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ABSTRACT

One of six related documents, this publication contains a U.S. Air Force course designed to help students improve their reading skills. The chapters contain lessons on reading habits and how they affect the reader, exercises to identify one's reading speed, an improvement program, exercises to improve eye movement and to reduce eye fixations, lessons for improving vocabulary, lessons for reading with a purpose, and exercises testing the previously covered information. An answer key to course tests and a suggested reading program format are included. (EL)

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Course 8A

USAF Senior Noncommissioned Officer Academy

Associate Program

Volume 2

READING IMPROVEMENT

Extension Course Institute

Air Training Command

2

First Edition

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THIS PUBLICATION HAS BEEN REVIEWED AND APPROVED BY COMPETENT PERSONNEL OF THE PREPARING COMMAND IN ACCORDANCE WITH CURRENT DIRECTIVES ON DOCTRINE, POLICY, ESSENTIALITY, PROPRIETY, AND QUALITY.

PREFACE

Now that you have read volume one and submitted the requested survey, you are probably asking yourself: How can I practice these skills and put them to some meaningful use? The self-improvement volume is the tool that aids you in solving this problem. It contains a reading improvement package and a writing improvement package. However, completing the two texts will not make you proficient in both reading and writing skills. They are simply tools designed to help you in beginning the long, hard road to proficiency. In order to realize the full benefits of the program, you must practice continuously on and off the job. As senior noncommissioned officers, we are tasked to exhaust all efforts to improve ourselves and, therefore, improve our value to the Air Force.

The volume on reading improvement begins by explaining some reading habits and how they affect the reader. Chapter 2 contains a series of exercises designed to help you identify the speed at which you read the comprehension that follows. From this starting point, you are to complete some reading exercises that should help you improve both speed and comprehension. In order to obtain maximum benefit, you should complete one reading each day. The objective is to develop good reading habits, and this can be done more effectively on a day-to-day basis.

The volume is not just concerned with promoting speed reading but also focuses on reading habits. Chapter 4 discusses eye movement and contains exercises which should improve that movement and reduce eye fixations. Just as eye fixations can affect reading proficiency, so can a limited or poor vocabulary. The exercises contained in Chapter 5 should help you in evaluating your vocabulary and promoting a routine that can enhance it.

Although reading faster and eliminating bad reading habits are excellent means of improving your reading ability, they are by no means the final step. When you take a trip, for example, you determine where you want to go and how you are to get there. Reading is much the same because if you have not determined why and what you want to read, then most of your reading is probably not beneficial to you. Chapter 6 places emphasis on the importance of determining the purpose of your reading.

In Chapter 7, we put it all together by completing some exercises that provide you with an opportunity to practice your speed, improve your comprehension, and increase your vocabulary. As you complete the self-improvement volume on reading, you will realize that it is just a beginning. Self-improvement requires a continuous commitment both on and off the job if your efforts are to be rewarded. We recommend you follow the advice in Chapter 8 for maximum effectiveness.

Not only do effective communicators excel in reading, but they have also mastered many of the problems associated with writing. To aid you, we have included a programmed writing text. The text begins with a narrative on punctuation, followed by some exercises. The parts of speech and how they are used is equally as important. Each part of speech is discussed and followed by programmed exercises.

After you gain a better understanding of punctuation and the parts of speech, you will find that the text shows you how they affect the sentence and paragraph. The text includes transitional devices and shows how they provide cohesiveness.

The programmed text concludes with a test designed to evaluate your understanding of the subjects covered. Restudy those areas of the test results that indicate a need for improvement.

This volume is valued at 15 hours (5 points).

Contents

What It's All About

READING is not what it used to be. Once it was a rare accomplishment, the exclusive possession of a few learned men. Now, just about everybody knows how to read. It is a daily necessity.

Most people read because they enjoy it. They like stories, gossip columns, poetry, or even comics. Many read because they're looking for information. They find it in sports pages, news articles, digest magazines, and how-to-do-it books. Many read because they have to. In their work they are required to read textbooks, handbooks, regulations, and thousands of other publications.

For these reasons, millions of Americans spend many hours of their time reading. They all know how to read, but the differences in speed and understanding are amazing. Reading speeds of different people vary from a halting 90 to 100 words a minute to a supersonic 1,000 or more, and understanding ranges from almost complete failure to get the idea of simple material to a thorough grasp of complex material. You can readily guess, of course, that these differences are largely due to differences in native ability and education. But did you know that reading habits also make a big difference? So big that with a relatively short period of coaching, the average person can increase his reading speed 50 percent or more without reducing his understanding of the material?

At the Air University, for example, a class of 115 officers increased their average reading speed from 311 words a minute to 504 words a minute in a course of 20 hours. They made this average gain of over 60 percent in speed with no average loss in understanding. The same kind of results have been achieved in many other military, educational institutions throughout the country. That's why you're getting this pamphlet now.

As a member of the Air Force, you have a particularly heavy reading load. Whether you're an airman or an officer, student or instructor, you have technical orders, textbooks, manuals, and regulations to read. Because the Air Force is a fast-moving and progressive organization, you'll have to be continually adapting yourself to changes in equipment and procedures. This requires a lot of reading. You'll want to keep up with new ideas in your hobby—more reading. You'll probably want to follow the news, or at least the sports—still more reading. Even if you don't do any relaxation reading (like stories), it's quite a load.

Like many others, you probably had no instruction in reading beyond the eighth grade. No doubt you were given hundreds of reading assignments through your high school and college years. But the chances are that no effort was made to help you do those assignments faster. The purpose was, rather, to increase your appreciation of literature, your knowledge of history, or your understanding of other subjects. Your teachers were more interested in what you got out of your reading than how long it took you to do it. And the major purpose of reading is to gain meaning.

Time also counts, though. If training can help you get as much from 60 minutes of reading as you did before from 100 minutes, you'll surely agree it's worthwhile. And training can do that. Tests at the Air Command and Staff College have shown that after a reading course, the average student could read in 22½ hours a stack of material which took him 36 hours before.

Of course, a tremendous improvement like that cannot be achieved by merely learning a few tricks. There is no magic formula. You have to find out what the essentials of good reading are and in which of those essentials you are weak. Then, by special exercises and by particular attention to those essentials in your daily reading, you can gradually increase your speed and understanding. It takes work and more work, but if you stick with it, the results will amaze you.

One of the essentials of good reading is rhythm. Yes, reading is like dancing—or typing—or any activity involving movement. Rhythm—or timing, if you want to call it that—is a basic requirement for speed. Take running, for example. If you don't have rhythm in your leg movements—say, if you change your stride twice a second—you certainly can't run your best. In reading, it's the same way.

When you read a line of print, your eyes don't execute a steady glide along the line. They move in a series of steps. Movies taken of your eyes as you read a line of type show that your eyes stop at one point, jump to another point, stop at the second point, jump to another point, stop, jump, and so on to the end of the line. You can see this for yourself by placing a mirror in such a position that you can observe another person's eyes as he reads. Try it. Also look at figure 1-1.

If you watch closely—or, better still, if you can get a good movie of the average person's eyes as he

WHAT THE READER SEES:

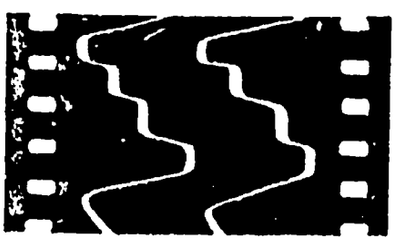
A good reader makes few fixations per line.

A po poor r read der plo reader plods s alo along.

WHAT THE CAMERA SEES:

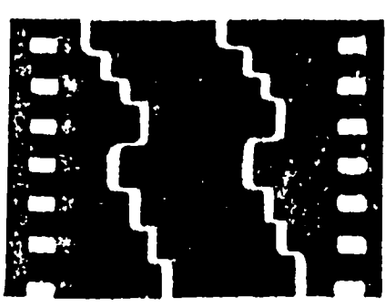
Pictured below are the eye-movements of good and poor readers while they read the lines as shown above in "What the Reader Sees." Left line shows movement of left eye; right line, movement of right eye. The horizontal parts of the lines are the jumps from fixation to fixation; the vertical parts, the time on each fixation.

GOOD READER



Makes few fixations and moves smoothly along line. He read his line in half the time it took the poor reader.

POOR READER



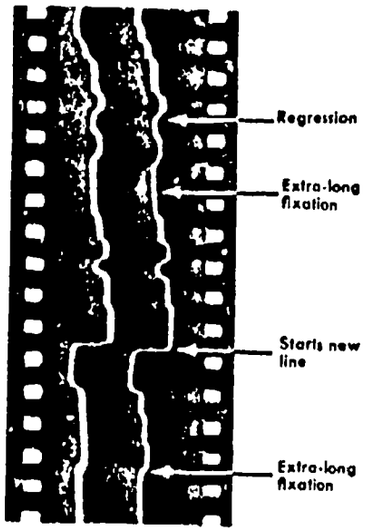
Makes many fixations and moves jerkily, even jumps backwards.

Figure 1-1. What the reader sees – what the camera sees.

reads—you'll find that the stops and jumps are quite irregular. Some stops last longer than others, and some jumps cover more ground than others. In other words, the average person keeps on changing his stride in irregular fashion. He doesn't have rhythm. In fact, you'll find it's even worse than that. Very often, in the middle of a line, the jumps will reverse direction several times. His eyes will take several forward steps, a backward step or two, then go forward again. Imagine how that would work in a hundred-yard dash! It doesn't work any better in reading.

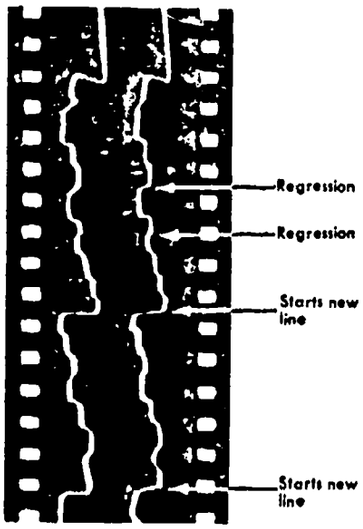
This is not an exaggerated picture. That's the way practically all of us read. But it doesn't have to be that way. With the right kind of exercises, we can eliminate much of the jerkiness and move at a regular, rhythmic reading pace. You'll get some of those exercises later in this pamphlet.

EYE MOVEMENT



A POOR READER

152 WPM -- 70% Comprehension
Note the long fixations and the regressions. He had to make many stops to figure out what was meant. He, therefore completed less than two lines in this period.



AN AVERAGE READER

250 WPM — 80% Comprehension
Some rhythm is evident, but notice the many fixations. He completed about 2½ lines in this period.

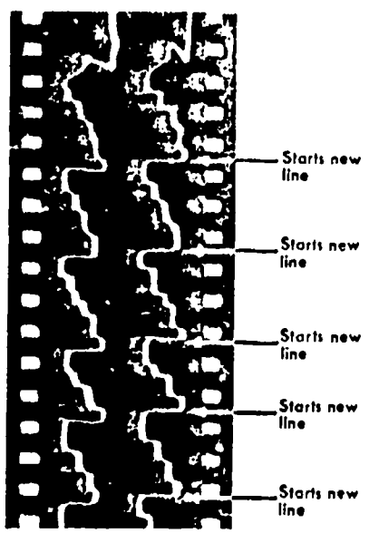
Figure 1-2 Eye movement

Although good eye rhythm will help your reading speed considerably, don't think that it's the whole story. Achieving good eye rhythm is only one step toward achieving your maximum reading efficiency. Another step is increasing the tempo of your rhythm. Your movements may be rhythmic, but perhaps you're only walking rhythmically. You'll move faster if you run rhythmically. In reading, too, you can change from a walk to a run. An important factor in this process is learning to take bigger steps.

As you know now, when you read, your eyes stop, jump, stop, jump, and so on. Each stop is called a *fixation* because your eyes remain fixed upon what they see until you can take it in. Then they jump to the next stop, or fixation. If a jump is in the wrong direction, it is called a *regression* because it is a backward movement. (See figure 1-2.)

The number of fixations your eyes make per line and the distance they jump each time depends on how much you can grasp in one fixation. If your eyes—that is, if you—can take in about 4 letters in a single fixation, you might have to make 10 fixations on a line.

However, if you can take in about 20 letters in a single fixation, your eyes can make bigger jumps and fewer fixations. You might require only four fixations for a long line of print. Clearly, then, the more your eyes can grasp in a single fixation, the faster you'll read. Thus, good reading speed requires not only moving



A FAST READER

585 WPM — 80% Comprehension
Notice the smooth, fast rhythm and the absence of regressions. He finished almost 6 lines in this period.

Each of the films represents the same length of time.

Figure 1-2 (Cont'd)

rhythmically from fixation to fixation but also taking in a large number of letters in a single fixation. The amount your eyes can grasp in a single fixation is called your *eye span*. Eye span, too, is something you can improve by practice. In a later chapter, you'll get exercises for this purpose.

These exercises will help you increase the number of letters you can see at a glance. But it doesn't do much good to see the letters if you don't know what they mean. Suppose that after you had developed good eye rhythm and a broad eye span, you something like this:

Qui de contemnenda gloria libros
scribunt, nomen suum inscribunt.

Your good eye rhythm and broad eye span don't do you much good there, do they? Even if you reached a point where, after a single glance, you could recite all these letters in their proper order, it still wouldn't do you any good unless you know Latin, because the words have no meaning for you.

The same holds true for English. If you know only a small number of words, you're likely to read a good many passages that won't mean much to you. When that happens, rhythm and speed don't help much. It's like a good runner trying to run over rough ground blindfolded. He's or she's likely to do a lot of stumbling and falling and, in spite of his or her potential speed, he or she may still have to crawl along.

To keep word obstacles from slowing you down to a snail's pace in your reading, you have to build up your vocabulary. We all learn some new words from time to time. Perhaps you learn more than many people. Yet, chances are you could learn still more words more effectively. Some suggestions are made later in this pamphlet as to how you can build up your vocabulary.

With practice in good eye rhythm and a broad eye span, and with a working system for vocabulary growth, you will be attacking and overcoming most of the problems that beset the average reader. However, if you already are a very good reader or if you become one as a result of this training, you'll meet another problem. This problem is sometimes called the *sonic barrier.*

Maybe you've never noticed this, but unless you are an exceptionally fast reader, you say the words when you read them. You don't say them out loud, of course, but you say them. Practically all of us do to one degree or another. At the lowest reading level, this takes the form of lip movement, such as children make when they read. At a more advanced level—where most of us are—it takes the form of throat movement. We don't say the words as we read them, but we think the words, and, as we do, our voice apparatus works accordingly. At the highest level of vocalization, there is internal hearing. Although you make no physical reaction of lips or throat, you hear the words in your mind. At any one of these vocalization levels, your inward speech retards your reading speed. The reason for this is simple.

The fastest speakers—sports announcers for example—can rarely exceed a speed of 400 words a minute. The average person generally speaks less than half as fast. Even allowing for skipping and slurring over of words, you could hardly expect to get beyond a speed of 500 or 600 words a minute in your inward speech. Therefore, if your silent reading is tied to inward speech, it can hardly go beyond 500 or 600 words a minute. That's why this is called the sonic barrier. Through conscious and consistent effort, you can get over this sonic barrier and into supersonic speeds. If you can do this often enough, it can become a habit that you can practice without conscious effort. In later chapters, an attempt is made to help you get into this habit.

Don't get the idea, though, that you'll ever be able to read all printed matter at supersonic speeds. No matter how good your eye rhythm and vocabulary, how broad your eye span, and how free from inner speech your reading becomes, you'll never be able to read a tech order or a regulation at supersonic speed and *get what you want out of it.* Different materials have to be read at different speeds. As Francis Bacon wrote over 300 years ago, "Some books are to be tasted, others to be swallowed, and some few to be chewed and digested."

You don't drive at the same speed in traffic or over a bumpy road as you do on an interstate highway. In the same way, you have to vary your reading speed according to the kind of material you're reading and what you want to get out of it. Some people plod through sports stories as if they were the fine print on a mortgage, while others race through directives as if they were simple ads. If you want the most out of your reading, you can't do either. In the one case, you'll waste a lot of time; in the other, you'll miss a lot of essential information. You have to fit your speed to your own requirements and to those of the reading matter. You may need to skim the material, to read it rapidly, to read it normally, or to study it carefully.

This is only common sense, of course. But you'd be surprised how often this bit of commonsense is ignored. You ignore a lot of other commonsense principles of reading, like having the right kind of lighting, avoiding noises and distracations, or focusing your whole thought on what you're reading. Most violations of these commonsense rules are due to the fact that extra effort or time is necessary in order to comply with them. People overlook the fact that in the long run obeying these rules saves considerable effort and time.

That's the way it is with the material in this pamphlet. You can't make any real improvement in your reading by just going through this book and then making a resolution. You have to work at it. You have to do the exercises in this pamphlet and a lot of similar ones on your own. You have to push yourself hard in your regular reading, find out where you are weak, and concentrate on strengthening those points. This will require concentration and perseverance. It will also take time. But if you follow through conscientiously, your efforts will pay off, not only in time saved but also in increased knowledge and understanding.

How's Your Reading

READING is a personal matter. The particular combination of mental and physical habits that make up your reading style is almost as unique as the particular combination of features and expressions that make up your face. Just as your face is different despite the fact that all faces have the same basic features, so is your reading style different even though the basic processes are the same for all.

No publication, therefore, can give you a specific prescription to cure your particular reading ailments. This volume can only describe the main features of effective reading and present suggestions and exercises that will help most people improve. To use it properly, you have to determine for yourself what your particular weaknesses are and which of the suggestions and exercises will do the most for you.

This does not mean that you should ignore any of the suggestions or skip any of the exercises. Unless you are already perfect, they will all help you. Some, however, you will not need as much as others. Spend less time on them. Concentrate on those that are most important for you.

To find out what aspects of reading you should place most emphasis on, you must carefully analyze your reading habits. A checklist provides a systematic way of doing this. Like most people who use checklists—pilots, aircraft mechanics, and many others—you'll find that a checklist makes analysis easier. What's more, it prevents your overlooking important items.

A reading checklist follows this paragraph. It isn't complete—a really complete list would fill a book—but it does enable you to check on your main difficulties. You can make it cover a lot more ground if, in answering each item, you consider not only the specific question asked but also all other details related to it. As you go through the items, think back to the reading you've done during the past few m onths and answer the items accordingly. You can answer most of the questions in the list for yourself. However, to answer the questions on eye movement, you'll have to get a friend to set up a mirror so he can watch your eyes while you read to a page of printed matter. Do this before you start on the checklist.

READING CHECKLIST

Eye Movement

- Do you make five or more eye stops on an ordinary line of print?
- Do you make frequent regressions (go back to read part of a line over)?
- Do your eyes glide quickly across the line and from line to line?

Vocalization

- Do you move your lips as you read?
- Do you move your throat and vocal chords when you read?
- Do you hear the words in your mind as you read?

Vocabulary

- Do you often run across words you don't understand?
- Do you often look them up in the dictionary?
- Do you avoid or put aside articles and books that contain many words you don't understand?

Comprehension

- Can you absorb the contents of a sentence almost at a glance?
- Can you understand and remember the contents of a passage after you've read it only once?
- Do you have to re-read a page several times to get the full meaning?
- Do you try to separate the important thoughts from the less important ones?
- Do you summarize mentally while you read?
- Can you read the average Air Force manual or regulation with complete understanding?

Reading Habits

- Are you careful about having good lighting when you read?
- Do you read with the radio or television on?
- Do you pay any attention to having a comfortable position when you read?

- Do you intentionally increase or decrease your speed for different kinds of material?
- Do you find your thoughts continually wandering away from the subject of your reading?
- Can you pay full attention to your reading for an hour or more at a stretch?

You may have noticed that the checklist includes no questions on your specific reading speed. That's because few people know their reading speed. It's important, though, for it provides you with a yardstick for measuring one kind of reading progress. By checking on your speed and comprehension now and at frequent intervals during your reading improvement program, you'll be able to tell how much you're accomplishing. Keep a record of your speed and comprehension scores for this and later tests in the volume.

How fast do you think you can read now?

The selection which follows will give you a chance to find out. It's an excerpt from a book about Groucho Marx as written by his son, Arthur. It is simple, amusing reading matter. Since the vocabulary and ideas are well below the ceiling of your ability; it's a good initial test of your reading skill as such.

A trained reader will read this selection in 1 minute and 30 seconds or less. Anyone who takes more than 3 minutes and 30 seconds is slow.

To time yourself, you need a watch or clock with a second hand. A good timing procedure is to write down the time that will be indicated by the minute hand when the second hand reaches 60 or the exact top of the dial. Be ready to glance at the timepiece again the instant you finish.

All Set? Then record the time on a separate piece of paper, turn to the selection, watch the timepiece until the second hand reaches 60, and start reading.

Speeded Comprehension Test No. 1a

LIFE WITH GROUCHO*

A few months after we had moved into our new home in Beverly Hills, Archie Mayo, a prominent Hollywood director, built a house with a swimming pool directly across the street from ours.

As frequently happens, the pool was completed and filled with water before the house was quite ready to be moved into. One hot day, while the house was still in the wallpapering and painting stage, Mayo happened to meet Father on the sidewalk in front of his place, and being a very friendly fellow, issued him and the rest of the Marx clan a carte blanche invitation to use his pool.

Father didn't want to appear too anxious—after all, he was an important star, even if he didn't have his own swimming pool—so he waited until Mayo had driven off down the street before he told Miriam and me to get our bathing suits on, and that we were going for a swim.

Thirty minutes later the three of us were lolling beside Mayo's opulently tiled pool, thinking how fortunate we were to have such wealthy friends, when we heard the back door slam. We saw, coming toward us, a rather nice-looking, matronly woman, who seemed quite incensed about something.

"Who are you?" she demanded of Father. "What are you doing here?"

"I'm swimming," replied Father. "What are you doing here?"

"It so happens I have a right to be here," she answered, with indignation. "I'm a relative of the man who owns this house."

"In that case take off your clothes and come on in for a swim."

"Don't you know this is private property?" she said, ignoring his invitation. "Who gave you permission to swim here?"

Miriam and I were a little nervous by this time, and we hoped he would tell her the truth and vindicate all of us. But Father had no such intentions.

"No one gave us permission," he said looking her straight in the eye.

"Then what are you doing here?"

"Swimming, I told you," said Father.

"That's not what I mean. Who said you could swim here?"

"No one. The kids and I just happened to be loitering in the alley when we saw your pool, so we thought we'd go for a dip. After all, no one else is using it. It's silly to have it going to waste."

She was livid. "Well, you just pick up your things and get our of here before I call the police," she threatened.

"We're not hurting anything," said Father. "Why should we."

"That's not the point," she snapped. "This is private property, and we don't have just anyone off the street dropping in here."

"That's the trouble with you rich," said Father. "You get a little money and right away the people off the street aren't good enough for you. Well, we're not budging. This is a free country, and I insist on standing up for our rights."

With that, he removed his glasses, put down his cigar and nonchalantly swam three lengths of the pool, as the woman watched, transfixed. Then he climed out again and started to dry off.

"As long as I'm going to swim here," he said in a complaining tone, "I wish you'd see that the water is heated. It's a little too cold for my blood."

She bridled indignantly, and stormed off in the direction of the house next door, announcing that she was going to phone the police.

"Do you think she will?" asked Miriam.

*Reprinted from *Life with Groucho*, by Arthur Marx, by permission of Simon and Schuster. Copyright 1954.

"Probably," said Father, stretching out on a towel, unconcerned.

"I'm scared," said Miriam, who was only six. "I'm going home."

"That's right," said Father. "Desert your father when he's about to be thrown in the jug."

He finally persuaded the two of us to stick around, and then, when he saw her return from making the call and go inside the Mayo house, apparently to wait for the police, he stood up and beckoned us to follow him.

He sauntered inside the house, and found the offended lady admiring the freshly painted and papered living room. It was really a beautiful room, the last word in luxury, despite the fact that it still contained no furniture.

Father cast an appraising eye around the empty room, then turned to her and said, "That's Hollywood for you! People can't even afford furniture, and they have to have a swimming pool."

She turned so white I thought she was going to have a heart attack, but two policemen arrived at that moment, and she managed to pull herself together.

"Here they are," she said. "I want you to arrest these people for vagrancy."

