NAVAL RESERVE
EDUCATIONAL CENTER
9TH NAVAL DISTRICT

SERIAL NO. 79

THE TRAINING DIVISION

BUREAU OF NAVAL PERSONNEL

NAVPERS 16101 (Revised)

#79

NAVAL RESERVE EDUCATIONAL CENTER
NINTH NAVAL DISTRICT
GREAT LAKES, ILL.

THE Communication OFFICER

FOREWORD

In this booklet an effort has been made to bring together under a single cover the most important duties of a communication officer, and to point out what practical and administrative proficiency a good communication officer should possess. The problems which have confused communication officers in the past—and which still confuse many!—are discussed, together with the tricks learned only by bitter experience.

Security does not permit a detailed discussion of coding operation, but numerous references to current publications are listed and these should be read at the first opportunity.

It is not intended that this booklet be used in place of *Communication Instructions*, or any other official publication; it is to be used in conjunction with them.

INDEX

THE COMMUNICATION OFFICER

DUTIES

On board capital ships, aircraft carriers, cruisers, and on other vessels where conditions warrant, the commanding officer appoints an officer of the line to act as communication officer. On the large ships (light cruisers and larger), the communication officer has three assistants: the radio officer, the signal officer, and the ship's secretary. On ships the size of destroyers and smaller, including most auxiliaries, the communication officer himself is the radio and signal officer, and ship's secretary, and must know the duties of each.

The communication officer is responsible for the operation and maintenance of the radio, sound, and visual signalling apparatus; for the compartments and deck spaces occupied by such apparatus; for the operation and maintenance of all internal communications (within the ship) employed in connection with external communications; for the procurement, custody, distribution, and correction of classified publications; for the preparation of all communication records and reports; for the organization, operation and supervision of all ship's communications to insure reliable, secure and rapid handling of messages.

A good communication officer must develop a genuine interest in his work and in his men. • He should understand visual communications, have a knowledge of tactics, and be able to read flag hoists, flashing light, and semaphore. He must understand radio communica-

tions, methods of delivering fleet traffic, radio procedure, technical radio, and ought to be able to read the International Morse Code. He must have a thorough knowledge of cryptography as that subject pertains to current Navy systems. He must be proficient in the duties of the ship's secretary, understand chain-of-command, official correspondence, filing, the handling of mail and mail logs, and other duties as set forth in U. S. Navy Regulations, 1920, and Communication Instructions, 1944.

The communication officer must be familiar with any operation plans, particularly the portions pertaining to communications. From the OPLAN he must organize, write, and distribute the ship's communication plan.

DIVISION OFFICER—LEADERSHIP

If you are communication officer, you will also be the division officer of the "C" division, which is composed of yeomen, quartermasters, signalmen, radiomen, and certain other technicians. Not only must you know naval communications, but you must *know your men*, and know how to get the most out of them in line of duty. You must be a *leader*. *You can be the greatest technical marvel the Navy has ever seen, but you will fail if you cannot get along with your fellow men.*

Learn the names of the men in your division, where their homes are and where their interests lie. Help them study for advancement in rating and show a genuine interest in them and in their work. If they know you are interested in them, and that *you know their job as well as your own,* they will work harder and longer without growling. And when you have your men work late, work late with them—don't be seen going ashore with your golf clubs!

Remember, your job requires not only a complete knowledge of naval communications, but, as division officer, a knowledge of human nature. You must be a

leader and know how to get your men to work for you, not by virtue of the stripes on your sleeve, but because of the man inside.

KNOWLEDGE OF YOUR JOB

Reliable, secure, and rapid communications are a prime requisite in modern warfare. On your shoulders as communication officer rests a heavy responsibility. Your knowledge of communications, your initiative and ability, some day may mean the difference between victory and defeat for your ship, the difference between life and death.

You should know Communication Instructions 1944, from cover to cover, as well as the other publications which govern the conduct of naval communications. You must be familiar with fleet and task organizations, characteristics of radio frequencies, radio and cryptographic security, codes and ciphers, signals and tactics, radio, intelligence, sound, and direction finder procedure.

SUPPLIES FOR YOUR SHIP

You must see that the following supplies are on hand for use in the communication office and the coding room:

(*a*) Weighted covers for publications.
(*b*) Blue and green ink.
(*c*) Hole puncher.
(*d*) Forms for dispatches and correspondence.
(*e*) Pads and blotters.
(*f*) Pen sets.
(*g*) Rubber stamps with the following legends: Secret, Confidential, Restricted, Urgent, Operational Priority, Priority, Routine, Deferred, Mailgram, Airmailgram, etc.
(*h*) Stamp pads.
(*i*) Carbon paper.
(*j*) Tools.
(*k*) File boards.

(*l*) Index cards and case.

(*m*) Paper of all types.

(*n*) Folders.

(*o*) Scissors.

(*p*) Wire baskets.

(*q*) Stapler machine and staples.

(*r*) Scotch tape.

(*s*) Tapes.

(*t*) Binders, pencils, stencils and mimeograph paper.

(*u*) Canvas bags for destroying publications by sinking.

These supplies can be obtained from civilian companies, navy yards, issuing offices, or the ship's stores. You should remember, however, that the above list is not complete, and is only to help you get started.
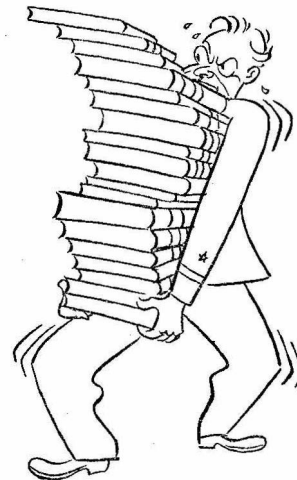
PUBLICATIONS

The Navy Department publishes hundreds of publications which deal with a wide variety of subjects. *Classified publications* are of three types: Secret, Confidential, and Restricted. *Registered publications* are classified publications which bear a *registered number*. These numbers are assigned by the R. P. S. (Registered Publication Section) in Washington, D. C., and would run from 1 to 3,000 if there were 3,000 copies of that particular publication printed. All registered publications are classified, but not all classified publications are registered.

Your principal concern will be the secret and confidential publications used in the performance of your communication duties, but, in addition, you are responsible for all other publications.

Classified and registered publications have "long titles" and "short titles," and you should be familiar with both. For example, many gunnery publications have the short title "ORD," followed by a number (*ORD 22*). The long title of *ORD 22* might be, "Instructions for Bomb Nose Fuze, MK V." Here are some of the more common short titles with their meanings: *FTP*—Fleet Training Publication; *USF*—United States Fleet (publication); *ONI*—Office of Naval Intelligence; *WPL*—War Plans; *WB*—Weather Bureau; *NWC*—Naval War College; *DTB*—Destroyer Tactical Bulletin; *HCTB* — Heavy Cruiser Tactical Bulletin; *ENG*—Engineering; *SHIPS*—Bureau of Ships; *CSP*—Communication Security Publication; *RPS*—Registered Publication Section; *HO*—Hydrographic Office;

YOURS — ALL YOURS!

DNC—Director of Naval Communications (publication); *ORD*—Bureau of Ordnance; *CCBP*—Combined Communications Board Publication.

Many United States Navy and British Royal Navy publication short titles are followed by a numeral or letters in parentheses denoting the edition number. Thus CSP 1271 (B) denotes the second edition of that publication, CSP 1271 (AB) the twenty-eighth edition, and SP 02380 (34) the thirty-fourth edition. The basic short title remains the same but the edition number or letter changes.

4

Nonregistered communication publications have been assigned the short title "DNC" followed by a number. DNC3 is the U. S. Navy Radio Call Sign Book, DNC4 the U. S. Navy Visual Call Sign Book.

Publications published by the Combined Communications Board are given the short title "CCBP" followed by a number. Restricted CCBP's are as follows: CCBP1—Combined W/T Procedure; CCBP2—Operating Signals; CCBP3—Combined R/T Procedure; CCBP4—Combined Teletype Procedure; CCBP5—Combined V/S Procedure; CCBP6—Extracts of CCBP5 for aircraft; CCBP7—Combined Communication Instructions; CCBP8—Combined Panel Code; CCBP11—Fighter Director Vocabulary.*

There are also confidential and secret CCBP's. These publications are assigned numbers prefixed with Ø and ØØ respectively.

As communication officer, you draw and stow *all* registered publications and devices for your ship, not just the ones pertaining to communications!

Many registered publications are in continual use in the radio room. A list of these should be prepared, and each successive watch should be required to check this list and sign for them. This check list will aid tremendously, as responsibility for any loss will be fixed immediately.

You must keep all confidential and secret publications in your custody *locked in your safe* when not in use, except when they are issued to another officer aboard, in which case *he* is responsible for their safe stowage. You should obtain a signed custody receipt for all such publications issued, either temporarily or for permanent use, to other officers. (Be sure he understands the stowage requirements.)

Learn how to change the combination of your safe right away. If some other officer knows the combina-

*Note: Information in CCBP1 and CCBP3 is contained in Cominst, 1944.

6

tion of your safe, change it immediately. Leave the new combination in a double sealed envelope with the captain. One word of caution: When you change the combination for the first time—and at all other times—be sure *not to shut the door of the safe* before you try out the new combination to make sure you set it correctly. Try the new combination several times with the door *open*. It is very embarrassing to have the better part of a Class 5 allowance locked in a safe no one can open with an OP (Operational Priority) message waiting to be deciphered.

DETERMINING ALLOWANCE OF PUBLICATIONS

Let's assume you are placing a ship in commission and do not have any publications. Publications are not placed aboard a vessel not in commission, but there is plenty you can do to get started. First get your P. C. O. (prospective commanding officer—prior to commissioning) or your C. O., as the case may be, to write you a letter of authorization (See RPS10) to give the issuing officer. Here is a sample letter of authorization; cut a stencil on it and have it filled appropriately every time you go to an issuing office:

USS _____

_____
(Date)

From: Commanding Officer.
To: Commandant. (Issuing Officer)
Subject: Authority to Draw Registered Publications.

1. This is to certify that_____ whose signature appears below, is authorized to draw registered publications and mail for this command.

2. The above officer will present NAVPERS 546 (identification card) as a means of personal identification.

3. Documents drawn by this officer will be placed in proper stowage on the date the issue is made.

_____
(Signed)

_____
(Signature)
(Ship's Seal)

7

Registered Publications Issuing Offices are storehouses for registered publications and devices. They are usually located at naval district headquarters, some Navy yards and naval operating bases. Find out from some officer on a nearby ship where the RPIO for your area is located. Before you start on your way, be sure you have your letter of authorization, which is necessary every time you go to the RPIO, and your identification card. Introduce yourself to the issuing officer, show him your identification card, and present the letter of authorization.

Unless you are a seasoned communication officer, the issuing officer will probably give you the currently effective edition of the Registered Publication Manual to read before he issues you any publications. This is your bible in regard to handling registered publications. Read it from cover to cover and make sure you understand your responsibilities as custodian. (Your commanding officer is the "holder" and you are the "custodian.")

The first thing you will do is determine what "Class Allowance" your ship holds. Class Allowances run from Class 1 Afloat and Class 1 Ashore, to Class 5 Afloat and Ashore. There are no divisions of Class 6 and Class 7 allowances Afloat and Ashore. Class 1 is the lowest allowance and Class 7 the highest. The currently effective edition of the *CSP 1150* series lists the different types of ships, commanders, and shore stations, and shows the class allowance of each unit or authority.

After determining your class allowance, you look in the *RPS* allowance tables (currently effective editions of *RPS 6* and *RPS 12*) to find out what specific publications your allowance should have and the number of each.

Working with the issuing officer, or one of his assistants, you check carefully the publications you are given (check the registered number, number of copies, short titles), wrap them up and place them in a mail bag,

sign a Transfer Report on Form RPS 1, take a carbon copy for your files, and proceed to your ship, where you stow all publications and devices in the safe. You may be able to borrow a United States Navy station wagon to take you and the bulging mail sacks to your ship—ask the issuing officer. Carry a .45 with you and make sure you know how to use it.

