

# CHAPTER 1

## YOUR CAREER AS A RADIOMAN

The fleet needs capable men in all ratings, because a modern naval force is only as good as the men who man the ships. Even with the most modern equipment, a naval force is almost powerless without competent men to operate and maintain their equipment. Good men are plentiful, but their capability depends chiefly upon their TRAINING.

In the performance of practical work, proficiency comes with practice and experience, for which no book — however helpful — can be an adequate substitute. On the other hand, much of the knowledge you must have can be gained only through study.

As a part of the Navy's training program, this self-study Navy Training Course is written for the purpose of aiding you in your preparation for advancement in rating. The course is designed to help you meet the professional (technical) qualifications for advancement to Radioman 3 and Radioman 2.

This training course consists of 14 chapters. The first chapter is nontechnical in nature and introduces you to the course. The remaining chapters deal with the technical aspects of your rating. Chapter 2 describes the organization, purpose, and function of naval communications. Chapter 3 is devoted to the various aspects of communication security. The international Morse code and its application are covered in chapter 4. Chapter 5 deals with the many types and forms of messages, and the contents of the various messages are discussed in detail. The next two chapters are devoted to operating procedure; radiotelegraph is covered in chapter 6, and radiotelephone in chapter 7. In chapter 8 the radio wave is discussed, and its propagation through the atmosphere is explained. Antennas also are covered in chapter 8. Chapter 9 deals with radio communication equipment. Teletypewriter equipment is the subject of chapter 10; teletypewriter operating procedures are

given in chapter 11. Chapter 12, entitled "Administration," describes some of the miscellaneous jobs of the Radioman. These include maintaining message files, entering corrections to publications, keeping circuit logs, and the like. The all-important consideration of electrical safety precautions is discussed in chapter 13. Maintenance of communication equipment is taken up in chapter 14.

The remainder of this introductory chapter gives information on the enlisted rating structure, the Radioman rating, requirements and procedures for advancement in rating, and references that will help you in working for advancement and also in performing your duties as a Radioman. It is strongly recommended, therefore, that you study this chapter carefully before beginning intensive study of the remainder of this training course.

### THE ENLISTED RATING STRUCTURE

The present enlisted rating structure, established in 1957, includes three types of ratings—general ratings, service ratings, and emergency ratings.

**GENERAL RATINGS** identify broad occupational fields of related duties and functions. Some general ratings include service ratings; others do not. Both Regular Navy and Naval Reserve personnel may hold general ratings.

**SERVICE RATINGS** identify subdivisions or specialties within a general rating. Although service ratings can exist at any petty officer level, they are most common at the P03 and P02 levels. Both Regular Navy and Naval Reserve personnel may hold service ratings.

**EMERGENCY RATINGS** generally identify civilian occupational fields. Emergency ratings do not need to be identified as ratings in the peacetime Navy, but their identification is required in time of war.

## THE RADIOMAN RATING

Within the enlisted rating structure, ratings are divided into a total of 12 groups, with ratings in each particular group related occupationally. The Radioman rating is a general rating in group V, commonly called the administrative and clerical group. At present, there is no provision for service or emergency ratings in the Radioman rating.

Your responsibilities as a petty officer in the Radioman rating break down into two types of duties: your professional duties and your military duties.

As a Radioman Third or Second Class, your professional duties may vary slightly, depending upon the activity to which you are assigned.

The Radioman is primarily an operator, but he does have duties as a technician. You will be required to fulfill certain qualifications that require you to know what makes your equipment work, as well as how to operate it.

Radiomen are used in all important segments of the Naval Establishment--from large communication centers to small stations, from attack carriers to the smallest patrol craft. Radiomen keep vital information flowing.

Ashore, most Radiomen are found in communication centers. Here, they are concerned with getting messages to and receiving them from ships of the fleet, and also monitoring other circuits. In addition, Radiomen operate teletype-writers and facsimile equipment.

Afloat, the Radioman is a "jack of all trades" in the communication business. His assignments include a little bit of everything, such as manning radiotelephone circuits, copying fleet broadcasts, or operating teletypewriter equipment.