I was sure that Father would divulge his identify then, and tell them how we happened to be swimming there, but he double-crossed me by pulling the Julius H. Marx routine again, and stuck to it until they were actually herding us into the squad car. Then he glanced down at his bathing trunks and said:

"Would you mind terribly if I ran across the street and changed into something more formal?"

The officer looked at his as if he were out of his mind, and stiffly informed him that Groucho Marx lived in that house.

"I know," said Father. "Sometimes I go by that name, too."

Check The Time! Now find your speed from the reading speed table. (See figure 2-1.)

You now have a rough idea of your reading speed. Of course, it's based on only one short test and isn't necessarily an accurate record of your true speed.

One does not take speed tests and arrive at a figure in words per minute as a final evaluation of his reading skill. The controlling purpose of reading is to grasp and retain the meaning as rapidly as possible.

For that reason, it is necessary for you also to have a check on your comprehension. Following is a group of questions to give you an understanding of the type of comprehension test that will follow each reading test.

On a separate paper, list numbers 1 through 7. After each number, write the letter for the correct answer.

Speeded Comprehension Test No. 1b

LIFE WITH GROUCHO

1. Where does the action take place?
   a. Beverly Hills.

TIME ELAPSED MIN:SECONDS	SPEED IN WORDS PER MINUTE	TIME ELAPSED MIN:SECONDS	SPEED IN WORDS PER MINUTE
1:20	666	2:55	303
1:25	627		
1:30	592	3:00	296
1:35	561	3:05	288
		3:10	280
1:40	536	3:15	273
1:45	507		
1:50	489	3:20	266
1:55	463	3:25	259
		3:30	254
2:00	444		
2:05	426	3:35	249
2:10	408	3:40	242
2:15	394	3:45	236
		3:50	232
2:20	380		
2:25	365	3:55	226
2:30	355	4:00	222
2:35	343	4:05	218
2:40	332	4:10	213
2:45	323	4:15	209
2:50	314	4:20	205

b. Long Beach.
c. San Jose.
d. San Francisco.

2. The stage of construction at the Mayo place was:
a. house and pool completed; house furnished.
b. pool tiled but not filled; house one-half completed.
c. pool completed, filled; house in wallpapering and painting stage.
d. excavation for pool in progress; house completed.

3. What reason did Groucho give for using the pool?
a. The were loitering nearby and the pool was not being used.
b. He had the owner's permission.
c. He wanted the children to learn to swim.
d. It was a hot day.

4. When asked what he was doing there, Groucho replied:
a. "Escaping from the law."
b. "I'm swimming."
c. "I'm the pool inspector."
d. "Getting cooled off."

5. What was Groucho's complaint about the pool?
a. He didn't like the color of the tile.
b. It was too deep.
c. There was no lifeguard.
d. The water was too cold.

6. When Groucho entered the new house he made remarks concerning:
a. being joined for a swim.
b. no one using the pool.
c. people with a pool and no furniture.
d. the wallpaper.

7. What did Groucho do when the police arrived?
a. He told them he was Groucho Marx.
b. He asked to swim across the pool once more.
c. He resisted arrest
d. He asked if he could go across the street and change clothes.

Turn to the Attachment for answers to Test No. 1 Ib. To arrive at your score, allow 14 points for each question and hope to get a top score of 98 on this particular test. Record your rate and score for Test 1.

Now that you have an initial check on your reading speed and comprehension, you may doublecheck by trying the next selection, "Woman's Secret Language." Secrets about women's double-talk are told by a woman, and both men and women will—well, you decide about the article!

Are you ready? Then record your time as before, and when the second hand reaches 60 start reading.

Speeded Comprehension Test No. 2a

WOMEN'S SECRET LANGUAGE*

The most widely used language in the world has neither name nor dictionary. If you are a woman, you've been able to speak it almost since childhood. If you are a man, you couldn't learn it if you studied it for 50 years.

I'm referring to the strange combination of words, intonations, faint eyebrow liftings, and well-placed pauses by which women contrive to do such things as: carry on a lively little duel in tones so dulcet that a man thinks they are exchanging compliments; comment scorchingly on an unpopular female absentee while giving men the impression she is their bosom friend; make gracious, face-saving gestures—which they have little intention of following through—to ease awkward social situations.

For example, when it's time for guests to go home, the good hostess naturally prefers to give the heave-ho in a delicate manner. This has led to much male befuddlement. Many a man, sitting comfortably by another couple's fireside after a leisurely Sunday luncheon, has been dragged out suddenly by his wife despite the hostess's pleas to remain longer. Maybe the hostess said, "Can't I give you just another spot of coffee?" in a tone that left "before you go" hanging in the air. Being tuned in on the hostess's beam, his wife received signal that it would be folly to ignore.

Many a male has come to grief through failing to note an allied sort of boobytrap. Picture, for instance, two couples walking home from an afternoon concert. As they are saying good-by outside Couple No. 1's house, Wife No. 1 pleasantly inquires, "Won't you come in for a cup of tea?"

If she had said heartily, "Do come in and have tea with us?" Wife No. 2 would probably have accepted. But, to a woman's ear, an over-polite, tentative tone indicates clearly the lay of the landscape.

Unfortunately, before she can give a good excuse for declining, Husband No 2 may bore in with, "Why, sure! Edie and I haven't a thing to do until dinner." Thus, in a living room strewn with Sunday papers, Couple No. 2 find themselves eating soggy graham crackers served by a tight-lipped hostess, and wishing they were in Baffin Land.

In this field of awkward social situations, the pregnant pause is also extremely convenient. When Mrs Jones telephones Mrs. Smith to say that her four spinster cousins have just arrived from Medicine Hat and that she'd like to bring them to the Smith's cocktail

*By Elsie McCormick. Reprinted with permission from the September 1956 *Reader's Digest*. Copyright 1956 by The Reader's Digest Association, Inc.

party, Mrs. S. doesn't say, "Over my dead body!" Instead she replies cordially, "Oh yes, bring them by all means"—but she pauses for several seconds before saying it. This lets Mrs. J. know that, unless she wants to be left out of Mrs. S's future social plans, she had better buy the cousins a bottle of blackberry cordial and let them have their own party at home.

Another technique which women sometimes use is the reversed-meaning statement. A man should realize that when his wife says, "I don't want a thing for my birthday," she is speaking not English but her ancient mother tongue. What she really means is, "I haven't noticed any packages being sneaked in, so be sure you don't forget." The number of doghouses occupied by gentlemen who took literally the statement "I don't want a thing . . ." would stretch from here to the Westminster Kennel Club.

If a woman makes a habi of expressing herself through opposites, her husband must be careful about agreeing too freely. It's a grave mistake to agree, for instance, when one's wife says of a lady to whom one might have been slightly attentive at a club dance, "That Miss Smith is quite handsome, isn't she?" A husband who says "Yes" to his wife's complimentary remarks about a feminine creature whose name she preceded with "that" does so only at his peril.

Realization of how hard it is even for intelligent men to comprehend what the other sex is really saying came to me soon after I was married. My husband and I attended a party at which two young women fought a round that had all the feminine guests on the edge of their chairs. As soon as we made our departure, I asked my bridegroom what he though of the battle. He looked blank. "What battle?"

"Why, the one that started when Alice told the brunette who was trying to take over Alice's boy friend that she looked awfully sweet in that dress," I replied. "It was obvious that the brunette had spent a lot of money to make herself into a flaming siren. Telling her that she looked sweet was the same as saying that she was no more dangerous than Little Red Riding Hood, and that her outfit was a complete dud."

My husband, puzzlement in his brow, remarked that they seemed to be getting along all right afterward. "In fact," he said, "the brunette was even running herself down and paying Alice complements."

"That's what you thought," I answered. "Here's one of those compliments. Alice was trying to show up the other girl by talking to her about the new book on Matisse. Then the brunette said, 'You're so brilliant and you've read so much. Poor little me—I just don't know anything. But maybe if I had more evenings at home, I'd do some reading, too.' "

"Well, well!" said my spouse.

Often the meaning of the language relies on intonation alone. Thus a woman can say, "I think she's very nice," and produce any of a dozen different meanings. For instance: (1) said brightly and with a ring of sincerity, it probably means that she really is very nice; (2) a faintly beliggerent attitude with emphasis on the first word, let's the audience know that the lady is so unpopular that only a courageous person would say anything in her favor; (3) a flat, expressionless tone conveys the idea that she's quite a bore; and (4) a slight insidious drawling of "very nice" announces that the speaker could say a great deal more about her, and probably will when she gets a better chance.

An important rule is that the women participating must never give open sign that they understand what is really being said. Thus no girl would ever reply to an undercover buffet with, "Your dress isn't so much either!" But she may answer "Your dress is pretty, too. My aunt had one like it last year and just loved it."

While the hidden lingo does produce complications, it has its obvious advantages. But, men, if you think you'd like to learn it, I can only suggest that you take up Sanskrit instead. You'd find it much easier.

Check and record the time. Now figure out how long it took to read this passage in minutes and seconds. Convert your time into minutes and decimals of a minute by multiplying the number of seconds by .017 and adding the result to the number of minutes. Thus, if it took you 2 minutes and 13 seconds to read the passage, multiply 13 x .017. This gives you .221. Your time in minutes and decimals of a minute is then 2.22. After you have converted your time, divide it into 1122 (the number of words in the passage) and you'll find your reading speed in words per minute.

To check on your understanding and retention of the information in the passage you just read, try this comprehension test, listing your answers on a separate sheet, as for Test 1b. This time, however, there are 10 questions.

Speeded Comprehension Test No. 2b

WOMEN'S SECRET LANGUAGE

1. How long would it take a man to learn the most widely used language in the world?
   a. By the time he finishes high school.
   b. In no time at all.
   c. Not in 50 years of study.
   d. As soon as he learns to talk.

2. For which of the following purpose is women's secret language *least* likely to be used?
   a. To ease awkward social situations.
   b. To carry on a lively little dual.
   c. To shame the family into giving mother what she wants.
   d. To comment scorchingly on an unpopular absentee female.

3. What is the effect on many a male of not understanding and recognizing the women's secret language?

a. He has been well ahead of the game.
b. He can play dumb and get his way.
c. He has come to grief.
d. He has developed a better language of his own.

4. To a woman, an over-polite, tentative tone clearly indicates
a. courtesy.
b. nothing.
c. secret language.
d. friendship.

5. What is the pregnant pause?
a. The pause before a frank answer.
b. Deliberate hesitation in answering.
c. Natural delay in answering.
d. A heavy pause of no significance.

6. Which of the following is a technique of women's secret language?
a. Bluntness.
b. Reversed-meaning statement.
c. Questions with strong eyebrow-lifting.
d. Normal intonation.

7. The number of dog houses occupied by gentlemen who do not speak nor understand this language would stretch from here to
a. Kalamazoo.
b. the White House.
c. the Westminster Kennel Club.
d. the Golden Gate.

8. If a wife makes a habit of expressing herself through opposites, a husband must
a. always agree.
b. be careful about agreeing too freely.
c. never agree.
d. try the same tactics.

9. When did the author come to the realization of man's difficulty with women's secret language?
a. At an early age.
b. Soon after she was married.
c. Soon after she left school.
d. As soon as she learned to speak it.

10. In women's secret language, the meaning seldom depends on
a. intonation alone.
b. gestures.
c. the pregnant pause.
d. directness.

Grade yourself on Test 2b by comparing your answers with those in the attachment. Give yourself 10 percent for each correct answer and record your comprehension score and your reading rate.

The minimum score for a comprehension test of this kind should be 70 percent. Careful readers will make 90 percent or 100 percent. If you answers were incorrect, probably need training in comprehension skills. You'll get many suggestions in the following chapters. Meanwhile, try to apply these two suggestions:

1. Look for the author's main idea and the chief items he presents to support it.
2. After reading the passage, *stop* and summarize from memory. Perhaps putting the summary in writing will help even more.

Try these suggestions on the next test. It is somewhat more difficult than the one you just read. Time yourself in the same way as before and remember there's a comprehension test afterward.

Ready? Have you checked and recorded the time? Then go ahead.

Speeded Comprehension Test No. 3a

HOBBIES UNLIMITED*

"No man," wrote Sir William Osler in 1905, "is really happy without a hobby. And it makes precious little difference what his outside interest may be—botany, beetles or butterflies, tulips, fishing, mountaineering or antiquities—anything will do so long as he straddles a hobby and rides it hard."

That the Air Force agrees with Sir William is revealed in the booming Air Force-wide hobby craft program. Thousands of airmen—from General LeMay on down through all ranks—continually avail themselves of the program's facilities. After a grueling 10 to 14 hours at the Pentagon, the Air Force Chief of Staff sandwiches into what is left of his day an incredible range of activities, from judo to tinkering with a hi-fi kit; from practicing on the electric organ to operating a ham radio rig.

It's much the same story with officers, airmen and their dependents at USAF bases around the globe. In what spare time they have, more and more personnel are taking advantage of the base hobby shops. Hobbies have, indeed, become an integral part of Air Force life.

The USAF promotes its hobby, arts and crafts program for a very obvious reason. Good morale is an important military factor. The hobby program benefits not only you and your dependents, but also the Air Force and the entire nation.

The hobby program's diversified activities range from simple manual skills to complex machine tool operation. From handicrafts and the arts to radio and electronic projects.

*By Dave Karten. Reprinted from *The Airman*, official journal of the Air Force, June 1962.

An airman stationed in Berlin builds souvenir wood models of the famed Brandenburg Gate in the woodworking shop after duty hours. A SAC maintenance man at Offutt AFB, Neb., takes a motorman's holiday during evenings to overhaul his car at the modern base hobby shop. And a lieutenant colonel in the Pentagon operates his ham radio set weekends, promoting people-to-people communication around the Free World.

A staff sergeant assigned to a TUSLOG detachment in Istanbul, Turkey, makes authentic finger-high miniatures of soldiers and equipment in his spare time. They portray the historical development of military uniforms and armament dating from 800 B.C. to the present.

A warrant officer at Wheelus Air Base, Tripoli, whose hobby is archaeology, takes advantage of the base's proximity to Leptis, which is one of the largest preserved archaeological finds in the entire area of ancient Roman culture. He works with British archaeologists to hunt ancient treasure. They have already made several discoveries and helped preserve artifacts of historic value.

These hobbyists are all participating in the dynamic USAF hobby program, whose motto is: "A hobby for every airman." A cliché? Perhaps, but to aircrew personnel on alert duty in the "mole holes," to men stationed at isolated radar sites, or so-called "hardship areas" that extend from North Africa to the Far East, the Arctic to the South Pole, on the DEW line, underground in a missile silo in Montana or Wyoming, a hobby can be a pretty important thing. "The difference," as one base commander put it, "between tolerable duty and tedium."

An example of this is Thule Air Base, Greenland, "Khrushchev's Kooler," as airmen call it, is less than 900 miles from the North Pole. During the first bleak months after the Air Force took over the base in 1952, an ominous picture emerged. The psycho rate went up; morale down. Some airmen spent their off-duty time doing nothing, worrying about "Dear John" letters they had received, or just keeping their "sweat charts" up to date.

The Air Force did something about it. To counterbalance some of the discomforts at our northernmost base, it built a hobby shop stocked with everything from power tools and potter wheels to hi-fi kits and a photographic darkroom. Morale went up. An Air Force doctor stationed in Thule said: "We found that a good hobby is one of the best methods of 'shook prevention' because anything that will help pass a day at Thule is worth its weight in psychiatric couches." At other Air Force bases around the globe the story was pretty much the same. When hobby shops moved in, tedium moved out.

If you're a "do-it-yourself" man, if you like to build such things as furniture or model airplanes, do leatherwork, or make repairs on your automobile, the Air Force hobby program is for you. Besides providing excellent facilities and space to work, the hobby shops stock the tools to do the job. They are well equipped with leather-working tools, mechanic's tools, and even hand and powered woodworking equipment like band saws, circular saws, sanders routers and lathes. Insofar as possible, the Air Force encourages hobby and craft programs to be self-supporting.

At many bases the hobby shop sells lumber, model kits, leather, lacquer, varnishes, sandpaper, paint brushes, and auto parts all at reduced prices. They also have qualified instructors to show you just how to go about repairing a carburetor, building a bookcase, or assembling your hi-fi kit. Such help is limited to instruction. After that you're strictly on your own, literally to "do-it-yourself."

To meet the diverse hobby interests of so many Air Force Personnel and their dependents, the USAF Personnel Services Division encourages well-equipped hobby shops of one kind or another. In general, they fall into five main categories: automotive, woodworking, electronics, photography, and crafts. The craft shops provide facilities for ceramics, model building, jewelry making, art, copper enameling, and leathercraft.

Catering to leisure-time hobbyists is not the only function of the dynamic USAF-wide hobby program. Many shops make an important contribution to the military training program by offering regular technical-vocational courses in automotive mechanics, welding, photography, woodworking, and electronics. These courses are conducted by fully qualified instructors.

The many-sided program also performs a valuable service in providing children of Air Force personnel the opportunity to use workshop facilities not generally available at dependent schools. In most cases the children take orientation courses before they use the hobby shops. The courses are designed to give them expert instruction in proper shop practices and correct use of various types of tools and equipment.

Airmen who serve with detached units are not overlooked. Isolated units, which are usually too far removed from the parent organization to utilize the base hobby shops, are supplied with "craft kits" that provide all the necessary tools, supplies, and instructions for a number of crafts. Although they are tailored to fit the specific requirements of the individual units, the kits usually cover such crafts as leatherwork, oil painting, copper tooling, glass etching, model building, and small metal work.

Although Air Force hobby shop facilities may vary from base to base, the purpose behind them is always the same: to stimulate, develop, and maintain the mental and physical well-being of USAF personnel and their dependents by providing them the opportunity for volunteer participation in planned leisure time activities.

"We're aware," says Col. Guy L. Blair, USAF Chief of Special Services, Personnel Services Division, "that leisure time needs vary with individuals. So we try to accommodate you whether you're interested in square dancing or chess, whether you collect coins or stamps, prefer skin diving, leathercraft, woodworking, or photography to the fine arts. And we're now making plans to enable missilemen to pursue their hobbies right

at the site where they are stationed. A missile recreation kit recently designed by our people does just that. It permits a missileer to pursue any one of a dozen hobbies right at the site whether he is stationed above or below ground."

How do you select a hobby? You try to hand at several until you hit the one that grabs and won't let go. That's the hobby for you. It takes thought and investigation to choose a hobby that suits you completely. You should take into consideration how much free time you can give it, the amount of money you will be able to spare for it now and after retirement, and what you expect of it. Choosing the right hobby may be one of the most important things you will do in your life. If you should ever suffer forced idleness, for example, your hobby can literally save your life.

There is the case of the fighter pilot who was seriously injured and badly burned when his plane crashed. He spent two years in Walter Reed Hospital. The first year he had to remain flat on his back, scarecely permitted to lift his head from the pillow.

During this time he underwent surgery to restore his features and was given extensive skin grafts all over his body. The situation looked pretty grim for a while. For, in addition to the serious damage to his body and his appearance, he had no relatives or acquaintances in the Washington, D.C., area. But from the outset, with the aid of nurses and attendants, he devoted himself to his various hobbies. He bought a 35-millimeter camera with which he took pictures of everyone who came into the room. He set up, with the attendants' help, and maintained an elaborate aquarium in which he raised tropical fish. He even learned to typewrite with one hand. Every waking moment, when he was not undergoing treatment, he was occupied with his hobbies or in reading hobby literature. People became interested in him because of his hobbies.

At the end of his two years he walked out of the hospital a whole man in body and spirits. Courage, fostered and aided by his interests in life, had sustained him through a very dark period and, coupled with the friendly associations of all who helped him, salvaged a life which had seemed without hope. As one psychologist put it: "The interests, arts, and skills which we recklessly toss away on entering adulthood may be the very tonics which could lift us over the darkest moments of our life.

Your hobby can be more than just something to keep you occupied in your spare time. Many officers and airmen discover during their military service a talent or skill that frequently leads into a successful post-service career. Many former Air Force men have found their retirement years more rewarding and financially profitable because they were exposed to the USAF's well-organized hobby, arts, and crafts program.

A hobby is also worthwhile because it keeps you active physically or mentally or both. "When we stop learning," says an old proverb, "we begin to grow old. When we stop being interested, we are really growing old."

In the halcyon days of the horsecar and the hoopskirt, people believed in hobbies mainly because the "devil finds work for idle hands." So they taught their children to whittle and saw and sew and perform many domestic tasks to keep them busy. Today, psychologists say, hobbies help to soothe and relax you, to ease the tension of high-pressure living.

Has the Air Force hobby program done that? The airman in Berlin, the warrant officer in Tripoli, the staff sergeant in Turkey, the maintenance man in Nebraska, the lieutenant colonel at the Pentagon, and the airmen stationed at isolated duty stations all over the Free World are writing the answer to that question.

Perhaps the best argument for acquiring a hobby was expressed by Sir Winston Churchill: "I would like to spend the first thousand years in heaven painting, and the next thousand laying bricks."

So, if you have a low threshold of boredom, and have fought it with every device from anagrams to crosswords, try a hobby; it will pay dividends in more ways than one.

Check and record the time. This article contains 1905 words. Find your rate of reading as you did for the last test.

Now take Test 3b on separate paper, listing the numbers 1 through 10 and your responses.

Speeded Comprehension Test No. 3b

HOBBIES UNLIMITED

1. What did Sir William Osler say about hobbies?
   a. Botany, beetles, and butterflies are poor hobbies.
   b. Working hard at a hobby is more important than the kind of hobby.
   c. Any man should be able to be really happy without a hobby.
   d. Working occasionally at the right hobby is more important than working hard at just any hobby.

2. Why does the Air Force promote a hobby program?
   a. For good morale.
   b. To develop manual skills.
   c. For show.
   d. For profit.

3. NOT mentioned as a hobby is
   a. archaeology.
   b. making finger-high miniatures of soldiers.
   c. glass etching.
   d. receiving "Dear John" letters.

4. Hobbies are especially important at such a base as
   a. Lackland.
   b. Offutt.
   c. Thule.
   d. Bolling.

5. A good hobby is one of the best methods of
   a. accident prevention.
   b. "cliché" prevention.
   c. "shook" prevention.
   d. "hardship area" prevention.

6. Apparently a missile recreation kit contains
   a. missile models.
   b. satellite models.
   c. material for several hobbies.
   d. subsilo darkroom equipment.

7. The Air Force hobby program is administered by
   a. Personal Services.
   b. Personnel Services.
   c. Wing Personnel.
   d. Personnel Retraining.

8. The article does NOT mention that a hobby can lead to
   a. retirement income.
   b. psychiatric couches.
   c. assistance to military training.
   d. tedium moving out.

9. Sir Winston Churchill's hobbies were painting and
   a. government.
   b. finance.
   c. anagrams.
   d. bricklaying.

10. Airmen stationed there called Thule Air Base
   a. "Khrushchev's Kooler."
   b. "the home away from home."
   c. "the mole hill."
   d. "Molotov's Motel."

Check your answers against the Key for Test 3b and grade your paper. Keep a record of your speed and comprehension scores.

You have now made a pretty fair check of your reading habits and skills, and you know more or less where you need help. To make sure, though, read for an hour or more each day for the next few days. Try to read materials of various levels of difficulty and observe yourself closely, keeping in mind the items in the checklist in Chapter 2. Then start on Chapter 3, "An Improvement Program."

CHAPTER 3

An Improvement Program

GOOD READING is not like good looks—it doesn't come naturally. You have to work at it. Of course, some people are naturally faster than others just as some people are naturally faster runners. They can do well even without special training. But have you ever known anyone who could run the 100-yard dash in 10 seconds without training? Even the best runners go through a training program when they have to compete in a track meet. They know they can't do their best without good coaching and a lot of practice.

Maybe you'll never compete in a reading contest for the championship of your base. But you're in a contest just the same—a reading contest with yourself. The very fact that you've reached this far in the manual shows that you'd like to better your reading speed and comprehensive and believe you can.

So far, you have taken three reading tests and have tried to analyze your strengths and weaknesses. If you have followed the suggestions at the end of Chapter 2, you have done several hours' reading in the few days since then. Perhaps you tried to correct some of the faults you discovered with the aid of the checklist. Would you like to check your speed and comprehension now? Take the tests on the next pages, using the same timing procedure as before. When you have finished, figure out your time in minutes and decimals of a minute, as before, and divide it into the number of words in the selection. This will tell you your speed in words per minute. Now, record the time, and begin reading.