In addition to the United States Navy publications, you must draw combined British-United States publications, most of which bear the short title "SP" followed by numbers. (SP means Signal Publication.) To determine what combined publications you draw from the issuing office, find out from *RPS 12*

CHECK CAREFULLY WITH THE ISSUING OFFICER

whether you are a major or a minor war vessel. Then look in the allowance table in *RPS 12* and determine what specific publications you get. (*RPS 12* also gives you the United States *Classification* of combined publications.) These combined publications are just as important as our own—more so in certain cases—and must be read and understood at the first opportunity. They must be corrected up to date immediately, along with United States Navy publications.

The Registered Publication Manual gives you complete information on the handling of registered publications; how to set up card index files, what to include in files, etc.

QUARTERLY REPORTS

All registered publications in your custody must be accounted for quarterly to the Chief of Naval Operations (D. N. C.—Registered Publication Section) on Form RPS 16. Every quarter you and a witnessing officer "sight" all publications including those you have issued to various officers (look at them, check registered number, count them), and make out your report.

If all registered publications and devices have been accounted for, you write on form RPS 16: "The quar-

INSIST ON SIGNED CUSTODY RECEIPTS

terly inventory of registered publications and devices was completed this date. No discrepancies." Or, if conditions warrant: "The quarterly inventory of registered publications and devices was completed this date. CSP 1000, registered number 999, missing, reported to CNO by dispatch (301134 of June 1942)." In both of the above cases further notations are required stating that all superseded publications that should be destroyed have been destroyed, and that all receipts

have been duly executed and forwarded to the proper authority.

The exception to the rule in the preceding paragraph is that at least once each calendar year you must submit a complete report listing all publications and devices by short title and registered number.

STATUS OF PUBLICATIONS

Publications go through five stages during their lifetime:

1. In preparation.
2. War Reserve (WR).
3. Reserve-on-board (ROB).
4. Effective.
5. Superseded.

Publications, after being printed, are distributed to issuing officers in a War Reserve status and are not issued to ships or stations. On a certain date, a publication in a WR status goes to an ROB status, and may then be issued to ships, but it is not to be used until made *effective*. One of your most important duties, as communication officer, is to make certain you have all the ROB publications to which you are entitled.

Registered Publication Shipment Memoranda (*RPSM*) furnish information to issuing officers on the status of the different publications. You will receive, from the RPIO, status sheets for use aboard ship. The *RPSM* tell you when a publication goes from WR to ROB, and the exact date on which it is effective and should be used. Whenever you go to an RPIO be sure to take with you the *last number* of the latest extract from the shipment memoranda you received.

DESTRUCTION REPORTS

When a publication is superseded it is burned. In some cases, however, superseded publications are retained for some period of time, so make sure you burn

publications only when instructed by appropriate authority.

Whenever you burn a publication you must take along another commissioned officer as a witness. After burning the publications, you must submit a report of destruction on form RPS 2. Make sure you never burn a publication that is still effective. And never burn anything prior to the date given in the instructions, except under unusual circumstances (for example, when it is in danger of being captured by the enemy).

CHANGE OF COMMAND

A change of command in your ship or station will necessitate a Transfer Report on form RPS 16. The currently effective edition of the Registered Publication Manual gives you complete procedure for this type of report; it is almost the same as a quarterly report.

SEND IN ALL REQUIRED REPORTS *ON TIME*, AND BE SURE TO KEEP A CARBON COPY OF ALL REPORTS AND RECORDS FOR YOUR FILE.

CORRECTIONS TO PUBLICATIONS

At the issuing office you will be given publications which contain corrections to publications you have on board. These publications will be included on the transfer report you sign at the issuing office, so be sure to check carefully and get everything you are signing for. The publications containing changes come out about every month and often contain important discussions of current communications as well as corrections. Read them carefully and keep all publications in your custody *up to date*.

The following is a list of these publications and what they correct:

(1) *CSPM (Communication Security Publication Memoranda)* contain changes to CSP publications, information concerning the date when certain publications will become effective,

superseded, or are to be burned. Read all CSPM carefully and check off in colored ink the changes which affect your ship or station.

(2) *CRPM (Combined Registered Publications Memoranda)* contain changes to combined British-U. S. publications having such short titles as, *SP, OU, CB, ASRS, AFO, BRITSIGLET*. You may also find changes to an RPS publication so keep a sharp look-out.

(3) *RPM (Registered Publication Memoranda)* contain changes to all United States Navy publications except *CSPs*. Here are some of the publications they correct: *ORD, FTP, ONI, USF, HCTB, WPL, NWC, HO, WB, RPS*.

Read all *CSPM, CRPM*, and *RPM* from cover to cover immediately upon receipt and check off the changes to be entered by you. Your failure to enter a correction in time may have
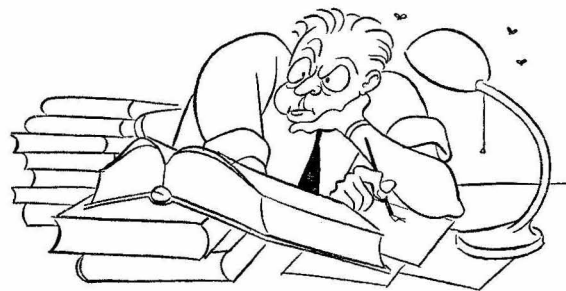
KEEPING UP TO DATE

serious results. All changes are numbered consecutively and are easy to keep track of. Show the captain any *CSPM* or *CRPM* discussions you think would be of interest to him.

(4) *NRPM (Nonregistered Publication Memoranda)* contain changes to nonregistered publications and "cut-out" pages. Changes to any publication may be sent by dispatch on "F" schedules, or by Basegram, in General Messages entitled ALCOM (call sign DATA); see Communication Standing Orders. These dispatch changes are confirmed later in CSPM, CRPM, RPM, or NRPM, as appropriate.

You will enter a majority of the changes in colored ink (not red) in the publication concerned. Some *CSPM* and *CRPM* contain "cut-out" pages at the end of the booklet which can be cut out and pasted in the

publication. Other changes may be lengthy, in which case you may type them either in the publication if it is loose leaf, or on a sheet of white paper and paste it in as a flap. After you enter a change, be sure to make a note of the fact in the publication. In many publications there is a page marked, "Record of Entry of Changes," but if there is not, make the note on the cover or other open space. (CRPM 214/42 entered 12–16–42, John J. Doe, Ens., USNR.)

Important changes which cannot wait for the next edition of a *CSPM*, *CRPM*, or *RPM* may be promulgated by dispatch in cipher over the Fox schedule. Changes are also sent out by letter, bulletin, or regularly numbered change.

In regularly numbered changes (Change No. 1 to *USF 70*), entire pages are reprinted incorporating all changes to date. In this case you make a bodily substitution of pages in the loose-leaf publication. With these numbered changes you receive a "List of Effective Pages," which tells you how many pages there should be in the revised publication, and whether a page is "original" or "Change No. 1."

Regularly numbered changes, like many registered publications, have "fly-leaf" receipts attached which you must have filled out and sent to the RPS. Fly-leaf receipts acknowledge receipt of a certain publication or change to a publication, and state that subject publication's pages have been checked against the List of Effective Pages and "(*a*) Found to agree therewith, or, (*b*) Found to agree therewith except as follows (list exceptions)." These changes become part of the basic publication and are not listed separately on quarterly reports or transfers after the changes have been entered, and fly-leaf receipts properly executed. If there are any missing pages, be certain to report them immediately on the fly-leaf receipt form, which is signed by the captain. Bind the carbon copy of the fly-leaf receipt in the publication concerned.

Whenever your ship makes any port, go to the issuing office (remember your letter of authorization) and draw any additional publications to which you are entitled. Take with you your last complete inventory on RPS 1, and the number of the latest *CSPM*, *CRPM*, and *RPM* you have aboard, as well as the number of the last shipment memoranda. This helps the issuing officer determine what publications you need and prevents him from giving you publications and devices you already possess. Many communication officers forget to take the above material with them, with the result that they draw many things they already have aboard.

Drawing of publications in excess of authorized allowance is an offense worthy of a letter of admonition or reprimand.

When in port for prolonged periods visit the issuing office at least once a week.

Correct the more important publications first. Use the precedence in *Communication Instructions, 1944* as a guide as to which publications should be corrected first. Obey existing instructions regarding the correction of ROB material.

Recognition signals should always be corrected before any other publications. If your recognition signals are uncorrected, you may never have a chance to correct any other publications.

RECOGNITION SIGNALS

While it is not possible to discuss recognition signals here, it must be realized that it is of vital importance to keep all such signals up to date. (Recognition signals are signals between allied vessels designed to establish mutual identity.)

It is a sad fact that uncorrected recognition signals have caused friendly vessels to fire on one another. Don't let this happen to you. Correct these signals immediately and become thoroughly conversant with *all systems* used in the area in which your ship is operating.

Post the daily extracts from effective recognition signals on the bridge, if such is the current regulation. See that all officers standing deck watches are thoroughly familiar with them, and with the correct challenge and reply procedure. Blinker tubes and Aldis lamps, plus any other signalling equipment, should be in good order and bulb replacements handy.

O. N. I. publications containing silhouettes of allied and enemy vessels should be available in the ready safe for use by the O. O. D.

KEEP RECOGNITION SIGNALS UP TO DATE

Instructions in regard to recognition signals must be observed at all times. It is a matter of life or death for you and your shipmates, as well as for your ship.

OTHER SOURCES OF INFORMATION

While the publications discussed so far furnish you with much important information, additional data is obtained from the following: *Communication Circular Letters; Navy Department semimonthly bulletins* (re-

16

stricted and confidential); *ONI Weekly; LANTFLT* (or *PACFLT*) *Memoranda; LANTFLT* (or *PACFLT*) *confidential letters; Communication Standing Orders;* letters and memoranda to various units (*DESLANT, SERVFOR*, etc.)

CODES AND CIPHERS

You will have a number of naval codes and ciphers in your possession, and you are responsible for their proper operation whether you, or the members of the coding board, are doing the enciphering or deciphering. You must be familiar with *all* systems held by your command and be able to instruct others in their use.

It is your responsibility to make sure that no one in your ship compromises any cryptographic system through faulty encryption, failure to follow the instructions, or careless conversation. How futile for brilliant men to spend years devising a code or cipher only to have it compromised by careless and incompetent officers! This is a serious matter, and one often taken too lightly by officers who think the elaborate precautions and instructions unnecessary.

The danger to our future operations resulting from the capture of our cryptographic systems cannot be overestimated. It is therefore necessary for you to have a well-organized plan for the destruction of codes and ciphers according to a definite precedence list. Read *Communication Instructions, 1944*, and take action on it. Your ROB editions may be destroyed considerably in advance of destruction of effective systems if deemed necessary by appropriate authority. The destruction bill must cover every eventuality.

Most of the larger ships have regular coding rooms. See that your coding room is well ventilated, equipped with sufficient lighting (battle light close to the working area), hooks for file boards, a safe, and an intercommunication system with radio central and other necessary offices.

17

SECURITY

Security is something like the weather. "Everybody talks about it but nobody does anything about it!"

Security is keeping classified information confined to the channels where it belongs, and preventing the unauthorized dissemination of classified information regarding any phase of naval operations or mechanical developments. It means not talking to anyone except authorized individuals about publications, codes or ciphers, or your work.

It is your responsibility to see that officers doing coding duty understand cryptographic security, that your radiomen understand and practice transmission security, and that no violations occur. Make sure all classified publications are stowed properly when not in use, and never issue a publication to an officer without getting him to sign a custody receipt giving the date, short title, and number of copies received.

As division officer you must impress on your men the importance of not divulging classified information or other official information in bars, cafes, and restaurants. A few seemingly innocent remarks dropped here and there may be just the information an enemy agent is looking for! See that security in all its phases is practiced aboard your ship, bearing in mind that in some ships space limitations make certain undesirable practices necessary as a matter of expediency.

MOVEMENT REPORTS

Movement reports when required are covered in publications or operation orders issued to those who need to know.

THE CODING BOARD

The coding board is a group of officers in your ship, designated by the commanding officer, who operate cryptographic aids held by the command. The size of the coding board depends on the type of ship. In large ships the coding board stands regular watches, each watch breaking down traffic received during its tour of duty. The coding room watch officer (CRWO), or coding room supervisor, is in charge of all traffic handled during his watch.

