Norman by Joseph Ramsey, a Boston machinist.

Ah, times be cruel hard, brothers. "Bugs" Rice, whom you all know to be long a crack operator in the Savannah Line, recently made a relief trip on a lowly beam trawler. "Bugs" has been on the beach here on sick leave for an extended period. We'll wager that his first few days on the trawler convinced him that he had never been really sick before.

This columnist has noted a marked increase in the skill and efficiency of the average collier operator. There was a time when these brethren took a fiendish delight in breaking the eardrums of everyone from Cape Cod to Hatteras with their ten thousand kilowatt spark sets. Nowadays you never hear one of them test his spark note for five minutes before sending a four word msg to WIM. Well, hardly ever. . . .

A Boston operator recently was unable to renew his license because of his inability to fulfill the citizenship requirement, and was forced to relinquish his assignment. There are one or two other licenses in danger here because of the dubious citizenship status of the holders. We feel genuinely sorry for the men thus affected by the citizenship bill we sponsored, and sincerely hope that when their citizenship claims are cleared they resume activity in the profession. Lest these fellows become embittered we remind them, poor consolation though it is, that had they been American citizens in a foreign country, they would never have possessed original radio operators' licenses.

U. S. Radio inspectors in the various ports of the country have received questionnaires from the F. R. C. asking their opinions of a proposed eight-hour day for radio operators. Boston and Norfolk inspectors have assured this reporter that they are heartily in favor of the eight-hour day and believe it to be a just and necessary reform. It is safe to assume that all radio inspectors are of the same opinion, and it is to be hoped that the lawmakers will be guided by the opinion of these local inspectors who, more than any other government officials, understand our work and our problems, and are aware of the inadequacy of present radio laws, and the unfair discrimination against radio operators.

New assignments have been few during the past month. Bob Miller, who has been true to the fishing industry ever since his first trawler

ASSOCIATION NEWS

Authorized representatives of the American Radio Telegraphists Association, Inc., 20 Irving place, New York City, are as follows:

Boston, Richard J. Golden, 79 Otis Street
New York, Pietro Rametta, 20 Irving Place
Baltimore, Christopher Kelley, 650 West Fayette Street

Miami, D. W. Scott, P. O. Box 2254
New Orleans, Forrest H. Flanders, Y. M. C. A., Box 314, 936 St. Charles at Lee Circle
Great Lakes, Arthur H. Freitag

Port Arthur, (Gulf representative), Hoyt S. Haddock

Baytown, Texas, Ralph E. Knudsen
Beaumont, Clyde B. Trevey

Those wishing to represent the organization in Seattle, Portland, San Francisco, Los Angeles and San Diego should communicate with the secretary, 20 Irving Place N. Y.

The inactivity of Mr. Flanders at New Orleans for the past few weeks was due to his becoming an inmate of the local Marine Hospital. As this goes to press Brother Flanders announces that he was released but is returning once more for removal of tonsils and will be back on the job within a week.

LEGISLATION MATTER

As a result of the recent elections and the surprising defeat of Representative F. H. La Guardia of New York, whom the association had hoped to have present its case for an eight hour day bill at the next session of Congress, we have suffered a severe loss in that stout-hearted champion of right. Nevertheless, our battle is far from lost. We have with us yet, Senators Wallace H. White, Jr., of Maine, C. C. Dill of Washington, Hiram Johnson of California, and we are setting forth on a campaign to enlist the aid of many new members of Con-

gress in our demands for equality in the matter of working hours with other workers.

For the past few weeks a committee has been drafting a measure which was placed before the membership and with slight modification approved at last meeting. The measure as amended, follows:

AN ACT TO PROMOTE THE SAFETY OF LIFE AT SEA BY REQUIRING EQUIPMENT AND AN EFFICIENT RADIO SERVICE ON SEA-GOING VESSELS.

Be it enacted, That all sea-going vessels of 1600 tons, gross tonnage, or over, leaving or attempting to leave a port of the United States to navigate the ocean or the Great Lakes, shall be equipped with radio apparatus capable of transmitting and receiving messages over a distance of at least one hundred nautical miles by day under normal conditions.

That an apparatus with an independent power supply, capable of maintaining communication over a distance of one hundred nautical miles for a period of six consecutive hours by day must be provided.

That this Act does not apply to vessels which, in the course of their voyage, do not go more than 200 miles between ports or more than 20 miles from the nearest land.

Sec. 2. That all vessels 1600 to 5500 tons, gross tonnage, shall maintain a radio service for at least eight hours per day while the ship is being navigated.

That all vessels over 5500 tons, gross tonnage, shall maintain a radio service for at least sixteen hours per day while the vessel is being navigated.

That all vessels carrying, or licensed to carry, twelve (12) or more passengers shall maintain a continuous radio service while the vessel is being navigated.

That the hours of service for vessels required to maintain an eight (8) hour and a sixteen (16) hour service per day shall be as under:

Zones	Western Limits	Eastern Limits	Duration of Hours of Service (Greenwich Mean Time)	
			8 Hours	16 Hours
A Eastern Atlantic Ocean, Mediterranean, North Sea, Baltic.	Meridian 30° W. Coast of Greenland.	Meridian 30° E. south of the coast of Africa, eastern limits of the Mediterranean, of the Black Sea, and of the Baltic, Meridian 30° E. to the north of Norway.	From 8h to 10h From 12h to 14h From 16h to 18h From 20h to 22h	From 0h to 6h From 8h to 14h From 16h to 18h From 20h to 22h
B Indian Ocean, Eastern Arctic Ocean.	Eastern limit of Zone A.	Meridian 80° E. western coast of Ceylon to Adam's Bridge, thence westward around the coast of India.	From 4h to 6h From 8h to 10h From 12h to 14h From 16h to 18h	From 0h to 2h From 4h to 10h From 12h to 14h From 16h to 18h From 20h to 24h
C China Sea, Western Pacific Ocean.	Eastern limit of Zone B.	Meridian 160° E.	From 0h to 2h From 4h to 6h From 8h to 10h From 12h to 14h	From 0h to 6h From 8h to 10h From 12h to 14h From 16h to 22h
D Central Pacific Ocean.	Eastern limit of Zone C.	Meridian 140° W.	From 0h to 2h From 4h to 6h From 8h to 10h From 20h to 22h	From 0h to 2h From 4h to 6h From 8h to 10h From 12h to 18h From 20h to 24h
E Eastern Pacific Ocean.	Eastern limit of Zone D.	Meridian 70° W. south of the coast of America, west coast of America.	From 0h to 2h From 4h to 6h From 16h to 18h From 20h to 22h	From 0h to 2h From 4h to 6h From 8h to 14h From 16h to 22h
F Western Atlantic Ocean and Gulf of Mexico.	Meridian 70° W. south of the coast of Amer. east coast of America.	Meridian 30° W. coast of Greenland.	From 0h to 2h From 12h to 14h From 16h to 18h From 20h to 22h	From 0h to 2h From 4h to 10h From 12h to 18h From 20h to 22h

Sec. 3. That the radio service shall be in charge of a qualified operator whose sole duty shall be to keep an efficient radio service and maintain the apparatus in good working order. Vessels required to maintain an eight-hour service shall carry at least one operator holding a first-class radiotelegraphist's license. Vessels required to maintain a sixteen-hour radio service shall carry at least two operators, one of whom shall hold a first-class radiotelegraphist's license, and the other operator shall hold a second-class radiotelegraphist's license or higher. Vessels required to maintain a continuous radio service shall carry at least three operators, two of whom shall hold first-class radiotelegraphist's licenses, and the other operator shall hold a second-class radiotelegraphist's license or higher.

An applicant for a first-class radiotelegraphist's license shall be at least twenty-one (21) years of age and must have had at least one year experience on a second class radiotelegraph license. An applicant for a second-class radiotelegraphist's license shall be at least nineteen (19) years of age.

In the next issue the name of the sponsor will be announced and it is absolutely imperative that every member get busy at once, writing to his senators and representatives asking support of this legislation. Do not wait for your brother operator to act. Do your bit in the campaign. Remember, you are the one to benefit directly from such legislation! Point out the necessity for the enactment of the bill or a similar measure, and when it is passed the depression for the majority of our idle operators will be over.

There is every indication that the International Treaty for Safety of Life at Sea will be ratified shortly after the Senate convenes.