Along with operating his equipments, the Radioman must be prepared to keep them in operation and perform maintenance when necessary.

Now that you have a general idea of your professional duties as a Radioman, let's discuss some of your military duties as a petty officer.

Often, the difference between a "good" petty officer and a "bad" petty officer is leadership. The guide for leadership in the Navy is General Order 21, which states, in part: "The strength of our nation and of our services depends upon courageous, highly motivated, and responsible individuals." Each command has a training program that provides instruction in leadership principles and practices. It is your duty to take

advantage of this instruction, and to apply the principles and practices in your everyday dealing with the men around you -- especially those who look to you for an example of leadership.

Many books have been written on the subject of leadership, and many traits have been listed as a necessary part of the makeup of a leader. Whether you are a successful leader is decided by the success with which you stimulate others to work willingly under your supervision -- not by compiled lists of desirable traits.

Self-confidence is one of the keys to leadership, but it must be backed up by enthusiasm and especially by knowledge. For example, you not only must be able to supervise lower rated men in their communication duties, but (as necessary) you also must be ready to pitch in and help do the job. Your men will respect you as a man who has demonstrated his know-how and skill.

A cooperative attitude also is a requirement of leadership. Do not let your experience in the RM rating make you unreasonable and overbearing with lower rated men whom you may have to instruct. Your attitudes are going to have a definite effect upon the attitudes and the actions of these men.

When you become a petty officer, you become a link in the chain of command between your officers and your men. Your responsibilities are more than merely giving orders and seeing that work is done. You likewise have a responsibility for sharing your knowledge with others. When the Navy promotes you, it expects you to bear some of the burden of training others.

Be competent in your instruction of others; the opportunity to acquire knowledge and to master new skills was not given to you solely for your own benefit, but also for the benefit of the Navy as a whole. As new types of communication equipment become available or changes in communication procedures evolve, you should be the first to learn about them. But do not be grudging in passing on this information and training to others.

A petty officer's working relationship with others is of great importance to the success of his work and the mission of his activity. In your day-to-day working relationships, you will be required to cooperate with others. This is true not only within your own division but with men in other divisions. Being able to get along is, at times, just as necessary as proficiency in performing your technical skills.

The ability to get along with others is, within itself, a definite skill. This skill can be developed in much the same manner as a technical skill; that is, the many different skills you must possess may each be studied and developed. Some of these are understanding another man's job, his problems, and his abilities. You must possess skill in instructing, leading, and (in some instances) inspiring the men with whom you work. Detailed information to help you develop these skills is given in the training courses Basic Military Requirements, NavPers 10054-A, and Military Requirements for Petty Officer 3 & 2, NavPers 10056-A. You should be familiar with the entire contents of both training courses before taking the Navywide examination for advancement in rating.

### ADVANCEMENT IN RATING

Some of the rewards of advancement in rating are easy to see. You get more pay. Your job assignments become more interesting and more challenging. You are regarded with greater respect by officers and enlisted personnel. You enjoy the satisfaction of getting ahead in your chosen Navy career.

But the advantages of advancing in rating are not yours alone. The Navy also profits. Highly trained personnel are essential to the functioning of the Navy. By each advancement in rating, you increase your value to the Navy in two ways. First, you become more valuable as a technical specialist in your own rating. And second, you become more valuable as a person who can train others and thus make far-reaching contributions to the entire Navy.

### HOW TO QUALIFY FOR ADVANCEMENT

What must you do to qualify for advancement in rating? The requirements may change from time to time, but usually you must:

1. Have a certain amount of time in your present rate.
2. Complete the required military and professional training courses.
3. Demonstrate your ability to perform all the PRACTICAL requirements for advancement by completing the Record of Practical Factors, NavPers 760.
4. Be recommended by your commanding officer, after the petty officers and officers supervising your work have indicated that they

consider you capable of performing the duties of the next higher rate.

5. Demonstrate your KNOWLEDGE by passing a written examination on (a) military requirements and (b) professional qualifications.

Some of these general requirements may be modified in certain ways. Figure 1-1 gives a more detailed view of the requirements for advancement of active duty personnel; figure 1-2 gives this information for inactive duty personnel.