It is your duty to instruct the members of the coding board in their duties. In this connection, see that every member of the coding board reads and understands *Communication Instructions, 1944*, particularly chapter 4. He must be thoroughly familiar with the current instructions for each cryptographic aid he will need to use and with all CSPM's, CRPM's, and RPM's which pertain to his duties.

Require the members of the coding board to keep the coding room neat and clean. Provide a basket marked, "BURN," and see that all work sheets are properly destroyed by fire and the ashes broken up.

The coding board should be familiar with all call signs by which the ship might receive traffic, and should know the fleet and task organization in which the ship is included. The ship's calls, and all calls for which the ship is guard, should be enciphered prior to 0000 G. C. T. every day and posted at the radio operating positions as well as in the coding room.

In time of war, petty officers of known trustworthiness may be members of the coding board. The commanding officer may place any enlisted man on coding duty; it is no longer necessary to write the Navy Department concerning the matter, and such letters are no longer desired.

United States Navy Regulations, article 76 (21) (b) allows authorization of especially reliable P. O.'s to handle secret documents within any ship, yard, station or contiguous activities of a naval base.

Plan the training of your coding board and instruct them in all possible conditions which might arise in your absence.

Instruct them in the routing of dispatches and make sure they route important messages to officers concerned at any hour of the day or night. Impress them with the need of *quick action* in emergency cases.

Check all files the first thing in the morning and know what has happened that may affect your ship.

You, and the coding board members, should be able to touch type about 35–40 words per minute. If you do not know how, learn!

It is a good idea to be familiar with some of the methods used by our enemies in breaking down our cryptographic aids and acquaint the board with these methods. Avoid mistakes which might prove fatal—letting the plain language version of an encrypted dispatch get on the air; improper operation of devices; stereotyped phraseology; unnecessary and incorrect procedure messages which divulge information to the enemy.

All officers doing communication duty should be familiar with the *Communication Standing Orders*, which are a supplement to *Communication Instructions*. In addition, they should understand the following: Crypto-channel charts, call sign ciphers and authentication systems, *CSP 1467 Series*, and the *CSP 1468 Series*.

ABBREVIATIONS

A thorough knowledge of British and United States Navy abbreviations is of the utmost importance to all officers in communications. Cipher dispatches often contain confusing abbreviations which hinder work unless you recognize them right away. Members of the coding board should study *Communication Instructions*, *Appendix V*, *CSPM*, *CRPM*, and *RPM*.

Here are a few abbreviations—do you know them? BLADING, BUSANDA, CTU, FMF, FFT, PSANDT, CTF, POA, ADCOMD, DFT, FABU, MIO, MRS, NATS, NTS, PHIBTRAIN, PSP, RNV, STAG, TFC, USRO and SATFOR.

PARAPHRASING

One of your duties may be paraphrasing messages. Paraphrasing is changing the wording and structure of a message *without changing the meaning!*

It is surprisingly easy to alter the meaning of a dispatch you are paraphrasing and you must guard constantly against such an error. *Communication Instructions* contain instructions for paraphrasing.

The best method of paraphrasing is to shift the sentence order, being careful not to use too many synonyms. Divide the message up into parts with light pencil marks, number the divisions you have made, and then rearrange the sequence in which the ideas in the message are presented, being careful to include *all* the numbered divisions. Always check the *meaning* of the paraphrase with that of the original message.

DRAFTING OF MESSAGES

Careful drafting of texts to avoid stereotyped phraseology, redundancy, and excessive repetition hinders enemy cryptanalysts in their utilization of statistical methods of solution, which depend upon frequencies resulting from habitual methods of expression.

Messages should never start with: REQUEST AUTHORITY . . . IN ACCORDANCE WITH . . . YOUR (reference numbers). Messages should never end with: COMPLY . . . DISPATCH REPLY REQUESTED . . . ADVISE. Read *Communications Instructions* in this connection.

It is your responsibility to see that proper drafting habits are practiced by officers originating messages aboard your ship. Although you do not have the authority to change any stereotyped phraseology, you may go to the originator and tactfully *suggest* certain changes, explaining *why* they are desirable; the chances are he will make them. If he refuses, the message must be encrypted and transmitted unaltered. Ex-

plain the pertinent parts of *Communication Instructions* to all officers who may have occasion to originate messages.

When it is necessary to refer to a letter in a dispatch use simply the originator's title (or abbreviation) and the *serial number* of the letter and date. Do not include the long name-title group and subject-number group, they only make the dispatch unnecessarily long and cumbersome. Example: "REFERENCE COMINCH SERIAL ZERO ONE EIGHT TWO NINE OF APRIL FOUR."

GARBLED?...
WASN'T ON MY
WATCH, SIR...

Many naval messages possess two common faults: they are of too high a precedence, and they are over-classified. Explain to officers *why* their message is over-classified—if it is—and point out that it will get to the addressee almost as quickly if sent routine, or even deferred. Explain to officers that a classification of secret does *not* mean the message goes in a more secure cryptographic system, but that the classification determines how the message is handled on receipt.

22

This is a point 90 percent of all originators do not understand: restricted cryptographic systems are inherently as secure as secret systems.

WHEN THE MESSAGE "WON'T BREAK!"

Security does not permit a detailed discussion of what action to take if a coded dispatch addressed to your ship will not "break." However, before you send a "service" message, such as QJM* or QMO, try all the "tricks" you know to make the dispatch come out. If this fails, you will have to resort to a service message.

You must understand when to use a "J" asking for verification of *information in the heading or text*, when to use QMO asking for a repeat of the message (used by coding board when a transmission garble is suspected), and when to use QJM asking for verification and repetition of encipherment. *Communication Instructions*, chapter 4, contains detailed information on how to handle specific situations, and should be available to the coding board at all times.

Important messages which are partially garbled should be routed immediately and the garbles cleared later. In some cases garbles can be cleared by inspection on the part of officers concerned.

INTERNAL ORGANIZATION

Internal organization means the organization on board your ship for handling dispatches received by radio or visual, with reliability, security, and speed. The internal organization of each ship will differ, but the basic requirements remain the same; see chapter 3, *Communication Instructions*.

Messages are addressed to your ship by placing your radio, visual, or task organization call sign after the date-time group in the heading of the message. There

*Q signals are from "Combined Operating Signals".

23

is no indication of which officer aboard is to receive the message for action. You, or the communication watch officer (CWO), must read the text of the message several times and decide what officer(s) would be interested in it. If the captain is the action officer, and the engineer officer and gunnery officer information officers, you check the C. O. as ACTION on the dispatch blank, and the other two as INFORMATION.

The action officer is the officer aboard your ship who will take action on the message. On small ships the C. O. is usually the action officer.

The information officer is the officer who takes no direct action on the message, but who should be informed of the contents because it may concern him. (There may be two or three information officers, or more, depending on the situation.)

When an incoming message makes reference to a previous message, have the earlier message available, or even clip it to the new dispatch.

The number of copies prepared of secret and confidential messages is limited; see chapter 4, *Communication Instructions*. These copies are distributed by messenger and the FILE copy initialed by the men receiving copies and returned to the code room file.

It is a good idea to keep a file board for each officer aboard and clip his dispatches to it prior to routing and after having been returned to the code room file. File boards for the following will be necessary for a medium-sized ship: Captain, executive officer, gunnery officer, navigator, communication officer, first lieutenant, engineer officer, supply officer, medical officer, signal and radio officers, and general (all officers).

The releasing officer is the officer who "releases" outgoing messages for transmission. On small ships he is usually the commanding officer, while on larger ships he may be the executive officer, head of a department, or other designated officer(s). If a ship is under radio silence no messages will be transmitted.

CENSORSHIP

In all probability you will be concerned with censorship of mail aboard your ship. If you are in charge of the censorship board, organize it efficiently, making maximum use of the available personnel. You will be governed in the work by *Censorship Regulations, U. S. Navy, 1942.*

WATCH STANDING AS O. O. D.

Communication officers on destroyers, and most auxiliaries, are required to stand deck watches in port and

COMMUNICATION OFFICERS
HAVE BEEN KNOWN TO
STAND DECK WATCHES
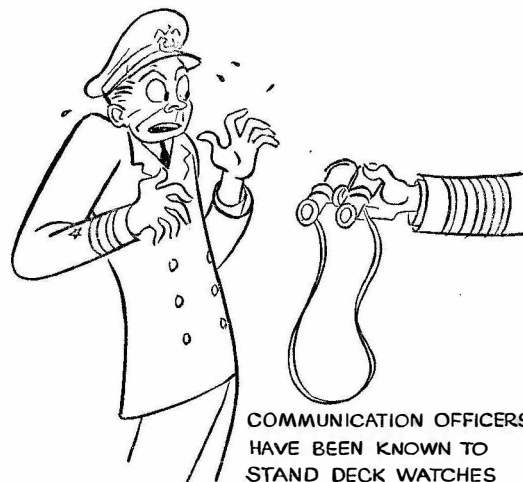
under way. The new officer will stand junior O. O. D. watches until qualified to stand a watch under way. On large vessels the communication officer and his assistants normally do not stand deck watches.

If you are a graduate of a midshipmen's school, do not forget the seamanship, navigation, and gunnery you learned just because you happen to be studying communications.

Special service officers (D–V (S) and C–V (S) offi-

cers) should buy and study books on seamanship, navigation, and gunnery. Ask questions, keep notes, keep your eyes open, and study books that will acquaint you with naval ships, tactics, maneuvering, and rules of the road. Remember, communications is only one of the important cogs in the functioning of the United States Navy.

Here are some good books to purchase and study:

(1) The Bluejackets' Manual.
(2) Naval Leadership, with Hints to Junior Officers and Others.
(3) Naval Administration, Vol. 1.
(4) The Watch Officers Guide, by Willson.
(5) Seamanship, by Knight.
(6) U. S. Navy Regulations, 1920.
(7) The Naval Officer's Guide, by Ageton.

THE
RADIO OFFICER

The radio officer must organize and supervise radio communication personnel to insure accurate, secure, and rapid handling of radio communications, arrange for guarding all required frequencies, see that transmitters and receivers are kept in adjustment, and inspect circuit logs and files. He must know radio and sound procedure, and prepare the watch, quarter, and station bill for radio personnel. The detailed duties and responsibilities of a ship's radio officer are given in *Communication Instructions, 1944.*

The radio supervisor is in direct charge of radio central, and on large ships he is usually a chief radioman.

If you are called upon to serve as radio officer aboard your ship, see that watches are fair to your men. See, too, that a good operator is ready to "back-up" an inexperienced man on an important message. Leave orders to call you if something unusual arises.

Do not forget to post all enciphered calls which might concern your ship for each 24-hour period; these enciphered calls and their translations should be tacked right beside the operating positions. Aboard ship the radiomen usually operate the call-sign cipher, and if this is the case in your ship, see that they post the necessary calls.

Have periodic check-ups made to insure that all transmitters are accurately calibrated. Do not use one transmitter all the time, distribute your load as much as possible and keep all rigs in working condition. In addition to transmitters, receivers and frequency meters should be calibrated frequently.

FREQUENCIES—CALIBRATION OF TRANSMITTERS AND RECEIVERS

Due to security and other factors it is impossible to list accurately the frequencies with which you will be concerned and on which you must calibrate your transmitters and receivers. Consult *USF 70A*, paragraph 2323, appropriate *Fleet Regulations*, and *Communication Instructions*, Appendix I, for specific information. The following frequencies are listed to help you get started:

(1) *2716 kc.* is the naval calling frequency but today it is used only in case of extreme emergency. The OTC generally maintains a listening watch on 2716 kc.

(2) *375 kc.* is the D/F frequency; used very little today.

(3) *500 kc.* is the distress and commercial calling frequency. It must be guarded by every detachment at sea. Guard ships will be designated by the OTC.

(4) *2000 kc. band* may be used as an intra-unit emergency circuit and in case of low visibility and separation; specific frequencies in this band will be designated by the OTC. *Area frequencies* also lie in this band, and should be guarded by one ship in a detachment when within waters having an area frequency.