The treaty itself, once ratified, will help to clear out our static-rooms. But the treaty itself is not sufficient. It contains several "jokers" which our bill is designed to clear up for the American operator. For instance, there is a provision for an auto-alarm on certain vessels to substitute for sixteen hours daily service by competent operators. There is a distinction made between a radio service and a radio watch—only the service being maintained by competent operators, and the watch left to auto alarms and to student operators whose code ability is such as to preclude the possibility of their reading traffic at a normal rate of speed.

We must bend to the task and work with a will to accomplish our object. Everyone must do his bit. When the beaches are cleared and the demand for operators increases, the association will be in an enviable position. The depression has wrought havoc with the schools which for two years have not sent out their normal supply of students into the marine fields. There is a steady decrease to be expected in the renewal of telegraphists' licenses which will

work to our advantage. The segregation of telegraphists and telephonists reduces the chances of either holder filling the other's boots in slack seasons. As a matter of fact, the passage of such a measure as we are now advocating, should put every available telegraphist to work and through this demand for operators work to our advantage in securing fair wages.

Don't let us down in this campaign, brothers. It is the most important measure we have undertaken and the success of the organization depends wholly upon the spirit of the members at such a time as this.

But what is the use of speaking further? Let's get started!

RADIO SCHOOLS—GOOD AND BAD

We are pleased to reproduce an interesting letter sent to a prospective student by one reliable radio school. A little more of this honest dealing by our schools would be appreciated by all. In these days when employment is anything but certain for long experienced operators, how any school can GUARANTEE employment to green stock is beyond us. Why not straightforward dealing, and honesty of policy? We think the following is very commendable and respectfully refer it to the attention of some of our less reliable outfits who apparently seem only interested in keeping the mill going and the "kitty filled."

I have your letter of the 5th., and note what you say about a guaranteed job.

Any such guarantee is fraudulent on the face of it and should be sufficient within itself to indicate to you that the school that gives it is, to say the least, unreliable.

We do not guarantee jobs. We do guarantee our course of instructions to train you so you will be capable of holding a job, but that is as far as we can go in justice to you and ourselves.

If the school you refer to made you a guarantee of a job when you finished their course and collected \$127.00 from you on the strength of such a guarantee, you ought to demand your money back, or turn the whole matter over to the Postal Inspector of your District. The U. S. Government does not countenance the misuse of the mails in any such way.

Should you decide to enroll for our Code Course you can obtain tapes through us at wholesale, price list enclosed, containing all the practical material of our course. When you have completed our course should you be unable to pass the code test for your 2nd class commercial examination, we will promptly refund your money.

There is no prospect, that we know of, for automatic machines to replace code operators.

Yours very truly,

CORRESPONDENCE SECTION

Dear Mr. Haddock:

Since our talk concerning the radio union now being formed, I have made a list of some of the changes which I believe to be necessary, desirable and beneficial for the advancement of commercial radiomen of today, and maintaining a standard of which we should be proud.

Before giving this list, I would like to say a few things in connection with the future end of a union for the commercial radiomen unless they show more "back-bone" as a body and with a leader than they have shown individually during the past three years.

I have noticed that regardless of where radio operators may meet—in church, in radio schools, drug stores, cafes, in the static "waiting rooms" or on the street corners, there is always talk of the "dirty deals" of this company or that, poor salaries, long working hours and under trying conditions, and the general unfair treatment received all the way around. We all kick about these things continually. Do we do anything to remedy this kind of deal? No! Absolutely not! Not one of us dare open our mouth in our own defense. Have I made an effort to help our profession? Yes, several times but got only far enough to learn that there were no marines at the gang-plank to keep me from leaving the ship, and that there were plenty operators starving ashore who would gladly relieve me. After two requests to "get off" or change my attitude, I gave up. Perhaps some few others have said a few things but, no doubt, with the same results. No one can win a battle single-handed and I must eat, so I follow the gang now.

Are we going to tolerate the membership of operators who will not stick together and fight? Fight for their deserved rights? If so, we don't want a union! The game will be worse afterwards than at present.

My appeal to all operators then is, "Join hands with your brother of the radio profession and fight with all we have." If we do, there is only one end. WE CAN'T LOSE! Just pass it on to the other operators that I'm with them to the last ditch, but no farther UNLESS THEY, TOO, cross with me.

Here is a list of the changes I would like to see made:

1. Operators must not be compelled to stay aboard the vessel while in port for the purpose of checking cargo, etc., or do any other work that is really the duty of the mate-on-watch.

2. Set a standard salary for tankers, freighters and passenger ships. Same on vessels carrying only one man, same on all vessels carrying two operators and on the larger passenger ships, a higher standard according to work done.

3. Prohibit operators from doing any class of work on the typewriter unless paid extra and according to the amount of work done. Same for any other class of work for the mates and captain.

4. Standard working time of eight (8) hours per day. Mates and engineers, licensed men, are required to work only eight hours except in cases of emergency.

5. Prevent the installation and operation of any class of radio receiving set on board any vessel except in the radio room.

6. Operators in all classes of stations ashore, broadcasting, point-to-point, research work or any others licensed by the Federal Radio Commission, must have at least a Second Class Commercial License and six months satisfactory service in a station open to public service.

7. Make a change, as far as practicable, in government examinations at least once each twelve months.

8. Eliminate all simple matters, require more

questions to each sheet and to be more comprehensive in scope for all commercial license government examinations.

There are a few others that I could name but they are those things that can easily be adjusted once we have corrected the above.

Assuring you that I am for the union one hundred percent, will say that I have already hoarded my membership fee and will apply for my membership upon my arrival in Port Arthur about the 27th of this month.

With best of luck and a strong push in your efforts to help us, I say,

Vy 73 OM

Mr. Benjamin Beckerman writing to the Senate Interstate Commerce Committee points out:

The only man in the American Merchant Marine working twelve hours a day is the radio man.

The most poorly compensated man for services rendered in the American Merchant Marine is the radio man.

The largest reduction of salaries made in the American Merchant Marine is that of the radio man.

There are numerous radio men in the American Merchant Marine at present receiving fifty dollars per month, out of that amount they have got to dress as their brother officers, save for a rainy day, and contribute to their dependents.

At present there is a large number of radio men idle on the beach, without funds, at the mercy of charity.

In a period of ten years a radio operator is granted renewals of five licenses while deck and engineer officers are granted only two, this is the only case where a radio operator gets more of something than his brother officers.

A five or ten year license for radio operators would be a large saving to the U. S. Government.

The U. S. Government is the only nation having a short term Commercial radio operator's license.

The American radio men have no chance for advancement in the American Merchant Marine as do the men in the Army or Navy, neither does he get a vacation with pay or a pension after years of service, all other officers licensed in the American Merchant Marine get all of those privileges.

Dear Mr. Delaney:

While in Providence, I was paid a visit by a student from the local radio school there. He wanted to see the apparatus and get a little data on commercial operating. It seems as though he had been "pumped up" at this school as to what a well paying profession radio operating is, and was all steamed up to get his license and get out. He said he had about two months more of school before taking the examination.

I do not know whether he represents the average student from that school, but if he does, I can't say very much for the school. The apparatus aboard this vessel consists of a two kilowatt modified type "G" Kilbourne and Clarke transmitter, with the large two KW navy spark gaps mounted on the panel front. He asked if I would start up and give him a little explanation, to which I consented. After getting the layout started up and stepping on the key a couple of times, he asked me where the tubes in the transmitter were located, as he could not see them. I then explained that it was a spark transmitter and used no tubes.

(Continued on Page 29)

EARLY RADIO HISTORY

(Continued from Page 16)

felt the effect of the new attempts at monopoly. In fact it was claimed human life at one time in danger meant nothing in an effort to put through a wireless message from an outside installation by way of a Marconi installation. Officials of the company denied later that extreme was intended, but some employee evidently failed to use his judgment.

The de Forest Company was getting some installation work in the form of land stations for private owners wanting news, or for point to point wireless work where no outside messages had to be relayed. The U. S. Navy was interested in wireless for its boats and the de Forest Company was favored with several of these installations.

Professor Fessenden was making some advances in apparatus developed for the new

ing from a trip to England, had differences with his company, which brought about his resignation. He had just recently applied for patents on a development which he called the audion, not considered at the time as of much importance. It was a bulb resembling in many features an electric bulb with certain gas content, a filament, a plate, and what he had added to what was then known, a grid or screen. Previous to this time as far back as 1884 Thomas A. Edison had noted that a plate sealed in a tube with a filament on which alternating current was flowing showed a direct current reading from the plate, which was termed the "Edison effect." In 1905 Professor J. A. Fleming of England had utilized this in his radio work, and it became the property of the Marconi Company of England, which by its agreements with subsidiary firms established in various countries naturally were entitled to the exclusive use of this in their respective territories.