Remember that the requirements for advancement can change. Check with your division officer or training officer to be sure that you know the most recent requirements.

Advancement in rating is not automatic. After you have met all the requirements, you are ELIGIBLE for advancement. You will actually be advanced in rating only if you meet all the requirements (including making a high enough score on the written examination) and if the quotas for your rating permit your advancement.

### HOW TO PREPARE FOR ADVANCEMENT

What must you do to prepare for advancement in rating? You must study the qualifications for advancement, work on the practical factors, study the required Navy Training Courses, and study other material that is required for advancement in your rating. To prepare for advancement, you will need to be familiar with (1) the Quals Manual, (2) the Record of Practical Factors, NavPers 760, (3) a NavPers publication called Training Publications for Advancement in Rating, NavPers 10052, and (4) applicable Navy Training Courses. Figure 1-3 illustrates these materials; the following sections describe them and give you some practical suggestions on how to use them in preparing for advancement.

#### The Quals Manual

The Manual of Qualifications for Advancement in Rating, NavPers 18068A (with changes), gives the minimum requirements for advancement to each rate within each rating. This manual is usually called the "Quals Manual," and the qualifications themselves are often called "quals". The qualifications are of two general types: (1) military requirements, and (2) professional or technical qualifications.

## ACTIVE DUTY ADVANCEMENT REQUIREMENTS

REQUIREMENTS *	E1 to E2	E2 to E3	E3 to E4	E4 to E5	E5 to E6	E6 to E7	† E7 to E8	‡ E8 to E9
SERVICE	4 mos. service— or comple- tion of recruit training.	6 mos. as E-2.	6 mos. as E-3.	12 mos. as E-4.	24 mos. as E-5.	36 mos. as E-6.	48 mos. as E-7. 8 of 11 years total service must be enlisted. Must be perma- nent appoint- ment.	24 mos. as E-8. 10 of 13 years total service must be enlisted.
SCHOOL	Recruit Training.		Class A for PR3, DT3, PT3. #AME 3			Class B for AGCA, MUCA, MNCA.		
PRACTICAL FACTORS	Locally prepared check- offs.	Records of Practical Factors, NavPers 760, must be completed for E-3 and all PO advancements.						
PERFORMANCE TEST		Specified ratings must complete applicable performance tests before taking examinations.						
ENLISTED PERFORMANCE EVALUATION	As used by CO when approving advancement.	Counts toward performance factor credit in advancement multiple.						
EXAMINATIONS	Locally prepared tests.	Service-wide examinations required for all PO advancements.					Service-wide, selection board, and physical.	
NAVY TRAINING COURSE (INCLUD- ING MILITARY REQUIREMENTS)		Required for E-3 and all PO advancements unless waived because of school completion, but need not be repeated if identical course has already been completed. See NavPers 10052 (current edition).					Correspondence courses and recommended reading. See NavPers 10052 (current edition).	
AUTHORIZATION	Commanding Officer	U.S. Naval Examining Center			Bureau of Naval Personnel			
	TARS are advanced to fill vacancies and must be approved by CNARESTRA.							

\* All advancements require commanding officer's recommendation.

† 2 years obligated service required.

‡ 3 years obligated service required.

§ Effective 1 Jan. 1963.