Speeded Comprehension Test No. 4a

AIR FORCE AID SOCIETY*

Money can separate even the closest of friends. Think not? Ask your buddy for a loan. He may give it to you; but more often, he won't. Whether or not you receive the cash, your friendly relationship will soon show signs of strain.

Good friends aren't easy to acquire. Why chance losing one? There's a better way to overcome financial emergencies. Visit the official emergency relief organization of the US Air Force. Call upon your local Air Force Society (AFAS) officer.

Explain your predicament. He will listen. The AFAS officer is prepared to meet and cope with any condition that requires emergency financial attention, any unforeseen situation that threatens the morale and welfare of Air Force people. And, if your AFAS representative can't handle your particular problem locally, he can call upon the Air Force Aid Society Headquarters, USAFMPC, Randolph AFB, Texas, for assistance.

All you have to do is qualify.

Essentially, everyone on active duty in the US Air Force is eligible for Air Force Aid Society assistance. This includes persons on extended active duty with the Air Force Reserve and the Air National Guard. In addition, personnel retired from active duty for length of service or disability and dependent wives of either active or retired Air Force members may also quality for AFAS loans. Widows, too, may be eligible. It all depends on their individual circumstances and obligations.

HOW TO QUALIFY

Although all airmen are eligible to supply for AFAS assistance, all may not qualify. Admittedly, some have visited their AFAS officer and left without a loan or grant, understandably disappointed. Not every "emergency" will qualify you for AFAS financial help, mainly because you must first know what really constitutes an emergency under the Society's rules.

For example, consider the airman who cannot meet a pressing financial obligation simply because he has no

*Reprinted from *The Airman*, official magazine of the U.S. Air Force, September 1968.

money. To him, that's an emergency. He's broke. No one will argue that fact. But, why is the airman broke? Suppose he lost his money gambling. Is his still an emergency situation? Sure it is; but it's not the kind that will qualify him for an AFAS loan. His problem was self-created.

On the other hand, suppose this airman lost his money accidentally or had it stolen. Can the AFAS help him? Now, the qualifying decision depends upon the airman's obligation. If, in the estimation of the AFAS officer, a real emergency does exist, the Society can and will help by providing funds for the airman's immediate needs.

The procedure is simple and consistent. Usually your AFAS representative is located in the Personnel Affairs Section of your local Consolidated Base Personnel Office. His door is always open. When you have a problem, drop in and discuss your situation with him. Omit nothing. Present all the facts so that he can weigh them properly. Then, if your problem can clearly be resolved by a loan or grant, the AFAS officer will act accordingly. Although he's in a position to make a decision on behalf of the AFAS, such a decision is not arbitrary. It must be based upon the regulations (AFM 211-1) and the overall purpose of the Society. Each case must be examined on its own merit. One cannot establish a precedent for others. Two cases may seem identical yet vary in a respect that puts each in an entirely different light.

It is almost impossible to conclusively list all the criteria for an AFAS loan or grant. Basically, however, the following circumstances might qualify you for assistance:

- Nonreceipt of pay, family allowances or allotments.
- Expenses incidental to emergency leaves.
- Emergency medical, dental, and hospital expenses.
- Assistance to dependents upon the death of Air Force personnel.
- Funeral expenses.
- Physically or mentally handicapped children.
- Emergency transportation expenses.
- Vocational training for wives of active duty personnel who, because of family financial problems, desire to provide a second source of income.
- Off-duty, terminal, and nonterminal TDY Bootstrap Education.
- House and trailer payments provided eviction or foreclosure is imminent.
- Loans for passenger travel on permissive reassignment.
- Loans for life insurance payments on the Air Force member when funds are not available due to nonreceipt of pay.
- Loans to active duty members to purchase or pay installments for auto insurance or emergency car repairs when the car is essential for commuting to and from the duty station and no other transportation is available.
- Loans for personal effects in case of "burnouts" if your property is not insured.
- Plus many others.

If the AFAS provides financial assistance, it is usually in the form of noninterest-bearing loans, the amount of which is based on the specific need. If a serious hardship exists, however, and it's obvious the requester will be unable to repay the money, the assistance may be given in the form of a grant. Grants, of course, need not be repaid. If they are, the money is credited as a contribution to the AFAS.

Naturally, loans must be repaid as soon as possible. When your loan is approved, you and the AFAS officer will work out a plan that is best for you, based upon your income and obligations. Most borrowers elect to repay their loans by allotments or installments. You may, of course, repay the money in a lump sum.

TYPES OF SERVICE

Air Force Aid Society services can be divided into three general categories: (1) general relief, (2) the chap (Children Have A Potential) program, and (3) the education program that provides loans and grants to thousands of Air Force children to attend college.

General relief has been briefly outlined. Local AFAS officers can provide answers to individual questions.

Maj. Gen. Reginald C. Harmon, USAF Retired, the present Director of the Air Force Aid Society, summarizes the CHAP program as follows:

"There is no greater burden that any family has to bear than that of having a child who cannot quite fit into the pattern which is designed for the training and education of children generally.

"Strangely enough, only a small minority of these cases are caused by any mental deficiency. Some are caused by psychiatric problems and others by the simple failure to learn to read and comprehend properly.

"The Air Force Aid Society seeks to help those children, regardless of the cause of their affliction. We have labeled our program CHAP (Children Have A Potential). Through the CHAP program, we are operating special clinics throughout the world, employing teachers, psychiatrists, and other specialists to help solve the children's problems and enable them to adjust to the normal environments of our society."

In 1967 the AFAS provided more than $400,000 in CHAP assistance. Among the problems for which relief was provided were cerebral palsy, cystic fibrosis, emotional disturbances, heart conditions, multiple sclerosis, muscular dystrophy, polio, speech defects, congenital deformities, and hearing problems. AFAS also contributed to the operation of several camps for Air Force children qualified for CHAP assistance.

The other major service of the AFAS involves education above high school level. It is the service that provides the greatest long-term benefits. Your son or daughter may be eligible for educational assistance under the General Henry H. Arnold Educational Fund, a program administered at the national level. All applications are reviewed by General Harmon and his staff.

If your son or daughter is already in college or a senior in high school, he or she may apply for

educational assistance by writing to Air Force Aid Society, National Headquarters. Washington, D.C. 20333, requesting an application blank. Your own local AFAS officer has a convenient card form which may be used for this purpose.

The General H. H. Arnold Fund provides educational assistance in the form of combination noninterest-bearing loans and grants. Assistance is awarded on the basis of financial need and scholastic aptitude of the student. It is designed to supplement parental financial support. A maximum of $1,500 per school year can be extended to deserving students. At the present time, one-fourth of this amount is given as a grant and need not be repaid. The remainder is loaned and need not be repaid until the student leaves full-time attendance in undergraduate training. Similar aid is also provided for vocational training of students after graduation from high school.

MEMBERSHIPS

Any individual, military or civilian, may become a member of the Air Force Aid Society by contributing at least $1. A donation of at least $50 and less than $500 entitles the donor to a Life Membership. A donation of $500 or more brings a Patron Membership to the benefactor.

No government funds are received by the Society. To continue functioning, it relies on voluntary contributions. In addition to its annual fund-raising campaign, the AFAS receives monies from special fund-raising activities at Air Force bses, contributions from civilian firms, income on investments, royalties from books and songs, and gifts and proceeds from special shows or athletic events. All contributions to AFAS are tax deductible.

Membership in the AFAS carries no material benefits other than the realization that your support is assisting your fellow airmen who need emergency financial help.

Under a Board of Trustees and through the Director, the national headquarters is generally responsible for all funds, including fund raising and the overall operation of the Society.

AFAS Hq USAF is located within the Directorate of Personnel Services at the Military Personnel Center, Randolph AFB, Texas. The military headquarters is responsible for the administration, management, and Air Staff direction of all AFAS activities within the Air Force in accordance with policies and procedures established by the Society.

Almost every real emergency affecting Air Force personnel today requires some financial outlay in order to be successfully resolved. The Air Force Aid Society stands ready to help all airmen meet these obligations. It must be a great comfort to all All Force members to know that such an organization is in being and is ready and willing to lend a helping hand when needed.

Check and record the time. This article contains 1741 words. Find your rate in words per minute.

Now take Test 4b on separate paper, listing the number 1 through 10 and your responses.

Speeded Comprehension Test No. 4b

AIR FORCE AID SOCIETY

1. Which of the following would NOT be eligible for AFAS assistance?
   a. Reservists on extended active duty.
   b. Members of the Air National Guard.
   c. Retired personnel.
   d. Dependent wives of AF members.

2. Which of the following words most closely identifies the basis for individual AFAS assistance?
   a. Emergency.
   b. Qualification.
   c. Eligibility.
   d. Necessity.

3. Normally you will find your AFAS representative in the office of
   a. Personal Affairs.
   b. Family Services.
   c. Personnel Services.
   d. Emergency Relief.

4. In granting assistance, AFAS representatives decide each case on
   a. precedent set in similar cases.
   b. definite eligibility rules.
   c. its own merits.
   d. firmly established criteria.

5. In case of extreme hardship, assistance from the AFAS will often be in the form of a
   a. nonrepayable grant.
   b. long-term loan.
   c. low interest grant.
   d. noninterest loan.

6. The overall purpose of the Children Have A Potential (CHAP) program is to provide assistance to those who are
   a. physically handicapped.
   b. mentally superior.
   c. handicapped in any way.
   d. mentally retarded.

7. Which of the following AFAS services provides the greatest long-term benefits?
   a. Education assistance above high school level.
   b. Outright grants for serious hardship.
   c. Noninterest-bearing emergency loans.
   d. Assistance offered to handicapped children.

8. College education assistance is provided through the General H. H. Arnold Fund in the form of
   a. noninterest-bearing loans.
   b. student earned scholarships.
   c. nonrepayable grants.
   d. combination loans and grants.

9. Donation of which of the following amounts provides a Life Membership in the AFAS?
   a. $50.
   b. $100.
   c. $300.
   d. $500.

10. Which of the following is NOT a source of AFAS funds?
   a. Civilian firms.
   b. Government grants.
   c. Investment income.
   d. Song royalties.

Check your answers against the Key for Test 4b and grade your paper. Keep a record of your speed and comprehension scores.

When you are ready, record the time and begin reading test 5a.

Speeded Comprehension Test No. 5a

THE EXILE COMES HOME*

Under lowering November skies the Navy tractor-trailer moved along Washington's rain-wet streets. Placards on its sides proclaimed "Operation Homecoming." Curator Paul E. Garber of the Smithsonian's National Air Museum drove with the vehicle as escort.

No great fanfare attended the occasion. The poor weather cancelled a scheduled flyover by military aircraft. And Monday is scarcely an ideal day for attracting crowds, even when the skies are bright.

But at last, after 20 long years in exile, the expatriate was back. Those two troubled decades had seen much agitation in newspapers, magazines, and the halls of Congress for its speedier return. The workings of fate, however, had ordained that it would not be until this day, November 22, 1948.

Yet the return was not to go without some welcoming ceremony. A rain-spattered throng had assembled on the Mall, that long green-sward carpet at the foot of Capitol Hill. There, too, were arrayed the Air Force, Army, and Navy bands. With them were the color guards of the three services, as well as those of the American Legion, Veterans of Foreign Wars, and the Boy Scouts of America.

The tractor-trailer braked to a halt before the Smithsonian Institution. Workmen carefully unloaded three big crates.

Home now from exile was the Kitty Hawk, the Wright brothers' biplane. It had opened the Age of Aviation on a distant December day above the windswept coastal sands of North Carolina.

A helicopter from the Coast Guard's station at Kitty Hawk buzzed down in salute to a landing on the Mall from the famed locale of the Wright brothers' feat. The weather discouraged long speechmaking, and the Kitty Hawk, still unseen by the faithful present, was borne into the Smithsonian's Arts and Industries Building.

"A perfect three-crate landing," cracked a wag as the last container disappeared into the edifice, which henceforth would be a hangar for the pioneer the historians call the "greatest of all aviation treasures."

In that museum, the Smithsonian had pledged, the Wright brothers' plane would occupy "the highest place of honor which is its due."

UNHAPPY CONTROVERSY

To countless Americans alive today it is incredible that the Kitty Hawk ever left the United States for any extended period. It so happens this is the sorry story.

Authorities agree Samuel P. Langley is entitled to rank among the great pioneers in the early history of aviation. He served as Secretary of the Smithsonian Institution from 1887 until his death in 1906. During that period he devoted much time to the theory of flight and the challenge of creating a machine that could course through the air.

As early as 1896 he succeeded in launching a steam-propelled model that made several successful flights of more th an 4,000 feet. His next challenge was designing a flying machine capable of carrying man.

By the autumn of 1903 he had the craft ready. It was launched by catapult on a houseboat in the Potomac, but it dove into the river. This October 7 failure was blamed on damage to the flying machine supposedly caused by the launching catapult. Repairs were made and December 8 saw a second attempt to get the craft airborne. Again it crashed into the river, broken. And again the launching system was held to be the villain.

December 8. Mark that date. Only nine days later, on December 17, the Wright brothers' plane took to the air at Kitty Hawk to make the first successful powered, controlled, and manned flight in history.

Langley's failures were well publicized. His efforts commanded public attention because of the prestige attached to his position as Secretary of the Smithsonian. As for the Wrights, they were just a couple of unknowns. The Kitty Hawk flights had few witnesses.

*Reprinted from *The Airman*, official magazine of the U.S. Air Force, December 1968

News of them met with abiding suspicion and scepticism. Probably another hoax, was the verdict of many.

Relations between the Wrights and Langley were consistently cordial and remarked by mutual respect. Indeed, some of Langley's theoretical papers on aerodynamics aroused the brothers' interest even before Kitty Hawk. Conceivably certain results of his research may have assisted the Wrights in the practical work they were doing.

Langley was one of those rare men who inspired a zealous loyalty in associates and subordinates. Sometimes the excessively zealous were apt to be unthinking. Langley died in 1906, to be succeeded by Dr. Charles D. Walcott as Secretary of the Smithsonian Institution. Soon the claim was abroad that Langley had been the inventor of the first powered aircraft capable of carrying man.

In a sense, the Wrights permitted the claim to gain credence. In this home community at Dayton, Ohio, they applied themselves to improving the design and capabilities of their original aircraft. Not until May 1908 did the Wrights fly before an audience under circumstances assuring that their performance would be well publicized. In March of that year, however, another aircraft of American design had been successfully flown and, earlier, two primitive flying machines had made their debuts in Europe.

The legend that Langley had made the first plane persisted. Indeed, it was seemingly confirmed anew in 1914 when Glenn Curtiss flew in the museum relic at Hammondsport, N.Y. What was not emphasized at that time was that the original Langley aircraft had been significantly modified and rebuilt for the Hammondsport exhibition. Even so, Curtiss could not keep the craft airborne for as long as five seconds and his longest hop was 150 feet.

Originally the Wright brothers would gladly have given their Kitty Hawk machine to the Smithsonian but they were not going to forfeit its claim to fame. Wilbur died in 1912, leaving Orville to champion their cause.

The Smithsonian was far from disinterested in acquiring the Kitty Hawk plane. At one point it suggested the sign identifying the Langley machine could be reworded to omit any blatant claim of primacy. However, the sign for the Wrights' craft likewise would carry no acknowledgement that it had been the first to bear man aloft. No deal.

Orville sat things out patiently. It was an irrational situation when all Europe unhesitatingly accepted the Wrights as the fathers of powered flight. Then came a request from London's South Kensington Museum for a loan of the Kitty Hawk machine to place it on exhibition.

After much deliberation Orville acceded to the request, but reluctantly as he let intimates know. He saw the loan as the "only way to correcting the history of the flying machine." And he expressed the hope that the plane's absence from its native shores would be temporary.

Thus it happened that the Kitty Hawk (as the craft had come to be known) went to England in 1928.

The US reacted with great dismay and regret. Belatedly the Smithsonian announced it was inaugurating an exhaustive research program to determine once and for all the true father of powered flight.

Orville Wright died January 30, 1948. The provisions of his will, made public within a week, contained a rude shock for his air-minded fellow countrymen. The Kitty Hawk would remain in London.

It should be noted here that six years earlier the Smithsonian had completed its exhaustive research on the origin of powered flight and made public the findings. Orville saw a copy of the report before its public release. The verdict was that the Wright brothers indeed had made the first successful airplane and that, if their Kitty Hawk should ever become available, "it would be given the highest place of honor (at the Institution) which is its due."

But that was in 1942 and there was a war on.

The national dejection over the loss of the Kitty Hawk was fortunately shortlived. The day after the provisions of Orville's will appeared in the press, newspapers carried a more welcome story. Among Orville's effects had been found correspondence with the director of the South Kensington Museum. Its burden: Orville's request for return of the Kitty Hawk to the US—a request the museum official sympathetically understood. And most important, the letters were dated six years after Orville had made his will.

The Kitty Hawk would be coming home, after all.

". . . WHICH IS ITS DUE"

With the arrangements timed to the hour of its first successful flight exactly 45 years earlier, the storied Wright biplane was officially unveiled 20 years ago this month—on December 17, 1948—in "the highest place of honor" at the Smithsonian's Arts and Industries Building.

A select audience of 500 witnessed the ceremony. The British Ambassador, Sir Oliver Frank, called the exhibit one of the rarest of historic objects and said the plane symbolized "the start of the 20th century."

"I feel the entire nation will rejoice," said President Harry Truman in a message, "because this historic aircraft is home again."

Gen. H. H. "Hap" Arnold saw the success of the Wright brothers and the ensuing development of air power as "chiefly responsible" for the position of leadership that the country had come to occupy.

One of the guests, John Moore, 63, of Colinga Island, N.C., gave no speech or delivered any tribute. He owed his invitation to the fact that he was the only surviving witness of the Kitty Hawk's first flight and had talked to the Wrights as they made their preparation.

A newspaper reported buttonholed him to ask how he thought the old biplane looked now.

Moore peered upward at the suspended aircraft.

"Looks about the same," he replied. He studied the aircraft again. "About the same," he repeated, "only cleaned up a bit."

Check and record the time. This article contains 1581 words. Find your reading rate.

Now take Test 5b and record your answers as before.

Speeded Comprehension Test No. 5b

THE EXILE COMES HOME

1. The Smithsonian's Arts and Industries Building received the Kitty Hawk in
   a. January 1948.
   b. July 1948.
   c. November 1948.
   d. December 1948.

2. The Kitty Hawk is most accurately identified as a
   a. biplane.
   b. glider.
   c. monoplane.
   d. triplane.

3. What was the primary cause for failure of two flights (other than the Wright brothers) in late 1903?
   a. The wing structure.
   b. The landing gear.
   c. The power mechanism.
   d. The launching system.

4. Which of the following distinguished the December 17, 1903, Wright brothers' flight from prior flights?
   a. Powered.
   b. Manned.
   c. Sustained.
   d. Launched.

5. Why did Langley's flight failures get more publicity than the Wright brothers' successful flight?
   a. He occupied a prestige position in Washington, D.C.
   b. He was the father of steam-propelled aircraft.
   c. He pioneered aviation experiments.
   d. He developed the theory of aerodynamics.

6. The claim that Langley invented the first powered aircraft capable of carrying a man aloft gained support because of the
   a. excessive loyalty of his associates and subordinates.
   b. many experiments he conducted with manned aircraft.
   c. help that his ideas gave to the Wright brothers.
   d. theoretical papers he contributed to the field of aviation.

7. Why did the Smithsonian fail to acquire the Kitty Hawk originally?
   a. The Wright brothers and Samuel Langley were fueding.
   b. Glenn Curtiss had not yet flown Langley's aircraft.
   c. The British wanted to exhibit it in the South Kensington Museum.
   d. The question over primacy in powered and manned flight appeared unsettled.

8. What was the determining factor in the return of the Kitty Hawk?
   a. Public pressure exerted by air-minded Americans.
   b. Correspondence between Orville Wright and the Kensington director.
   c. Provisions of Orville Wright's will made public in 1948.
   d. Decision reached by the Smithsonian on the matter of primacy.

9. On which anniversary of its first successful flight was the Kitty Hawk officially unveiled at the Smithsonian?
   a. 25th.
   b. 35th.
   c. 45th.
   d. 50th.

10. What witness to the original flight of the Kitty Hawk attended the return ceremony at the Smithsonian?
   a. Sir Oliver Frank.
   b. John Moore.
   c. General H. H. Arnold.
   d. Glenn Curtiss.

Check your answers against the Key for Test 5b and grade your paper.

In the next test article, General Foulois tells about flying an early Wright airplane. When you are ready, record the time and begin Test 6a.

Speeded Comprehension Test No. 6a

THE DAY I TAUGHT MYSELF TO FLY*

The faculty at the Signal Corps School, Fort Leavenworth, Kansas, apparently did not observe that my graduation thesis on aeronautics was taken largely from the Holy Bible, Jules Verne, and Army field

*By Major General Benjamin D. Foulois (USAF Ret.) as told to Harold T. Carven. Reprinted from *The Airman*, official journal of the Air Force, September 1965.

service regulations. They liked it, and as a result I was assigned to aviation duty at Fort Myer, Virginia, upon my graduation in June 1908.

At that time, Fort Myer was the center of our government's attempt to get men off the ground and into the sky. I guess you could call it the Cape Kennedy of its day.

The month after my assignment there, the Signal Corps made two contracts, one for a lighter-than-air ship, or dirigible, and another for a heavier-than-air flying machine. Both craft had to go through a number of tests prior to acceptance.

The airship, designed by Glenn Curtiss and Tom Baldwin, arrived first, and I was among those who became airship pilots. It was accepted in August 1908, but while we were making the acceptance tests, Orville Wright arrived with the Wright Flyer. Lieutenants Frank Lahm, Tom Selfridge, and I were given assignments in connection with testing it. Tom was killed in a crackup on September 17, and Orville Wright, who was flying the machine, was seriously injured. That crash ended our flying for 1908.

By July 1909, Orville had recovered, and tests were resumed. On July 30 it was my privilege to be Orville Wright's navigator on the final acceptance test.

The airplane became Army property on August 2, and shortly thereafter the Aero Club of Washington held a banquet to honor the Wright brothers. After the usual political and diplomatic speeches, Wilbur and Orville were asked to address the group. Well, these were men of action, not words. Wilbur got up and said everything he had to say in five minutes, and he sat down. Then it was Orville's turn.

"Gentlemen," he said, "amongst the birds the parrot is the best talker and the poorest flyer. I never try to emulate the parrot."

Then he sat down. They were both better flyers than talkers, except when they were discussing aeronautics in the shop or hangar. Then they would talk far into the night.

Well, I enjoyed talking with these men, and I wanted to learn to fly that airplane. The contract called for the Wrights to teach two Army officers to fly, and Frank Lahm and I were chosen. We built a hangar at College Park, where the University of Maryland is today, and got ready for the instruction. Then I got orders to represent the United States at an international aeronautical congress in France. As a result, a young engineering officer named Lt. Fred Humphreys was selected to take the flying lessons in my place, and I went on to Europe.

I got back from France shortly before Lahm and Humphreys made their first solo flights in mid-October 1909. Although he was not obligated to do so, Wilbur Wright volunteered to give me some flying lessons anyway. By November 5, I had completed 54 minutes of instruction, but had not yet made a takeoff or landing. I also had flown with Humphreys, but only as a passenger.

Well, on that date I was out there on the field ready to fly, and Lahm and Humphreys were in the air with the plane. They finally came in to land, hooked a wing into the ground, and cracked it up. The weather was getting cold, so that ended our flying for 1909.

Lahm was sent back to his cavalry regiment about the middle of November under a law that required officers to spend at least two years out of six with troops. The engineers didn't want any of their bright young officers in this crazy game of flying, so Humphreys was relieved, too. That left me with 54 minutes of instruction, a wrecked airplane, eight enlisted men, and a civilian mechanic—the whole active duty air force at that time!

The chief signal officer called me into his office in December and told me he was going to send me and the airplane down to Fort Sam Houston, at San Antonio, Texas.

"Take plenty of spare parts," he said, "and teach yourself how to fly."

After exhibiting the airplane in Chicago and St. Louis, I arrived at Fort Sam Houston in February 1910 and my men and I built a hangar on what was then known as the mounted drill ground. We fixed the plane up, and by the 2nd of March it was ready to fly. I made four flights with it, the first flight 7 minutes, second one 14 minutes, third 21 minutes, and the fourth about 21 minutes when the fuel pipe broke. I came in and landed, knocking the tail off the airplane. I made four firsts that day—my first solo, my first takeoff, my first landing, and my first crackup.