(5) *3000 kc.* is the "scene of action" frequency. A loudspeaker on the bridge is usually cut in on this frequency when appropriate. Your attention is invited to *Communication Instructions, 1944*, Appendix I, Article 141.

(6) *4235 kc. NERK series* is the primary ship-shore circuit. A continuous watch need not be maintained (unless so ordered), but equipment should be calibrated and ready for use on these frequencies. These frequencies are to be used only for ship-shore traffic.

If you have a message that is to be placed on the shore communication system, and plan to use one of the frequencies in the 4235 kc. NERK series, do not invariably call a specific shore radio station. If any difficulty is experienced in raising a particular shore station, use the call sign NQO (Any or All Naval Shore Radio Stations) in preference to the call of a specific station. The use of NQO eliminates the possibility that if any particular shore station is busy at the time you call, or cannot hear you due to skip distance, your ship will call and receive no answer. Send your traffic to any shore station which answers your call and have him place the message on the shore communication system.

(7) *60–80 mc.* Frequencies in this range are used for Inter-Unit Emergency Maneuvering circuits with TBS or TBY equipment. Transmitters and receivers should be calibrated on all VHF bands which might be used.

In connection with frequencies, their characteristics and ranges, your attention is invited to appendix B of this publication.

TRAINING

Many radiomen going to the fleet today are recent graduates of radio schools and cannot be considered experienced operators. Organize a school for further training in code, procedure, and material. A few weeks of carefully planned training should make most of these men dependable operators capable of holding down a circuit.

RADIO PROCEDURE

You must have a thorough knowledge of radio procedure as explained in *Communication Instructions, 1944*, chapter 6. Be familiar with commonly used operating signals ("Q" signals) and naval radio organization—fleet frequency plans, *OPLANS*, *USF 70A*, *Communication Instructions*, Appendix I, and the pertinent *LANTFLT* or *PACFLT* publications.

It may never be necessary for you to draft a heading for an outgoing dispatch, but your men respect you

more if they know that you know *how* to do it. Every officer in communications should be an expert at drafting all types of messages.

See that your radiomen place an "operator's service" on all messages transmitted and received. The service should include the following data: (1) Ship or station received from or sent to; (2) Time of receipt (TOR), or time of delivery (TOD); (3) Method (frequency, semaphore, blinker, etc); (4) Initials or sign of the operator handling the transmission.

LEARN RADIO PROCEDURE - DON'T BE A WALLFLOWER!

Your duties do not require you to operate a radio circuit, but it is a fine thing if you can. Learn the code and bring your speed up to about 25 words per minute. Here again, your men will think more of you if you know *their* job as well as your own. Plug in on the Fox schedule and increase your speed.

The routing of plain English traffic to the various officers is a function of the radio supervisor under the supervision of the communication watch officer. If you are CWO, make sure all such traffic is routed correctly. (Coded dispatches are usually routed by the members of the coding board or the coding room watch officer.)

Radio-telephone communication is important, particularly in convoys and on smaller ships. Know radio-telephone procedure as described in *Communication Instructions*, make sure unauthorized transmissions do not take place.

If you are attached to a naval air station or an aircraft carrier, radio-telephone is of tremendous importance. Your organization should provide for quick action in decoding messages, and rapid designation of action officers. Only alert, intelligent radiomen should be called upon to man these 'phone circuits—when things start happening it is no time to have a man turn with a blank look on his face and ask, "What do I do now?"

Keep the use of voice circuits to a minimum, and observe strict precautions that no information of potential value to the enemy is transmitted. When sending signals from *CSP 950* or *CSP 734*, encode them in the effective edition of the Signal Cipher.

Arrange for a "cease talking" signal for R/T circuits; the blowing of a whistle or some type of variable pitch tone may be used successfully. Be sure the radioman keeps a log of all important transmissions.

Temporary call signs are often used on voice circuits *within a unit only*. Such calls consist of the names of objects which can be clearly understood; example: CHICKEN, SUPERMAN, LOLLYPOP. A call using these call signs would be: "SUPERMAN THIS IS LOLLYPOP OVER!"

UNDERWATER SOUND

Underwater sound equipment will also be under your supervision as radio officer. Destroyers, some submarines and other vessels, have supersonic "echo-ranging" gear which permits them to follow the movements (track) of enemy submarines. The sound equipment sends out a pulsing signal which bounces back when it

strikes an object. Knowledge of the speed of the signal through water at a certain temperature permits determination of the range of the object.

The sound operator, knowing the range, determines the bearings of the object and reports his findings to the appropriate officer who takes offensive action.

Underwater sound gear is used not only for tracking, but also for listening for propeller sounds, and for communicating with friendly vessels.

Study your supersonic equipment and learn how to operate it. *The Sound Operators Handbook*, published by the West Coast Sound School, San Diego, California, 1942 edition, is an excellent source of information on this interesting subject.

RADIO DIRECTION FINDING

Radio direction finding is an important aid to navigation and you will have D/F equipment aboard. You should understand the principles of D/F, the difference between a beacon station and a D/F station, and calibration procedure. Be familiar with *HO 205 and HO 206* and look up current communications regarding beacon operation.

A radio beacon station sends out a signal containing an identifying letter at certain specified times and the *ship* takes the bearing. Bearings on three or more beacon stations permit the ship to determine its approximate position.

Radio direction finder stations take bearings on a transmitting ship or aircraft and send the result in the D/F code. (Be sure you understand how to operate the "garble table.") D/F stations track enemy units during war, i. e., follow their movements by taking successive bearings and plotting them on a master chart.

Learn how to take bearings yourself. Do not be afraid to ask a radioman about points you do not understand. It may be necessary for you to man the D/F in an emergency.

Bureau of Ships Manual, chapter 67 (M. E. I. chapter 30), contains information on D/F calibration and operation. Read *CSP 1494 (A)*, bring it to the attention of your commanding officer; familiarize yourself with enemy frequencies and be on your toes. (See CB 4002 series and various fleet letters.)

CONTACT AND AMPLIFYING REPORTS

For information on Contact and Amplifying Reports see *Communication Instructions, USF 70A*, and appropriate LANTFLT or PACFLT publications. Know what frequency to use in sending these reports and to whom to send them.

RADIO THEORY

It is not essential that you understand complicated radio theory but it is an excellent idea to know enough so you feel at home with transmitters and receivers, and can be of assistance in an emergency.

Buy a good book on technical radio written for beginners and study it. As radio officer, you should understand the characteristics and ranges of different frequencies, skip distance, harmonics (series), and elementary transmitter and receiver operation. *Understanding Radio*, by Watson, Welch and Eby, is a good elementary book, while *The Radio Amateurs Handbook* is better for the more advanced students.

CARELESS RADIO OPERATION

Careless, unauthorized radio operation endangers your ship. Enemy D/F stations may take bearings, obtain valuable information on your supposedly secret location, and take action. Your radiomen must understand and practice *transmission security*.

Tune transmitters *before* weighing anchor and not just prior to reaching your objective. Radio silence, when prescribed, must be strictly maintained. The only

person who can authorize breaking radio silence in your ship is the commanding officer. (See *USF 70A*.)

Read *Communication Instructions* for a complete discussion of transmission security; bring it to the attention of your radiomen. A knowledge of radio procedure is essential if you are to understand this reference. Read also CNO Security Bulletins.

Encrypted call signs can be compromised by radiomen who have pronounced personal sending characteristics—"swing." Discourage "swing" and make offending operators practice on an audio oscillator and eliminate it.

DISTRESS CALLS ON 500 KC.

500 kc. is the International distress frequency, and today many distress signals are being transmitted on this frequency by merchant vessels. Great care must be taken to make certain the call is legitimate, and not a fake sent by the enemy to lure naval vessels to the position.

The distress frequency must be guarded (listened in on) during the two silent periods each hour, unless it is being guarded continuously. (*See Communication Instructions*, chapter 6.) The silent periods are 3 minutes in duration, from X:15 to X:18, and from X:45 to X:48, each hour.

Communication Instructions for Merchant Ships (*CIMS-42*) (or Wartime Instructions for Merchant Ships, WIMS-1, WIMS-2, and WIMS-3, when effective) gives radio procedure for use by United States Merchant Vessels. Read *CIMS-42* (or WIMS-1, WIMS-2 or WIMS-3 when effective) and become familiar with the signals in it.

ADVANCEMENT IN RATING

Everyone wants to go up in the world—an ensign wants to be a "jg" and the captain wants to be an admiral. Your radiomen want to advance too, and it is

part of your job to see they are supplied with the proper BuPers training courses to study. This applies to signalmen if you are signal officer, and to yeomen if you are ship's secretary.

Encourage "strikers" to study for their "crows" and radiomen to study for advancement. It means more money for them and a healthy mental condition. If you have men who are officer material, try to get them commissioned. The Navy needs good officers and there are a number of enlisted men who fulfill the requirements. If *you* expect your enlisted men to work for you, *you* have to go to bat for them.

FILES

Required files are explained in *Communication Instructions*. The radio station file contains copies of all messages sent, received, and relayed by radio telegraph. Inspect the radio file and the circuit logs at frequent intervals and know what is happening.

Messages should be filed by the most convenient system for your ship and its internal organization. This is normally by date-time group in the heading of the message, with outgoing and incoming messages in different files. This makes it easy to pick out a dispatch if the originator, at a later date, says MYDIS Ø81111. You would look in the incoming file under the eighth day of the current month and locate the dispatch with those reference numbers. For *intra-Navy* use, the zone suffix letter *Z* is omitted *if time is GCT*.

Separate files are kept for general messages (ALNAV, NAVOP, USFLEET, etc.), and for Fox schedule messages. Fox schedule messages should be filed in order of station serial number, making it easy to locate a particular dispatch if you send or receive a QHB 1 or QHB 2.

Keep all files in good order so you can lay your hands on a dispatch at a moment's notice. If you have a tactical file of your organization which shows what action

is taking place, have it conveniently indexed according to a definite system, and not some haywire system of your own.

A radio officer's work is alive and interesting. *Work* at your job, learn the radio code, study the important material in the field, show your men that you are interested in radio and in *them*. Be a leader—show by doing! Do not loaf around and work only hard enough to get by—grab your job with both hands and master it!

THE SIGNAL OFFICER

The duties of the ship's signal officer are set forth in *Communication Instructions* and are similar to those of the radio officer except that the signal officer is dealing with a different medium of communication.

SIGNAL ORGANIZATION

The signal officer is in charge of all visual communication personnel and must see that they are proficient in procedure and in the operation of the different visual signalling devices. If you are signal officer be sure that your signalmen are alert for all signal lights and the recognition signals effective during their watch.

You are responsible for the training of signalmen and must see that BuPers training courses are available.

In most ships a chief signalman is under the signal officer, and the signalmen and strikers under the chief. Chief quartermasters are also proficient in visual signals. These chief petty officers can be of great help to an inexperienced signal officer; do not be afraid to ask them questions about things you do not understand.

FLAG HOIST

As signal officer you should be able to read all the flags and pennants and be proficient in the use of the *Signal Books* and the *U. S. Navy Visual Call Book*.

Learning to flip the pages of the *General Signal Book* quickly to the correct signal takes time; practice until you attain both accuracy and speed. *The Visual Call Sign Book* is more complicated than *The Radio*

Call Sign Book, but once you understand the basic calls and the systems for generating compound calls—particularly task organization calls—their interpretation becomes a matter of seconds.

Learn the use of such Navy flags and pennants as: CORPEN, TURN, DEPLOY, ANS, FORM. Be familiar with the governing flags and their meanings.

Flag hoist is one of the most important methods of visual signalling and to understand it thoroughly you must be familiar with tactical movements of ships, changes of course, lines of relative bearing, time and types of routine reports, such as position reports and noon fuel reports.

You should be able to stand on the bridge and read a flag hoist, interpret the call and be looking up the

signal when the message comes from the signal bridge. Familiarize yourself with all calls for the organization of which your ship is a part, and with the effective *Signal Cipher*.

Mersigs, Volume I (BR 637) (or Wartime Instructions for Merchant Ships, WIMS–1, WIMS–2, and WIMS–3 when effective) is important if you are acting as a convoy escort vessel. *The International Code of Signals, Volume I*, is used for communicating with merchant ships of any nationality.