**INACTIVE DUTY ADVANCEMENT REQUIREMENTS**

REQUIREMENTS *		E1 to E2	E2 to E3	E3 to E4	E4 to E5	E5 to E6	E6 to E7	E8	E9							
	FOR THESE DRILLS PER YEAR				*											
TOTAL TIME IN GRADE	48 24 NON-DRILLING	6 mos. 9 mos. 12 mos.	6 mos. 9 mos. 24 mos.	15 mos. 15 mos. 24 mos.	18 mos. 18 mos. 36 mos.	24 mos. 24 mos. 48 mos.	36 mos. 36 mos. 48 mos.	48 mos. 48 mos. 24 mos.	24 mos.							
DRILLS ATTENDED IN GRADE †	48 24	18 16	18 16	45 27	54 32	72 42	108 64	144 85	72 32							
TOTAL TRAINING DUTY IN GRADE †	48 24 NON-DRILLING	14 days 14 days None	14 days 14 days None	14 days 14 days 14 days	14 days 14 days 14 days	28 days 28 days 28 days	42 days 42 days 28 days	56 days 56 days 28 days	28 days							
PERFORMANCE TESTS			Specified ratings must complete applicable performance tests before taking examination.													
PRACTICAL FACTORS (INCLUDING MILITARY REQUIREMENTS)	Record of Practical Factors, NavPers 760, must be completed for all advancements.															
NAVY TRAINING COURSE (INCLUDING MILITARY REQUIREMENTS)	Completion of applicable course or courses must be entered in service record.															
EXAMINATION	Standard exams are used where available, otherwise locally prepared exams are used.							Standard EXAM, Selection Board, and Physical.								
AUTHORIZATION	District commandant or CNARESTRA							Bureau of Naval Personnel								

\* Recommendation by commanding officer required for all advancements.

† Active duty periods may be substituted for drills and training duty.