We hauled the wreckage into the hangar and tried to puzzle out what had gone wrong in the landing. Finally I sat down and wrote a letter to the Wright brothers telling them what I thought I had done, and they wrote back and told me what I ought to have done. That started my correspondence course with the Wright brothers, and I guess it made me the first correspondence course airplane pilot in history.

After we repaired the airplane I went up again, flew around awhile, cut the engine, and started my landing approach. Coming in toward the drill ground the plane dropped suddenly toward the ground and threw me completely out of my seat. Fortunately, I fell back into the seat, straightened out the control levers, and came on in.

Capt. Fred Austin, a field artillery battery commander, galloped up on his horse and wanted to know what had happened. I said, "Fred, I need something to keep me in that damn seat! Something like a trunk strap about four feet long with a buckle on it so I can lash myself down onto the seat." Well, that afternoon his battery saddler gave me a strap, and it became the first safety belt ever used in an airplane in this country.

On my third day of flying I had to reorient my monorail catapult system into the wind every time I took off. The wind was changing direction every 10 or 15 minutes. On one takeoff I just got the plane off the track and into the air when a sidewind hit me and teakettled me up on one wing and down I went. The crew had to pull old Number One off me that time. They cut a couple of wires that were gouging into my left leg, and finally I was free. I carry a scar today from

that crash, although it's the only one I've ever received from flying.

Right away I decided to do away with the tower and track system and put wheels on the plane, so I sent my mechanic to San Antonion Arsenal. He rounded up a pair of rubber-tired cultivator wheels, then started working on some recoil springs to go with them, and soon we dispensed with tower and track altogether.

All the crashes and repairs were costing us money, and we had very little to work with. One day I was called into the chief signal officer's office at Fort Sam Houston, and he said he had heard rumors that we were spending our own money to keep the airplane in the air. I told him I had been alloted $150 to run that airplane for four months, and had dug into my own pockets for $300. I said my enlisted men had also contributed what they could and that the carpenters, plumbers, blacksmiths, painters, and tailors on the post were furnishing materials, and that's the way we were keeping the plane in operation.

Well, he said this was bad advertising for the War Department, and he was going to report me to Washington. He did, and about a week later I got a letter ordering me to stop flying, take my detachment to an Army target range about 25 miles from the post, and put in an electrical annunciator buzzer system for operating and handling targets. We went out there and dug trenches, laid cable, made manholes, and did everything in the world for a month. Two good Signal Corps noncommissioned officers and a half dozen illiterate laborers could have done the job. What it amounted to was that I got a reprimand from the War Department and my enlisted men got a month of hard labor in return for all the flights we had accomplished up until that time.

When this job was finished we went back to Fort Sam Houston and resumed flying. We wanted to develop the airplane into a stable platform for air reconnaissance work. Old Number One was the last of the Kitty Hawk models, and with its two elevators out in front it was about as stable as a bucking bronco. We continued experimenting while the Wright brothers made modifications back at Dayton, Ohio. When one of the elevators up front was moved around to the back, stability improved somewhat, but not enough. I later found out that by using just one elevator, the rear one, I had a platform that worked very well. I could let go of the levers and make notes and sketches. It got to be an airplane that could be used for real military reconnaissance.

Eventually we got a second airplane to work with, the Wright-Collier, and finally, in April 1911, a third Wright machine.

DAWN PATROL

In the spring of that year we were having trouble in Mexico, which was itself having a considerable amount of internal troubles, and 10,000 troops were concentrated at Fort Sam Houston, ready to move down to the border if they had to. These troops were camped on the mounted drill ground, and this left me with a space for flying operations about 500 yards long and 100 yards wide. During this time I had to do all my flying before reveille in the morning or after retreat in the afternoon, because they not only used my flying field but all the other open spaced I had there for drill purposes. Well, I didn't mind that so much because I got quite a lot of satisfaction out of getting up before reveille and waking the troops, which they didn't appreciate at all.

Since most of the men, mules, and horses had never seen an airplane, I though it would be a good idea to indoctrinate them. One day the Sixth Cavalry was lined up for a parade, with about 400 officers and enlisted men and their horses participating. I came sailing in over the formation, and they went running in every direction. Then I headed straight for San Antonio to get out of the way until the smoke cleared. Fortunately for me the division commander down there, General Carter, was in favor of this indoctrination work.

One particular incident that I recall involved a battery of artillery that used to come out and form up on my flying field, and go through their maneuvers. Guns, caissons, and horses, they got all lined up nicely, ready for the officers to report front and center to the battery commander, when I came in over them from behind, diving like I had for the Cavalry outfit.

Unfortunately for me, I overlooked the fact that the wind had shifted, and while the battery scattered in every direction, I came in downwind about 60 miles an hour, considerably faster than the normal landing speed. At the rate I was going and in the direction I was moving, I was headed straight for a row of tents on one side of the field, and I had to do something mighty quick. When I got almost to the tents I still had speed enough to make a sharp left turn down the flank of those tents. Then, when my flying speed decreased and I was ready to touch down, there right in front of me was a horse and wagon. Well, I hit the horse in the chest and knocked him back on his haunches, and he glared at me and I glared at him for a few seconds. Then he got up, overturned the wagon and joined the milling bunch of artillery horses and guns.

About this time the owner of the horse and wagon appeared from between the tents, and he and I got into an argument. He was going to sue me for damages, and I gave him the devil for being out on the field where he had no business to be. And about that time a lordly voice behind me said, "He, Bennie, what the hell's going on?" Well, I look around and there, sticking his head out of a tent, was a young captain of engineers named Douglas MacArthur, adjutant of the engineer battalion that occupied that flank of the field.

Well, I left the owner of the horse and wagon talking to himself, and I went over to see Doug. He and I had been lieutenants together and served together for years.

THEY WERE EXPENDABLE

"Doug," I said, "it was a choice between your tent and that horse and wagon. Lieutenants and captains and horses are expendable in this man's Army, but government tents are not. If I'd hit that tent I'd have it on my paycheck next month."

Well, we reminisced about a lot of the things we'd been through and chatted awhile, then I went back to my plane to see if I couldn't fix it, which I had to.

I've thought about that little incident on many occasions in later years. Later on when MacArthur was Chief of Staff of the Army and I was chief of the old Army Air Corps, we fought and bled for the Army a lot of times together. I've often thought since that time that if I'd hit that tent I certainly would have changed history.

In July 1911, on orders from the War Department, we shipped the first Army airplane to Dayton to be restored by Wilbur and Orville Wright. The only original part left at that time was the upper main surface. In all my crackups I had landed it in every way possible except on its back.

When the Wright brothers were through restoring it, they sent old Number One to the Smithsonian Institution in Washington, D.C., where it was placed on permanent display.

Before this machine became a museum exhibit, the public looked upon the Wright brothers and everyone associated with them as people who should be in a government hospital for the insane. Now we are thinking in terms of travel to the moon and beyond. We have come a long way since the Army got its first airplane back in 1909, and we are likely to go a great deal further in an equal period of time in the future. I will not attempt to predict what advancements will be made in the next 50 or 60 years, but will say that I believe that in aerospace nothing, absolutely nothing, is impossible. We'll just keep moving ahead.

Check Your Time! This test has 2542 words. Find your reading rate. Now take Test 6b.

Speeded Comprehension Test No. 6b

THE DAY I TAUGHT MYSELF TO FLY

1. Which of the following might be considered an early counterpart of Cape Kennedy?
   a. Kelly Field.
   b. Fort Myer.
   c. Wright Field.
   d. Fort Sam Houston.

2. When Orville Wright made the final acceptance test of the first Army airplane, his navigator was
   a. Lt. Lahm.
   b. Lt. Humphreys.
   c. Lt. Austin.
   d. Lt. Foulois.

3. Which of the following said, "Amongst the birds the parrot is the best talker and the poorest flyer?"
   a. Orville Wright.
   b. Glenn Curtis.
   c. Wilbur Wright.
   d. Tom Baldwin.

4. The strength of the entire active duty air force at the close of 1909 was
   a. 8
   b. 9
   c. 10
   d. 11

5. Which of the following events occurred in connection with the author's solo flight?
   a. He scattered horses and men of the Sixth Cavalry.
   b. He damaged the tail of the aircraft.
   c. He hit a horse and wagon on the field.
   d. He hooked a wing into the ground.

6. Which of the following "firsts" was contributed by a field artillery battery saddler to solve an early flying problem?
   a. The first bucket seats.
   b. The first landing gear wheels.
   c. The first tower and track system.
   d. The first safety belt.

7. The chief problem with the monorail catapult system of takeoff was
   a. adjusting to changing wind direction.
   b. generating sufficient thrust.
   c. preventing the plane from bucking.
   d. achieving an adequate speed level.

8. In the early days at Ft. Sam Houston, a primary goal was to develop the airplane for use in
   a. bombing.
   b. transport.
   c. reconnaissance.
   d. fighting.

9. When the first Army airplane was sent to the Wright brothers for restoration, the only original part left was the
   a. front elevator.
   b. upper main surface.
   c. rear elevator.
   d. tail assembly.

10. "Old Number One" is on permanent display at
   a. Fort Myer, Virginia.

b. Dayton, Ohio.
c. Fort Sam Houston, Texas.
d. Washington, D.C.

Check your answers against the Key and keep a record of your speed and comprehension scores.

Now review your previous answers to the check-list items in Chapter 2. Change any that you find wrong as a result of your observations during the past few days, then return to this page and read on.

You are now ready to plan your reading improvement program. It should consist of the following five elements:

1. Basic exercises
2. Vocabulary work
3. Corrective work and exercises
4. Purposeful reading
5. Speed and comprehension tests

There are three sets of basic exercises in this volume: eye movement exercises, speeded word recognition exercises, and speeded word meaning tests. These are in the next chapter. Plan to take these exercises regularly. Regardless of your social problems, go through them about twice a week. They will help you develop good eye movements.

The vocabulary work includes 9 lists consisting of 20 words each. These are in Chapters 5, 6, and 7. In Chapter 5 are other suggestions for vocabulary improvement. In this area, too, you should do some work regularly, no matter where you need corrective action.

Your corrective work will, of course, depend on what your difficulties are, as shown by the checklist. If you have eye movement and eyespan difficulties, you will do well to give extra time to the suggestions in Chapter 4. If you have vocabulary difficulties, Chapter 5 will provide you with special work and suggestions. If comprehension seems to be your main problem, put special emphasis on the material in Chapters 6 and 7.

In your purposeful reading periods you can tie all these together by reading interesting infomational material of your own choice. These periods should each consist of about 30 minutes of reading. You can make your own reading selections from the magazines and from the books in the library. Start off with simpler material, then gradually select more and more difficult material as you go along. Further suggestions on how to plan these periods are in Chapter 6.

The speed and comprehension tests in Chapters 6 and 7 are exactly the same type as those you already have taken. Plan on taking them periodically. They will give you a good idea of how well you are progressing.

All in all, we suggest a 5-week program planned somewhat along the lines of the Suggested Reading Program. (See figure 3-1.)

You don't have to follow this program to the letter. Use your judgment to fit it into your time schedule. If you are hard pressed for time, it's all right to work on your reading only 3 or 4 days a week and stretch out the program to 6, 7, or 8 weeks. Don't make it any longer, though, for then it will be too diluted to have the proper effect. On the other hand, you may want to spend more time on the program and concentrate it into 3 or 4 weeks. That's all right, too, but don't squeeze it together any more than that. You can't cram for a reading test like you can for an information test. You can't condense a month's reading program into a few days of continuous work any more than you can condense a month of football practice into a few days of continuous training. All that will do for you is make you sore and stiff. The only way to reach the peak of your reading potentialities is by a gradual and steady climb.

In the course of making this climb, as well as during your regular periods of study, try as much as you can to keep distractions to a minimum. Even in routine mechanical jobs, where little mental concentration is required, it has been found that reducing noise increases efficiency. In work that depends on mental concentration, quietness is far more important. Make every attemt, therefore, to do your reading and studying at a time and a place that is peaceful and quiet. If you live in a barracks or if you have children, achieving the ideal situation will pose quite a problem. Still, there are a lot of things you can do to reduce noise and interruptions while you work. No matter how bad the situation is, you can improve it if you put your mind to it.

Certainly you can eliminate the distractions that you create yourself. While you generally don't think of it in that way, an uncomfortable reading position is really a distraction. Although you may not be conscious of the distress signals your cramped muscles send to your mind, they definitely reduce your efficiency. Poor lighting has a similar effect because it puts a strain on your eyes. If you want proof of the fact that muscular fatigue hurts your reading efficiency, just consider the extreme condition. Have you ever tried to study when you were "dead tired"? You either found yourself reading the page over and over without getting any meaning, or you woke up wondering why you didn't go to bed in the first place. Less fatigue has a lesser effect, but it does detract from your efficiency.

Another type of distraction that isn't generally thought of as such is internal distraction. The room may be quiet, the light perfect, your position may be most comfortable, your body in the pink of condition, and still your mind may be a million miles away from what you are reading—or it may be asleep. Internal conflicts or lack of interest can drive you—or bore you—to distraction. On the other hand, many a man who is worn out by 10 minutes of reading in perfect light can turn around and do 3 hours of close work on an airplane model in poor light without feeling the least bit tired. The point is, you have to develop a deep and genuine interest in what you are reading or the whole business is more or less a waste of time. If you approach this business of reading with a negative attitude, the scraping of a chair can be a major distraction and the reading of a single page a tiring ordeal. If, however, you

	Monday	Tuesday	Wednesday	Thursday	Friday
All 5 weeks	Eye exercises	Corrective work	Vocabulary work and check	Eye exercises	Corrective work
1st week	Purposeful reading	Word meaning test	Purposeful reading	Reading test	Purposeful reading
2nd week	Word comprehension exercises	Purposeful reading	Reading test	Purposeful reading	Word meaning test
3rd week	Purposeful reading	Reading test	Purposeful reading	Word meaning test	Purposeful reading
4th week	Reading test	Purposeful reading	Word meaning test	Purposeful reading	Reading test
5th week	Purposeful reading	Reading test	Purposeful reading	Reading test	Word meaning test

Figure 3-1. Suggested reading program.

throw yourself into it wholeheartedly, you can become oblivious to noise and discomfort.

That sounds almost like saying that noise and distraction aren't important. Have we gone around in a circle, first emphasizing quiet and comfort and then brushing it aside? Perhaps. But then the whole matter of reading works in a kind of circle. If you have trouble with your reading and do nothing about it, then it's a chore that tires you out without giving you much in return, and you avoid it as much as you can. When you do have to read something, you approach it unwillingly. Every little thing distracts you; you can't get interested in your reading. This makes you dislike reading even more, avoid it even more, and so on around the circle. On the other hand, if you work at improving your reading and develop skill in it, you read with less effort and you get more out of it. You become interested and you enjoy it. Therefore, when you read more, you get still more out of it, enjoy it more, and so on around the circle.

So, by all means, avoid distractions and discomfort, but above all, throw yourself into this reading program wholeheartedly and build up your interest in it. That's the way to get results.

Better Eye Movement

UNLESS you have defective vision, you can increase your eye span and smooth out your eye movements by proper exercise. This was demonstrated during World War II by the remarkable success of the flash method of aircraft recognition. This method, which taught aircraft recognition largely by flashing pictures of various planes on the screen for a moment, showed the surprising potentialities of the eye and mind to grasp an overall picture with an instant's exposure and to distinguish later between closely similar objects. The same principles apply to your eye span in reading.

To help you develop good eye span and eye movements, this chapter includes exercises on combinations of letters, combinations of digits, and words. It also includes tests on speeded word comprehension. At the end of the chapter, there are suggestions as to how you can readily work out any number of more advanced exercises for yourself.

GROUP LETTER AND GROUP DIGIT RECOGNITION

In each of the five eye movement exercises, figures 4-1 through 4-5, there are eight columns of groups of letters or digits. In each line, the left column contains a group of letters (or digits) which is repeated again on the same line in one of the other columns. Each of the other groups on that line is different from the one in the left column. In taking the exercise, find the group that is exactly like the one in the left column.

For example:

EREM MERE MEME EREM MEER
REME EREN EMER

As you run your eyes across the line looking for the group that is exactly like the one in the left column, be conscious of your eye movements and try to keep them smooth and regular. Avoid inwardly repeating the initial group as you proceed with the exercises. Complete each exercise as rapidly as you can without sacrificing accuracy. Go over each exercise several times, as time permits. Come back to the exercises later.

SPEEDED WORD RECOGNITION EXERCISES

The word is the basic tool for reading as it is for thought and conversation. Good reading and clear understanding require speed and accuracy in recognizing word groups. The three speeded word recognition exercises will help you develop this speed and accuracy. When you do these exercises, follow the same principles as before:

1. Try to keep your eye movements smooth and regular.
2. Avoid inwardly repeating the initial word as you proceed across the line.
3. Work as fast as you can without sacrificing accuracy.

Speeded Word Recognition Exercise No. 1

1. FANCY: finery, phantasy, fantasy, fancy, fine
2. LAYER: lawyer, layette, layer, lazy, lea
3. HALL: holt, hill, hold, door, hall
4. GOLD: robin, eagle, gold, glow, gild
5. EON: era, eon, neon, end, and
6. SPECIAL: spectator, speak, special, specific, spectacular
7. BARE: bone, barely, bear, bare, bore
8. TAKE: took, taken, token, tact, take
9. LATE: latter, late, latest, lateness, later
10. WIDE: narrow, slim, bright, wide, exact
11. EXPRESS: catch, suppress, express, pressure, text
12. CERTAIN: vague, certain, undecided, terrific, reliable
13. CLASS: class, claws, clear, clasp, clans
14. SEE: sewn, exact, rabbit, boy, see
15. DATA: connect, data, race, trick, herd
16. ODOR: ordure, seem, odor, seen, order
17. EFFECT: frank, affect, later, effect, fact
18. ANSWER: restive, elipse, answer, portion, lithe
19. UNLIKE: universal, unlike, livable, kick, usual
20. DOOR: luncheon, door, floor, stand odor

WENT	WHEN	WANT	TEND	TENT	WHNE	WENT	TOWN
MELE	MELE	LEEM	EMEL	MEEL	MALE	'TELE	NELL
FAIR	TARE	TEAR	FERE	RAIL	FAIR	'TAIR	EAIR
KEEL	KEAL	KELE	KEEL	LEEK	KAEL	LEKE	TEEL
GEAR	FEAR	TEAR	GARE	REAR	BEAR	EGAR	GEAR
SAIL	SEAL	SALE	CAIL	SIAL	ASIL	TAIL	SAIL
BAiL	BELL	BAIL	LAIB	BALE	GAIL	IBAL	LABI
ELAR	REAL	RELE	ALAR	ELAR	ELER	LEAR	R^LE
MEAT	ATEM	META	MEAT	MATE	NEAT	TEAT	TEAM
GATE	GAIT	BAIT	TAIG	GATE	RATE	TAGE	MATE
BOON	NOON	COON	BOON	BOOR	BOOM	OBON	NORM
EREM	MERE	MEME	EREM	REME	MEER	REME	EREN
TEAR	TARE	TAIR	REAR	AREA	REAT	TEAR	A'TER
DOOM	DOME	ROME	COOM	DOOR	DOMO	DOOM	OMOR
CARE	CEAR	AREC	CERA	GARE	CARE	CERE	CARL
ABEL	ABLE	ABEL	ATEL	BEAL	LEAR	BELA	EBAL
LEAR	TEAR	REAL	EARL	LAIR	LEAL	LERE	LEAR
ENER	RENE	NEER	REME	REER	ENER	EMER	ENFR
NEAL	LEAN	NEAL	LENA	NAEL	NALA	NALE	NEEL
INTO	ITON	ENTO	TOIN	NOIT	OTNI	INTO	INLO
FEEL	REEL	ELLE	FEAL	FEEL	EEEL	ALEF	FEAR
LARK	LERK	KARL	ARAK	TARK	IARK	LARK	SARK

Figure 4.1 Eye movement exercise no. 1.

RPFR	RRPF	RRFP	RPRF	RFRP	RPFR	RFPR	RPER
BAUD	BOAD	BIAD	BAUD	BUDA	BUUD	BUOD	BAUD
TROP	TROT	TROR	TROP	TRUP	TPOR	TTRO	TOPR
PIOD	PDIO	PIOB	POIB	POID	RIOD	PIOD	PIUD
REXF	REYF	RFXE	REXF	RYEF	RXEF	RFEX	REXR
WXYG	WYXG	WXYC	XWYG	XYWG	WGXY	WXYG	VXYG
RNSA	RSNA	PNSA	RNMA	RNAS	NRSA	NSRA	RNSA
AUIE	AUIE	AVIE	AIUE	AEIU	AUEI	AIVE	AIEU
CKRP	CPRK	CRKP	CKRP	CRPK	COPK	CPKR	CPOK
MNOV	MONV	MVON	MNOV	MVNO	MIVN	MVIN	MNIV
SQIX	SIQX	SXIQ	SXQI	SOXQ	SXOQ	SQIX	SOQX
YYTO	YTYO	YOTY	YOYT	YOTO	YYTO	YOOT	YTOI
FODR	FDOR	FRDO	FDRO	FODR	FIOD	FDOI	FOID
HNMS	HMNS	HSMN	HSNM	HONM	HNMS	HMON	HMNO
JKNO	JOHN	JNOK	JONK	JKNO	JNOP	JOPN	JONP
LABC	LBCA	LCBA	LABC	LOBA	LBOA	LAOB	LABO
RANE	RANE	REAN	RENA	ROEN	RNOE	RENO	REON
NHGI	NGHI	NIGH	NGIH	NIHG	NOHG	NHGI	NGOH
ITFI	ITIF	IFTI	IIFT	ITFI	IIFO	IOFI	IFOI
EFEP	EEFP	EPEF	EPFE	EPOE	EFEP	EOPE	EEOP
REDY	RDEY	RYDE	RYED	RODE	RDOE	REDY	RDEO

Figure 4.2 Eye movement exercise no. 2

1234	1432	1342	1234	1324	1243	1423	1254
4123	4132	4321	4213	4173	4312	4231	4123
8567	8657	8576	8765	8675	8756	8567	8746
9678	9715	9678	9867	9786	9768	9687	9876
6789	6789	6879	6987	6798	6897	6978	6729
6345	6354	6435	6534	6543	6345	6453	6425
4567	4756	4657	4765	4567	4767	4576	4697
2345	2435	2754	2345	2354	2453	2543	2534
3456	3546	3456	3645	3465	3564	3654	3615
7456	7465	7546	7645	7564	7654	7456	7548
1789	1798	1879	1987	1989	1983	1978	1789
5234	5324	5423	5234	5249	5243	5432	5342
8912	8912	8921	8291	8129	8219	8192	8194
1834	1348	1438	1384	1843	1834	1483	1382
1357	1537	1375	1357	1735	1736	1753	1573
8613	1875	8613	8316	8163	8631	8361	8317
3912	3219	3129	3291	3192	3921	3926	3912
4765	4657	4567	4625	4675	4765	4576	4756
7913	7931	7139	7319	7913	7139	7391	7394
2197	2781	2719	2971	2179	2791	2197	2917
8246	8426	8246	2864	8624	8642	8642	8652
3175	3175	3157	3571	3751	3517	3715	3716
5397	5379	5739	5938	5793	5397	5973	5937
1753	1735	1753	1537	1357	1573	1375	1374
8413	8314	8341	8143	8413	8431	8426	8137
5678	5678	5768	5867	5861	5876	5768	5786

Figure 4-3. Eye movement exercise no. 3.