FLASHING LIGHT

Flashing light is another important means of visual communication, and you should be able to read it from yardarm blinkers, searchlight, or blinker tube, at a speed of 10–15 words per minute. It is a comfortable feeling not to have to wait for a signalman to inform you what is happening. Read it yourself.

Accuracy, not speed, is important in flashing light. Do not let any of your signalmen "burn up" the other fellow just to show how fast he can send. Fast, sloppy sending makes for repeats and wastes time.

Blinker tube and Aldis lamp communication is especially important today and is used to transmit and answer recognition signals. These directional systems afford greater security than yardarm blinker or large signal searchlight because the light beam is directed toward a specific objective. In both cases, a trigger instead of a telegraph key is used to form the characters of the International Morse Code.

Semaphore and flashing light procedure is so similar that semaphore can be used by a ship receiving a DFL (direct flashing light) transmission. This may be necessary at times during daylight for ships which do not have enough signal searchlights to accomplish automatic relays. (See *Communication Instructions*.)

SEMAPHORE

Although not as important as flag hoist or flashing light, semaphore is used a good deal and you should be able to read it about 15–18 words per minute. Here again, you can copy a message yourself and perhaps catch an error a signalman might let slip through.

DOES IT BOTHER YOU TO HAVE SOMEONE READ OVER YOUR SHOULDER?

As signal officer, you have an excellent opportunity to become proficient in signals and tactics; take advantage of it.

VISUAL PROCEDURE

A knowledge of visual signalling procedure is essential. It is somewhat similar to radio procedure but simpler. *Communication Instructions, 1944*, chapter 7, discusses visual procedure and other important material, such as miscellaneous visual and sound signals.

VISUAL FILE

A visual station file is kept of all incoming, outgoing, and relayed messages. This file should be kept neat, orderly, and up to date. A visual log book also is kept and is similar to the radio log. Inspect both files and logs often.

DRILLS

One of your most important duties is the drilling of your signal gang to increase their knowledge, accuracy, and speed. Signal competitions are fine for keeping up interest when time lags.

Drill your signal force not only in Navy signals, but in signals from the *International Code of Signals, Volume I*, for communication with merchant vessels, and in *Mersigs, Volume I, (BR 637)* (or WIMS when effective) for convoy communications. Drill in these publications should embrace flag hoist, flashing light, and semaphore.

Develop a smart signal gang and show them you are interested in them and that you know what is going on. Try to be as good or better than they are. Then, and only then, will you get the most out of them.

THE
SHIP'S SECRETARY

The ship's secretary is responsible for the care and routing of all ship's correspondence, for the stowage and custody of secret and confidential matter issued him, and for the operation and maintenance of material used in connection therewith. He shall keep informed of the progress of correspondence from officer to officer, and maintain a follow-up system (tickler file) to insure that letters and other routed material are returned to the captain's office within a reasonable length of time. *Communication Instructions* list the duties of the ship's secretary.

The administration of the postal service is under the CNO (DNC). A confidential mail address list is issued to all ships and stations (with frequent changes). The latest list is contained in CNO confidential letter, subject: "Mail Addresses for Classified Bases and Organizations Located at Classified Bases," which is printed in the Navy Department Confidential Bulletin.

CORRESPONDENCE AND FILING

U. S. Navy Regulations, 1920, chapter 52, contains a discussion of Navy correspondence. If you are serving as ship's secretary, you should be familiar with the chain-of-command, particularly as it concerns your organization.

The *Formulation of Directives* is another publication with which you should be familiar; it outlines the form to be used in operation plans, operating orders, and dispatch order forms. The full title of this publication is, *Sound Military Decision, Including the Estimate of*

the Situation and the Formulation of Directives, published by the Naval War College, Newport, R. I.

The *U. S. Navy Filing Manual* gives you instructions for the filing of official correspondence and lists file designations for all subjects. See that your yeomen follow the system set up in this publication.

The *Mechanics of Navy Correspondence*, published by the Gregg Publishing Co., New York, N. Y., is an extremely useful booklet on that subject.

MAIL LOG

As ship's secretary you will keep the classified and registered mail logs. All such mail must be logged in and out, and your log should make provision for entering the following information: classification, date mailed, date received, file number, registered number, subject, from _____, to _____, via _____, remarks, and ship's serial number.

Classified mail shall be accorded stowage and handling as required by *U. S. Navy Regulations, 1920,* article 76, which contains a definition of secret, confidential and restricted matter.

NAVY MAIL CLERKS

Navy mail clerks who handle mail *aboard ship* are enlisted men of regular Navy ratings or nonrated men nominated by their commanding officer, and so designated by the Post Office Department. Navy mail clerks of specialist (M) ratings, including WAVES, serve only on shore stations, and the WAVES only in continental United States. Mail clerks sell stamps, make up and dispatch mail, and receive and open all pouches addressed to the ship, in addition to delivering mail and performing other postal duties. Each mail clerk and assistant mail clerk takes an oath of office and is bonded for a sum of not less than $1,000.

The mail clerk receives necessary equipment from postal authorities. He will maintain a sufficient stock

of required items, requisitioning them as need indicates. All postal equipment, except empty mail bags, will be stowed in the post office safe.

The following are to be read carefully and followed in the operation of the ship's post office; the communication officer will make the checks and inspections required:

(1) *Instructions for the Guidance of Navy Mail Clerks and Assistant Navy Mail Clerks*, issued by the Postmaster General, Washington, D. C.

(2) *Bureau of Naval Personnel Manual*, articles D-5305 to D-5311.

(3) *U. S. Navy Regulations, 1920*, chapter 53.

(4) Other orders and instructions issued by competent authority.

Remember that mail from home is good for morale. Organize the ship's postal system efficiently and take every step to see that mail is forwarded to your ship by the postal authorities; notify all hands when the mail will close so those who wish can write a letter home.

⚓   ⚓   ⚓
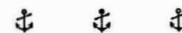
Bear in mind that you may be assigned to a small vessel as communication officer and be prepared to perform *all* the duties discussed in this booklet and the references. Or, you may be the signal officer, or assistant radio officer, or just a member of the coding board and CWO on a large ship. Whatever task you are assigned upon reporting aboard, throw yourself into it with all the energy and ability you possess.

Develop skill in the *practical* as well as the administrative aspects of your job. Your men will respect you more and work harder if they know *you* can do what *they* are doing. Do not tell everyone how much you know, show them by your handling of specific situations.

Technical knowledge and practical proficiency are not worth much if you cannot get along with your fellow men. Learn their names, treat them fairly, help them

study for advancement, and do not let the state of your liver influence your attitude toward them. Reward a job well done with a word of commendation. Be dependable, be strong, be sincere—*be a leader*.

Remember, we are all learning every day of every year; never think you know all there is to know. Say little but keep your eyes and ears open. If you make a mistake, admit it, but do not make the same mistake twice. When you are given an order, carry it out quickly and accurately. One of the finest things a senior officer can say about you is, *"He is dependable."*

In emergency situations, DO SOMETHING. Do not sit around and wait for your senior officer—it may be too late. Initiative and common sense are important in the Navy.

"Aim at success but never think you have achieved it!"

APPENDICES

APPENDIX A

SIMPLIFIED NAVAL RADIO W/T PROCEDURE

The heading of a naval message is important because it tells the originator of the message and to whom it is addressed. It tells whether the message is urgent, operational priority, priority, routine, or deferred, and it tells the radioman how to route the message to the addressees. At first glance, the heading of a naval message appears to be a confused jumble of letters and numbers, but after you learn the meaning of the letters and numbers, it makes sense.

A message will never get to the addressees if the heading is copied incorrectly; impress this on your radiomen. On the fleet broadcast schedule (the Fox schedule) each group in the heading is sent twice to make sure that operators copy it correctly.

There are two naval forms in use today:

(I) PLAINDRESS. In plaindress messages the address (originator and addressees) appears in the heading. There are four types of plaindress messages:

    (*a*) Normal.
    (*b*) Modified—normal.
    (*c*) Abbreviated.
    (*d*) Modified—abbreviated.

(II) CODRESS. The heading of a codress message contains only such data as are necessary to effect the particular transmission in question. The only call signs in the heading, after the call, belong to those activities who are to break down the cipher text of the message as it appears on a particular schedule. (NOTE.—See Communication Standing Order No. 6A.)

PLAINDRESS MESSAGES

Because plaindress messages are more difficult to understand, let's take them up first. A plaindress message is composed of the following parts:

(1) The call.
(2) Preamble.
(3) Address.
(4) Message instructions.
(5) Text.
(6) Message ending.

This sounds complicated, so let's examine each part and see what it does and what it contains.

(1) THE CALL. If there is a group of people standing around watching you trying to start your car, and you want Bill Jones to help you, you say, "Hey, Bill Jones, come here and give me a hand!" Everyone hears you, but Bill Jones knows you are calling *him*. It is the same in naval radio; the call tells who is calling whom, only instead of using a man's name in the call, you use a radio call sign. Thus, NSS is the call sign for Radio Washington, NAH for Radio New York, NAD for Radio Boston.

Many times there are a number of stations operating on the same frequency and you must make sure the call is sent accurately and distinctly to avoid confusion. Here is an example of a preliminary call:

NSS V NAH K

The prosign "V" means "from" or "calling." In the above example, Radio New York (NAH) is calling Radio Washington (NSS). He says, in effect, "Hey, NSS, this is NAH calling you!" Or, "NSS from NAH, answer!" The prosign "K" means "Go ahead, transmit."

Let's take a minute and see how naval call signs are assigned.

Naval shore radio stations are assigned three-letter call signs starting with the letter "N"—NSS, NAH, NAD, NPM, NSC.

Naval ships are assigned four-letter call signs starting with "N"—NIDN, NADV, NITR, NICS.

Collective and command call signs are letter-numeral-letter, letter-letter-numeral-letter, or four-letter pronounceable in formation, such as D4G, AB2B or CHOW. A *collective call sign* is one which calls a group of ships—M8Q is the collective call sign for SUBDIV 14 which might be composed of three submarines. A *command call* calls for the commander of a group of ships or fleet division—F6G is the call sign for COMSUBDIV 14. The only way you can tell whether a letter-numeral-letter call sign is collective or command in meaning is to look it up in the *U. S. Navy Radio Call Sign Book*. If CDD 65 (Commander Destroyer Division 65) is embarked in your ship, you must know his call sign and receive traffic addressed to him.

Naval shore activities, such as commandants of naval districts, navy yards, and bureaus in Washington, D. C., are assigned call signs but these call signs *are not radio calls* in spite of the fact they are used in the headings of radio messages. Such call signs are four-letter pronounceable words which do not start with the letter "N." The call sign for the CNO is MUSK, the call sign for BuDocks is FROG.

Because these are not radio calls, you can *never send* a call like this on a radio circuit: MUSK V NAH K. You must call the radio station which is guard (sends and receives traffic) for MUSK, which is NSS (Radio Washington), and indicate in the address of the message that the message is to be delivered to MUSK.

In teletype communication, however, it is proper to send the pronounceable call of the shore activity *if* that activity has a teletype room and receives traffic direct without going through the radio guard station's wire room. Example: ABIR V NAD, is proper because COMEASTSEAFRON (ABIR) has a teletype room

and sends and receives his own traffic. This call would be incorrect if sent by *radio;* NAD would then have to call NAH. the radio station which is guard for CESF.

"Combination" call signs are a little more complicated, but not at all difficult. There is a call sign for "Inspector of Naval Material at _____", which is BIDE. There are also geographical call signs; the call for New York, N. Y., is BELT. Therefore, the call for "Inspector of Naval Material at New York, N. Y." would be BIDE BELT—a "combination" call sign.

Shore activities which have teletype machines of their own are normally assigned two-letter call signs such as "PD". Here is a typical teletype call: "PD V KJ P144 . . ."

The *U. S. Navy Radio Call Sign Book* contains full details on the various types of call signs and their use. You will find it convenient to place tab markers on certain pages to indicate clearly the different sections of the book. You must also understand all types of visual calls as listed in the *U. S. Navy Visual Call Sign Book;* pay particular attention to the generation of task call signs. *SP 02378* lists combined British-U. S. Radio Call Signs. Be sure you know all call signs assigned your ship and the unit of which she is a part!