RADIOMAN 3 & 2

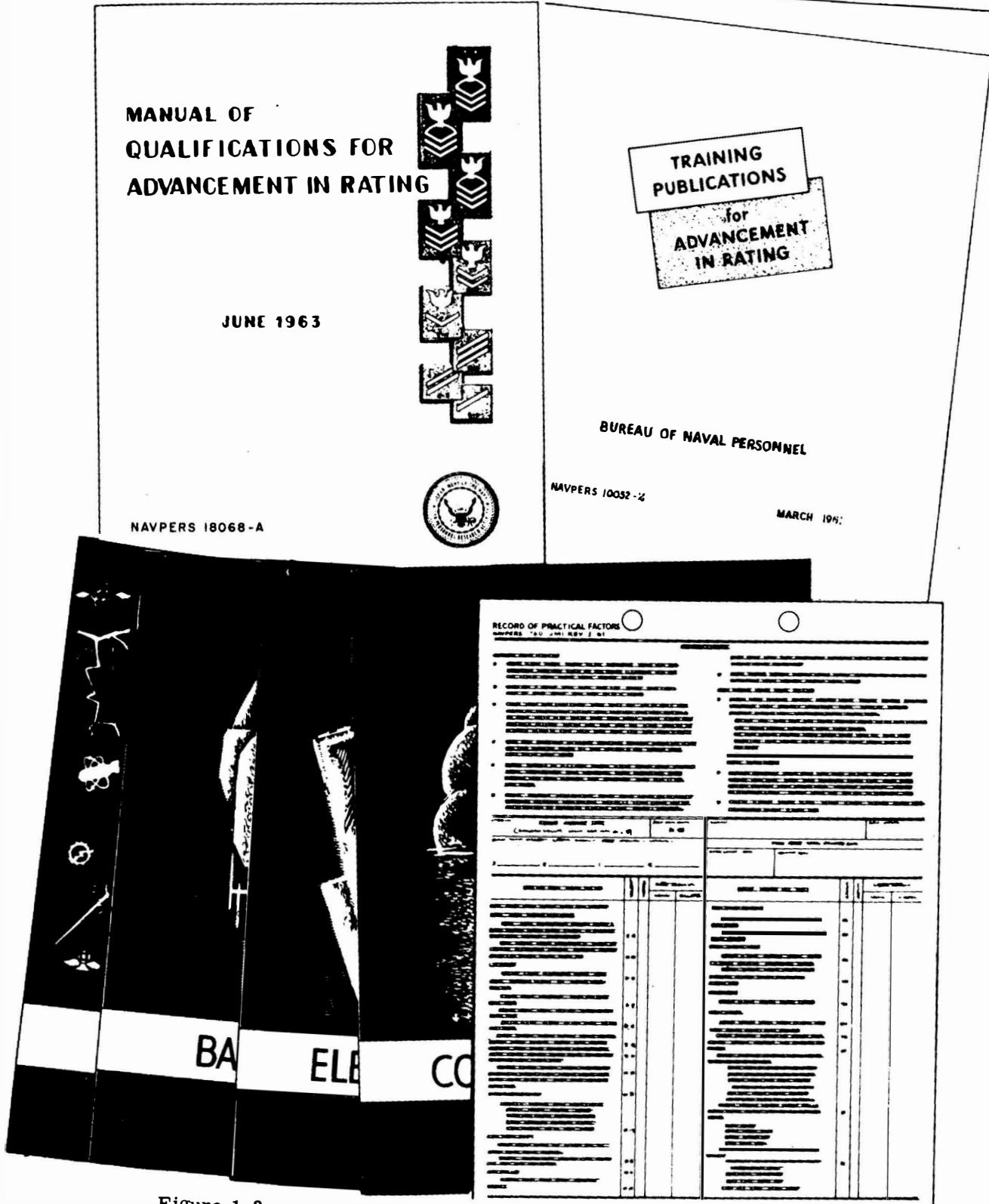


Figure 1-3.—Materials used in preparing for advancement.

5.3

**MILITARY REQUIREMENTS** apply to all ratings rather than to any one particular rating. Military requirements for advancement to third class and second class petty officer rates deal with military conduct, naval organization, military justice, security, watch standing, and other subjects which are required of petty officers in all ratings.

**PROFESSIONAL QUALIFICATIONS** are technical or professional requirements that are directly related to the work of each rating.

Both the military requirements and the professional qualifications are divided into subject matter groups; then, within each subject matter group, they are divided into **PRACTICAL FACTORS** and **KNOWLEDGE FACTORS**. Practical factors are things you must be able to DO. Knowledge factors are things you must KNOW in order to perform the duties of your rating.

The written examination you will take for advancement in rating will contain questions relating to the practical factors and the knowledge factors of both the military requirements and the professional qualifications. If you are working for advancement to second class remember that you may be examined on third class qualifications as well as on second class qualifications.

The Quals Manual is kept current by means of changes. The professional qualifications for your rating which are covered in this training course were current at the time the course was printed. By the time you are studying this course, however, the quals for your rating may have been changed. Never trust any set of quals until you have checked it against an UP-TO-DATE copy in the Quals Manual.

### Record of Practical Factors

Before you can take the servicewide examination for advancement in rating, there must be an entry in your service record to show that you have qualified in the practical factors of both the military requirements and the professional qualifications. A special form known as the **RECORD OF PRACTICAL FACTORS**, NavPers 760, is used to keep a record of your practical factor qualifications. This form is available for each rating. The form lists all practical factors, both military and professional. As you demonstrate your ability to perform each practical factor, appropriate entries are made in the DATE and INITIALS columns.

Changes are made periodically to the Manual of Qualifications for Advancement in Rating, and revised forms of NavPers 760 are provided when necessary. Extra space is allowed on the Record of Practical Factors for entering additional practical factors as they are published in changes to the Quals Manual. The Record of Practical Factors also provides space for recording demonstrated proficiency in skills which are within the general scope of the rating but which are not identified as minimum qualifications for advancement.

If you are transferred before you qualify in all practical factors, the NavPers 760 form should be forwarded with your service record to your next duty station. You can save yourself a lot of trouble by making sure that this form is actually inserted in your service record before you are transferred. If the form is not in your service record, you may be required to start all over again and requalify in the practical factors which have already been checked off.

### NavPers 10052

Training Publications for Advancement in Rating, NavPers 10052 (revised), is a very important publication for anyone preparing for advancement in rating. This bibliography lists required and recommended Navy Training Courses and other reference material to be used by personnel working for advancement in rating. NavPers 10052 is revised and issued once each year by the Bureau of Naval Personnel. Each revised edition is identified by a letter following the NavPers number. When using this publication, be SURE that you have the most recent edition.

If extensive changes in qualifications occur in any rating between the annual revisions of NavPers 10052, a supplementary list of study material may be issued in the form of a BuPers Notice. When you are preparing for advancement, check to see whether changes have been made in the qualifications for your rating. If changes have been made, see if a BuPers Notice has been issued to supplement NavPers 10052 for your rating.