Marconi office to which the transferred United Wireless men reported. J. B. Duffly sitting at desk at left; E. E. Bucher, at desk by the window

means of intelligence transmission, and in 1906 successfully carried one of these in the courts against the de Forest Company, by the efforts of the National Electric Signaling Company, of Pittsburgh, which had been formed to promote his devices. The National Electric Signaling Company did not build any stations of its own, nor was it interested in owning any boat installations, it was making every effort to sell equipment for the construction of wireless stations on land as well as on boats, but in these early days both the Marconi Company, and the de Forest Company had many stations of their own scattered around the country.

The Branly coherer, a device used in registering the wireless signals, was the early pride of the Marconi Company. A similar device, but of a liquid nature, was used by the National Electric Signaling, and de Forest soon developed his own which he termed a decoherer. These were hard items to get around in the early days of wireless, and each of the owners scanned carefully every installation of the other to see that its patents were not infringed at this point.

On November 28, 1906, Lee de Forest return-

In 1907, the United Wireless Telegraph Co. had been organized to take over the American de Forest Wireless Telegraph Company, Lee de Forest having left the organization.

Wireless in the early days knew no boundaries, it was international. We find Lee de Forest in England trying to sell his equipment, in France, and in Germany. We find in the United States, the Marconi Co., the de Forest Company, the Telefunken Co. (German), and the National Electric Signaling Co., all competing for radio installation jobs for the United States government, and in the case of the Arlington station, the biggest installation of the time, the contract going to the National Electric Signaling Co., which was utilizing the developments of Professor Fessenden.

As early as 1912 we find the National Electric Signaling Co., which was owned by only five stockholders, claiming to have invested \$1,000,000 in the hope of future profit in their company although incorporated in 1902 with capital stock of \$100,000.

The Marconi Company of America at this time had a capital authorized of \$1,665,000 do-

(Continued on Page 22)

TRANSOCEANIC COMMUNICATION

(Continued from Page 13)

The alternators made possible surprisingly good communication during the cool six months of the year, but heavy static during other seasons always hampered traffic and frequently imposed serious obstacles to continuous transmission. It became very evident, therefore, that long wave radiotelegraphic communication was too seriously affected by the elements to provide satisfactory day in and day out service with regular and reliable capacity.

By 1926, short waves generated by improved vacuum tubes, and directional transmission had made their appearance on wavelengths of approximately 30 meters, or frequencies of 10,000 kilocycles. Here were found surprising possibilities for speedy transmission, it being frequently possible to transmit at the rate of 200 words a minute, as compared with 30 to 60 words a minute with the long wave method. It was also found that the old enemy "static" had almost disappeared, although its place was taken by a new and very troublesome phenomenon called "fading." It was observed that a fading period might last anywhere from a few seconds to several hours, during which time the signal disappeared entirely and the circuit ceased to operate. Further observation revealed that fading did not affect all the wavelengths of this band with equal intensity at the same time. Frequently, when signals would fade out completely on one frequency, good communication was possible on another frequency. Therefore, it was possible to make use of the various wavelengths in the 30-60 meter band during certain hours, but radio science had to contend with blank periods of each day during which no communication was possible.

The use of shorter wavelengths, between 14 and 25 meters, followed in 1927, and in this band were found working conditions that were much more regular and useful. Fading was found still to be present, but the periods were usually of shorter duration. However, momentary fades of extremely brief duration gave radio engineers much trouble until it was discovered that a signal which had faded at one location might still be present at another location, perhaps less than a thousand feet away, and vice versa. This led to the development of the so-called Diversity Receiving System, in which three distinct receiving antennae are placed approximately 1,000 feet apart, each supplying its own receiver. The products of these three receivers are combined in a common output to make a signal free from momentary fades.

In the band of wavelengths between 14 and 60 meters most of the world's long range radio communication is conducted today. Long experience and the compilation of exhaustive data have shown radio engineers how best to employ each segment of this part of the radio spectrum at each hour of the day between the various countries of the world. By means of modern equipment it is now possible to establish uninterrupted communication, on one frequency or another, with every country of the world equipped with similar radio facilities.

The segment of the radio spectrum next to be conquered and made useful for commercial purposes is the band between 5 and 8 meters. These wavelengths have been found to be practically free from static or fading, but their

range appears to be quite limited unless the corresponding stations are placed at high elevations. At elevations of from 2,000 to 3,000 feet R. C. A. Communications, Inc., has designed excellent communication stations operating over distances up to 300 miles, utilizing wavelengths between 5 and 8 meters. The inter-island radiotelephone circuits which now link the Hawaiian Islands operate in this band.

Interesting research work is now being conducted in the wavelength band between 50 centimeters and 1 meter. These extremely short waves appear to have many of the properties of light in that they may be made extremely directional by use of suitable reflectors. The distance over which they may be used will probably be found to be still more limited—perhaps not exceeding fifty miles.

It is too venturesome to attempt to foretell what the ultimate development of radio communications may produce. But there are certain classes of service which have been either already attained, or which show definite promise of future usefulness. Communication by radiotelegraph may now be regarded as thoroughly practicable, since it is possible to maintain constant contact with remote points for 24 hours each day. Similarly, radiotelephony between continents may now be regarded as an attained commercial accomplishment. Next in order is facsimile transmission.

Although intensive experimentation has been conducted for years with long distance, facsimile transmission, this art is not yet in the state at which it offers better or even equal economy in transmission as compared with existing telegraph or telephone services. It is understandable that as more exacting tasks are demanded of radio, it becomes necessary to provide means of transmission that are at once more comprehensive and more rapid. Enough has been learned, however, to support the belief that further development will result in a vastly improved facsimile service for the transmission of all kinds of intelligence. Such a service would permit the economical and rapid facsimile handling of ordinary telegrams on a competitive basis with existing telegraph services.

The list of radiotelegraph circuits now in daily use, in order of the years in which service was inaugurated, is as follows:

1920; Great Britain, Hawaii, Japan, Norway, Germany (Berlin), France.

1921; Germany (Hamburg).

1922; Italy and Poland.

1924; Argentina and Sweden.

1925; Dutch East Indies.

1926; Brazil, French Indo China, Holland.

1927; Philippine Islands, Hawaii—Philippines, Dutch Guiana, Colombia, Venezuela (Maracay), Belgium, Porto Rico, China (Hong Kong, via Philippines), China (Shanghai, via Philippines), Turkey.

1928; Venezuela (Maracaibo), Canada (Montreal), Portugal, Australia (via Montreal), Dutch West Indies (Curaco), Liberia, Cuba.

1929; Fiji Islands (via Hawaii), New York—San Francisco, Spain, New Orleans—Porto Rico, Syria, Costa Rica.

1930; Chili (Santiago), Panama, San Francisco—Panama, Moscow, Czechoslovakia (Prague), Santo Domingo.

1931; Mukden, San Juan—Ensenada, Porto Rico.

1932; Mexico City, Switzerland (Berne).

(Reprinted by permission of The RCA News.)

EARLY RADIO HISTORY

(Continued from Page 20)

ing an annual business of \$120,000 a year, having 12 land stations, and 350 ships.

The United Wireless Telegraph Company, originally a de Forest Company, with an authorized capital of \$20,000,000, and having 55 shore stations, and over 450 steamer installations.

There was also a smaller American concern, the Missouri Company with an authorized capital of \$300,000. There were, of course, even smaller than this, who having left only light "footsteps on the sands of time," we are not mentioning.

Early in 1912 the United Fruit Company, operating a fleet of boats mainly between the United States and Central and South America, had twenty of their boats with wireless equipments, intended to equip the balance of their seventy boats as well, and owning two land stations in Gulf of Mexico ports. They were not interested in selling equipment but owned all their own installations outright.

The Beginning of Legal Battles

Ship equipment and land stations were the only means of income in these days. Of course there was "traffic" which brought in revenue, but only the Marconi Company, and the de Forest Company under the name of United was interested in this traffic. The Telefunken Co. (German), and the National Electric Signaling were suppliers of materials for wireless stations.