CONDA	CONEI	COMFU	CONDA	COMBE	DENEG	COLER	DONEL
LAKEB	LAKEB	MEKAJ	KAMET	MEKAV	MAKEF	KAMEH	KELAJ
HAIRD	HAIDM	HALEC	HALOK	HELIS	HAREW	HAIRD	HAMAI
ORNAC	ORANW	ORNAR	AONRD	ONRAL	OARNR	RNARA	ORNAC
RALEE	RLEAE.	RELAV	RLLEO	RALEE	RELMA	RAELQ	RLEAB
EDACB	EDAMG	EDACB	EDDOU	EDLOP	EDAPF	EDGEN	EDIBP
BEKAQ	BKEAH	ABEKE	KABEC	KBEAT	BEKAQ	KKABG	KEBAD
KALEF	KEIAJ	KLEAI	KALEF	KLAED	LEAKS	KAELR	KEALH
DEPTR	DEPUM	DEPRL	DEPLN	DERMO	DEPAP	DERER	DEPTR
VELAM	VELAM	VALEA	LAVED	AVELG	VEALI	VLEAL	LAVEO
URVOL	UORUR	URVOL	VUORU	VORUY	UROVB	RUOVE	OOVRH
PERAB	PEARK	PREAN	RPAEQ	PRAET	PAREW	PERAB	PARBT
IMETR	MIETA	ITEMC	MEETE	TIMEG	TIEMI	ETEMR	IMETR
FIDDL	FIDEM	FIFTO	FIGHQ	FIDDL	FIEFS	FIGDU	FIGNW
MATIS	MAITY	MATIS	MTAIB	TMAID	AMITF	MTIAH	IMTAJ
TALEP	TELAL	TLAEN	TALEP	TLEAP	TLEAR	TEALR	TALMV
WHEMT	WHENA	HWENC	WNEHE	WNHEG	NEWHI	WHEMT	HNEWR
QUICU	QIUTM	QUCID	QTIQU	QIUTS	QUICU	QUTIW	QTCUY
ALADK	ADALA	LAADC	LADAE	DLAAG	DALAI	ALADK	DRALM
NAREO	NAREO	NAROQ	RENAS	ARNEU	NARDW	RONEY	ANROB
GOAHD	GOALF	GOCAH	GODFS	FOLDG	GOAHD	GOETN	GOBBP
JURIW	JIURR	JRUIT	JIURV	JURIW	JIRUY	JRIUA	JURIL

Figure 4.4 Eye movement exercise no. 4

ACONDA	ECONEI	HCOMFU	ACONDA	ACOMBE	UCENEG	CCOLEK	ADONEL
CLAKEB	CLAKEB	OMEKAJ	VKAMET	VMEKAV	UMAKEF	AKAMEH	AKELAJ
FHAIRD	KHAIDM	UHALEC	IHALOK	OHELIS	THALEW	FHAIRD	UHAMAI
JORNAC	TORANW	FONARN	FOANRD	BONARL	FOARNR	ORNARA	JORNAC
SRALEE	ERLAEA	CREALV	ORLLEO	SRALEE	TRALAM	GRAELQ	TRALEA
BEDACB	BEDAMG	BEDACB	FEDDOU	FEDELP	BEDAPF	LEDGEN	MEDIBP
ABEKAQ	IBKEAH	DABEKE	UKABEC	AKBEAT	ABEKAQ	AKKABG	IKEABO
EKALEF	KIELAJ	ILKEAI	EAKLEE	EKALEF	AKLAED	BLEAKS	EKAELR
ADEPTR	ODEPUM	IDEPRL	EDEPLN	UDERMO	IDEPAP	ODERER	ADEPTR
IVELAM	IVELAM	OVALEA	ALAVED	FAVELG	AVEALI	OVALEL	ALVAEO
MURVOL	DUORUR	MURVOL	OVUORU	IVORUY	TUROVB	PRUOVE	BURVAH
APERAB	APEARK	OPREAN	OPRAEQ	APRAET	UPAREW	APERAB	IPARTB
PIMETR	AMIETA	BITEMC	MMEETE	ATTMEG	ITTEME	BETEMR	PIMETR
EFIDDL	AFIDEM	IFIFTO	OFIGHQ	EFIDDL	EFIEFS	UFIDGU	AFIGMQ
OMATIS	AMAITY	OMATIS	AMTAIB	ATMAID	BAMITF	EMTIAH	MIMTJ
UTALEP	ATELAL	UTLAEN	UTALEP	OTLEAP	ITEALR	ETAELT	ITALMV
AWHEMT	EWHENA	UHWENC	HWNEHE	HUWENC	TWNHEG	ONEWHI	AWHEMT
IQUICU	OQUITM	IQUICD	EQUIUQ	QQIUTS	IQUICU	OQUTM	EQTCUY
BALADK	DADALA	BLAADC	FLADAE	ADLAAG	ODALAI	BALADK	UDRALM
ANAREO	ANAREO	ANAROQ	TRENAS	TARNEU	INARDW	DRONEY	DANROB
IGOAHD	IGOALF	AGOCAH	UGODFJ	OGOLDL	OLDGJ	IGOAHD	AGOETN
OJURIW	IJIURR	OJRUIT	UJIURV	OJURIW	IJIRUY	UJRIUA	IJUIRL

Figure 4.5. Eye movement exercise no. 5.

Speeded Word Recognition Exercise No. 2

1. EQUIVALENT: equivelent, equivilent, equivalent, equivulent, equivolent
2. CONCEIVE: conceave, consieve, conceive, conseave, conceve
3. DECEIVE: decieve, deceive, deceave, deceieve, deceise
4. JUXTAPOSITION: juxaposition, justaposition, juxtaposition, juxaposition, juxtaxposition
5. MALLEABLE: malleable, maleble, malabeal, maleable, maleble
6. AZIMUTH: azmuth, aizmuth, azemuth, azimuth, azmiuth
7. DUCTILITY: ducktility, ductilety, ductility, ducttility, ductility, ductilitty
8. PERMEABLE: permable, permeable, permeible, premeable, preamble
9. CASTIGATE: castegate, castigete, castigate, castrate, castrigate
10. ECSTASY: exstasy, ectasy, ecstasy, ecestracy, ectrisy
11. PRECEDENT: presedent, precadent, precedent, presadent, presdent
12. UNEQUIVOCAL: unequivocel, unequivacal, unequivical, unequivocal, unequivocul
13. APPEASEMENT: appeasment, appeacement, apeasement, appeasement, apeacement
14. AGGRANDIZEMENT: aggrandizment, aggrandizement, agrandizement, aggrundizement, aggradizement
15. ASSOCIATE: asociate, assoceate, associatte, associate, asociatte
16. RETALIATE: reatiliate, retaleate, retaliate, reteliate, retiliate
17. EXEMPLIFY: exemplefy, exemplify, exemplefye, exemplafy, eximplify
18. PHRENISECTOMY: phrenictomy, phrenesectomy, phrenesictomy, phrenisectomy, phrenasictomy
19. APOLOGIZE: appologize, apologise, apollogize, apologize, appologice
20. ACCOMMODATE: acommodate, accommodate, acomodate, accomodate, accammodate

Speeded Word Recognition Exercise No. 3

1. FACE: fece, fact, face, fuce, fase
2. DATA: deta, data, datum, delta, duta
3. OSTENSIBLE: ostensable, ostenseible, ostensuble, ostensible, ostionible
4. ARTIFACT: arftafact, artfact, artifact, artfict, aretefact
5. BUILD: build, biuld, built, biult, bilt
6. CAJOLE: cajel, cajul, cajole, cojol, cajal
7. AFFECT: afect, effect, affict, affect, afict
8. MORES: moores, morees, mores, mors, morres
9. COMPUTE: compute, compote, compuke, comute, compete
10. EXPLICATE: esplicate, explacate, explicate, explecete, explicit
11. FEASIBLE: feasable, fees ble, feasible, fezible, feassible
12. OSTRACIZE: octrasize, ostrasize, ostracize, ostracise, ostradise
13. EULOGY: eulogie, eulogy, ulogy, eulogie, eulagy
14. PRETENSE: pretence, pretance, pretense, pretince, pretinse
15. ERGO: erga, ergoe, ergo, ergu, ergi
16. SCIATIC: scratic, scietic, sciatic, sciatec, sciotic
17. RECEIVE: reseive, receive, receave, receise, receipt
18. CONFERRED: confered, conferrd, conferrred, conferred, confered
19. NECESSARY: neccesary, necessary, neccessary, necesary, nesessary
20. ENUCLEATE: enacliate, inuclete, inucleate, enucleate, eneucleate

SPEEDED WORD MEANING TESTS

Below are three speeded word meaning tests. These tests are similar in a sense to the speeded word recognition exercises but are considerably more difficult in that they involve a full understanding of the meaning of the word at the left. Follow the same procedure as in the speeded word recognition exercises, again trying to keep your eye movement smooth, avoid inward repetition of the words, and proceed as rapidly as possible.

For each test, however, list numbers 1 through 20 on a separate paper and, as you take the test, write the letter identifying the word that means the same as the first word in each line. Keep a record of your time on each test. Grade your paper by referring to the related Key.

Speeded Word Meaning Test No. 1

1. ACQUIT: (a) free from accusation, (b) depart, (c) obtain, (d) indict, (e) obligate
2. BELONGINGS: (a) baggage, (b) clothing, (c) utensils, (d) possessions, (e) merchandise
3. CLINIC: (a) meeting place, (b) observatory, (c) place for treatment, (d) operating room, (e) laboratory
4. DEPENDENT: (a) supporting, (b) relying on another, (c) unhappy, (d) unwanted, (e) reckless
5. DROUGHT: (a) a medicine, (b) long dry spell, (c) a drink, (d) unsettled weather, (e) thirst
6. EXTENDED: (a) completed, (b) refinished, (c) made visible, (d) helped, (e) prolonged
7. FACILITATE: (a) prepare, (b) plan, (c) make easier, (d) order, (e) make happier
8. HEEDLESS: (a) worthless, (b) lazy, (c) spontaneous, (d) careless, (e) slow
9. HYGIENIC: (a) healthful, (b) antiseptic, (c) living, (d) moist, (e) helpful
10. INSURRECTION: (a) fight, (b) counter-revolution, (c) rebellion, (d) espionage, (e) raid

11. NUTRITION: (a) growth, (b) training, (c) upbringing, (d) flavor, (e) nourishment
12. ODIOUS: (a) smelly, (b) disgraceful, (c) evil, (d) unusual, (e) hateful
13. PRECEPT: (a) concept, (b) command or principle, (c) statement, (d) keyword, (e) idea
14. RUDDER: (a) accelerator, (b) directional control, (c) robot, (d) signal, (e) altitude regulator
15. STABILITY: (a) unchangeableness, (b) abstractness, (c) resistance, (d) correctness, (e) softness.
16. TRANQUILITY: (a) recreation, (b) sleepiness, (c) reluctance, (d) calmness, (e) solitude
17. TURBULENT: (a) muddy, (b) tubular, (c) turning, (d) soothing, (e) tempestous
18. VICTUALS: (a) vitamins, (b) supplies, (c) food, (d) victims, (e) victors
19. WORKMANSHIP: (a) craftsmanship, (b) appearance, (c) technology, (d) invention, (e) capability
20. ZEALOUS: (a) anxious, (b) eager, (c) envious, (d) ready, (e) demanding

Check your answers agains the Key at the end of the pamphlet and keep a record of your score.

Speeded Word Meaning Test No. 2

1. ABNORMAL: (a) slightly above average, (b) subhuman, (c) unequal, (d) not normal, (e) not allowed
2. CONSCIENTIOUS: (a) conscious, (b) concerned, (c) careful, (d) slow, (e) eager
3. CUSTODY: (a) arrest, (b) charge and control, (c) imprisonment, (d) parole, (e) requirement
4. EMBLEM: (a) photograph, (b) ornament, (c) curio, (d) medal, (e) symbolic device
5. EQUITY: (a) claim, (b) lien, (c) justice, (d) legality, (e) mercy
6. FISCAL: (a) annual, (b) taxable, (c) financial, (d) political, (e) profitable
7. GUARANTY: (a) pledge, (b) consent, (c) deposit, (d) repayment, (e) demand
8. ILLEGAL: (a) adjudged, (b) illegible, (c) unlawful, (d) unprotected, (e) unfavorable
9. INSTINCTIVE: (a) reasonable, (b) conscious, (c) learned, (d) spontaneous, (e) stimulating
10. LATERAL: (a) backward, (b) to the side, (c) forward, (d) from above, (c) upward
11. MANDATE: (a) command, (b) instruction, (c) report, (d) resume, (e) mandible
12. NARCOTIC: (a) mind-expanding, (b) hypnotic, (c) stimulating, (d) injurious, (e) numbing
13. PENSIVE: (a) eager, (b) melancholy, (c) dangling, (d) five-sided, (e) agreeable
14. PERSEVERE: (a) repeat, (b) encourage, (c) very severe, (d) try, (e) persist
15. POSTURE: (a) place, (b) feeling, (c) resemblance, (d) position, (e) physique
16. SENTRY: (a) guard, (b) sanctuary, (c) box, (d) agent, (e) policeman
17. SUBSIST: (a) subvert, (b) subserve, (c) develop, (d) live, (e) remain
18. SUPERVISE: (a) perform, (b) consult, (c) order, (d) plan, (e) superintend
19. TRANSMISSION: (a) receiving, (b) sending, (c) differential, (d) propeller, (e) changing
20. UNIFORM: (a) not varying, (b) firm, (c) smooth, (d) united, (e) not formed.

Check against the Key and record your score.

Speeded Word Meaning Test No. 3

1. ABSTAIN: (a) prevent, (b) separate, (c) allow, (d) maintain, (e) refrain
2. ANONYMOUS: (a) unavailable, (b) unnamed, (c) immaterial, (d) abnormal, (e) irregular
3. CALORIE: (a) food, (b) carbohydrate, (c) heat unit, (d) protein, (e) glucose
4. COMMEND: (a) commence, (b) commit, (c) repair, (d) praise, (e) command
5. COORDINATE: (a) harmonize, (b) pass over, (c) join, (d) develop, (e) choose
6. DEXTERITY: (a) skill, (b) correctness, (c) rotation, (d) malignancy, (e) dextrose
7. EMPHATIC: (a) loud, (b) forceful, (c) sympathetic, (d) ecstatic, (e) taut
8. FISSION: (a) fusion, (b) friction, (c) combining, (d) dissension, (e) splitting up
9. INCESSANTLY: (a) immediately, (b) quietly, (c) now and then, (d) continually, (e) happily
10. INITIATE: (a) learn, (b) research, (c) receive, (d) start, (e) promote
11. MUNITION: (a) defense, (b) rampart, (c) war material, (d) cache, (e) outpost
12. NEGLIGIBLE: (a) disregarded, (b) negotiable, (c) nonchalent, (d) tiny, (e) trifling
13. PIVOT: (a) turn, (b) move, (c) wobble, (d) post, (e) incline
14. PROPEL: (a) turn, (b) explode, (c) push, (d) bump, (e) twist
15. RECONCILE: (a) settle, (b) amend, (c) coerce, (d) convince, (e) prove
16. STEALTHILY: (a) quickly, (b) secretly, (c) easily, (d) openly, (e) deliberately
17. STOW: (a) boat, (b) load, (c) steer, (d) turn, (e) move
18. SUPERSEDE: (a) recede, (b) accede, (c) superimpose, (d) update, (e) replace
19. TERMINATION: (a) terminator, (b) climax, (c) end, (d) summation, (e) recapitulation
20. ZENITH: (a) horizon, (b) nadir, (c) lowest point, (d) highest point, (e) mid-point

Check against the Key and record your score.

YOUR OWN EXERCISES

Besides these ready-made exercises and tests, there is a limitless number of exercises you can devise for

yourself. For one thing, you can take a piece of cardboard and cut out a slot in it as shown in figure 4-6. You can then put it over a page in a printed book and slide it quickly over a line of print so that it first reveals a group of letters then covers it up. Have a piece of paper and a pencil alongside; and as soon as the letters are covered up, write down the group of letters as you remember it. Then slide the cardboard down another line to reveal and then cover up another group of letters. Write down this group as you remember it. Meanwhile, sliding the card down has left the first group revealed, and you can check the accuracy of what you wrote down for it. A single printed page can thus give you twenty or more groups in a row. Incidentally, it will take a little practice in sliding the card before you can do it just right.

By increasing the speed at which you slide the slot over the line, you can reduce the fixation time and can make the exercises harder as you broaden your eye span. Don't be discouraged if at first you can't grasp all the letters in a group. Keep on working, and you'll be surprised at how well you'll be able to grasp a group of seven or eight letters with only a momentary glance. This simple exercise will give you as much practice in eye span as you want. Every time you want another exercise, just turn the page.

It's a flexible kind of exercise, too. Not only can you vary the fixation time by changing the speed at which you slide the card, but you can also vary the size of the group of letters by using another piece of cardboard with a bigger slot. In fact, you can increase the width of the slot until it covers a group of words instead of a group of letters. Thus, this readily constructed exercise gives you as broad a range as you can possibly want, both as to time of fixation and breadth of eye span.

There is one disadvantage to this system, however. When you get the slot very wide, you'll often find incomplete words at either end of it. At the left end of the slot you may see only the tail end of a word, while at the right end of the slot you may see only the front end of a word.

An easy-to-make system of eye-span exercises that overcomes this difficulty is the flashcard system. To set it up, you simply get a batch of cards and on each one handprint a group of letters, a word, or a group of words. (See figure 4-7). When you first start, make a set of twenty cards, each with five letters or digits printed on it. Later, when you can grasp the five-letter groups easily, make a batch of cards with six letters or digits. Still later, you can make sets with word groups. The best way to practice with these cards is to have a friend flash them before you one by one, exposing each for a fraction of a second. After each card is flashed, write down the letters as you remember them. After the whole set is flashed, you can compare your answers with the cards. This system, too, is flexible, for you can reduce fixation time by increasing the speed with which the

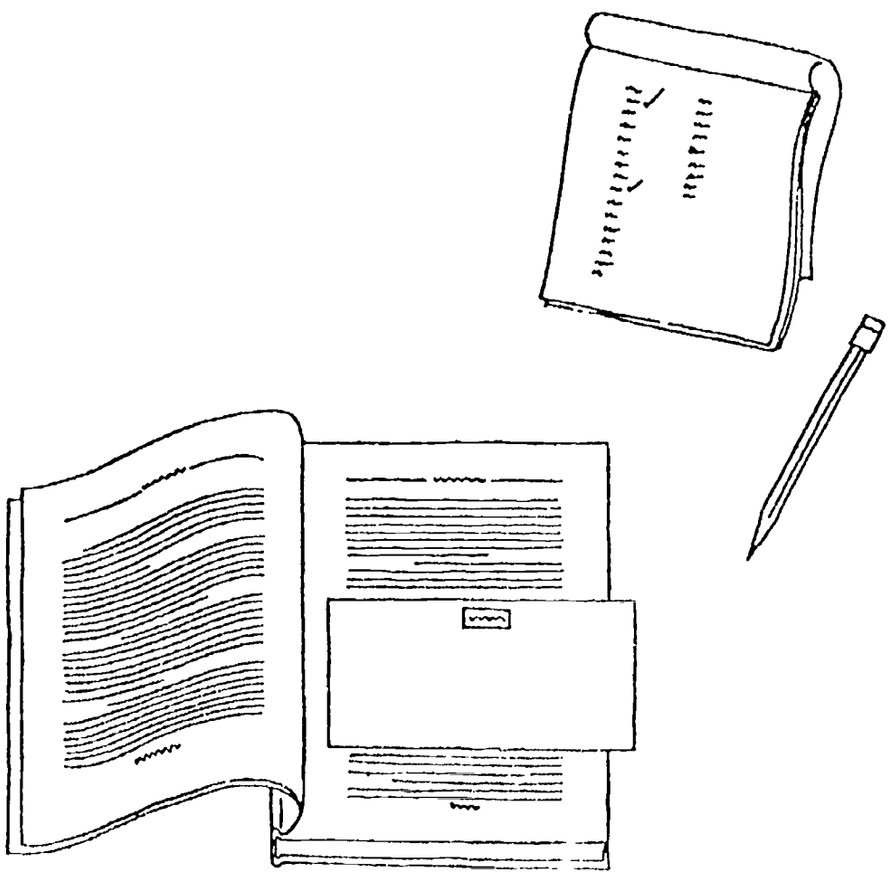


Figure 4-6. Eye span exercise.

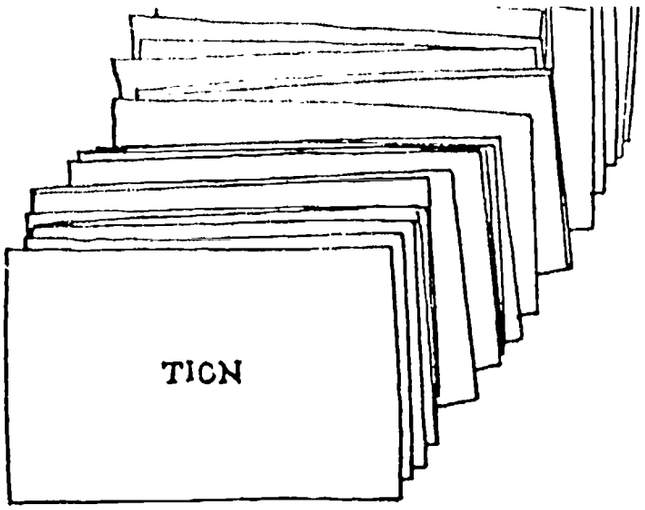


Figure 4-7. Flash cards.

card is flashed, and you can increase eye-span difficulty by increasing the number of letters or words on each card.

By conscientious use of the exercise described here, you can make a significant increase in your eye span. You can build up your word power by following the vocabulary suggestions in the next chapter. These two kinds of growth will in themselves make your reading faster and smoother.

There is still another way, though, to smooth out and speed up your eye movements. This involves awareness of regressions and slowness in all your reading, especially the purposeful reading described in Chapter 6. Don't let your eyes regress. Make them keep moving forward across the lines. At the same time, push yourself to read faster and faster. Don't go so fast that you don't know what you're reading. But do try to go a little faster than you think you can. Continuous effort along this line will gradually get you into the habit of reading by phrases instead of by single words. You'll get tired quickly at first, just as you do when you first start conditioning yourself for a race. As you get into condition, however, you'll find it takes less and less effort.

More Word Power

WORDS carry most of our thoughts and ideas. Sometimes words fail us, but most of the time we convey our knowledge and our feelings to others by words. That's one of the reasons why we are superior to animals. We can learn not only from our own individual experiences but also from the experiences many others tell us about. In that way, we can considerably expand our knowledge and understanding. Still, transfer of knowledge by the spoken word is limited because we can't talk with all the wise people and experts in the world. Besides, we may forget what we hear and have no easy way of checking on it. That's where the written word comes in.

If thoughts and ideas are recorded in books, then they are available even when the person who conceived them is far away or dead. By reading, we gather all the accumulated knowledge of all the generations all over the world—if we know the words. Another thing—we don't use words only when we want to convey our thoughts to others. We use them even to work things out in our own minds. Observe yourself while you are thinking, and you'll find that your thinking generally consists of words or groups of words.

Words, then, represent facts, observations, principles, and feelings. The more words we learn and the better we understand those we already know, the easier it is to receive the knowledge, experiences, and thoughts of others, and the more clearly we are able to think ourselves. So far as reading goes, greater knowledge of words means greater speed and better understanding. If we know the word well, it is an old friend whom we can immediately recognize by the briefest glimpse. We don't have to look back several times and wonder, "Who's that? Did I meet him somewhere?"

Build up your vocabulary, then. You'll read faster and comprehend more fully. You won't have to refer several times to any word, and you won't have to re-read the sentence repeatedly, wondering, "What does that mean?" To paraphrase an Air Force slogan, word power is reading power and understanding power.

One of the first steps in building word power is to rival Noah Webster on a smaller scale, that is, to compose a small dictionary of all new words—words that are new to *you*. A looseleaf notebook will serve the purpose. It should contain the word, the dictionary definition, and your use of the word in the sentence—something like this:

Word	Definition	Usage
dec'i.mate	to kill one out of every ten persons of; to kill a large proportion of; especially applied to a body from whom the victims were selected by lot.	Bubonic plague more than decimated the villages.

As your list increases, it will be a good idea for you to arrange the words in alphabetical order. You can use the same procedure with a slight revision; that is, you can make up an index card file with the information for each separate word on a card. *Example:*

SA.GA.'CIOUS —able to discern and distinguish with wise perception. —showing keenness and wisdom.
EX. He was too sagacious to be deceived by anyone, even by himself.

Another device that will expand your "vocabulary waistline" is recognition of the parts of a word. If you know what certain beginnings (prefixes) and endings (suffixes) mean, you can determine the meaning of words more easily. Here are a few examples:

Prefixes

ante--before	antedate to have occured before a later date, or time.
circum -around	circumlocution—an indirect or roundabout expression.
extra -outside, beyond	extracurricular not part of the regular course of study; beyond the prescribed activities.
hyper over, above, above measure	hypercritical--too critical
in—not	incontrollable inept--not suitable
in—very much so (an intensive)	inflammable—exceedingly burnable (confusion with the other "in-" meaning "not" has led to the more usual "flammable.")
mis--badly, poorly	misplace—to put in a wrong place.
over—over, excessively	overload, overreact
super- above, over, above in position or extent	superstructure—any part of a structure in relation to the parts on which it rests. supercharger, superintendent
tele--from a distance	television, telephone, telephoto, teletypewriter
ultra -beyond	ultrasonic—beyond sound ultraviolet—lying just beyond the violet end of visible light.