The required and recommended references are listed by rate level in NavPers 10052. If you are working for advancement to third class, study the material that is listed for third class. If you are working for advancement to second

class, study the material that is listed for second class; but remember that you are also responsible for the references listed at the third class level.

In using NavPers 10052, you will notice that some Navy Training Courses are marked with an asterisk (\*). Any course marked in this way is MANDATORY — that is, it must be completed at the indicated rate level before you can be eligible to take the servicewide examination for advancement in rating. Each mandatory course may be completed by (1) passing the appropriate enlisted correspondence course that is based on the mandatory training course; (2) passing locally prepared tests based on the information given in the training course; or (3) in some cases, successfully completing an appropriate Class A school.

Do not overlook the section of NavPers 10052 which lists the required and recommended references relating to the military requirements for advancement. Personnel of ALL ratings must complete the mandatory military requirements training course for the appropriate rate level before they can be eligible to advance in rating.

The references in NavPers 10052 which are recommended but not mandatory should also be studied carefully. ALL references listed in NavPers 10052 may be used as source material for the written examinations, at the appropriate rate levels.

### Navy Training Courses

There are two general types of Navy Training Courses. RATING COURSES (such as this one) are prepared for most enlisted ratings. A rating training course gives information that is directly related to the professional qualifications of ONE rating. SUBJECT MATTER COURSES or BASIC COURSES give information that applies to more than one rating.

Navy Training Courses are revised from time to time to keep them up to date technically. The revision of a Navy Training Course is identified by a letter following the NavPers number. You can tell whether any particular copy of a Navy Training Course is the latest edition by checking the NavPers number and the letter following this number in the most recent edition of List of Training Manuals and Correspondence Courses, NavPers 10061. (NavPers 10061 is actually a catalog that lists all current training courses and correspondence courses; you will find this catalog useful in planning your study program.)

Navy Training Courses are designed to help you prepare for advancement in rating. The following suggestions may help you to make the best use of this course and other Navy training publications when you are preparing for advancement in rating.

1. Study the military requirements and the professional qualifications for your rating before you study the training course, and refer to the quals frequently as you study. Remember, you are studying the training course primarily in order to meet these quals.

2. Set up a regular study plan. It will probably be easier for you to stick to a schedule if you can plan to study at the same time each day. If possible, schedule your studying for a time of day when you will not have too many interruptions or distractions.

3. Before you begin to study any part of the training course intensively, become familiar with the entire book. Read the preface and the table of contents. Check through the index. Look at the appendixes. Thumb through the book without any particular plan, looking at the illustrations and reading bits here and there as you see things that interest you.

4. Look at the training course in more detail, to see how it is organized. Look at the table of contents again. Then, chapter by chapter, read the introduction, the headings, and the subheadings. This will give you a pretty clear picture of the scope and content of the book. As you look through the book in this way, ask yourself some questions: What do I need to learn about this? What do I already know about this? How is this information related to information given in other chapters? How is this information related to the qualifications for advancement in rating?

5. When you have a general idea of what is in the training course and how it is organized, fill in the details by intensive study. In each study period, try to cover a complete unit — it may be a chapter, a section of a chapter, or a subsection. The amount of material that you can cover at one time will vary. If you know the subject well, or if the material is easy, you can cover quite a lot at one time. Difficult or unfamiliar material will require more study time.

6. In studying any one unit--chapter, section, or subsection--write down the questions that occur to you. Many people find it helpful to make a written outline of the unit as they study, or at least to write down the most important ideas.

7. As you study, relate the information in the training course to the knowledge you already have. When you read about a process, a skill, or a situation, try to see how this information ties in with your own past experience.

8. When you have finished studying a unit, take time out to see what you have learned. Look back over your notes and questions. Maybe some of your questions have been answered, but perhaps you still have some that are not answered. Without looking at the training course, write down the main ideas that you have gotten from studying this unit. Don't just quote the book. If you can't give these ideas in your own words, the chances are that you have not really mastered the information.