To give a picture of the already forming legal tangles in the radio business of 1912, we find the Marconi Company of America suing United Wireless Telegraph Company and National Electric Signaling Company. The National Electric Signaling Company suing the Telefunken Company, The United Wireless Telegraphic Company, the Marconi Company, the Wireless Specialty Company, and the United States government. All of these suits based on patent infringements on equipment, and in the case of the United States government for having purchased and used equipment which the Signaling Company claimed was infringing. The National Electric Signaling Company being sued by Professor Fessenden in turn itself, according to congressional investigation testimony of Rear Admiral Edwards.

Professor S. M. Kintner, general manager of the National Electric Signaling Company, being asked by Senator F. E. Burton during an investigation in the matter of a monopoly, replied:

"We claim no monopoly other than such as would be given by our patents. The Marconi Company have a monopoly, to a certain extent along their line of development. We claim nothing more than the monopoly that our patents would give us."

In February 1912, the United Wireless Telegraph Company being unable to meet their obligations were forced into bankruptcy, and some 30,000 stockholders who had invested several millions of good American dollars were anxious to know what had become of their money. What was left of United Wireless in April of 1912 was taken over by purchase by the American Marconi Company. We quote from the RCA News of May 1932, "published at New York for its employees by the Radio Corporation of America."

"Around about the RCA circle are a few men to whom this month of April brings thoughtful memories. These memories are of days when radio was young, days of hopes and anxieties during the regime of the United Wire-

less Company, the shortcomings of which, now so clear, were then not perceptive.

"To these men 'United' was making history—and they were part of it! Every new long distance record, every addition of a new station and every fresh contract for business, were signals for elation. The then infant art of radio had no more loyal supporters than they who staunchly stood by old 'United' in her vain struggle for existence.

"Then came the eventful day in April, 1912, when the United standard was lowered and in its stead was unfurled that of the faithful Marconi Company—the personnel of which later formed the nucleus of Radio Corporation."

This practically gave the Marconi Company complete control of ship to shore, and ship to ship communication, and their 7,500 stockholders in America at the time were a little uncertain as to whether they were better off or not for their investment in the stocks of the Marconi Company. Land stations at the time cost about \$10,000 each and ship installations roughly about \$1,200 each. The Marconi Company of England, and the various subsidiary companies in other countries had an authorized capital of \$20,000,000 which up to 1910 did not show any profit to stockholders.

Lee de Forest, after leaving his original company in 1906, had formed the Radio Telephone Company, but business was not doing so well and three years later he joined up with the Federal Telegraph Company which had been formed in 1907 and was operating several land stations on the west coast. While on the west coast working with his audion development, he accidentally ran into the effect later termed regeneration, but failed to patent the circuit causing him much trouble at a later date as we will find later.

In 1914 de Forest got into a legal scrape with the Marconi Company on his audion, the Marconi Company already controlling the Fleming patent which was essential to the audion, and lost his case.

The only radio, or as it was known then wireless used commercially in 1914 was the telegraph form of sending messages, by dot and dash signals. We learn from a pamphlet issued at the time by the Marconi Company of America which was practically alone considering the volume of business handled that a message by wireless from New York to any point in Great Britain or Ireland could be sent for 8½c a word, a Marconi lettergram of 13 words from New York to London for 60c, and a Marconi lettergram from New York to London of 25 words for \$1.00.

In 1915 we find the Marconi Company of America putting out and paying for a booklet in which is quoted:

"Monopoly in a publicly used communication system invariably produces efficiency."

From the above we can believe that they felt pretty good in their virtual control of wireless communication. Since economists generally agree that there are only three methods of a monopoly, control at the source, control of distribution, and patent control, the latter of which they seemed pretty strongly entrenched in, they probably had good reason for their comfort.

M. R. Rathborne advises us that he has joined the forces of Dr. Lee de Forest. Dr. de Forest is devoting a good part of his time to the study and development of the television field, and we understand some real news on this subject may be coming anytime now from the laboratories of Dr. de Forest, at Hollywood, Cal.

If you want to advance in radio

. . . it will pay you to send now for this new book, for 10 days' free examination.

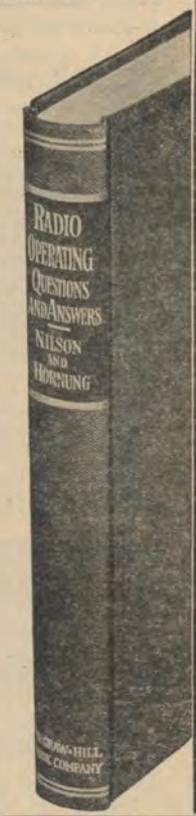
NEW FOURTH EDITION

NILSON and HORNING'S

RADIO OPERATING QUESTIONS AND ANSWERS

Over 600 Questions and Answers

350 pages, 6x9, 131 Illustrations, \$2.50



NOW COVERS
 broadcasting, marine, police, aeronautical and amateur radio operating
 New edition also includes:
 —many new questions and answers on tube transmitters and other equipment and apparatus
 —complete answer to important question of attenuation pad calculations
 —new radio laws and regulations, including license regulations which became effective July 1, 1932
 —more information on amateur operation, including unlimited amateur telephone operator's license

HERE is a book that will help you pass examinations and to know your stuff better in any field of practical radio. Gives over 600 questions and answers covering all radio operator license examinations. Planned especially for men shooting for operator licenses or for technical positions in radio, and for amateurs and short wave fans. New fourth edition covers broadcasting, marine, police, aeronautical and amateur radio operating.

Questions are taken almost entirely from government and other license examinations. They are typical and cover all subjects on which you need to be prepared. Questions are grouped under such topics as Tube Transmitters, Motors and Generators, Receiving Apparatus, etc. Other sections give requirements for various licenses and then show what sections of book to study to cover all the requirements for any given license. Answers are complete and made clear with descriptions, illustrations and diagrams.

If you want to advance in radio send for this book today. It will cost you nothing to examine it; it will point a quick, direct way to preparation for any license examination.

See this book for 10 days FREE

Send this coupon

McGraw-Hill Book Company, Inc., 330 W. 42nd St., N. Y. C.
 Send me Nilson and Hornung's Radio Operating Questions and Answers, postpaid, for 10 days' Free examination. I will send \$2.50 or return the book within 10 days of receipt.

Name

Address Position

City and State Company CQ-10-32

(Books sent for free examination to retail purchasers in U. S. and Canada only)

“I SAW YOUR AD IN CQ.” Tell this to our advertisers, it helps all of us

THE MADRID CONFERENCE

(Continued from Page 11)

officers of a foreign nationality during a longer period than is provided for above each contracting government shall take suitable steps so that all the enterprises operating radiocommunication services conform to the regulatory provisions.

2 (1) There shall be two classes of titles or certificates for officers of radiocommunication:

A. Title or certificate of an officer of radiocommunication of the first class.

B. Title or certificate of an officer of radiocommunication of the second class.

(2) Each government shall be free to fix the number of examinations and the aptitude judged necessary to obtain the respective diplomas, one or other of these diplomas qualifying the holder for the different radiocommunications with the difference that, for each class of station the speed of transmission and of reception as well as the degree of technical knowledge required will be taken into consideration.

The minimum conditions for obtaining the title or certificate of officer of radiocommunication shall be as follows:

A. First Class

The 1st class title or certificate shall state the professional and technical ability of the officer of radiocommunication in connection with:

a. Theoretical and practical knowledge of the general principles of electricity and their application to radiotelegraphy and radiotelephony or to any other means of radiocommunication as well as theoretical and practical knowledge of the instruments used for radiocommunication.

b. The necessary practical knowledge for making repairs to radiocommunication equipment and especially for repairs on board of damages which may occur in stations on ships and aircraft.

c. Correct transmission and reception by ear of code groups (combinations of letters, numbers and punctuation marks), at a speed of 20 (twenty) groups per minute, and of a text in clear language of the nationality of the applicant, at a speed of 25 (twenty-five) words per minute. Each code group shall include five characters, each number or punctuation mark counting as two characters. The average word of the text in clear language must include five characters.

d. Detailed knowledge of the regulations applicable to the exchange of radiocommunications, knowledge of that part of the regulations dealing with the safety of life at sea, and of the other regulations dealing with maritime or aerial radiotelegraphy and finally knowledge of the special provisions governing the various radiocommunication services.

e. General knowledge of geography, especially for the principal lines of navigation and of communications by wire and wireless.

e bis. Adequate knowledge of a language—French, English, Spanish or one other language—other than the language of the nationality of the applicant; the latter must be able to express himself suitably in one of these languages both orally and in writing.

In order to be allowed to take the examination for obtaining the first class title or certificate, the officer of radiocommunication must have had the professional experience of at least one year in practice on board a ship or in a coast, land or aerial station.