Today most call signs are cryptographed in the effective call sign cipher.

(2) THE PREAMBLE. The preamble may contain one or more of the following three items:

(*a*) *Station serial numbers* are used on certain messages to assist the receiving station in ascertaining whether it has received all messages sent to it by a particular transmitting station. Shore stations usually use a separate series of numbers for each shore station communicated with during the month. The first message to each shore station monthly after 0000 of the first day of the month (GCT) is numbered one, and the succeeding messages to the same shore station are numbered consecutively until the following month, after which a new series starts again.

Station serial numbers on the Fox schedule begin at 1 and run for a month in most cases, after which a new series begins. Ships normally do not use serial numbers; look up current regulations regarding use of station serial numbers. Example: NSS sends NBA his twenty-third message of the day:

NBA V NSS **NR23**...

(*b*) *Precedence* is indicated in the Preamble immediately following the station serial number (if any). Precedence prescribes the order in which messages are to be handled; there are five classes of precedence in the United States Navy:

O   Urgent.
OP   Operational Priority.
P   Priority.
R*   Routine.
D   Deferred.

Example: NSS sends NBA his twenty-fourth message of the day which is Operational Priority to *all* addressees:

NBA V NSS NR24 - **OP** - . . .

(NOTE.—The separative sign, transmitted "II," recorded as a dash (–) is used to set off prosigns which might otherwise be confusing to the receiving operator. Notice its uses in the examples which follow.)

A message does not have to be the same precedence to all addressees; it might be OP to one addressee and P to the others. This is what is meant by *dual precedence.* In such cases, both precedence prosigns will appear in the Preamble but only one will have call signs following it; this precedence prosign will be the one which applies

---

*Prosign "R" is used only in dual precedence messages.

to the smaller number of addressees. The remaining prosign applies to all other addressees.

Example: NSS sends his twenty-fifth message of the month to NBA. It is Operational Priority to M3G and P9K, and Priority to A4D, J4Q, L8C, and PLUG (all these call signs are included in the address, as you will see shortly):

NBA V NSS NR25 – OP – M3G P9K – P – . . .

Here, OP applies to the call signs following it. The P applies to the rest of the addressees.

(c) *Transmission Instructions* are the last item in the Preamble and consist of instructions from operator to operator on how to deliver the message to addressees. Transmission instructions may contain the following prosigns:

F—Do not answer.
G—Repeat this transmission back to me.
T—(alone)—Station called transmit this message to all addressees.
Operating Signals—Three-letter signals starting with "Q" which convey standard information in condensed form.
N—Exempted.

Example: NSS sends NWP his fourth message of the month. It is deferred to all addressees. NWP is to transmit to all addressees.

NWP V NSS NR4 – D – T – . . .

Example: NSS sends NAU his forty-fifth message of the month, priority to all addresses. The message is action to SUBDIV 14 (M8Q) info COMSUBSLANT (D8U). NAU is told to transmit to M8Q *less* NICS. Delivery has been made to D8U and NICS by other means:

NAU V NSS NR45 – P – T – M8Q – N – NICS – A – NSS
162Ø3Ø M8Q – W – D8U – GR15 B̄T̄

See *Communication Instructions* for further examples of data in transmission instructions.

(3) THE ADDRESS. The address is the most important part of the heading. If it is garbled an important message may never reach its destination, and an engagement with the enemy may be lost. The address must be copied correctly.

The prosign "A" always starts the address of a message except when the call serves as the address. "A" means, "The originator of this message follows." If a message originates with BuPers (STAR) it would look like this:

NERK V NSS NR6 – D – A – STAR . . .

Naval messages, with a few exceptions, have a "date-time" group, or reference numbers, immediately following the call sign of the originator. This date-time group shows the date and time of origin. The first two numerals are the date (dates 1–9 are prefixed by Ø), and the last four the time in GCT. In "joint" (U. S. Army-Navy) and "combined" (United States-Allied Nations) communications, the time is followed by a zone suffix letter; see *Communication Instructions* and *SP 02376(2)*.

241534 means the twenty-fourth day of the current month, and the time of origin is 1534 (GCT). Because the time in Greenwich, England, is 4 hours ahead of our time (EWT) at New York, N. Y., we subtract 4 hours from 1534 to find local time. In this case it would be 1134Q (plus 4).

Immediately *after* the date-time group come the call signs of the action and information addressees. Call signs which follow prosign "W" are information addressees.

Example: Opnav (MUSK) originates a message. action to USS Texas (NADV) and information to USS New York (NADT). It is being transmitted on the NSS "F" schedule:

NERK V NSS NR7 – A – MUSK 15Ø039 NADV – W –
NADT

The prosign "N" may be used in the address to exempt one ship from a collective call sign in which she is included.

Example: Opnav (MUSK) originates a message, action to COMSUBSLANT (D1N), and information to SUBDIV 14 (M8Q) less USS Bonita (NICS):

NERK V NSS NR889 – P – A MUSK Ø81111 D1N – W –
M8Q – N – NICS

The above message is being sent on the NSS "F" schedule which all addressees are copying at sea. A message once transmitted on a regular "F" method schedule is considered delivered to all addressees required to copy the schedule.

Neither the *precedence* nor the *address* may be altered by relaying stations.

(4) MESSAGE INSTRUCTIONS. Message instructions precede the text and may contain appropriate Operating Signals ("Q" signals), the group count, and the "long break" ($\overline{BT}$).

Example: Cominch (S4G) originates a message, action to USS New York (NADT) and information to USS Arkansas (NACT). Both addresses are to inform Cominch when they receive the message (QHR is an Operating Signal from *CCBP 2*); the group count is 78:

NERK V NSS NR89Ø – A – S4G Ø91212 NADT – W –
NACT QHR GR 78 $\overline{BT}$ . . .

The Message Instructions are fixed by the originator and may not be altered by others.

(5) THE TEXT. Texts are drafted by officers aboard your ship and during war are usually cryptographed.

Operators should take particular care in sending and receiving coded texts; bad garbles occur if sending or receiving is careless and sloppy. In cipher messages make sure the radioman copies the first two groups

and the last two groups with 100 percent accuracy. The groups which follow are important, but particular care should be taken with the first and last two groups of a message. Radiomen know that usually the first and last groups and second and next to last groups of a ciphered message are the same, and if they copy the indicators wrong at the beginning, some men copy them wrong at the end to make their reception *look* correct. Watch out for this; tell your radiomen to copy *exactly what they hear* even if the groups are different from what they would expect!

Here is an example of a message up through the text:

NERK V NSS NR999 – P – A – MUSK Ø411Ø3 NADV
NEQJ – W – NISS QHR GR 19 $\overline{BT}$ BASAJ DQTUE
XCRRU PKUFK WZSZA JNTUY YRPEK DWXDK
PDKTK WSSIE FUDEW PXZXS EFEOS PQAQQ
RGINA TASTF SIUYA DQTUE BASAJ

(6) THE MESSAGE ENDING. The message ending is the last item in the dispatch and is set off from the text by a long break ($\overline{BT}$). It includes the date-time group repeated from the heading, any final instructions between operators, and an ending prosign, "K" or "$\overline{AR}$."

"K" means, "Go ahead, transmit. This is the end of my transmission to you and a response is necessary."

"$\overline{AR}$" means, "This is the end of my transmission to you and no response is required or expected."

(NOTE.—In *Communication Instructions*, *CCBP 1*, and *CCBP 2*, some of the two- and three-letter prosigns are overscored, like this: $\overline{AR}$. This means that when the radioman sends them he runs the letters together instead of leaving the normal space between them. Radiomen in their logs never indicate overscoring because it is understood. In this appendix such prosigns will be overscored. Refer to the above publications for information on which prosigns are sent as one group.)

If an operator sends "K" as the ending sign, he wants a receipt for the message just transmitted; he wants to know whether you copied the entire dispatch "solid" on your mill. Before receipting for a message, the radioman should check his reception carefully—count the groups, make sure the heading is correct, etc.

If an operator sends "$\overline{AR}$", it indicates he is through and does not expect any answer from you. All messages on the Fox schedule end with "$\overline{AR}$".

Here are a few examples of the use of different prosigns and Operating Signals in the message ending.

(1) NSS wants a receipt from NAT for his message:

NAT V NSS NR4 – D – A – FROG 112244 AXEL GR 54 $\overline{BT}$ TEXT $\overline{BT}$ 112244 K

(2) NAT receipts for above message, no response required:

NSS V NAT R NR4 $\overline{AR}$

(3) NSC tells NCO he has nothing to send and is finished:

NCO V NSC QRU $\overline{AR}$

Now let's take a complete message and mark it off into the different parts we have discussed:

Call   Preamble
NAD V NAO   NR34 – P – T –

Address
A – CAZE Ø32223 ABIR – W – TEAM CRAB WIND

Mess. Insts.
QHR GR 81 $\overline{BT}$

Text   Mess. Ending
FARID HPMXD‑‑‑‑‑‑‑‑‑‑HPMXD FARID $\overline{BT}$ Ø32223 B K

Here is what it means: NAO calls NAD and sends him the 34th message of that month. The precedence is Priority to all addressees. NAD is to transmit to all addresses. The originator is CAZE on the 3rd day of the month at 2223 GCT. The message is addressed to ABIR for action, and to TEAM CRAB WIND for

information. The addressees are to inform the originator when message has been received (QHR). The message contains 81 groups between $\overline{BT}$ and $\overline{BT}$; in the message ending the date-time group is repeated, the receiving operator is told there is more to follow (B), and that he is to receipt for the message (K).

DIRECT COMMUNICATION. When the originator and addressee are in direct radio communication it is not necessary to use originator's prosign (A) or to repeat call signs of origin and action. In the example below, NADV is the originator and NIDN the action addressee; the *call* serves as the address:

NIDN V NADV – P – 141155 GR 45 $\overline{BT}$ TEXT $\overline{BT}$ 141155 K

CODRESS MESSAGES

A codress message carries the entire address (originator, action and information addressees) cryptographed in the text. Transmission instructions may also be cryptographed in the text.

The only call signs which appear in the heading, other than those in the call, are those of ships or activities required to decipher the message. (Call signs are not used in the text. Use the name of the ship or activity, or its authorized abbreviation.)

Example: Opnav originates an OP message addressed to USS Texas for action and to USS Omaha for information. The message is transmitted on the NSS Fox schedule. The calls for the Texas and Omaha appear in the heading—*they* are the ships required to break down the cryptographed text:

NERK V NSS NR245 - OP - HGB6F WZQAL 251145 GR 49 $\overline{BT}$
FUQOF GVGHJ ‑‑‑‑‑‑‑‑‑‑X ACTION TEXAS INFORMATION OMAHA FROM OPNAV X
‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑ GVGHJ
FUQOF $\overline{BT}$ 251145 $\overline{AR}$

(All of the text above, between the two BT's would be encrypted; the translation is shown merely for example.)

(NOTE.—HGB6F is assumed to be the enciphered call of USS Texas, and WZQAL the enciphered call of USS Omaha.)

See *SP 02376 (2)*, Cominst, and standing order No. 6 for complete information on codress messages.

PROCEDURE MESSAGES

A procedure message is a message between operators, employing prescribed prosigns or operating signals, and essential to traffic handling or station operation. Procedure messages seldom contain a date-time group (see *Communication Standing Order No. 16A*) or a group count.

Here is a typical procedure message in which NIDN asks NADV to repeat the 24th to 31st groups of a message just transmitted:

NADV V NIDN $\overline{\text{IMI}}$ 24 to 31 K

If the originator and addressee in a procedure message (often called a "service message") are not in direct communication, the originator's call sign is used and is followed immediately by the call sign of the action addressee. After the call sign of the action addressee comes the text of the procedure message.

Example: NIDN calls NAD and sends him a Priority message which he is to transmit to the addressee (ZONA). QMJ 1 is an Operating Signal meaning, "Message _____ indecipherable. Check indicators and repeat." In this case, NIDN has found ZONA's message Ø81111 indecipherable and asks ZONA to check the indicators. NAD is to receipt to NIDN for this transmission.