Suffixes

-able—able, likely	capable, likable
-cy—state, condition	accuracy, captaincy
-dom—state, condition	freedom, wisdom
-er—doer, maker	writer hunter, seeker
-ette—little, feminine	statuette, parkerette
-ish--characteristic of, somewhat	Spanish, amateurish, bluish
-less without	homeless, friendless
ment condition	punishment, involvement
-or doer	inventor, juror
-or quality, condition	horror, honor
ward in the direction named	homeward, backward

Build up this list further as you go along. You'll find it pays.

Closely related to this prefix-suffix search is the seeking out of word roots. That, too, pays. For example, a word in Latin or in Greek may be the great-grandfather of a group of words that we use in our 20th century Air Force. *Example:*

Roots

aer- aero- Greek Air
aerate—make air circulate through aerial—of the air, high up, antenna aerobatics—spectacular feats in flying aerobic—able to grow and live only in the presence of oxygen aeronautics—the science or art of flying an airplane aerosol—colloidal particles in a gas, as the air aerospace--the earth's atmosphere and the space outside it, considered as continuous aeroplane—airplane aerostat--a dirigible, balloon, or other lighter-than-air craft
-graph Greek Writing
biography—"life" or "living" plus graphy photograph—"light" plus graph electrocardiograph—"electric" plus "heart" plus graph geography—"earth" plus graphy bibliography—"book(s)" plus graphy paragraph literally, "beyond or beside the writing," as a marginal note to indicate a paragraph mimeograph—"imitate" plus graph stenographer—"narrow, small," plus grapher. One who writes shorthand heliograph—"sun" plus graph. It has several meanings, one of which is an instrument to send messages by flashing the sun's rays from a mirror.

People speak of "using the dictionary," or "looking it up in the dictionary," as though there were only one, although everyone knows there are several. There are "desk-sized" dictionaries and there are larger ones. Most dictionaries are excellent, but they are not all the same. They take different approaches. Do you know, for example, that in some dictionaries the first meaning is the oldest meaning and in other dictionaries it is the most common meaning, possibly the latest? Do you know that dictionaries vary in the symbols used to show pronunciation? What is important is to become thoroughly familiar with the dictionary that you are using, and what is more important is to get the dictionary habit – to use a dictionary often. You cannot only look up the meaning of words new to you but also the meaning of words you already know. You will probably learn something new either way. Did you know that you can also look up separate word parts, such as prefixes?

What, then, are the things you can find in a dictionary? We have already mentioned some of them. First is spelling, including the division of the word into syllables. Of course, if you don't know how to spell the

word, especially the first of it, you may have trouble finding it. Next usually comes respelling for pronunciation with symbols to indicate the various sounds. You don't need to memorize the symbols, but learn to use the key at the bottom of the page. Are there two or three pronunciations? The first may be the one most frequently used, but you cannot tell by looking whether the first one has more users than the second, or whether the two are about equal in number of users. If a pronunciation is listed, it is a good one.

Next you will find an abbreviation for the part of speech; then, the various inflected, or different, forms of the word, especially if they are irregular, such as "go, went, gone, going." You may say, "But I already know these." But what about the word "unhappy"? Do you say unhappiest" or "most unhappy"? Do you say "oftener" or "more often"? (Either, for the last example.)

Now, or possibly later, depending on the particular dictionary, comes the origin of the word. Is it from OE (Old English), as "home"? Is it from Gr (Greek), as "photograph"? Is it from Arabic through Latin, as "alcohol"? English has borrowed words from many languages.

Next you will find what people usually think of as the primary reason for using a dictionary—meanings, or definitions. There may be one meaning or several. If the word can be used as different parts of speech, these will be distinctively shown with definitions for each. You can add to your vocabulary by learning the other meanings of words: *Example:*

	As a Verb	*As a Noun*
case	to cover with a case	1. state of things 2. event 3. example 4. a case of action in law, a suit 5. state of circumstances 6. form of a noun or pronoun in relation to other words 7. a peculiar person

A dictionary also gives you common phrases which the word is a part of, words with similar meanings (synonyms), and words with opposite meanings (antonyms). When you're looking for a word, it is worth the trouble to shop around and choose the one that has just the right shade of meaning that you want. *Example:*

	Synonyms
discord	want of harmony plus a positive clashing which manifests itself in personal relations by quarreling and antagonism.
strife	throws the emphasis on a struggle for superiority rather than on the incompatibility of the persons that disagree.
conflict	implies a clashing and a struggle; stresses the process, connoting an uncertainty of outcome.
dissension	lays greater stress on a breach between persons and parties.

You often have some idea of the meaning of a new word that you find in a sentence. How it is used in the sentence—its context—is a clue to the meaning.

Of course, it's pretty hard to follow a policy of just looking up words for their own sake. The best way to increase your vocabulary is to tie it up with something meaningful, such as the reading program described in Chapter 3. In the course of this program and all other reading and study that you do, you'll probably run across many words you are not sure of. Follow through on these words by making up a dictionary card for them and by looking up their pronunciation, origin, meanings, and synonyms. In particular, record meanings. If you keep this up as you continue your reading and broaden your interest, you'll develop real word power. The dictionary habit will improve your reading as it widens your perspective and increases your understanding.

Meanwhile, to help you check your present status, here are three vocabulary tests. There are more in Chapters 6 and 7. The tests are more difficult than the speeded word meaning tests in Chapter 4. The directions for taking the tests are clear, but here is a suggestion for following them up. After you check your answers against the key, look up the words you missed, make a dictionary card for them, and use them frequently, at least for a while. Words, like money, give the most pleasure and serve their best purpose when they are well used. In the vocabulary tests each word has one correct answer, or meaning. In a dictionary, you will find that most words have more than one meaning.

VOCABULARY TESTS

For each of the vocabulary tests, list the numbers 1 through 20 on a sheet of paper. After the number, write the letter identifying the word that means the same as the identifying first word in each line. Always work rapidly.

Vocabulary Test No. 1

1. ACCELERATE: (a) supply air, (b) speed up, (c) stir up, (d) spin, (e) take off
2. BY-PRODUCT: (a) cheap product, (b) substitute, (c) main product, (d) secondary product, (e) blow-off
3. COMBATANT: (a) spy, (b) one that combs, (c) attendant, (d) official, (e) fighter
4. CONCEPT: (a) rule, (b) plan, (c) pregnancy, (d) development, (e) idea
5. COUNTERREVOLUTION: (a) a revolution against a revolution, (b) a revolution against a government, (c) turning clockwise, (d) turning counterclockwise, (e) insurgency
6. DECONTAMINATE: (a) make dirty, (b) pour out, (c) become radioactive, (d) make clean, (e) terminate

7. DISSIPATE: (a) to wander, (b) to spend, (c) to forgive, (d) to dissimulate, (e) to waste away

8. ESPOUSE: (a) ex-wife, (b) change, (c) sponsor, (d) partner, (e) telepathy

9. GRAPHIC: (a) seen, (b) unusual, (c) symbolic, (d) vivid, (e) like a grid

10. IMPETUS: (a) stimulus, (b) reaction, (c) devil, (d) mass, (e) motion

11. INFLAMMABLE: (a) not burnable, (b) vigilant, (c) flammable, (d) hot, (e) flaming

12. INSURGENT: (a) rebel, (b) supporter, (c) belligerent, (d) enemy, (e) resurgent

13. MANEUVER: (a) attack, (b) pretend, (c) plan, (d) extend, (e) manipulate

14. MILITANT: (a) leading, (b) aggressive, (c) military, (d) demanding, (e) counterinsurgent

15. PHYSIQUE: (a) facial expression, (b) strength, (c) bodily makeup, (d) endurance, (e) medicine

16. RECIPROCAL: (a) turning, (b) unknown, (c) shared by both sides, (d) one-sided, (e) repeating

17. RENDEZVOUS: (a) place of departure, (b) appointed meeting, (c) French food, (d) restaurant, (e) true love

18. RHUBARB: (a) dessert, (b) agreement, (c) fruit, (d) controversy, (e) pie

19. TRANSCONTINENTAL: (a) on the land, (b) above the continent, (c) through the air, (d) between continents, (e) across the continent

20. VIGILANT: (a) watchful, (b) strong, (c) lively, (d) friendly, (e) vigorous

Vocabulary Test No. 2

1. AMPLE: (a) limited, (b) small, (c) spacious, (d) awful, (e) meager

2. INFLEXIBLE: (a) sure, (b) turgid, (c) contorted, (d) elastic, (e) fixed

3. NULLIFY: (a) validate, (b) negate, (c) agree, (d) nullify, (e) rectify

4. LANGUID: (a) chipper, (b) long, (c) liquid, (d) listless, (e) energetic

5. SPORT: (a) team, (b) fine, (c) ennui, (d) safety, (e) amusement

6. CONSENT: (a) permission, (b) assume, (c) practice, (d) such, (e) derive

7. SHY: (a) frank, (b) frighten, (c) modest, (d) unusual, (e) insecure

8. STRATEGEM: (a) attempt, (b) attack, (c) strait, (d) plot, (e) air

9. TOUGH: (a) light, (b) dark, (c) sturdy, (d) fragile, (e) elastic

10. QUICKLY: (a) promptly, (b) sluggishly, (c) early, (d) lately, (e) rightly

11. EXPENSIVE: (a) expansive, (b) costly, (c) wide, (d) faraway, (e) cheap

12. DESPISE: (a) loathe, (b) deter, (c) determine, (d) esteem, (e) defer

13. NEGLECT: (a) negotiate, (b) need, (c) disregard, (d) negate, (e) number

14. LODGE: (a) augment, (b) reside, (c) build, (d) raze, (e) allow

15. POSSESS: (a) lose, (b) loose, (c) post, (d) attract, (e) own

16. DIALECT: (a) duality, (b) laxity, (c) language, (d) thought, (e) concept

17. VITAL: (a) dead, (b) immobile, (c) indispensable, (d) needless, (e) violated

18. FRAGMENT: (a) part, (b) whole, (c) arc, (d) square, (e) memory

19. CONTINUE: (a) contain, (b) retinue, (c) desist, (d) persist, (e) contive

20. COMMENCE: (a) terminate, (b) comment, (c) command, (d) commit, (e) initiate

Vocabulary Test No. 3

1. PROTOCOL: (a) petrol, (b) procedure, (c) emphasis, (d) element

2. PREJUDICE: (a) feeling, (b) idea, (c) bias, (d) concept

3. INHERENT: (a) extraneous, (b) extrinsic, (c) intrinsic, (d) incidental

4. EMBRACE: (a) decline, (b) spurn, (c) adopt, (d) subsume

5. COMPLAISANT: (a) perverse, (b) disagreeable, (c) frigid, (d) affable

6. ARROGATE: (a) aggravate, (b) renounce, (c) yield, (d) usurp

7. COGNIZANT: (a) anesthetic, (b) oblivious, (c) aware, (d) ignoring

8. GRAVE: (a) austere, (b) volatile, (c) vain, (d) nugatory

9. MISANTHROPIC: (a) philanthropic, (b) benevolent, (c) pessimistic, (d) humane

10. NEGLIGENT: (a) rigid, (b) attentive, (c) strict, (d) heedless

11. PESSIMISTIC: (a) optimistic, (b) cynical, (c) sanguine, (d) assured

12. PLEAD: (a) confer, (b) vouchsafe, (c) supplicate, (d) accord

13. PROMISCUOUS: (a) discerning, (b) discreet, (c) prudent, (d) indiscriminate

14. FRUGAL: (a) wasteful, (b) profuse, (c) lavish, (d) thrifty

15. MALIGN: (a) defend, (b) extol, (c) defame, (d) praise

16. PARSIMONIOUS: (a) profuse, (b) lavish, (c) generous, (d) frugal

17. PRAISE: (a) vilify, (b) defame, (c) exalt, (d) slander

18. BOISTEROUS: (a) tranquil, (b) sedate, (c) vociferous, (d) still

19. DILAPIDATED: (a) rejuvenated, (b) disintegrated, (c) repaired, (d) restored

20. MEEK: (a) arrogant, (b) spunky, (c) contumacious, (d) lowly

Check again the Key and record your score.

Purposeful Reading

THE PURPOSE of reading is to get the idea that the writer tries to convey. Any part of the idea that you miss represents a loss as sad as money bet on a horse that came in last. Sadder, in fact, because you may worry about the loss of the bet and be wiser the next time. In reading, you may never be the wiser. This chapter is included to help you avoid reading losses.

One of the basic reasons for reading loss is the lack of an incentive—that is, lack of purpose or direction. A man wandering about in a snowstorm or otherwise without sense of direction will travel in circles. That holds true also for a man who reads aimlessly. He goes through a lot of motions but he gets nowhere.

The solution is obvious. When you read, read for a purpose. Tie your reading to your work, your hobby, or your personal life. If there is no real connection there and you still feel you ought to read the material, set it up as a challenge—a mental contest between yourself and the author. If you agree with his or her principles, read the material with the idea of checking his or her points and seeing if you can add more and stronger points. If you disagree, check his or her points for contradictions, weaknesses, and errors.

Another basic cause of reading loss is failure to adapt yourself to the author's style. When you have an opponent—or a partner—in a tennis match or a bridge game, you try to figure out his style and play accordingly. You have to do the same in reading. In spite of the emphasis placed on words in the last chapter, there is more to reading than just absorbing words. Often, you have to read between the lines to get the author's idea. For example, does he or she mean exactly what he or she says, or is he or she being ironic? To get a feeling of the author's style, it's well to notice how he makes his statements, marhsals his facts, and presents conclusions. Does he or she arrange the facts in a time sequence? In the order of their importance? Or according to how much of an impression they make? Does he or she proceed from the specific to the general in his or her discussions, or vice versa? You can answer these questions by approaching your reading alertly and going through it observantly.

A good way to attack an article or a book is to give it a once-over first. Glance at the paragraph headings and make a quick check to see how the entire passage relates to these headings. Notice clues such as words in italics or boldface type. Observe any footnotes that give explanations and references. Watch out for definitions. Chances are that carefully defined terms are key items in the discussion. Look for pictorial or graphic illustrations. Be alert for quotations. Such a once-over will give you a sort of framework into which you can fit individual items as you read them.

When you actually start reading the material, keep on asking yourself, "What is the most important idea the author is trying to present?" Search for the important points, for they represent the core and the real substance of the material you have before you.

Important ideas stand out in a variety of ways. They may be so placed that their importance is pointed up by their location.

Introductory and opening sentences give you a key to those points.

CAPITALIZED or *italicized* words are used to draw attention. Here are words the author wants you to remember.

Very often authors will pose a question at the outset. This question will focus attention on the main point of the article.

By giving special attention to the main points, you help yourself remember the supplemental information—the stories and examples that are put in to support these main points—because they provide a connection to tie the supplemental information together. Sometimes the author will help you by including a summary paragraph or sentence that ties together all the loose threads of the discussion. Read this summary carefully.

However, regardless of whether the author summarizes or doesn't, it's a good idea to summarize for yourself after you have read the material rapidly. You can do this orally or you can put it in writing in your own language. Put only the essential ideas into the summary; don't go too much into detail. If you have special reason to remember the material well—for example, if you are studying for an exam—the next step is review. This is also a form of summary because it involves a quick going over of the information with particular concentration on points that have to be remembered. By the way, one good way of fixing a passage firmly in your mind is relating it as closely as possible to your own personal experience.

Marking up a book is another form of preparing a summary and a guide for further study. Of course, if the book is not your own, you have to keep your notes elsewhere. But if it is yours, never hesitate to write in

marginal notes. Underline or circle information that will be useful reference for you at a later date. Don't do this, though, during your first reading because the pencil work will interfere with the reading continuity. Read it once first and get the whole picture. Then, when you go through it again, underlining and marking, you have a much better conception of what the important points are.

As a mechanical aid to this process, you will find the following checklist useful. It will give you the same kind of guidance as did the checklist you used in diagnosing your reading ability. In answering the questions in the checklist as you read, you will make clear to yourself in orderly fashion just what the important ideas are and how they are handled by the author. After you have used the checklist a number of times, you won't have to refer to it because you'll be asking yourself these questions automatically.

CHECKLIST TO GET MAIN IDEAS

Of what significance are the terms in the title?
Does the title define the subject matter that follows?
Does the author define certain terms? Why?
What are other key terms?
What terms or phrases reoccur?
What is the main topic of each paragraph?
How does each paragraph further the discussion?
How does the author arrange his material?

PURPOSEFUL READING

An airplane design is tested not on the engineer's drawing board but in the air. Similarly, the test of all the various skills and techniques that have been pointed out to you is in your actual reading of articles and books. kGood eye rhythm and a broad eye span are essential for reading efficiency, but they are only a means to an end. Reading is more than transferring from the printed page to your mind the wriggly marks that constitute letters an' words. Word knowledge, too, is something you can't get along without. But reading is more than picking up word after word. Reading is picking up ideas, sorting them, weighing them, and then throwing away the useless and saving the good. *The whole purpose of this pamphlet, therefore, is to help you pick up the thoughts and ideas in your reading faster and more efficiently.* That purpose is carried out in full in those periods when you read various articles and books. That's why this set of exercises has been entitled "Purposeful Reading."

It doesn't matter exactly what magazine or books you read just so long as they have a purpose and a meaning for you. Of course, it is best if you start off with simpler, easier-to-understand material in your first purposeful reading periods and gradually move on to more and more difficult material in later periods. But even that is not absolutely necessary.

When you're doing your purposeful reading, follow through all the principles and techniques explained previously in this manual. Be conscious of your eye movements, and don't let your eyes regress. If you run across material that you don't understand, don't go back to parts of the sentence in fragmentary fasion. Reread the whole sentence several times if necessary, until you understand it. If there are words you don't fully understand, follow the dictionary card procedure explained in Chapter 5. Be especially forceful in pushing yourself to read the very fastest you can without losing comprehension.

Above all, however, make comprehension your primary objective. If possible, work together with a friend and let him figure out comprehension questions to ask you when you have finished a significant part of a book or an article. If you have to work by yourself, write a summary when you are through and then compare your summary with the original article to see what you missed or got wrong. In either case, make a strong effort to find out exactly where you fell down—if you did—and restate your comment or summary. Except for the fact that you don't actually time yourself, this is the same kind of exercise that you get in the speeded comprehension tests, which are resumed below. When you are ready, record the time and begin Test 7a.

Speeded Comprehension Test No. 7a

PLATFORM FOR INVASION*

When I learned at the press conference that stories of this kind were on the censored list I at once revoked the order and told the pressman to write as they pleased—urging them only n ot to lose their perspective. To my astonishment, several reporters spoke up to ask me to retain the ban, giving me a number of arguments in support of their recommendations. They said that troublemakers would exaggerate the importance of the incidents and that the reports taken up at home would cause domestic dissension. I thanked them but stuck to my point, with the result that little real excitement was ever caused by ensuing stories. It was a lesson I tried always to remember.

Progress in these matters of administration, preparation, training, planning, had to go forwrd simultaneously. An early deficiency in our wartime Army involved a dismaying lack of comprehension on the part of our soldiers as to fundamental causes of the war. Differences between democracy and totalitarianism were matters of academic rather than personal interst; soldiers saw no apparent reason why conflict between the two was any concern of America. No matter what

*From *Crusade in Europe*, by Dwight D. Eisenhower. Copyright 1958 by Doubleday & Co., Inc. Reprinted by permission of the publisher.

clash of opinion had existed on the point before the war began, a clear, simkple, and commonly held understanding was now essential among our troops. An attendant deficiency was a similar lack of comprehension as to the need for battle discipline and for incessant training in teamwork and in the employment of weapons.

Both subjects evoked frequent comment by observant press representatives. The matter could not be dismissed—as some commanders tried to do—with the complacent statement that all of this came about because the troops were not yet "blooded." There always has existed a curious notion that instant perfection i these matters comes about with the first whistle of a hostile bullet. Admittedly there are certain things to be learned from battle experience that can be absorbed in no other way. On the other hand, any commander who permits a unit to enter battle lacking any advantage, any needed instruction, or any useful understanding that could be imparted to that unit beforehand, is guilty of a grave crime against the soldiers he leads.

That a soldier shoud understand why he is fighting would not seem to be an arguable point. Yet I have heard commanders attempt to oversimplify this psychological problem with the assertion that soldiers fight for only a few simple and essentially local reasons. Among these they include pride in a unit, respect for the opinion of comrades, and blind devotion to an immediate leader. These things are important and the wise commander will neglect none of them in his effort to produce a first-class fighting unit in which all the members are so trained that chances of success—and individual survival -are raised to the maximum. But the American soldier, in spite of wisecracking, sometimes cynical speech, is an intelligent human being who demands and deserves basic understanding of the reasons why his country took up arms, and of the conflicting consequences of victory or defeat. Von Steuben commended vividly on this point during the American Revolution. He explained in a letter to a friend that in Europe you tell a soldier to do thus, and he does it; and that in America it is necessary also to tell him why he does it.

Once the recruit of 1941 was inducted into the service the military leader had to shoulder almost exclusive responsibility for imparting such an understanding, but there was implied a glaring deficiency in our country's educational processes. It seemed to me that constant stressing of the individual rights and privileges of Ameican citizenship had overshadowed the equally important truth that such individualism can be sustained only so long as the citizen accepts his full responsibility for the welfare of the nation that protects him in the exercise of these rights.

Belief in an underlying cause is fully as important to success in war as any local esprit or discipline induced or produced by whatever kind of command or leadership action. Cromwell's "Ironsides" marched into battle singing hymns. Their iron discipline was matched by an inner conviction that never deserted them in any kind of dramatic crisis.

Grosvenor Square, where our Headquarters and the American Embassy were located, through the soldier's love of nicknames soon became "Eisenhowerplatz," and was so referred to, at times, in the press.

This was merely amusing, but the location made it difficult to lead a quite personal life. British hospitality and the presence in London of a number of American friends combined to bring me innumerable invitations of all kinds. Finally, to avoid the inescapable incidents of hotel life, I moved my personal quarters to a quiet little cottage on the edge of the city. I lived there with my naval aide, Commander Harry C. Butcher, and my orderly, Sergeant Michael McKeogh. Two negro soldiers, Sergeants John Moaney and John Hunt, joined us to take care of the house and a simple mess. They stayed with me throughout the war.

From July onward I did not, during the war, accept any invitations except from the Prime Minister or from members of the American or British armed services. These always had business as their primary object.

Visits to the troops had not yet assumed their later proportions on my schedule; there were still relatively few units in the United Kingdom to visit. One of the earliest trips of this sort was in connection with our first offensive operation against the enemy—a bombing raid to celebrate July 4, 1942. The targets were four German airdromes in Holland. Six Bostons under command of Captain Charles C. Kegel, included as part of a larger British formation, ran into severe flak and two failed to return. To mark our entry into European fighting I took time to visit the crews immediately before the takeoff, and talked with the survivors after their return.

During the war Mr. Churchill maintained such close contact with all operations as to make him a virtual member of the British Chiefs of Staffs; I cannot remember any major discussion with them in which he did not participate.

An inspirational leader, he seemed to typify Britain's courage and perseverance in adversity and its conservatism in success. He was a man of extraordinarily strong convictions and a master in argument and debate. Completely devoted to winning the war and discharging his responsibility as Prime Minister of Great Britain, he was difficult indeed to combat when conviction compelled disagreement with his views. In most cases problems were solved on a basis of almost instant agreement, but intermittently important issues arose where this was far from true. He could become intensely oratorical, even in discussion with a single person, but at the same time his intensity of purpose made his delivery seem natural and appropriate. He used humor and pathos with equal facility, and drew on everything from the Greek classics to Donald Duck for quotation, cliche', and forceful slang to support his position.

I admired and liked him. He knew this perfectly well and never hesitated to use that knowledge in his effor to swing me to his own line of thought in any argument.

Yet in spite of his strength of purpose, in those instances where we found our convictions in direct opposition, he never once lost his friendly attitude toward me when I persisted in my own course, nor did he fail to respect with meticulous care the position I occupied as the senior American officer and, later, the Allied commander in Europe. He was a keen student of the war's developments and of military history, and discussion with him, even on purely professional grounds, was never profitless. If he accepted a decision unwillingly he would return again and again to the attack in an effort to have his own way, up to the very moment of execution. But once action was started he had a faculty for forgetting everything in his desire to get ahead, and invariably tried to provide British support in a greater degree than promised.