B. Second Class

The second class title or certificate shall state the professional ability of the officer of radiocommunication with regard to:

a. Elementary theoretical and practical knowledge of the general principles of electricity and of their application in radiotelegraphy

and radiotelephony or in any other mode of radiocommunication as well as theoretical and practical knowledge of the operation of the instruments used for radiocommunication.

b. The necessary theoretical and practical knowledge needed for making repairs to radiocommunication apparatus and especially for those repairs, with the means at hand, of damage which may occur in those stations on board ships and aircraft.

c. Correct transmission and correct reception by ear of code groups (combination of letters, numbers and punctuation marks), at a speed of 16 (sixteen) groups per minute and of a text in clear language of the nationality of the applicant, at a speed of 20 (twenty) words per minute. Each code group must include 5 characters, each number or punctuation mark counting as two characters.

d. Knowledge of general geography especially for the principal navigation lines and communications by wire and by wireless.

e. Detailed knowledge of the regulations applying to the exchange of radiocommunications, knowledge of the documents concerning rates for radiograms, knowledge of that part of the regulations dealing with the safety of human life at sea, and of the other regulations dealing with maritime or aerial radiotelegraphy and, finally, knowledge of the special provisions which govern the various radiocommunication services.

e bis. Adequate knowledge of a language—French, English, Spanish or one other language—other than the language of the nationality of the applicant, the latter must be able to express himself in a suitable manner in one of these languages, both orally and in writing.

REASONS

The speed of transmission and reception which we propose is justified by this consideration that if there is one aspect of radiocommunication where it is necessary to have both speed and good technique, it is precisely in the communications assured by mobile stations. Experience has shown that in the case of an S. O. S., it is necessary to reach the highest transmission speed and to have the greatest professional ability for reception of all communications concerning that S. O. S. All the time that is lost, no matter how little it may seem, may cost several human lives.

With regard to technical speed we ask the honorable delegates and representatives to take into account the imperative necessity of deciding that the professionals who bear the responsibility of one station or another, must possess a great deal of technical knowledge. In fact, it is to the competence of the professional only that we confide the proper operation of the station and the efficiency of the service, that is to say, to sum up, the safety of the life of passengers and crew in the case of an S. O. S.

It is the officer of radiocommunication who must of his own initiative and by virtue of his own competence, solve all the cases of damage without being able to reach help or advice of persons who might be professionally better qualified than himself.

For the reasons which we have set forth above, we believe that it would be neither opportune nor necessary, to accept another class of title or certificate than those of the first or second class.

4. (1) In order to become officer in charge of a first class mobile station, all officers of radiocommunication of the first class must have had at least one year's professional experience either in a ship station or in a coast or land station.

(2) In order to become officer in charge of a mobile station of any other class, all officers

(Continued on Page 30)

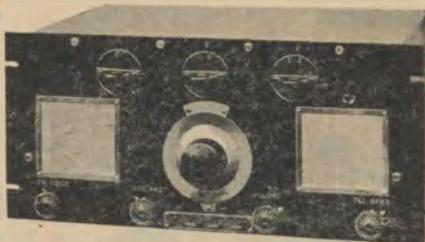


**Hundreds of Items—Only a Few Listed
Everything at Lowest Wholesale Prices**

National Products

At Prices That Are Worth Investigating

Type A.G.S. Super Heterodyne, A.C. or D.C., in stock. This receiver is unquestionably the finest on the market. Band spread coils may be secured for amateur use of this commercial receiver. Write for Special Prices.



- S.W. 58 less coils\$40.88
- Power supply for S.W. 58 23.24
- S.W. 34 less coils 38.52

- S.W. 3 A.C. model less coils for use with National power supply 20.88
- 5880 A, B and C supply 20.30
- S.W. 3 D.C. 6 volt—2½ v. tubes.... 20.88

All National Coils at Special Prices

Midget Condensers at New Low Price

COPPER TUBING

1/4"	3/16"	1/4"	5/16"
3e ft.	4e ft.	5e ft.	6e ft.
Inside			
Dia.	3/16"	1/4"	5/16"
1 1/2"	7e turn	8e turn	
2 3/8"	7e turn	8e turn	12e turn
3"	10e turn	12e turn	14e turn

**Chrisell Acoustic
Condenser
Microphones**

These units will enable you to put your phone in the "broadcast quality" class at a remarkably low figure.

Complete kit of parts for condenser head ...\$2.95
Condenser head tested and guaranteed\$7.95
Condenser head with two stage resistance coupled amplifier, complete in shielded box, tested and guaranteed \$19.75

**Hardwick
Hindle
answers**

the bleeder resistor and grid leak problems once for all.

Hundreds of other items at Big Special Prices. Constant changing of prices and merchandise makes it impossible for us to issue a catalog. Let us quote you on your needs by return mail.

NOTE—ABOVE PRICES INCLUDE GOV'T. TAX



**NAVY TYPE
TELEGRAPH KEY**

List \$3.60. Navy knob—1/4" Tungsten contacts. While they last\$1.25

Leeds SUPREME transmitting key. Ideal for beginner's practice set. List \$1.75.
Special NOW55c



**No. 398 Gold Bug Automatic
Transmitting Key**

\$12.50 list. Simple in construction, correct mechanically, and electrically rugged and durable 3/32" contacts, complete with cord and plug. Brand new in original cartons. While they last\$4.45
No. 10202 Extra heavy 3/16" contact\$5.45

We have a complete line of
**GENERAL RADIO
PARTS** in Stock

**If it's
SHORT WAVE
EQUIPMENT
We have it**

Complete line of Weston and Jewell Meters and set Analyzers at lowest wholesale prices. Let us quote you on your needs.

Genuine Type C Baldwin Phones

\$12.00 List—Mica diaphragm. Limited quantity—only 2 pair to a customer.
Special\$3.95
Erpe imported 4000 ohm featherweight phones. Special\$1.35
Para imported featherweight phones\$1.35
\$5 Eiseman Head phones; 2500 ohms; brand new; complete with head band and cords\$1.00

Aerovox High Voltage Condensers

Type 1456 2500 v.		Type 1457 5000 v.	
Test		Test	
.00005 to .0005	\$29	.00005 to .00015	.38
.001	.38	.0002	.44
.0015	.47	.00025	.44
.002	.56	.0005	.53
.0025	.60	.001	.71
.003-.004	.66	.0015	.83
.005	.75		
.0075	.96		
.01	1.20		



45-B Vesey St., New York City

New York Headquarters for
Transmitting Apparatus

WHEN IN TOWN VISIT OUR STORE

Mail Orders Filled Same Day

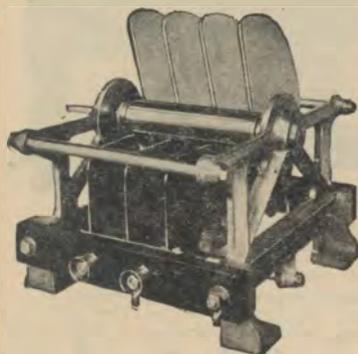
10% Cash

Must Accompany All
C. O. D. Orders

"I SAW YOUR AD IN CQ." Tell this to our advertisers, it helps all of us

CARDWELL CONDENSERS ARE UNXLD.

Everywhere Noted
For Their
Reliability



No matter
What Your
Condenser
Requirements
Write Us
For A
Quotation

"The Standard of Comparison"

ALLEN D. CARDWELL CO.

81 Prospect St.,
BROOKLYN, N. Y.

SAN FRANCISCO

When in San Francisco there
is only one place to stop

THE MANX

For years the rendezvous of
Merchant Marine Officers
On POWELL STREET
Between O'Farrell and Geary

SEATTLE

THE REHAN HOTEL

8th Avenue and Union Street

A hotel for radio operators while
in port. Come here and meet your
friends. A congenial home-like at-
mosphere.

RATES \$5.00 PER WEEK and Up

MRS. NELLIE G. WRIGHT, Prop.

AEROVOX

CONDENSERS & RESISTORS for All Radio Uses

Dry Electrolytic Condensers	Pyrohm Heavy Duty Resistors
Filter Blocks	Edison Base Pyrohms
Buffer Blocks	Tapped Pyrohm Resistors
Socket Power Condensers	Wire Wound Resistors
High Voltage Condensers	Center-tapped Resistors
Transmitting Condensers	Non-Inductive Lavites
Bypass Condensers	Grid Leak Resistors
"A" Condensers	Resistor Mountings
Moulded Mica Condensers	Interference Filters

Write for this Valuable Periodical

A free monthly publication dealing with design
factors in the use of condensers and resistors will
also be mailed, free of charge on request.