Orig.   Act.
NAD V NIDN – P – T – A – NIDN ZONA QMJ 1 ZONA Ø81111 K

There is no date-time group in such a procedure message unless, with enciphered calls, a date other than that of the message being referred to is used in enciphering the call signs. If it is necessary to use a date-time group in a procedure message, the long break ($\overline{\text{BT}}$) separates the heading from the text, as follows:

NERK V NSS NR9ØØ – D – !A – 9HTRE 181134 G5WS8 $\overline{\text{BT}}$
QMU 1 17ØØ34 (NSS NR 834) $\overline{\text{AR}}$

This message is being sent on the Fox schedule, station serial number 9ØØ, deferred precedence, originator 9HTRE, date-time group, action to G5WS8 (both calls enciphered), long break, QMU 1: "Cryptographic system indicated in your message 17ØØ34 is not held." Notice the use of a station serial number to aid in identifying the message.

The uses of $\overline{\text{INT}}$, $\overline{\text{IMI}}$, J, QJM, and QMO are confusing if instructions are not thoroughly understood. It is with this in mind that the following is written.

(1) $\overline{\text{INT}}$, preceding prosigns and Operating Signals, indicates that the matter to follow is in the form of a question.

Example: NBA asks NSS, "May I transmit?"

NSS V NBA $\overline{\text{INT}}$ K

NSC asks NCO, "What is my signal strength?"

NCO V NSC $\overline{\text{INT}}$ QSA K

$\overline{\text{INT}}$, before a part of a received message, is used to ask, "Has the indicated portion been received correctly?"

Example: G6F asks NAM, "Is the date-time group as indicated?"

NAM V G6F $\overline{\text{INT}}$ 231145 K

(2) $\overline{\text{IMI}}$ is the "repeat" sign. It is sent from operator to operator when one radioman has missed part of the message just transmitted. $\overline{\text{IMI}}$ used alone means, "Re-

peat all your last transmission." $\overline{\text{IMI}}$ followed by identification data means, "Repeat portion indicated."

Example: NPG asks NPM to repeat his last transmission:

NPM V NPG $\overline{\text{IMI}}$ K

NPM asks NIJZ to repeat the 16th to 23rd groups.

NIJZ V NPM $\overline{\text{IMI}}$ 16 to 23 K

Remember, $\overline{\text{INT}}$ and $\overline{\text{IMI}}$ are used by the *radioman* to secure "fills" or repeats on a message just transmitted, or to ask if a certain portion is correct. The radioman may have missed the groups, or be uncertain of them because of static, interference, typewriter keys jamming, or because the other operator was sending too fast.

(3) "J" is the prosign meaning "Verify and repeat message (or portion indicated), check cryptographing." It asks the *originator* to verify and repeat the substance of his heading or text, and can never be used by radiomen to secure a repeat!

NOTE.—When *only* the enciphering requires checking use an Operating Signal (QJM or QMJ), do not use "J."

"J" is sent on the authorization of the addressee in your ship back to the *originator;* it is used when the addressee does not understand something in the heading or text, and thinks a mistake has been made.

Example: A dispatch is received by L8F from CINCLANT (A6O), broken by L8F's coding board, and routed to the appropriate officer for action. The order in the message appears to be incorrect in view of certain knowledge possessed by the action officer; he thinks it should have been addressed to another unit. He, therefore, authorizes a "jig" back to the originator to determine whether the dispatch is correct:

A6O V L8F J Ø81111 K

The above example assumes direct communication; L8F is asking for verification and repetition of the whole dispatch. If L8F just wanted the *text* verified, he would have sent: A6O V L8F J Ø81111 AA $\overline{\text{BT}}$ K.

Prosign "C" is used in answering a "jig" and means, "This is a correct version of message indicated (or portions thereof)."

(4) QJM means, "Check encipherment of message _____ (or portions indicated) and repeat". QJM is sent on the authorization of the coding room supervisor and goes back to the coding board of the originator. Radiomen normally do not authorize the transmission of a QJM, although if they are working certain cipher systems, as they often do afloat, they may request the CWO or CRWO to authorize its use.

Example: The coding board in the USS Wichita (NAFZ) cannot break the text of COMEASTSEAFRON (ABIR) dispatch Ø42233. The following message would be transmitted if the ship were not under radio silence:

NAM V NAFZ – P – T – A –NAFZ ABIR QJM Ø42233 AA $\overline{\text{BT}}$ K

(This "service" message is Priority, NAM is to transmit to ABIR, a receipt is required).

QMJ may also be sent by the CRWO; QMJ means, "Message _____ indecipherable. Check _____ (1. Indicators; 2. Message and machine settings) and repeat." QMJ may be used when you suspect the specific source of the trouble, while QJM is more general.

(5) QMO is the operating signal which means, "Repeat message _____ (or portion indicated)." QMO is used by the CWO or CRWO to secure a repeat of a message which has already been transmitted (i. e., used some time *after* the message has been received). QMO may be used by the coding board when a "transmission garble" is suspected. Often a QMO will clear up the garbles caused by careless sending or receiving and it

will not be necessary to resort to a QJM or QMJ. QPO is used in sending the answer to a QMO.

Many officers become excited when a message will not break and shout right away "Send 'em a QJM!", when some initiative and common sense would have produced perfect English!

If you do have to ask for a repetition of the message, or a verification of the encipherment, do not sit around and smoke your pipe while waiting for the answer—keep trying to crack the garble yourself!

In connection with the breaking of garbles in the different cryptographic systems, your attention is invited to *CSP 847 (A)*, and *Communication Instructions*, chapter 4.

Although you are not required to memorize "Q" signals it is a good idea to be familiar with the more commonly used ones. Here is a list of Operating Signals important to communication officers:

Cryptographed traffic. QJM, QMJ, QWI, QMU, QPL, QMK, QQB, QQY.

Means of Transmission. QWM, QKC, QYB, QXL, QNL.

Authentication. QHA 1–2, QMA 1–3, QIA, QJA 1–2.

Traffic. QMO, QPO, QHB 1–2, QQL, QZM, QLM, QQO, QQM, QLR, QMM, QIR.

Signal strength and Readability. QSA, QRK.

Combined Operating Signals (CCBP 2) contains a complete list of "A" signals together with instructions on their use. Look through *CCBP 2* and study the meanings of the above signals.

ACKNOWLEDGMENTS

Acknowledgments are often confusing to new communication officers; here is a short review.

An acknowledgment is a communication from the addressee of a message to the originator conveying the information that the originator's message has been *received and understood*.

Instructions to acknowledge a message, if required, normally will be included by the originator in the *text* of his message.

An operating signal may be used to request an acknowledgment when such instructions were not included in the text of the message, or when it is necessary to hasten an acknowledgment previously requested.

Acknowledgments are sent by two methods: (1) An operating signal may be used to convey the addressee's acknowledgment, (2) the addressee may originate a message containing the acknowledgment.

⚓   ⚓   ⚓

Appendix A is not intended to furnish a complete summary of W/T procedure; it outlines important basic facts which all communication officers should know. For complete information, your attention is invited to *Communication Instructions*, and *CCBP 2*.

APPENDIX B

RADIO WAVE PROPAGATION AND FREQUENCY CHARACTERISTICS

As a communication officer, you should understand elementary principles of radio wave propagation, what causes waves of different frequencies to possess different characteristics, and what waves can be used to cover certain distances. The following pages contain a simple explanation of these subjects.

Unlike radio transmitters and receivers, radio waves cannot be seen or touched. We know them only indirectly, by their effects. We know that they travel with the speed of light (186,000 miles per second), that they are electromagnetic, and that waves of certain frequencies are reflected by the upper atmosphere.

For a simple explanation of frequency, consider a child's swing. When the swing makes a complete trip to and fro it completes one cycle. If the time required for this complete trip is 1 second, we say the frequency is one cycle per second. A radio transmitter generates a signal of many thousands of cycles per second—the wave is making that number of oscillations per second, and this is spoken of as "frequency."

The frequency of radio waves is expressed in kilocycles per second (thousands of cycles per second), or in megacycles per second (millions of cycles per second). The abbreviations "kc." and "mc." mean the indicated number of oscillations *per second*. The *length* of radio waves is expressed in *meters*. It is easier to express slight variations in frequency by using kilocycles or megacycles, rather than expressing variations in terms of wavelength measured in meters, hence these terms are always used by the Navy. Example: 15 kc. is 15000 cycles per second; 500 kc. is 500000 cycles per second; 56000 kc. is the same as 56 mc.

Frequencies below 1500 kc. are usually expressed in kilocycles, while frequencies above 1500 kc. may be expressed in either kilocycles or megacycles. Frequencies above 30000 kc. are usually expressed in megacycles as this involves writing fewer digits. Thus, 78 mc. is used instead of 78000 kc.

There is a definite relation between wavelength and frequency. As wavelength increases, frequency decreases; as wavelength decreases, frequency increases. A wave with a frequency of 15 kc. has a wavelength of about 20000 meters; a wave with a frequency of 15000 kc. has a wavelength of about 20 meters. The examples which follow will help you understand the relation between wavelength and frequency.

Low frequency—Long wavelength. The diagram below shows a freight train made up of long boxcars, corresponding to *long wavelength*. With the train moving at a constant speed, the number of times per unit of time the intersections between cars pass a fixed telegraph pole is the *frequency*. Naturally, the longer the cars, the fewer the intersections that will pass the pole—the longer the wavelength, the lower the freqency.
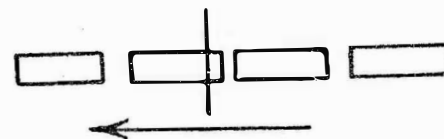

High frequency—Short wavelength. In this example, the train is composed of *short* box cars, corresponding to short wavelength, and the number of intersections passing the pole per unit of time is the frequency. With the train traveling at the same speed as in the above example, it will be seen that many more intersections pass the fixed pole—the shorter the wavelength, the higher the frequency.
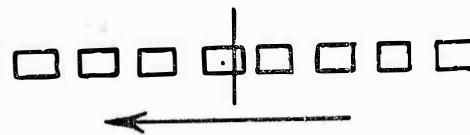
It must be remembered that the speed of the trains in the above examples did not change. The speed of radio waves also remains constant (186,000 miles per second), and is not affected by changes in frequency.

Radio waves are radiated from the transmitting antenna at all angles to the horizontal. There are two principal types of wave:

(1) GROUND WAVE. These ground waves travel along the surface of the earth, and are rapidly weakened or attenuated (absorbed) until they are no longer of useful strength.

Ground wave

EARTH
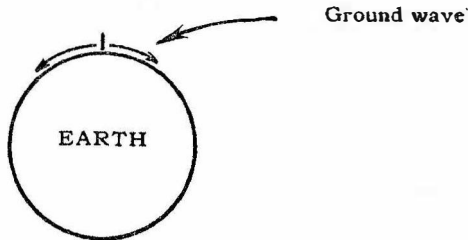
On low frequencies (10–500 kc.), the ground wave is important and can be detected for thousands of miles when a powerful (250-kilowatt) transmitter is used. Radio Washington (NSS/NAA) transmits the fleet broadcast schedule ("F" method) on low frequency (around 17–18 kc.), using great power to force the signal out many thousand miles.

The principal advantage of low frequency is that it is very reliable, and not as subject to distortions by magnetic storms and electrical disturbances as high frequency. The disadvantage of low frequency is the size and amount of radio equipment needed to build a powerful station, the great steel towers required to support the antennas, and the extreme susceptibility of all this vast equipment to bombing. Powerful high-frequency equipment is smaller, requires less elaborate transmitting antennas, costs less, is quicker to construct, and more easily moved from one location to another.

(2) SKY WAVE. Not all energy radiated by the antenna follows the surface of the earth, in fact, the greater portion is likely to be at angles considerably above the horizontal. These higher angle sky waves would travel outward into space indefinitely and be of no use for communication if they were not bent back to earth again. Sky waves that are bent back to earth are of tremendous value for communications.