Check Your Time! This exercise has 1354 words. Now take Test 7b. Record your answers as before.

Speeded Comprehension Test No. 7b

PLATFORM FOR INVASION

1. Eisenhower realized the deficiency of American soldiers in
   a. adequate physical training.
   b. complete military indoctrination.
   c. understanding the war's cause.
   d. ambition to overcome the enemy.

2. What was Eisenhower's opinion of the relation between training and battle experience?
   a. He thought battle experience taught a soldier everything he needed to know.
   b. He thought the troops needed to be "blooded" and then receive more training.
   c. He thought painstaking preparation must precede battle experience.
   d. He though the first whistle of a hostile bullet taught instant perfection.

3. Von Steuben lived at the time of the
   a. American Revolution.
   b. Civil War.
   c. First World War.
   d. Second World War.

4. With which part of war operations did Churchill maintain close contact?
   a. Air.
   b. Naval.
   c. All.
   d. Land

5. How long would Churchill argue about a point that he disagreed on?
   a. To the very moment of execution.
   b. Even after action had begun.
   c. Until he agreed on the point.
   d. Until too late for action.

6. The first American offensive action was against German airdromes in Holland on
   a. Washington's Birthday, 1942.
   b. June 28, 1942.
   c. Armistice Day, 1942.
   d. July 4, 1942.

7. The soldier's name for Grosvenor Square was
   a. Grosvenor Square.
   b. Eisenhowerplatz.
   c. Hitler's Hate.
   d. Embassy Row.

8. After telling the newsmen to write as they pleased but with perspective, Eisenhower found that
   a. more distortion appeared in his stories.
   b. ensuing stories caused little excitement.
   c. severe misunderstandings developed.
   d. all the newsmen supported his position.

9. According to the article, Churchill in speaking would draw on everything from the Greek classics to
   a. Donald Duck.
   b. Von Steuben.
   c. Cromwell.
   d. Alice in Wonderland.

10. What British quality did Churchill seem to typify?
   a. Its muddling through.
   b. Its courageous perseverance.
   c. Its conservatism in adversity.
   d. Its love for oratory.

Check the Key to see how you did on comprehension. When you are ready, record the time and begin Test 8a.

Speeded Comprehension Test No. 8a

THE FUTURE IS HERE*

We thought we had most of the problems of flying licked after crowding every ounce of performance into reciprocating aircraft. Then along came the first jets.

*"Looking at the Maching Bird," by Tony LeVier. Reprinted from *Flying Safety* magazine.

They really upset the applecart. Maximum performance for a piston driven plane suddenly became almost minimum performance for a jet, and as these speeds increased we ran up against something else—the sound barrier!

Starting with the experimental airplane, built by Bell, followed almost immediately by the F-80, the transition from reciprocating power to jet power was almost an overnight affair. The jet age was with us, and we were pretty much unprepared. Our thinking and our planning had to be altered radically. Even those of us who were in this new industry little realized where these blow-torches were leading us. We had a tiger by the tail, and it took a lot of doing to tame him.

In those early days, the combination of a jet airplane and a jet engine was considered to be the answer to almost every problem. I remember in particular a group of engineers waiting for me to make a test flight. One of the design men from an engine company said, "You know our problems are over. The jet engine is so simple that we'll no longer have any great amount of trouble."

How wrong can a guy be?

Then came 1949 and we entered the speed-nutty age. This business of cracking the sound barrier became a must for everybody in the business. If you hadn't cracked through, man, you hadn't lived!

I remember the first time I went through. Of course in those days you were on your own. We were all building aircraft with the same goal in mind, but at first nobody was passing out any free advice. Fortunately, I had a good machine. It was well designed and well built. I didn't tear the wings or the tail off, and the plane and I both survived our first trip through the speed of sound. Now we've entered another era. I call it The New Look! We've licked our old problems of subsonic speeds, only to be faced with new ones as we crowd across Mach. Our fighter planes have jumped into the 100 series, and the race is on again.

Airplanes today have a brand new appearance. You've seen most of them and once again you're asking, which configuration is best? We have deltas and swept wings and straight wings and some with almost no wings. If you'll look at newer aircraft you'll see what tremendous advances have been made in this speed business.

Back in 1903, the Wright Brothers' first airplane flew at 40 to 45 miles an hour. That's about .05-.06 Mach. Since then, we've doubled our speed every eight to ten years. By 1950 we had reached the sound barrier and were pressing against it in level flight. Then a peculair thing happened. In the past two years we doubled the speed of sound and have gone through one barrier only to encounter another. We've accomplished as much, speedwise, in two years as we had accomplished previously by slow steps over a 50-year period, and the end is not yet in sight. By 1960 we're going to be traveling awfully fast, and we've got to accelerate our thinking and planning once again to stay abreast of our advance into The New Look.

Now, let's take today. Right now, 1955. If you as a pilot, should visit an Air Force test center, you'd find many different airplanes and a lot of strange and different configurations.

Every manufacturer is shooting toward more speed and better stability and control. Probably the outstanding difference in outward appearance of many new aircraft over the old is the horizontal stabilizers. One may be extremely low. Another extremely high. In these supersonic airplanes one may well wonder where it should be, but it probably won't be where it used to be, otherwise it would have been—and there you are!

Fuselage design too has changed a great deal. It used to be that the normal fuselage was about two-thirds of the span of the wing. Now we find that most fuselages are twice the wing span and apparently still growing.

Our wing designs are changing radically too. Regardless of configuration, delta, swept or straight, each must be of low aspect ratio if they're to do the job. They've got to be razor sharp and razor thin. We have to forget such airfoil designs as the Clark Y and the Davis. They did a job, and a good one too, for slow airplanes, but today's wing in profile just doesn't resemble anything we've ever seen before.

Cockpit layout remains virtually unchanged in the supersonic airplane. Maybe it is improved a bit, but I feel that there is still room for refinement. One feature that is changing fast, however, is power over weight. Even though these new airplanes get bigger and heavier with every design change, the engine manufacturers are crowding ahead and making greater power available. This means, of course, that takeoff performance becomes increasingly better all the time.

As in all jets, altitude means miles when unbalanced against pounds of fuel consumed. To get that altitude we must climb on an exacting schedule, and right now it looks as though the best way to derive maximum climb performance is by utilizing the Mach meter as the gage, rather than the airspeed indicator.

Unfortunately, even the current Mach meter has certain limitations. This is known as static position error. Inasmuch as our newest aircraft climb and normally cruise in the subsonic range, it is unfortunate that this position error occurs right where we need it most. In reality, we're flying faster than the meter indicates. As speed increases, so too do drag and fuel consumption. Combatwise, these new planes are critical as far as fuel is concerned. That is why I say we climb, cruise and let down on a definite schedule. As in any airplane, it'll do the job if the pilot is alert and careful. It's the careless lad who gets into trouble That applies to any airplane ever invented.

Another problem that faces us today is discovering the most economical power settings to insure maximum performance. This is a case of taking thrust and drag and working the two against a given Mach number for the greatest efficiency.

In older jets, we found that the thrust line and the drag line usually met in the subsonic level and that, mind you, was with everything open. Throttle at 100 percent and afterburner on. In these new birds, however, we find a different condition. We have low drag and a high thrust—tremendous thrust. When we chart the performance, we find that the drag line rises

quite sharply as we approach Mach, and then after passing through the barrier, the drag line and the thrust line start to parallel each other and apparently continue on into infinity.

As I noted previously, we're up against a new barrier now. It is the heat barrier. Call it thermal, if you prefer. Here our engines are running against a restriction of temperature, and eventually we may have to fly by a temperature gage when we get into the higher speeds. Okay, that's just another problem. We'll lick this one as we've licked all of the other important problems in the past.

We have to recognize today, more than ever before, that speed is energy. You store it up. The faster you go, the more energy is available and you can do a lot of things with it.

At altitude, indicated speeds may be low. Don't ever let that fool you because the true airspeed is high. And, you can use that speed in these supersonic jobs to a far greater advantage than you've ever imagined.

Check Your Time! This exercise has 1301 words.

Now take Test 8b. Then check against the Key. Keep a record of your rate and your comprehension score.

Speeded Comprehension Test No. 8b

THE FUTURE IS HERE

1. As reciprocating aircraft were gradually replaced by jet aircraft, maximum performance for a piston driven plane suddenly became
   a. minimum performance for reciprocating engines.
   b. maximum performance for a jet.
   c. unchanged in relation to a jet.
   d. minimum performance for a jet.

2. The author says we've accomplished as much, speedwise, in two years as we had accomplished previously in
   a. ten years.
   b. a 50-year period.
   c. the 20th century.
   d. the history of mankind.

3. Probably the outstanding difference in outward appearance of many new aircraft over the old is the
   a. cockpit configuration.
   b. vertical fin fillet.
   c. concentration of main landing gear below the fuselage rather than below the wings.
   d. horizontal stabilizers.

4. The normal fuselage used to be two-thirds of the wing span. How has this changed?
   a. It is twice the wing span and apparently still growing.
   b. It bears a 3-to-1 ratio to horizontal surface length.
   c. It is equal to wing span.
   d. It is three-fourths the wing span.

5. Wing design, regardless of configuration, must have
   a. high angle of attack.
   b. greater flap surface to offset high speed of drag in landings.
   c. extra bracing for split-S maneuvers.
   d. low aspect ratio.

6. How has cockpit layout changed in the supersonic airplane?
   a. It has changed drastically.
   b. It is virtually unchanged.
   c. It has been flattened to accommodate pressurization.
   d. It is so improved that it is completely satisfactory.

7. The best way to derive maximum climb performance in supersonic aircraft is to
   a. use take-off charts in flight handbooks.
   b. use the airspeed indicator as gage.
   c. use the Mach meter as gage.
   d. memorize chart figures for one specific aircraft.

8. In older jets the thrust line and the drag line usually met in the subsonic level, when
   a. power settings were high.
   b. wing had low aspect ratio.
   c. tricycle gear was used.
   d. throttle was at 100 percent and afterburner was on full.

9. What drag and thrust characteristics do supersonic planes have?
   a. Low drag and high thrust.
   b. High drag and low thrust.
   c. Parallel drag and thrust as the plane approaches Mach.
   d. Sharply increased drag after going through Mach.

10. The new barrier we are now up against is the
   a. heat barrier.
   b. Mach barrier.
   c. power-over-weight barrier.
   d. sonic barrier.

Check the Key for Test 8b.

Three vocabulary tests follow. These are similar to the ones you took in the last chapter. For each test, list the numbers 1 through 20 on separate paper and record your answers.

Vocabulary Test No. 4

1. ABEYANCE: (a) enforcement, (b) operation, (c) resuscitation, (d) suspense
2. AMIABLE: (a) churlish, (b) morose, (c) kind, (d) acrimonious
3. COMPEL: (a) encumber, (b) impede, (c) coerce, (d) thwart
4. GENEROUS: (a) avaricious, (b) covetous, (c) penurious, (d) liberal
5. PRETENSE: (a) candor, (b) ingenuousness, (c) actuality, (d) disguise
6. VIGILANT: (a) alert, (b) oblivious, (c) unwary, (d) incautious
7. FLUCTUATE: (a) abide, (b) adhere, (c) persist, (d) vary
8. AMPLIFY: (a) amputate, (b) condense, (c) epitomize, (d) augment
9. INHERENT: (a) intrinsic, (b) extrinsic, (c) fortuitous, (d) incidental
10. PERMISSION: (a) objection, (b)resistance, (c) consent, (d) opposition
11. EVIDENCE: (a) conviction, (b) proof, (c) probity, (d) bias
12. OBSTINATE: (a) amenable, (b) complaisant, (c) obedient, (d) stubborn
13. HYPROCRISY: (a) pretense, (b) candor, (c) honesty, (d) transparency
14. TACITURN: (a) silent, (b) garrulous, (c) loquacious, (d) unreserved
15. SAGACIOUS: (a) stupid, (b) scottish, (c) ignorant, (d) discerning
16. PRIMEVAL: (a) exotic, (b) modern, (c) aboriginal, (d) foreign
17. DECEPTION: (a) integrity, (b) uprightness, (c) fraud, (d) fairness.
18. SUPERFLUITY: (a) frugality, (b) economy, (c) excess, (d) shortcoming
19. CALAMITY: (a) boon, (b) triumph, (c) consolation, (d) misfortune
20. VERACITY: (a) imposture, (b) fabrication, (c) truth, (d) mendacity

Check against the Key and record your score.

Vocabulary Test No. 5

1. PERSECUTE: (a) seek to punish, (b) harass, (c) follow, (d) defend, (e) succeed
2. SALIENT: (a) salty, (b) brave, (c) wind-driven, (d) protruding, (e) marketable
3. FALLACIOUS: (a) illogical, (b) deflated, (c) inflated, (d) obsolete, (e) autumnal
4. ASPERSION: (a) vegetable, (b) medicine, (c) dislike, (d) scattering, (e) derogatory criticism
5. AMPHIBIOUS: (a) energetic, (b) theatrical, (c) pertaining to land and water, (d) equivocal, (e) copious
6. PETROL: (a) bird, (b) guard, (c) fatherly, (d) gasoline, (e) irritable
7. RAVAGED: (a) raved, (b) decayed, (c) counted, (d) devastated, (e) arranged
8. SATELLITE: (a) mineral, (b) debutante, (c) follower, (d) satirist, (e) hermit
9. PREROGATIVE: (a) inquiry, (b) medicine, (c) belief, (d) privilege, (c) donation
10. VINDICTIVE: (a) position, (b) vengeful, (c) windy, (d) victorious, (e) defeated
11. NULLIFY: (a) expand, (b) rectify, (c) make void, (d) give notice, (e) enliven
12. FELONY: (a) slave, (b) device, (c) greeting, (d) crime, (e) prisoner
13. REPRISAL: (a) repetition, (b) surprise, (c) revenge, (d) mistake, (e) reward
14. INSTIGATED: (a) hesitated, (b) incited, (c) resisted, (d) marked off, (e) abused
15. PROTOCOL: (a) drug, (b) protest, (c) police, (d) alliance, (e) procedure
16. DECREPITUDE: (a) feebleness, (b) deception, (c) dismay, (d) ability, (e) agility
17. SANCTIONED: (a) concealed, (b) canceled, (c) chanted, (d) approved, (e) blessed
18. PROTRACTED: (a) withdrawn, (b) lengthened, (c) bent, (d) demolished, (e) measured
19. DICTUM: (a) earphone, (b) saying, (c) dictator, (d) appendix, (e) auction
20. INTEGRATE: (a) untie, (b) advance, (c) imitate, (d) originate, (e) unify

Check your answers against the Key.

Vocabulary Test No. 6

1. THERAPY: (a) praise, (b) rhapsody, (c) heat wave, (d) criticism, (e) method of cure
2. INFLAMMABLE: (a) swollen, (b) combustible, (c) noncombustible, (d) red, (e) burning
3. AQUEDUCT: (a) overpass, (b) underpass, (c) detour, (d) waterfall, (e) water main
4. NAUTICAL: (a) mischievous, (b) negligible, (c) maritime, (d) difficult, (e) rugged
5. LUNAR: (a) crazy, (b) of the moon, (c) shining, (d) respiratory, (e) month
6. SECTOR: (a) worldly, (b) heavenly, (c) subordinate (d) section, (e) line
7. COAGULATE: (a) clot, (b) freeze, (c) dissolve, (d) collect, (e) scatter
8. DERELICT: (a) crane, (b) student, (c) disciple, (d) prophet, (e) outcast
9. HAWSER: (a) winch, (b) anchor, (c) mooring, (d) rope, (e) mast
10. RENDEZVOUS: (a) meeting place, (b) detour, (c) command, (d) dreadful, (e) magnificent
11. PLAUSIBLE: (a) grammatical, (b) fatiguing, (c) false, (d) credible, (e) incredible
12. CONCUR: (a) agree, (b) disagree, (c) risk, (d) happen, (e) defeat
13. ALTIMETER: an instrument to measure, (a) elevation, (b) speed, (c) temperature, (d) humidity, (e) direction

14. FAN: (a) leader, (b) admirer, (c) son, (d) relative, (e) flywheel

15. TORQUE: (a) wool cap, (b) game bird, (c) speech, (d) suffering, (e) rotating force

16. RECAPITULATION: (a) surrender, (b) retreat, (c) beheading, (d) summary, (e) injury

17. ARTICULATE: (a) speechless, (b) vegetable, (c) clear, (d) scheming, (e) question

18. CHRONIC: (a) acute, (b) illness, (c) timepiece, (d) era, (e) habitual

19. OBSOLETE: (a) outmoded, (b) utter, (c) hidden, (d) vague, (e) modern

20. ABEYANCE: (a) submission, (b) reduction, (c) suspension, (d) homage, (e) shelter

Check your answers against the Key.

Speedier Comprehension

CHAPTER 7 has three reading tests, or exercises, and three vocabulary tests. You are nearing the end of the volume, and these tests are probably more difficult than the preceding ones, although the material in the next reading test should be very familiar to you.

When you are ready, record the time and begin reading Test 9a.

Speeded Comprehension Test No. 9a

HOW TO GIVE ARTIFICIAL RESPIRATION*

The most important thing to remember in giving artificial respiration is to *begin immediately*. Don't waste time moving the victim to the ideal location; don't wait for mechanical equipment. Start at once.

You may have leraned the old prone pressure method or the more recent back pressure-arm lift or back pressure-hip lift methods. In these methods the victim was placed on his stomach. It has now been proved that the mouth-to-mouth (or mask-to-mouth) method is far better than any other. In this method, the victim is placed on his back and receives your exhaled air. It saves many more lives and it is simpler to do. It works because you normally take only one-quarter of the oxygen out of the air that you breathe in.

Do not waste time trying old methods, or worrying about getting infected. The possibility of infection is remote. You have a life to save.

Another important consideration of artificial respiration is to insure that the *air passageway is open*. If there is an obstruction, air cannot enter the lungs, no matter what method you use. The air passageway of an unconscious victim is usually blocked to some degree.

There are three main causes for obstruction. The first is foreign matter, such as false teeth or liquids, in the mouth or throat. The second is relaxation of the jaw. The tongue is attached to the jaw so that it falls backward and blocks the throat (called "swallowing the tongue"). The third is the position of the neck. When the neck is bent forward so that the chin is down close to the chest, there is a tendency for the throat to become "kinked" and block the passage of air.

Keep the air passageway open by placing the victim's head in the position of an individual looking upwards while holding his lower jaw forward in a *sword-swallowing position*. When someone stops breathing, establish an open air passageway at once.

MOUTH-TO-MOUTH METHOD

1. *Turn the victim on his or herback.*
2. *Clean the mouth, nose, and throat.* If the mouth, nose, and throat appear clean, start artificial respiration immediately. If foreign matter such as vomitus or mucus is visible in the mouth, nose, and throat, wipe it away quickly with a cloth or by passing the index and middle fingers through the throat in a sweeping motion.
3. *Place the victim's head in the "sword-swallowing position."* Place his or her head *as far back as possible* so that the front of his or her neck is stretched.
4. *Hold his or her lower jaw up.* Approach the victim's head, preferably from his or her left side. Insert your left thumb between the victim's teeth at the midline. Pull his or her lower jaw forcefully outward so that the lower teeth are further forward than the upper teeth. Hold his or her jaw in this position as long as the victim is unconscious. You can wrap a piece of cloth around your thumb to prevent injury by the victim's teeth.
5. *Close the nose.* Close the victim's nose by compressing it between the thumb and forefinger of your right hand.
6. *Blow air into the victim's lungs.* Take a deep breath and cover the victim's open mouth with your open mouth with *airtight contact*. Blow rapidly until the chest rises. Blow forcefully into adults and gently into children.
7. *Let air out of the victim's lungs.* After the chest rises, quickly separate lip contact with the victim, and allow the victim to exhale by himself.

If his or her chest did not rise when you blew in, improve the support of the victim's air passageway, and blow more forcefully. Repeat the inflations of the lungs 12 to 20 times per minute. You'll find that you need to breathe slightly deeper and faster than usual in order to

*From Chapter 5, AF Pamphlet 50-55, *GMT—First Aid*, 1 January 1969. (Now Rescinded.)

get enough air for yourself. Continue rhythmically without interruption until the victim starts breathing or is pronounced dead. A smooth rhythm is desirable, but split-second timing is not essential.

Do not wait for a mechanical resuscitator, but if an approved one is available, use it. The most important advantages of good mechanical resuscitators are that they can supply 100 percent oxygen, and if properly adjusted, they supply the correct amount of pressure. They signal when the airway of the victim is obstructed and they draw a little excess fluid from the respiratory system. But the mouth-to-mouth technique accomplishes adequate ventilation, and most important, you can start it immediately.

Usually, you cannot use the mouth-to-mouth procedure described above on children under the age of three because the large size of your thumb interferes with adequate mouth-to-mouth contact. In addition, you may find this method difficult in a victim whose mouth cannot be opened. In these cases, use the following method.

MOUTH-TO-MOUTH FOR SMALL CHILDREN AND VICTIMS WITH TIGHT JAWS

1. *(Same) Turn the victim on his back.*
2. *(Same) Clean the mouth, nose, and throat.*
3. *(Same) Place the head in the "sword-swallowing position."*
4. *Hold the lower jaw up—alternate technique.* Approach the victim's head from his left side. With both of your hands, one on each side of the victim's head, grasp the angles of his or her lower jaw just below the ear lobes. Lift his lower jaw forcefully upward so that the lower teeth are further forward than the upper teeth. To open the victim's lips, pull his or her lower lip down with your thumbs while forcefully holding his or her lower jaw up and forward. *Hold his or her jaw in this position* as long as the victim is unconscious.

5 and 6. *Close the victim's nose and blow air into his lungs—alternate technique.* Take a deep breath and cover the victim's mouth with your mouth, causing an *airtight contact.* Block the victim's nose to prevent air leakage by pressing your right cheek against the nasal openings. (Your hands are occupied elsewhere.) In a baby, the rescuer's mouth can cover both the mouth and nose with an airtight contact. Blow rapidly until the chest rises. *Blow forcefully into adults and gently into children.*

7. *Let air out of victim's lungs.* After the chest rises, quickly separate lip contact with the victim and allow the victim to exhale by himself or herself. If his or her chest does not rise, improve the support of the victim's air passageway and blow more forcefully. Repeat the inflations 12 to 20 times per minute.

If his or her chest did not rise when you blew in, improve the support of the victim's air passageway, and blow more forcefully. Repeat the inflations of the lungs 12 to 20 times per minute. You'll find that you need to breathe slightly deeper and faster than usual in order to get enough air for yourself. Continue rhythmically without interruption until the victim starts breathing or is pronounced dead. A smooth rhythm is desirable, but split-second timing is not essential.

Do not wait for a mechanical resuscitator, but if an approved one is available, use it. The most important advantages of good mechanical resuscitators are that can supply 100 percent oxygen, and if properly adjusted, they supply the correct amount of pressure. They signal when the airway of the victim is obstructed and they draw a little excess fluid from the respiratory system. But the mouth-to-mouth technique accomplishes adequate ventilation, and most important, you can start it immediately.

Usually, you cannot use the mouth-to-mouth procedure described above on children under the age of three because the large size of your thumb interferes with adequate mouth-to-mouth contact. In addition, you may find this method difficult in a victim whose mouth cannot be opened. In these cases, use the following method.

MASK AND TUBE METHOD (MASK-TO-MOUTH)

Several devices consisting of a short tube with a mask at one end to cover the victim's face have been developed to increase efficiency and provide sanitation. One, the "Venti-Breather," has a valve to control inhalation and exhalation through slots in the tube. The rescuer breathes in one end of the tube. A mask at the other end covers the victim's nose and mouth permitting air to be blown through the nose in case the lips are clamped shut. There is no need to hold the nose closed. "Venti-Breather" does away with steps 5 to 7. All other steps are as described. Clean the victim's mouth and throat with fingers. Hold the jaw with one hand and the mask with the other. (In some cases, you can use your thumb and index finger to hold the mask to the face, thus freeing the other hand.) Be sure that the mask is airtight to the victim's face, that his or her head is in the sword-swallowing position, and that his jaw is pulled forward. Watch to see that the victim's chest rises and falls. If it doesn't, try using both hands to hold the victim's jaw up, one on each side.