Write for Complete Catalog

AEROVOX CORPORATION
78 Washington St., Brooklyn, N. Y.

"I SAW YOUR AD IN CQ." Tell this to our advertisers, it helps all of us

ATTENTION READERS!

Seldom does a day go by that we do not receive requests for back issues of "CQ." We are pleased with this enthusiasm, BUT let's be fair. A certain number of each issue are printed. There is only one way to be SURE of getting your copy . . . that is to subscribe. We try to please everyone, but issues do finally exhaust themselves. If you like "CQ" don't trust to luck, if you are not already a subscriber send in your \$1.50 and be sure of every issue. PLEASE PRINT THE COUPON. Send to "CQ," 112 West 13th St., New York, N. Y.

Name _____

Street _____

City _____

CLASSIFIED ADVERTISING

CQ will accept classified advertising from licensed radio operators and persons employed in allied services at the special rate of five cents per word.

Remittance in full must accompany copy, closing date for classified advertisements is the first of the month preceding publication date. Provisions of paragraphs (1) and (2) apply to all advertising in this column, regardless of which rate may apply.

GUARANTEED MICROPHONE REPAIRS—Any make or model—24-hour service. Stretched diaphragm double button repairs, \$7.50. Others, \$3.00. Single button repairs, \$1.50. Write for 1933 catalog, with diagrams. Universal Microphone Co., Ltd., Inglewood, California.

FOR SALE—Radio Model Vibroplex, heavy contacts, \$10.50. Like new. Guaranteed. L. D., care CQ, 112 W. 13th St., N. Y. City.

SHORT WAVE TRANSMITTERS, receivers, portables, \$7.00 up. Inquiries welcomed. Ernest Ruland, Natick, Mass.

FOR SALE—Teleplex with 5 rolls radio tape, 7 rolls Morse. Cost \$33, will sell for \$15. J. Morgan, 74 Hyatt Ave., Harrison, N. Y.

THE LYNMORE

20 Irving Place

Headquarters of the

AMERICAN RADIO

TELEGRAPHISTS ASSOCIATION



While in New York help the institution that helps you.

RATES, \$4.00 PER WEEK, and Up.

J. C. LINDENMEYER, Prop.

"I SAW YOUR AD IN CQ." Tell this to our advertisers, it helps all of us

NEW YORK NOTES

(Continued from Page 14)

the Scanmail is having a big turn-over in operators. A two man job, she is making her third trip with two new ops, John P. Hall and T. McCarthy.

W. D. Thomas and Eddie Rocks are putting out some tall yarns anent the efficiency of their equipment on the Manhattan. From unbiased sources, however, come more reliable reports that the Manhattan is really worth-while on 600.

Pietro "Mussolini" Rametta is still threatening to take a trip to Italy to see his bambino. New York will lose a fine delegate but Mussie promises to be a really efficient European representative and to cover whatever Mediterranean vessels are unlucky enough to make Genoa. He wishes you to know that he compiled those "Odd Facts" appearing alongside his poem in last month's issue.

R. Foege, who has been on the beach here all summer, is still waiting for the Gulfenn to make a trip. Or even for any vessel to make a trip.

Herbert W. Martin has made daily pilgrimages to 75 Varick for over three months—since leaving the George Washington. G. Fitzsimmons relieved Lohman there as chief, and Charlie Porter went back as junior after an extended vacation in New England during the summer.

Alfred H. Rowe, who has been spouting short wave to all comers at Radiomarine, finally proved himself a master of the art by winning second prize in a national contest for short wave receiver design. Now, go ahead and argue with him!

John Curran drops around regularly. He is still at liberty at Radiomarine.

Willard Bliss, who is still with the Martinique, reports that vessel likely to tie up at Thanksgiving time, and that we can expect a lively time at meetings until he once more puts forth on the briny. They ought to do us a favor and keep that fellow at work!

George O. Dill, who took out the British motorship Daga some months ago when her operator was stricken with appendicitis, returned from England as a passenger of the Laconia. He went to Australia and thence to England in the Daga.

Kenneth C. Peterson postcards that he is now the proud father of a son. Congrats, Pete.

Via scuttlebutt radio comes the information that things are picking up in the Texas area. Gordon E. McCallum of H. F. DeBardleben fame, reports that there is a noticeable change for the better in the vicinity of Galveston, Port Arthur and Baytown. First bit of good news we have had in some time.

Jack Kennedy took out the American Merchant on a relief trip. No one uses the buzzer at headquarters now and the bridge games have taken on a higher degree of serenity. Jack was slated to go back in the Cristobal of the Panama Railroad Line.

Simon Golden (not our Boston Golden) made a few relief trips in the Pan Bolivar and was quite wroth when informed that he had to get off to relieve the unemployment situation for someone else. He is passing the time making intermittent coastwise trips. By the way, it was remarked that it was quite a sight to see Golden wroth—especially one day at 75 Varick street.

Johnny Lohman was transferred to the Baracoa where he is now combination operator-purser.

Louis D. Bland took one trip off from the American Banker. Dick Cuthbert relieved him.

I. Margolis got a short relief job on the Robert E. Lee.

THE MIDNIGHT WATCH

He sits in a little cabin,

Placed somewhere on the craft,
His aerial wires strung overhead
Running fore and aft.

His ship is leaving for home,

And on the midnight air
Come many signals of faraway ships,
For silence at sea is rare.

Tightly the phones are clamped on his head,

And the tubes give forth a glow,
And out of the midnight air come
The queries of those who want to know.

W S C he hears the call from K U S P

Q R U, they ask, (have you anything for me?)

W S C comes back with a roar,

As he answers the faraway call,

He tells them Q R U (for you nothing at all.)

But Q S P please to K D E Z,

(And tell him there is something

For him here with me.)

Idly he taps his tuning dial,

Thinking of nothing much at all,
But as he listens his heart gives a leap
For it's a different kind of a call.

He hears a voice

And a strain of music clear

Of a song which, to him, is very dear,

He strains his ears,

And listens to the end

And waits with bated breath to hear

What the announcer has to send.

But just then comes a burst of static,

And as he tunes his set again,

He murmurs somewhat regretfully

"I wonder who I had then?"

And thus the night passes,

As all nights must come to an end

And daylight begins to dawn in the east,

And the sun takes an upward trend.

And, as the signals grow dim in phones,

And far stations gradually fade away,

He realizes to himself that his midnight watch

Has finally changed to day.

VERNON W. MINZEY

WOR Located

The Federal Radio Commission approved of the spot picked by Station WOR, near Tremley, N. J., for their new 50,000 watt broadcast station. The station is now operated on 5,000 watts, and A. J. McCosker, the managing director, expects big things in the future of the new transmitter. Construction will begin at once.

Luckenbach Passenger Service

The Luckenbach Steamship Lines have entered the passenger service. Twenty-one modern freighters from 8,000 to 14,000 tons will be affected by this action. Points of travel will be Boston, New York, Philadelphia, Los Angeles, San Francisco, Portland and Seattle. Under the same management boats from Mobile, New Orleans, and Houston will also be available to the west coast.

CORRESPONDENCE SECTION

(Continued from Page 19)

To that he replied, "Why, they told me up at school that spark sets were no longer in use, and they give no instruction as to their operation." Then he laid his hands on top of the gaps and asked what they might be.

After explaining to the best of my knowledge what everything was about, he then started asking questions in regards to wages, conditions under which we work, etc. Just to find out what kind of a "line" the school handed them (the students), I asked him what salary he expected. He said they told him at the school he would at least get \$125 per month. When I told him what my wages were (\$66 per) he liked to have fainted, but I did give him a little encouragement by telling him that some lines were paying as high as \$100 per month. I asked him if he expected to get a job as soon as he got his license. He said he had been told by the fellow running the school that he would get all of his pupils a job. (There are 150 attending the school, so I was told.) I do not know the name of the school, but this student referred to the party who runs the school as "Sully," or some such name.

I told the student if he wanted any more information as to the existing conditions to write to the A. R. T. A., and you would only be too glad to furnish the information.

This, I think, is a good argument as to why it should be compulsory for expectant operators to serve apprenticeship under experienced men, and various types of apparatus.