This bending action is explained by the existence of a region of ionized atmosphere known as the ionosphere, which surrounds the earth like a huge curved mirror. The possibility of radio waves being returned to earth from such an ionized region was proposed simultaneously by A. E. Kennelly in America, and by Oliver Heaviside in England, in the year 1902. This was more than 20 years before radio amateurs proved high frequency communication feasible. In honor to these two scientists, the ionosphere was named the Kennelly-Heaviside layer. The ionosphere is not a single layer—there are several layers—but for purposes of explanation we will use only a single layer. Let's examine the ionosphere and see what it is that causes sky waves to be refracted and reflected back to earth, making the miracle of high frequency (short-wave) communication as we know it today.

Radiations from the sun strike the upper atmosphere and cause the ionization of gas molecules (the releasing of electrons) so that free electrons are present in this ionized layer. This billowing cloud of electrons forms the refracting and reflecting medium which causes sky waves to be bent back to earth. This bending may be caused by either reflection or refraction, both being very similar to reflection or refraction of light waves. It is common to speak of a "reflected" wave even though the actual process is refraction. The higher the degree of ionization, the greater the refracting power of the ionosphere.

The lower the frequency, the more easily the wave is bent. At the higher frequencies the bending is relatively small, so that whether or not the wave returns to earth depends on the angle at which it enters the ionosphere. The higher the frequency, the higher the angle at which the wave will enter the layer, until a critical angle is reached at which the wave barely manages to get back to earth. Waves which enter the Kennelly-Heaviside layer at still higher frequencies will not be bent enough, do not return to earth, and are useless for communication over any distance. This is true on ultra high frequencies (UHF), and the ground wave is the only useful portion of the energy radiated, having what approximates an optical range (line of sight). (It should be understood that *all* waves at *all* frequencies radiate some ground wave, the exact amount depending on the frequency. Ground wave on the high frequencies is usually good for communication up to 15 miles.)
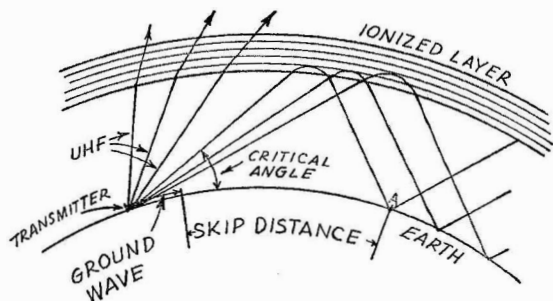
It should be clear to you at this point why it is possible to communicate over tremendous distances using high frequency and relatively low transmitter power. The sky wave shoots up into the upper atmosphere, is reflected back to earth, bounces back up into the ionosphere, and so forth. By using these frequencies, it is possible to transmit a signal many thousand miles with only a few hundred watts input to the final amplifier of the radio transmitter. The selection of which high

frequency to use is often difficult because you have to cope with constantly changing conditions in the upper atmosphere, and a phenomenon known as "skip distance."

You can probably guess what causes skip distance. If the ground wave from your ship's transmitter travels 100 miles, and the first sky wave returns to earth 500 miles from your ship, there will be a band 400 miles wide around you in which your signal cannot be detected.
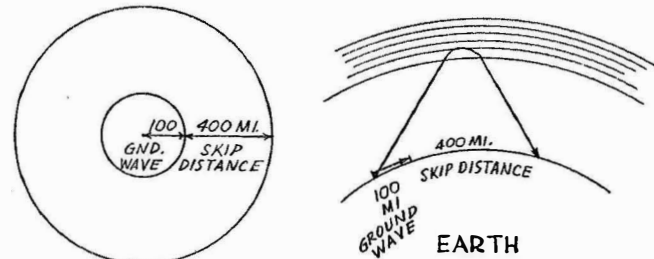
The region lying between the end of the useful ground wave and the point where the highest-angle waves return to earth is known as the skip distance, because all sky waves skip over this zone and no signals can be heard. The size of this zone depends on the frequency, the state of the ionosphere, the time of day or night and the season of the year. (The height of the Kennelly-Heaviside layer may vary from 50 to 250 miles above the surface of the earth.)

Very high frequencies (VHF). Very high frequencies (30–300 megacycles) have recently become of great importance. VHF radiotelephone transmitters are used in convoy and for tactical maneuvering of combatant ships. Signals are usually sent by radiotelephone with great speed (you can talk much faster than you can send or receive radio code). During the major portion of the time, VHF is relatively free from interception outside of an area slightly greater than the optical path. On frequencies around 30 mc. "skip" occurs fre-

quently, resulting in communication over several thousand miles. As the frequency increases, skip-distance effects become more uncommon and seldom occur on frequencies over 100 mc. Refraction in the lower atmosphere is sometimes encountered, resulting in extension of the transmitting range to several times the optical path.

Normally, the only signals received on VHF will be in the ground wave area or over distances which place the transmitting and receiving antennas in a substantially optical path. The sky wave rarely returns to earth at frequencies above 60 mc., although it has under freak conditions.

It should be kept in mind that radio waves and light waves are substantially the same, the main difference being that radio waves, even at very high frequency and superfrequencies, are much lower in frequency than light. Beginning with 40 mc., radio waves start to take on the straight line propagation characteristics of light. Frequencies of 50–80 mc. are much better for "optical" range work than frequencies in the lower edge of this band (28–30 mc.) which bend more with the curvature of the earth even without "skip" effect, resulting in a range 25–50 percent greater than the optical path, and on certain occasions many thousands of miles. In aircraft, the optical range may be as much as several hundred miles. Transmitting antennas for VHF transmitters are generally placed as high as possible to increase range—the reason greater distances may be covered on VHF from aircraft than from surface vessels.

The following table is intended only as a rough index to the ranges of the different frequencies. Due to the varying condition of ionosphere, seasonal and otherwise, it is impossible to state any hard and fast rule. The range estimates are on the conservative side. (See *Communication Instructions*.)

Frequency	Range	Remarks
10–100 kc.	High Power: 5,000 miles or more, good conditions. Medium Power: up to 1,000 miles.	18 kc. by NSS for F skeds. Not subject to skip but prolonged fading is likely.
100–500 kc.	High Power: 5,000 miles or more, good conditions. Medium Power: up to 500–800 miles, more at night.	375 kc.—Int'l D/F freq. 500 kc.—Distress freq. and Com'l calling frequency.
500–1,500 kc.	Day: 150–300 miles. Night: 1,000–2,500 miles.	Broadcast band.
1,500–2,000 kc.	Day: 150–300 miles. Night: 1,000–2,500 miles.	Subject to skip effect, Police radio.
2,000–4,000 kc.	Day: 250–350 miles. Night: 1,500–2,500 miles.	Inshore patrol; aircraft; short dist., point-point.
4,000–6,000 kc.	Day: 300–600 miles. Night: 8,000–12,000 miles.	Point to point transmission 4235kc. NERK series starts.
6,000–10,000 kc.	Day: 800–1,500 miles. Night: 8,000–12,000 miles.	Used between widely separated ships and shore stns.
10,000–13,000 kc.	Day: 2,000–8,000 miles. Night: 3,000–10,000 miles.	Range depends on conditions. Long range communications.
13,000–18,000 kc.	Day: 1,000–12,000 miles. Night: unpredictable.	Good for long range work when conditions are good.
18,000–30,000 kc.	Range variable, may be up to several thousand miles, or slightly over optical range.	Very dependent on conditions, "freaky."
30,000–200,000 kc.	Usually good only for very short distances; the aircraft range may be up to 150 miles. 8–40 miles from surface vessels.	These frequencies are not subject to "skip" effect except under unusual conditions. (See text.)
200 mc. and higher	Used for experimental work. Their range is limited to a substantially optical path.	

There are two phenomena which you should understand:

(1) FADING. Fading is caused by, (a) interference between ground and sky wave at the receiving point, and, (b) by sky waves which enter the ionosphere at different angles being reflected at slightly different angles, and thus arriving at the receiving antenna at different times. High frequencies may be subject to a very rapid fade, while on low frequencies the fade is long and slow.

(2) STATIC. The first type of static is caused by natural phenomena such as discharges of electricity between clouds of different potential or from clouds to earth—lightning striking a tree. Static due to natural causes cannot be eliminated but its effects can be reduced. Frequency modulation tends to eliminate this type of static.

The second type of static is man-made static. It is more common and can usually be eliminated. This kind of background noise in radio receivers, particularly high frequency receivers, is caused by any piece of electrical apparatus which generates a spark which sets up electric waves in the atmosphere (electric razors, electric motors, generators, etc.). Combination of fixed condensers and inductances (coils of wire) will usually eliminate or reduce man-made static.

APPENDIX C

Notes on Advancement in Rating

In addition to your communication duties aboard ship, you may be division or junior division officer. One of your duties will be the advancement of your men in rating. You must develop a genuine interest in your men and earn their respect and loyalty. One good step in this direction is to get deserving, competent men advanced in rating.

The *Bureau of Naval Personnel Manual*, part D, gives you information on advancement in rating. It lists the qualifications for the different rates and the petty officers in those rates. Look up the various BuPers circular letters on the subject. The captain's yeoman can help you find the letters which apply. The following is a summary of the procedure to be followed:

(1) *Training courses.* BuPers publishes training courses for every rate in the navy. You may secure these courses from the educational officer, or by writing to the Bureau. The enlisted man is required to study the course and take the progress examinations, which you mark (an answer book is furnished). The mark is turned over to the educational officer and entered on a card.

(2) *Complement.* Each ship or station has a complement, i. e., the number of men in each rate allowed that ship or station. If a vacancy exists in the complement, and your man meets other qualifications, he may be examined for advancement. At the present time there are some "open rates" in which advancements are authorized without regard to vacancies in complement, as long as the man has demonstrated his aptitude for that rating and meets other qualifications. Consult BuPers circular letters.

(3) *Time in present rate.* One of the qualifications listed in the *BuPers Manual* is the time required in one

rate before a man can progress to the next higher rating. For example, an RM3c might have to be nine months in the rate prior to going up for RM2c.

(4) When your man has finished his course and received his Certificate of Attainment from the educational officer, and has met all other requirements, you are ready to write a memorandum to the commanding officer informing him that you have a man ready to be examined. The C. O. will then appoint a rating board of three officers who conduct the examination. The examination may be oral but usually it is written. In many rates the man is given an examination in the practical aspects of his rate, such as receiving and transmitting code at a certain speed in the case of radiomen. The examination paper is graded and the mark turned in; if the man has passed he is advanced in rating.

You will probably be a member of several rating boards, and will find that you know little, if anything, about the subject in which you are examining the man. The best procedure in this case is to get a copy of the training course and write your examination from it, or get the CPO in that branch to write the examination, or secure several sample examinations from other ships or stations.

Remember, *you* want to be promoted, and your enlisted men want to go up in rating. It means a lot to him, more money for his family plus a feeling of achievement. Work with him and help him along, make a loyal friend of him and he will be a better worker for you and the ship.

APPENDIX D

Communications Check-Off List

When your ship makes port there are a number of important things for you to do in connection with overhaul, upkeep, and in the maintenance of operating efficiency. The following check-off list will be helpful in outlining your work: cut a stencil of it and run off several hundred copies. As various things come up at sea which must be attended to by you in port, note them on this form.

COMMUNICATION CHECK-OFF LIST

U. S. S. _____

Date _____

1. Dispatches:
   ALNAVS_____
   BASEGRAMS_____
   MISSING FOX NUMBERS_____
   CINCLANT (or CINCPAC)_____
   COMINCH_____
   Q MESSAGES_____
   MISSING_____

2. Publications:
   CSPM_____
   CRPM_____
   RPM_____
   RPSM_____
   RETURN_____
   SUPERSEDED_____
   EFFECTIVES_____

3. Frequencies:
   FOX_____
   AREA_____
   AIRCRAFT_____
   SPECIAL_____

4. Burn:
   _____

5. Personnel:
   _____

6. Material and Supplies:
  NEEDED _____
  REPAIR _____
  TURN IN _____
  CHECK OR CALIBRATE _____
  D/F _____
  SOUND _____
  VISUAL _____

7. Reports:
  MONTHLY DESTRUCTION _____
  QUARTERLY _____
  TRANSFER _____

8. Departmental Recommendations:
  _____
  _____

9. Miscellaneous:
  _____
  _____
  _____
  _____