9. Use Enlisted Correspondence Courses whenever you can. The correspondence courses are based on Navy Training Courses or on other appropriate texts. As mentioned before, completion of a mandatory Navy Training Course can be accomplished by passing an Enlisted Correspondence Course based on the Navy Training Course. You will probably find it helpful to take other correspondence courses, as well as those based on mandatory training courses. Taking a correspondence course helps you to master the information given in the training course, and also helps you see how much you have learned.

10. Think of your future as you study Navy Training Courses. You are working for advancement to third class or second class right now, but someday you will be working toward higher rates. Anything extra that you can learn now will help you both now and later.

#### SOURCES OF INFORMATION

One of the most useful things you can learn about a subject is how to find out more about it. No single publication can give you all the information you need to perform the duties of your rating. You should learn where to look for accurate, authoritative, up-to-date information on all subjects related to the military requirements for advancement and the professional qualifications of your rating.

Some of the publications described here are subject to change or revision from time to time--some at regular intervals, others as the need arises. When using any publication that is subject to change or revision, be sure that you have the latest edition. When using any publication that is kept current by means of changes,

be sure you have a copy in which all official changes have been made. Studying canceled or obsolete information will not help you to do your work or to advance in rating; it is likely to be a waste of time, and may even be seriously misleading.

#### BASIC NAVY TRAINING COURSES

As you refer to your quals, you probably will discover certain areas in which you need more basic study. Consequently, you will need to obtain additional books. The most useful books for this purpose are the training courses listed in the reading list in the front of this manual. These training courses serve three purposes: They give you much of the background you need to prepare for a technical rating; they offer a handy refresher course in subjects you may have forgotten; and they are useful throughout your Navy career as a handy reference library. The training courses are organized in such manner that they may be used with a minimum of supervision.

The contents of some of the basic courses listed in the reading list are summarized in the following paragraphs.

Basic Electricity, NavPers 10086-A, is intended as a basic reference for all enlisted personnel of the Navy whose duties require them to have a knowledge of the fundamentals of electricity. Like the other courses, it starts from the very basics by introducing a broad picture of the electrical characteristics of matter and proceeds with a discussion of static electricity, electricity in motion, and electrical circuits. It explains the uses of Ohm's law and the power equations, and makes applications to actual circuits. Emphasis is placed on the various types of circuits — series, parallel, and series-parallel, and on the theory of induction as applied to electrical motors and other electrical apparatus. The essentials of generators and motors are explained. The closing chapters include a fundamental treatment of transformers, synchro units, and electrical measuring instruments.

Basic Electronics, NavPers 10087-A, is intended as a basic reference for all enlisted men whose duties require that they know the fundamentals of electronics. The RM3, in his preparation for advancement, should be familiar with chapters 1 through 14, 17, and appendix II.

The first few chapters are concerned with electron tubes and transistors, including their

application in electronic circuits. Power supplies also are treated in the early chapters. Communication equipment is covered in the chapters entitled "Transmitters," "Transmission Lines," and "Elementary Communication Receivers." One chapter is devoted to electronic test equipment. Appendix II contains the electronic color code and symbols.

Basic Handtools, NavPers 10085-A, presents in a concise form the descriptions of basic handtools and instructions for their use. It also contains information on layout, testing, checking, setting, and cutting. One section is concerned with the care and use of power equipment.

### TRAINING FILMS

Training films available to naval personnel are a valuable source of supplementary information on many technical subjects. A selected list of training films that may be useful to you is given in appendix I of this training course. Other films that may be of interest are listed in

the United States Navy Film Catalog, NavPers 10000 (revised).

### SCHOOLS

The Navy has several excellent service schools for rated Radiomen. You should endeavor to attend all of them. Successful completion of these schools will greatly enhance your qualifications and thus your advancement opportunities.

The Teletype Maintenance Schools at Norfolk and San Diego offer excellent courses of instruction in teletypewriter maintenance and repair. Graduates of the Teletype Maintenance Schools are eligible for the Cryptographic Repair Schools at Portsmouth, Va., and Vallejo, Calif.

The Class B Radioman Schools at Bainbridge, Md. and San Diego, Calif. provide, at an advanced level, the knowledges and skills required of Radiomen in fulfilling their shipboard supervisory, operational, and maintenance responsibilities.