Yours very truly,

Dear Editor:

In the October issue of CQ, a Great Lakes note from a correspondent mentions the arrival at the port of New Orleans of nine vessels (operating under American capital) but under foreign registry.

I am particularly interested in American owned vessels of foreign registry, seeing that my American First Class license was cancelled some months ago, resulting in my unemployment ever since because of my service aboard a foreign registered vessel of American ownership.

On applying for a renewal of my license I was told that I must take a complete re-examination because I had been sailing under a foreign flag. One wonders what a flag has to do with an operator's ability. No complaint was made that I was less capable after serving aboard a vessel of foreign registry. The reports of American shipmasters appearing on my license indicate that my services were "Very Good" and "Excellent." It seems reasonable that an excellent record should stand, especially when signed by American shipmasters covering service under them, otherwise the necessity of masters signing licenses that are to be disregarded later by government examiners, appears to be a paradoxical farce of the first magnitude.

The American owned vessel I served upon was commanded by an American master and officers. It carried modern American radio apparatus, transacted ninety-five per cent of its radio communications with American companies, and spent nineteen months of its time in American waters, where it still remains, out of commission.

The vessel flew the American flag during the last six months or more of its operation. I have a photograph to prove it. Because the vessel flew the American flag I felt that my service aboard was keeping my license valid. However, when a renewal license was requested, this matter was disregarded by the radio authorities, although a supervisor of radio admitted that the cancellation of the license was

working a hardship. One can imagine the consternation resulting if all professions were subjected to such a law.

When an American radio company can show that an operator who has been in their employ, working with their stations every month for nineteen months transacting radio business amounting to nearly \$800, and sailing for nineteen months in American waters, it seems reasonable that a renewal of license should be granted.

As an A. R. T. A. member since its organization I should be glad to see what the association can accomplish in bringing about some reasonable change in such a curious law, and the restoration of licenses to those who have lost them.

Very truly yours,

JOHN HENRY GREEN

FOREIGN NOTES

RATES OF PAY OF BRITISH RADIO

OPERATORS EFFECTIVE MARCH, 1932

Grade 1 operator on vessels with tonnage of not exceeding 3,000 tons.

Grade Operator	Class Vessel		
	Class 1	Class 2	Class 3
Grade 1 vessel not exceeding 8,000 tons	L14.8.0	12.12.0	11.14.0
8,001 and not over 12,000	L15.6.0	13.10.0	12.12.0
12,001 and not over 16,000	L16.4.0	13.10.0	12.12.0
16,001 and over	L17.2.0	13.10.0	12.12.0

Operator-in-charge on class 1 shall be paid 18 shillings a month extra.

Grade 2 operators			
With 6 months and less than 1 year service	L7.13.0	7.13.0	7.13.0
1 year and less 2 years service	L8.11.0	8.11.0	8.11.0
2 years and over	L9.9.0	9.9.0	9.9.0
Grade 3 operators	L6.6.0	6.6.0	6.6.0
Service abroad in excess 18 months per month extra	L1.10.0		

Tanker allowance $7\frac{1}{2}\%$ of monthly wages for period on tanker articles.

Where food not provided by shipowner 2 shillings 6 pence per day and must be paid directly to operator.

German operators are registering strong opposition to the combination mate-operator and have asked the aid of the British operators in combating the situation.

(Per Geo. O. Dill)

Election Campaign Brings Revenue

Senator Clarence C. Dill recently estimated that the last election brought \$5,000,000 in additional revenue to broadcast stations throughout the country. The senator quoted the price of NBC red network of 58 stations was \$12,250 an hour; blue network of 55 stations \$10,110 an hour; Columbia chain of 91 stations \$15,600 an hour.

Conference Results

At Madrid the censorship clause was modified to prevent censors from deleting parts of messages, thus entirely changing their meaning, or from holding up a message without notifying the sender immediately. This item was pressed by the American press, and is considered a victory by European correspondents of American news agencies.

THE MADRID CONFERENCE

(Continued from Page 24)

of radiocommunication must have had at least six months' professional experience in a ship station or in a coast or land station.

5. Each administration shall take the necessary steps to oblige the officers of radiocommunication to keep the correspondence secret and to avoid the fraudulent use of titles or certificates.

6. The governments concerned shall make the necessary provisions so that the holders of titles or certificates delivered by virtue of the preceding regime shall retain their rights as holders of these titles or certificates.

7. The provisions of the present article shall become obligatory within a minimum period of one year after the going into effect of the present regulations.

SHIP RADIO CRYSTAL ERA

(Continued from Page 10)

at Blaabandshook, Denmark, (OXB) may be heard half way down the English channel. The station at Cullercoats on the border of England and Scotland (GCC) is picked up in the channel; and then, in order, Dover, North Foreland, Niton, and Land's End—the latter four along the south coast of England. Also while the ship is passing through the channel and into the Atlantic, the Holland station (PCH), Belgian station (OST), and the French Eiffel Tower station (FL), and Ushant (FFU) are heard in operation.

The English station at Land's End (GLD) is heard at a distance of 650 miles from shore; Ushant, France, station at a distance of 750 miles, and the Poldhu, England, station (MPD) at a distance of 1,600 miles from shore. The station at Crookhaven, Ireland, is heard at a distance of 850 miles from shore. Shortly after Poldhu's signals are unreadable on the ship's set, Arlington (NAA) near Washington, D. C., is picked up; then Cape Race (VCE), Bar Harbor Me., (NBD); Cape May, (NSD); and finally, within 250 miles of New York, Brooklyn Navy Yard—NAH, WCI, NBD, and WSE are picked up in turn.

As the ship nears New York harbor she enters a field where the radio traffic is very heavy and it is remarkable the number of messages that are sent and received between ships and shore stations in an area where so many stations are in operation. Modern tuning gear makes it possible to adjust for strong signals to or from a desired station or ship. This, and the fact that the various stations employ different signaling tones gives the operator a chance to listen to calls from all stations and to dispatch his messages to any desired station so they may be delivered many hours before the ship reaches New York.

A STEAMSHIP LINE WRITES

To all Masters:

There have been several instances, recently, or question arising in the minds of the Masters of vessels regarding their proceeding to sea without the services of their radio outfits, or of radio operators.

No vessel is required by U. S. law to carry radio apparatus unless she carries fifty persons. Except in the case of the —, and in her case only when she carried fifty or more persons, passengers and complement combined; our vessels are voluntarily equipped with radio.

Dispensing with the services of the apparatus or operators is, therefore, a matter of Company policy only.

Whenever the question arises Masters are authorized to proceed at their own discretion, advising this office of their action.

Signed,

Marine Superintendent

SUBSCRIBE FOR CQ

RADIO OPERATING QUESTIONS and ANSWERS

By NILSON and HORNUNG

Three hundred and fifty-six pages of text. Profusely illustrated. A New Edition just published includes Aeronautical, Police Radio, Beacons, Airways and Teletype. 534 Questions and Answers. The Fourth Edition is right up to the minute.

Price \$2.50

THE RADIO MANUAL

By G. E. STERLING
Formerly U. S. Radio Inspector

Edited by
ROBERT S. KRUSE
Formerly Technical Editor of QST

PRICE - \$6.00

805 pages of real worth while material that will go well on any radio operator's desk, and should be in every radio man's bookcase.

Send Check or M. O.

Do Not Send Cash

CQ MAGAZINE CO.

112 West 13th St.,

NEW YORK CITY

"EVEN BETTER THAN VOLUME ONE!" . . .



SAY THE OWNERS OF BOTH VOLUMES

THERE ARE NO DUPLICATING PAGES IN THE TWO VOLUMES OF RIDER'S PERPETUAL TROUBLE SHOOTER'S MANUALS

Volume II is the companion Manual to Volume I. Volume II contains all new information, none of which appeared in Volume I and most of which will not be found in any other Manual published today.

If you own a copy of Volume I, you will want Volume II immediately. Volume II shows diagrams of sets produced since the publication of Volume I and the two Manuals together represent a complete diagrammatic history of radio receivers since the beginning.

Volume II fulfills the demands made by Service Men for full electrical values of resistors and condensers. For instance, THE ELECTRICAL VALUES OF ATWATER KENT RECEIVERS ARE GIVEN IN COMPLETE DETAIL.

Volume II has been prepared on the basis of the results of a comprehensive survey, made to determine exactly what Service Men want and need in a Manual. It includes wiring diagrams, chassis layouts, socket layouts, alignment data, peak frequencies, location of trimmers, color coding, electrical continuity of units sealed in

cans, special notes, circuit peculiarities, voltage data and other important information. Special attention has been given to auto-radio, automatic record changers, superheterodyne converters—everything necessary to the successful operation of a service business.

SPECIAL—More Than 50 Pages of Point-to-Point Resistance Data READY FOR IMMEDIATE DISTRIBUTION

Buy it from Your Dealer—Sold with a Money-Back Guarantee

- | | |
|--|---|
| Auto Elec. Service Co., Montgomery, Ala. | Blan, the Radio Man, New York, N. Y. |
| Radio Mfg. Supply Co., Los Angeles, Calif. | Coast to Coast, New York, N. Y. |
| Radio Supply Co., Los Angeles, Calif. | Ft. Orange Radio Dist. Corp., Albany, N. Y. |
| Offenbach, San Francisco, Calif. | Kronson, Buffalo, N. Y. |
| Warner Bros., San Francisco, Calif. | Maurice Schwartz & Son, Schenectady, N. Y. |
| Electric Supply Co., Oakland, Calif. | Roy C. Stage, Syracuse, N. Y. |
| Vreeland, Denver, Colo. | Sun Radio Co., New York, N. Y. |
| Star Radio Co., Washington, D. C. | Wholesale Radio Service, New York, N. Y. |
| Electric & Radio Supply Co., Chicago, Ill. | Baltimore Radio, New York, N. Y. |
| Klaus Radio Co., Peoria, Ill. | H. L. Dalis, New York, N. Y. |
| Mid-West Radio Mart, Chicago, Ill. | Federated Purchaser, New York, N. Y. |
| Newark Electric Co., Chicago, Ill. | West Side Y. M. C. A., New York, N. Y. |
| Pioneer Auto Supply Co., Chicago, Ill. | Shaw's, Charlotte, N. C. |
| The Swords Company, Rockford, Ill. | Aitken Radio Corp., Toledo, O. |
| Allied Radio Corp., Chicago, Ill. | Burns Radio Co., Dayton, O. |
| Chicago Radio Apparatus, Chicago, Ill. | Goldhamer, Inc., Cleveland, O. |
| Grant Radio Co., Chicago, Ill. | Hughes-Peters Elec. Corp., Columbus, O. |
| Kruse Radio Co., Indianapolis, Ind. | Kladag Radio Labs., Kent, O. |
| State Radio Co., Indianapolis, Ind. | Lew Stores, Toledo, O. |
| Sidles-Duda-Myers Co., Des Moines, Ia. | Progress Elec. Co., Cleveland, O. |
| P. O. Burkes & Co., Louisville, Ky. | Ross Radio Co., Youngstown, O. |
| Schuler Radio Service, New Orleans, La. | Steinberg, Inc., Cincinnati, O. |
| T. F. Cushing, Springfield, Mass. | Uncle Sam Stores, Akron, O. |
| H. Jappe Co., Boston, Mass. | United Radio Stores, Akron, O. |
| Muddy's Radio Labs., Boston, Mass. | J. K. Gill Co., Portland, Ore. |
| Trade Contact Corp., Boston, Mass. | Johnson-Weller Co., Inc., Portland, Ore. |
| A. R. Spartana, Baltimore, Md. | Cameradio, Pittsburgh, Pa. |
| Mattson Radio, Baltimore, Md. | Hall's, Harrisburg, Pa. |
| R. & M. Radio Co., Detroit, Mich. | Keystone Radio Co., Philadelphia, Pa. |
| Radio Distributing Co., Detroit, Mich. | Radio Elec. Service Co., Philadelphia, Pa. |
| Radio Specialties, Detroit, Mich. | M. & H. Sporting Goods, Philadelphia, Pa. |
| Reno Radio Stores, Detroit, Mich. | M. H. Edwards Radio Svc., Providence, R. I. |
| Wedemeyer Radio Co., Ann Arbor, Mich. | J. L. Perry, Nashville, Tenn. |
| Lew-Bonn Company, St. Paul, Minn. | Service Parts Co., Inc., Abilene, Tex. |
| Radio Maintenance Co., Minneapolis, Minn. | Southwest Radio Svc., Dallas, Tex. |
| Southern Minn. Supply Co., Mankato, Minn. | Strauss-Frank Co., Houston, Tex. |
| Walter Ashe Radio Co., St. Louis, Mo. | Walter Tips Co., Austin, Tex. |
| Burstein-Applebee Co., Kansas City, Mo. | Wilkinson Bros., Dallas, Tex. |
| Van Ashe Radio Co., St. Louis, Mo. | Johnston-Gasser Co., Richmond, Va. |
| Sidles-Duda-Myers, Lincoln, Neb. | General Radio, Inc., Seattle, Wash. |
| Bennetts Radio Supply, Perth Amboy, N. J. | Spokane Radio Co., Spokane, Wash. |
| Jacksonfield Radio, Camden, N. J. | Wedel Co., Seattle, Wash. |
| Ferry & Smith, Newark, N. J. | Foster-Thornburg Hw. Co., Huntington, W.V. |
| General Radio Shop, Newark, N. J. | Harriman Radio Svc., Appleton, Wis. |
| Radio Shop of Newark, Newark, N. J. | Radio Parts Co., Milwaukee, Wis. |
| American Sales Co., New York, N. Y. | W. A. Roosevelt Co., La Crosse, Wis. |

If there is no dealer near you, order direct from us

RADIO TREATISE CO., Inc.

1440 Broadway
NEW YORK CITY

"I SAW YOUR AD IN CQ." Tell this to our advertisers, it helps all of us



CANDLER SYSTEM Training in High Speed Telegraphing is guaranteed to increase your speed in sending and receiving.

The **CANDLER SYSTEM**, using Walter H. Candler's own original methods, has trained and brought beneficial results to more than 45,000 Radio and Morse Operators in the past 20 years. If you have any difficulties in your work as a telegrapher, or lack the efficiency and speed which you know you must have to be successful, write Candler. Candler training is guaranteed with a positive Money Back Agreement. If you don't make good with its help, your training will cost you nothing.

DON'T BE HANDICAPPED with a

GLASS ARM

Put Strength and Snap into your Sending Arm with the famous **CANDLER SYSTEM**

The Government requires **HAND SENDING** for Commercial Operator's Examinations. Don't let a weak arm deprive you of your rights. Let the **CANDLER SYSTEM** help you. It is positively the only method known to science for revitalizing and rebuilding weak and broken down arms and for training the muscles in fingers, wrists, arms and shoulders, used in sending and writing with pen and "mill," and for giving you steady nerves.

VIGOROUS HEALTH and LASTING STRENGTH THROUGH SCIENTIFIC TRAINING

As a Radio Operator, you need the specialized training of the **CANDLER SYSTEM**, which has developed the fastest men in the business. Within a few days after beginning this great course, you will feel yourself going forward rapidly; your **SENDING, RECEIVING** and **WRITING** speeds will improve almost beyond belief and you will **FEEL BETTER** in every way than you have ever felt before.

In point of health and telegraph efficiency, let the **CANDLER SYSTEM** do for you what nothing else in the world can do. Write for **FREE** particulars today. No obligation. State your present difficulties in telegraphing and condition of health. You will receive a personal letter of advice and valuable information by return mail.

CANDLER SYSTEM CO., Dept. 68 6343 S. Kedzie Ave., Chicago

Sending is *EASY*

Easy-Working

With the Genuine Martin No. 6

New **VIBROPLEX**

Reg. Trade Marks: Vibroplex; Bug; Lightning Bug
IN COLORS: Blue, Green, Red



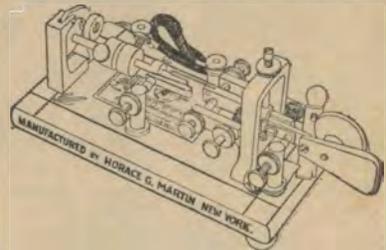
The smoothest, easiest-working bug on the market. Easy to learn. Easy to operate. Makes sending easy.

Black or Colored, **\$17** Nickel-Plated, **\$19**

THE VIBROPLEX COMPANY, Inc.

825 Broadway, New York City
Cable Address: "VIBROPLEX" New York

Improved **MARTIN** Vibroplex



Black or Colored, **\$17** Nickel-Plated, **\$19**

Special Martin Radio Bug—Extra large, Specially Constructed Contact points for direct use without relay. **\$25**

Old Vibroplex accepted as part payment
Remit by Money Order or Registered Mail

"I SAW YOUR AD IN CQ." Tell this to our advertisers, it helps all of us