SPECIAL CONSIDERATIONS

OBSTRUCTED BREATHING. If the victim appears to be breathing to some degree, keep his or her air passageway open until he awakens by maintaining the support of his lower jaw. If his tongue or fingernails are blue rather than pink, he is not breathing adequately

and requires assistance. You must perform exhaled-air *assisted breathing* by breathing air into the victim's lungs each time that the victim himself breathes in. Adjust your timing to assist him. Do not fight his attempt to breathe. Synchronize your efforts with his.

The victim may appear to be breathing because of movement of his or her chest and abdomen. Actually no air may be moving into his or her lungs because of *complete obstruction of the air passageway* from improper position of his head and jaw. For this reason, it is most important to find out whether there is any movement of air in and out of the victim's mouth and nose by listening closely.

The victim may be breathing noisily (snoring) indicating *partial obstruction of the air passageway.* You can relieve this condition by holding the victim's head in the sword-swallowing position with his or her jaw thrust forward.

After giving exhaled-air artificial respiration for a period of time, *the victim's abdomen may bulge.* This is caused by air which is blown into the victim's stomach. Air inflation of the stomach rarely occurs when the correct technique is applied. It does occur if the air passageway is blocked by improper support of the head and lower jaw, or if the blowing is too forceful.

Air inflation of the stomach is not dangerous, but inflation of the lungs is easier when the stomach is empty. If you see the victim's abdomen, causing the air to be burped. Since this maneuver may also cause the victim to vomit, you must be ready to roll the victim's head to the side and clean his throat at once.

TRANSPORTATION. It is extremely important that some one remain at the victim's head during transportation to keep the victim's air passageway open by the methods described above and to start an exhaled-air technique of breathing if the victim ceases to breathe.

WATER IN THE LUNGS. The drowning victim may have water in the lungs. Water cannot be removed from the lungs satisfactorily by any means. Exhaled-air artificial respiration is effective, even with water in the lungs.

WATER IN THE STOMACH. The drowning victim usually swallows large amounts of water. When you perform the first few breaths of exhaled-air artificial respiration, the water may be pushed into the victim's throat by pressure transmitted through the diaphragm by the extending lungs. You must be alert to this possibility and roll the victim's head to the side immediately so that the water and other materials may drain out. Resume exhaled-air artificial respiration as quickly as possible.

As soon as the patient starts breathing or additional help becomes available, see that the patient's clothing is loosened (or if wet, removed) and that he is treated for shock, by lowering head and shoulders, elevating his legs and keeping him warm. Do not, however, interrupt rhythmical artificial respiration to do this before he or she starts breathing.

HIGH ALTITUDE. The above methods also work for a person who stops breathing because he or she has gotten too little oxygen at high altitude. However, they only work if there is enough oxygen in the air you breathe out. There will not be enough oxygen if you are above 10,000 feet cabin altitude and not getting oxygen through a mask. In this case, it is best to apply a resuscitator, if available; if not, quickly put a mask on the victim. Be sure the mask is attached to an operative oxygen regulator. Switch the regulator on and turn to 100 percent oxygen. Give back pressure-arm lift artificial respiration.

PREPARE—FOLLOW UP

You must act rapidly in cases of drowning or electric shock, or whenever breathing stops. A victim not breathing cannot live long. It is of utmost importance that you learn the proper first-aid measures for these emergencies before they occur. Learn the correct procedures for giving artificial respiration. Do not stop at just memorizing the steps; team up with others and actually practice all the steps, using the mask and tube described previously, if available.

Once a victim of drowning, electric shock, etc., begins to breathe normally and he or she has been treated for shock, he or she should remain lying down until he is seen by a physician or his or her recovery seems assured. When he or she is conscious, you can give him or her a lukewarm drink, such as coffee or tea.

Check Your Time! This test has 2018 words. Now take Test 9b. Record your answers on separate paper.

Speeded Comprehension Test No. 9b

HOW TO GIVE ARTIFICIAL RESPIRATION

1. Which of the following is most important in giving artificial respiration?
   a. Use a mechanical resuscitator.
   b. Begin at once.
   c. Find a good location.
   d. Avoid infection.

2. Exhaled air contains about what percent LESS oxygen than inhaled air?
   a. 10.
   b. 25.
   c. 50.
   d. 75.

3. Why is the "sword-swallowing" position very important?
   a. It clears foreign matter from the mouth.
   b. It helps regulate the rate of inflations.
   c. It opens the air passageway in the throat.
   d. It permits good mouth-to-mouth contact.

4. What is the recommended number of inflations of the lungs per minute?
   a. 5 to 12.
   b. 12 to 20.
   c. 18 to 28.
   d. 30.

5. Which of the following is probably the best procedure for giving artificial respiration to a baby?
   a. Straight mouth to mouth.
   b. Mouth to mouth, check against nasal openings.
   c. Mouth covering both mouth and nose.
   d. Back pressure.

6. Which of the following is an advantage of the mask-and-tube method over the mouth-to-mouth method?
   a. The head does not have to be in the sword-swallowing position.
   b. The mask does not have to be airtight.
   c. The jaw does not have to be pulled forward.
   d. The victim's mouth does not have to be open.

7. Of the following, which would interfere MOST with giving artificial respiration?
   a. Obstructed passageway.
   b. Water in the lungs.
   c. Water in the stomach.
   d. Tight clothing.

8. Why is it important to stay near the head of someone recovering after artificial respiration?
   a. It is a good morale factor.
   b. The victim may need treatment for shock.
   c. He may need assisted breathing again.
   d. You may need to explain to the police.

9. If you are giving mouth-to-mouth resuscitation and the victim begins labored breathing, what should you do?
   a. Stop immediately.
   b. Continue your rhythm of breathing.
   c. Double your rate of breathing.
   d. Adjust your timing to assist his or her efforts.

10. When the patient is breathing satisfactorily, you should also treat him routinely for
   a. shock.
   b. burns.
   c. wounds.
   d. broken bones.

Check your answers against the Key and see how well you did.

When you are ready, start timing yourself and begin reading Test 10a, on squall lines and tornadoes.

Speeded Comprehension Test No. 10a

FELLOW TRAVELERS*

Squall lines and tornadoes occur under similar conditions. Tornadoes may occur at any time within the formative stage of squall lines; or they may form during, in advance or to the rear of a squall line. They also occur frequently when there is no identifiable squall lines.

It goes without saying that some of the worst flying conditions are encountered in the vicinity of squall lines. This is true because in their most active stage, during their first few hours of life, they are composed of a continuous line of thunderstorms containing moderate to severe turbulence, heavy rain or hail, almost continuous lightning, gusty winds, brief windshifts, rapid temperature falls and abrupt pressure rises. There is always the possibility of one or more tornadoes in the vicinity of a squall line.

A tornado is a violent circular whirlpool of air, having an average diameter of 250 yards. Within its funnel-shaped cloud there are spiraling winds of terrific speed. Estimates of this speed vary from 200 to 600 mph.

Tornadoes usually move from south to northeast at approximately 40 mph but have a tendency to skip about at random along their general course. No one yet knows how high the funnel cloud of the tornado extends above the base of the thunderstorm under which it forms, but tornadic influence has been encountered at nearly 40,000 feet. A funnel-shaped cloud was reported in one instance as extending from the surface of the earth to approximately 35,000 feet, where it merged with the cirrus anvil overhanging clouds. Lighting, in a thunderstorm containing a tornado, is the bright continuous sheet type with a lacework effect due to intensely vivid flashes of frequent forked lightning. It appears brighter, more colorful and more vicious than

*By Major W. B. Willis. Reprinted from *Flying Safety* magazine.

in any other type of storm. Although it is one of the least extensive, a tornado is the most violent of all storms.

The life span of a tornado is exceptionally short, approximately one hour for the average storm. The life span of the squall line is relatively short also, usually 12 hours.

The Severe Weather Warning Center of the Air Weather Service attempts to forecast the geographical areas and times of occurrence of tornadoes, as well as hail, severe turbulence aloft and gusty surface winds in excess of 50 knots associated with severe thunderstorms.

At the present time the geographical area within which the most intense thunderstorms are expected to occur is referred to in teletype messages as a "black area." Within this black area there may be forecast areas of tornadoes. These areas will be restricted to 10,000 square miles if possible, but may be larger if the developing weather warrants it. This is an advisory service and the information is sent directly to the station weather officers and flight service centers for further dissemination. At the present time the information furnished by the Severe Weather Warning Center is not available through CAA Radio Range Stations.

Squall lines are rather difficult to forecast by even the most experienced personnel. In some instances they are well past the formative stage before they are identified on map analysis by forecasting personnel and seldom if ever appear on 24- or 36-hour forecast maps. Thus, if a squall line forms over a rather sparsely settled area, it may be in its most active stage before it is identified.

Every pilot who was ever caught in a squall line would probably have given most anything he had to have been warned in advance. Until there is a better understanding of the mechanism of squall lines, the best method of dealing with the problem is to recognize them as soon as possible after they have formed. Almost any cold front situation may be a squall line breeder.

Tornadoes are equally as difficult to forecast. To predict exactly where one will strike, with any degree of accuracy, is virtually impossible. The Severe Weather Warning Advisory has proven to be of valuable service to flights through black areas. Pilots are more cautious and keep a closer watch on weather conditions than they are prone to do normally.

Atmospheric instability is prevalent over most of the United States east of the Rockies, with normally a steady progression of cold fronts and accompanying squall lines from March through June. This is also the period in which to expect a sharp increase in tornado activity, with the area of maximum occurrence, approximately 600 miles in diameter centered over northwestern Mississippi in March. This area moves northwestward through April and is centered over eastern Kansas in May and June, with the belt of maximum occurrence extending from northern Oklahoma to southern Minnesota.

Records from 1916 through 1954 indicate that half of the reported tornadoes occurred between 1400 and 2000 local time, and that approximately 80 percent of the total occurred between noon and midnight. They have been reported at all hours of the day and night throughout every month of the year.

Studies of squall lines and flights through them indicate no apparent preferred level for penetrating a given severe squall line. Severe turbulence has been reported at all levels flown, and from 4000 feet up there seems to be no one level worse than another. More severe turbulence reports were received between 2000 and 4000 feet than for any of the other levels, but it is thought that this was due to the belief of many pilots that they were less likely to encounter severe turbulence in the lower levels.

Radar is an excellent aid in determining the location of squall lines. However, it only indicates areas of precipitation and many pilots have had the mistaken idea that if they can avoid these areas they will be clear of all severe turbulence. This is only partially true, because a radar echo does not in itself indicate turbulence and there have been numerous occurrences of turbulence outside of cloud and rain areas.

Very few people have flown into a tornado and lived to tell of their experience. It is the opinion of those who have flown through one that it is impossible for any pilot regardless of experience level, to fly safely through tornado areas without being subjected to extremely hazardous conditions.

There is really no comfortable level for penetrating violent thunderstorm activity, such as is encountered in severe squall lines, with the types of airplanes being flown today.

On many different occasions experienced pilots, with thousands of flying hours to their credit, have been unable to get their aircraft successfully through a squall line area. This is true for both commercial and military pilots.

It is absolutely true that most thunderstorms in their dissipating stage can be flown through with only light or moderate turbulence being encountered. Obviously, it is foolish to fly deliberately through squall lines or well-developed thunderstorms that appear to be in their most active stage.

Air Weather Service personnel are available to give you the latest actual and forecast weather conditions for your proposed flight. They, in turn, would appreciate your report of any unusual activity or deviation from forecast weather. Call the nearest radio facility and give them the information as soon as possible, and at your first stop give the local weather forecaster a thorough briefing. Your information might mean a lot to another pilot who will be flying along the same route.

Check Your Time! This test has 1219 words. Now take Test 10b. Record your answers on a separate sheet of paper.

Speeded Comprehension Test No. 10b

FELLOW TRAVELERS

1. Squall lines, in their most active stage, are composed of
   a. thunderstorms, usually accompanied by tornadoes.
   b. continuous line of thunderstorms.
   c. falling pressures and varying temperatures.
   d. radioactive dust clouds.

2. What is the usual direction of travel of a tornado?
   a. Southeast to northwest.
   b. Southwest to northeast.
   c. South to north.
   d. West to east.

3. What is the relation of the life span of a tornado to the duration of a squall line?
   a. The tornado's span is as long as the squall's span.
   b. The tornado's span is not related to the life of the squall line.
   c. The tornado lasts longer than the squall line.
   d. The squall line lasts longer than the tornado.

4. The geographical area within which the most intense thunderstorms are expected to occur is referred to in teletype messages as a
   a. "white area."
   b. "grey area."
   c. "RSIV area."
   d. "black area."

5. Squall lines usually are formed by
   a. cold front situations.
   b. vectorial wind changes over sparsely populated areas.
   c. an anti-cyclonic effect.
   d. a persisting stationary front.

6. Atmospheric instability is prevalent over
   a. most of the United States including parts of northern California.
   b. most of the United States including parts of southern California.
   c. most of the United States east of the Rockies.
   d. all of the United States and part of Canada.

7. Eighty percent of the tornadoes reported from 1916 through 1954 occurred between what hours?
   a. 1200 and 2400.
   b. 1400 and 2000.
   c. 0000 and 1200.
   d. 1800 and 2400.

8. What part of a squall line does radar detect?
   a. Severe turbulence.
   b. Rain.
   c. Tornadoes.
   d. Thunder.

9. The preferred level for penetrating a severe squall line is
   a. between 2000 and 4000 feet.
   b. between 4000 and 6000 feet.
   c. between 6000 and 9000 feet.
   d. not stated.

10. If you must fly through a squall line, the best time to do so is while it is
   a. dissipating.
   b. forming.
   c. most active.
   d. proceeding northeast.

Now check against the Key.

When you are ready, record the time and begin Test 11a.

Speeded Comprehension Test No. 11a

NUCLEAR EXPLOSION AND FALLOUT*

The Blast

A five-megaton nuclear weapon explodes with a brilliant flash that lasts about a minute. A quick burst of nuclear and heat radiation emerges from ground zero, the point of the explosion. The spurt of nuclear radiation is called initial radiation or prompt radiation and kills within a mile or two. The heat rays can kill unprotected people up to 10 miles away and may start fires beyond that. The heat rays and initial radiation are followed by a blast wave which starts at more than 2,000 miles an hour, but loses much of its damaging force by about 10 miles out. With the blast wave comes a violent wind which picks up loose objects and bears them outward. A burst at ground level would leave a crater about half a mile across and 200 feet deep. Nearly everything within a radius of a mile of ground zero would be destroyed.

Extent of Damage

A five-megaton nuclear burst at ground level would destroy most buildings two miles from the point of the

*From *Fallout Protection, What to Know and Do About Nuclear Attack*, published by the Department of Defense, Office of Civil Defense (Government Printing Office, 1961).

explosion. Steel-frame buildings would be knocked sideways and great fires started.

The destruction five miles away would be less severe, but fires and early fallout could be a significant hazard.

At 10 miles, sturdy buildings would remain intact. At this distance fires probably would not be started by the fireball, but might be started by the blast wave which could rupture gas lines and short-circuit wires. Flying glass would present a major danger, as would early fallout.

At 50 miles from the bomb burst, all buildings would remain standing. The fading blast wave would take about five minutes to arrive, but would still shatter many windows. The greatest danger at this distance would be from early fallout which would begin arriving in some areas within three or four hours, depending upon weather conditions at the time.

Fire Storms

When nuclear or incendiary bombs strike a highly combustible city area, they can create a "fire storm"; the rising column of hot gases draws in surrounding cool air, producing inward-blowing winds that confine the fire storm to the blast damage area. Primary fires would be a much greater hazard than fire storms. For maximum fire damage, a nuclear weapon must be detonated high in the air. This would eliminate most of the potential fallout hazard. The spread of fires from a nuclear attack would be limited in the same ways as are peacetime fires—by barriers such as open space rivers, highways, by rainfall, and by varied distribution of burnable material.

Fallout

As the brillian fireball of a ground-level burst rises in the sky, it draws up a vast amount of earth that is melted or vaporized and contaminated by the radioactive residue of the explosion. A little later this material, condensing in the cold upper air like rain or snow, starts falling back to earth because, like ash from a fire, it is heavier than air. It is called fallout because it falls out of the sky, wherever the winds may blow it. You cannot tell from the ground which way it will be carried because its scatter is determined by high-altitude winds, which may be blowing a different direction from the ground-level winds you can observe. About five miles from the explosion, the heavier particles--early fallout--would reach the ground in half an hour. Twenty miles away, people may have nearly an hour to get ready. One hundred miles away the fallout may not start for four to six hours. All this early fallout, which carries the bulk of the radiation danger, descends in less than 24 hours. The less dangerous lighter particles delayed fallout--might stay aloft for months.

How Early Fallout Looks

The most dangerous fallout--early fallout--would consist of radioactive particles that are relatively large and heavy--about the size of table salt or fine sand. The chances are you could see the particles although you could not detect the radiation from the particles without the use of a special instrument.

Exposure to Radiation

During the average lifetime, every human being receives about 10 roentgens of nuclear radiation from natural sources. In addition, people are exposed to small amounts of radiation in dental and chest X-rays and even from luminous dials of wrist watches.

When large amounts of radiation are absorbed by the body in short periods of time, sickness and death may result. In general, the effects of radiation stay with people and accumulate over a period of time. Few people get sick who have been exposed to 100 roentgens or less. Exposure to more than 300 roentgens over a period of a few days will cause sickness in the form of nausea, and may cause death. And death is certain if a person receives an exposure of 1,000 roentgens over a period of a few days.

Young people might be injured more by nuclear radiation than older people. This is because young people are more apt to absorb radioactive elements into their bones and internal organs than are older people. Since young people are potential parents, they should be protected as much as possible following a nuclear attack to minimize the possible genetic effects on their descendants resulting from too much exposure to nuclear radiation.

Little Protection From Special Clothing

Fallout radiation would pass through any type of protective clothing that would be practical to wear. Heavy and dense materials, such as earth and concrete, are needed to stop the highly penetrating fallout rays. Certain types of protective clothing could be useful—particularly for emergency workers—in keeping fallout particles off the body, but the wearer would not be protected from the gamma radiation given off by the particles. The worker would wear the clothing when in a fallout contaminated area, and then discard it or brush and wash it off thoroughly before entering a noncontaminated area.

Radiation Sickness Not Contagious

Radiation sickness is neither contagious nor infectious. Fallout radiation cannot make anything radioactive. Food and waste that have been exposed to fallout radiation are contaminated only to the extent that they contain fallout particles. Exposed food that may have particles on it can be made safe by washing, brushing, or peeling. Fallout particles can be removed from water supplies by sedimentation or filtering. People who have fallout particles on their bodies or clothing probably would not carry enough to endanger other people, but they should wash themselves for their own protection.

Radiation in the Air

Following a nuclear attack the air would be contaminated by radioactive fallout only to the extent that it contained fallout particles. The most dangerous fallout particles—early fallout—would reach the earth in the first day after the detonation, but their mere passage through the air would not contaminate the air. Fallout particles in harmful amounts would not be present in basement family shelters. People in underground family shelters could keep fallout particles out of their shelters by having a simple hood over the air-intake pipe. Special filters are not needed for small shelters. However, group shelters that have high-velocity air-intake fans would have to have filters on the air-intake system to keep fallout particles out.

Long-term Effects of Radiation

Following a nuclear attack, most radioactive elements in fallout would decay rapidly, losing most of their power to harm. However, for some time thereafter the hazard could continue to restrict normal activities in some parts of the country. A few elements, such as strontium 90, cesium 137, and carbon 14, are long-lived and could harm humans in some ways, such as by being absorbed by food plants. However, the long-term damaging effects of such exposure are not yet known in great detail.

Evacuation vs Shelter

Two conditions make pre-attack evacuation of less general value as a protective measure for nuclear attack than it appeared to be a few years ago: the danger of radioactive fallout to unsheltered evacuees, and the decrease in the probably attack-warning time if any enemy should attack with high-speed missiles. However, the problem of mass movement of people in the event of a nuclear attack is still a significant one because plans must be made to get people into shelters rather rapidly. Also, it may be necessary to move people out of severely damaged areas after an attack.

Probable Reaction to Disaster

Experience has shown that many human beings act cooperatively when disaster strikes, many feel helpless, a few panic. Disaster studies indicate that information, planning, and preparation clearly increase the extent of cooperative and constructive behavior following a disaster.

Record the time. The article has 1428 words. Find your reading speed in words per minute.

Now think over the passage you have just read—*but don't look at it*—and try to summarize the ideas mentally or in writing, whichever you prefer. Then prepare an answer sheet and take the following comprehension test.

Speeded Comprehension Test No. 11b

NUCLEAR EXPLOSION AND FALLOUT

1. Approximately how long does the brilliant flash of a five-megaton weapon last?
   a. Thirty seconds.
   b. One minute.
   c. Ninety seconds.
   d. Two minutes.

2. What is the initial speed of the blast wave of a five-megaton weapon?
   a. Less than 760 miles per hour.
   b. About 1,000 miles per hour.
   c. More than 2,000 miles per hour.
   d. About 5,000 miles per hour.

3. What is the minimum number of miles from a five-megaton burst at which all buildings would remain standing?
   a. 10.
   b. 20.
   c. 40.
   d. 50.

4. From what type of nuclear explosion would maximum fire damage result?
   a. A burst high in the air.
   b. A ground-level burst.
   c. One 500 feet above ground level.
   d. An underground burst.

5. Approximately how long would it take fallout from a five-megaton surface burst to travel 100 miles?
   a. One to two hours.
   b. Two to three hours.
   c. Four to six hours.
   d. Eight to ten hours.

6. How much radiation does a person receive from natural sources during an average lifetime?
   a. 10 roentgens.
   b. 25 roentgens.
   c. 50 roentgens.
   d. 100 roentgens.

7. To what extent will fallout radiation contaminate food?
   a. So much that the food will have to be destroyed.
   b. To the extent that fallout particles remain.
   c. For six hours after the removal of fallout particles.
   d. For 24 hours.

8. Which of the following is one of the elements mentioned as having long-lived radiation?
   a. Plumbum 15.

b. Calcium 25.
c. Cesium 1.
d. Strontium 90.

9. Which of the effects of a nuclear explosion travels farthest?
a. Blast wave.
b. Initial radiation.
c. Heat wave.
d. Fallout.

10. How does the value of pre-attack evacuation compare now with its value a few years ago?
a. Its value appears to have slightly increased.
b. It is about the same.
c. It is less valuable.
d. Its value has greatly increased.

Check your answers against those in the Key and grade yourself. Again record your speed and comprehension score.

Your reading rate was probably lower on this test than on the previous one, for here the ideas and words were more difficult. Incidentally, how many words in this selection had you guessing? If you can't remember for sure, go over the selection now and count them. You can give yourself an approximate vocabulary rating on the basis of the following table:

Sure of *all the words*	**EXCELLENT**
Not sure of *6 words or less*	**GOOD**
Not sure of *12 words or less*	**AVERAGE**
Not sure of *18 words or less*	**FAIR**
Not sure of *more than 18 words*	**POOR**

Three more vocabulary tests follow. When you are ready to take them, list numbers 1 through 20 for each tests on separate paper and go ahead.

Vocabulary Test No. 7

1. DIGRESSION: (a) advancement, (b) retreat, (c) wandering, (d) vocation, (e) study
2. CONVECTION: (a) guilt, (b) belief, (c) curvature, (d) circulation, (e) radiation
3. ANNUITY: (a) boredom, (b) pension, (c) persistence, (d) calendar, (e) anniversary
4. SUMMARILY: (a) totally, (b) abruptly, (c) recently, (d) finally, (e) repeatedly
5. SPECTRUM: (a) continuous range, (b) display, (c) hope, (d) gamble, (e) investment
6. OBLIQUE: (a) perpendicular, (b) parallel, (c) sharp, (d) slanting, (e) flat
7. DOGMATIC: (a) canine, (b) opinionated, (c) ambiguous, (d) uncertain, (e) tolerant
8. DORSAL: (a) side, (b) front, (c) lower, (d) back, (e) upper
9. REDUNDANT: (a) plentiful, (b) lacking, (c) superfluous, (d) fragrant, (e) reactionary
10. CALIPERS: (a) slingshots, (b) parts of gas masks, (c) garments, (d) gun sizes, (e) measuring instruments
11. ANNUALS: (a) years, (b) trials, (c) greetings, (d) byways, (e) chronicles
12. DEFRAYED: (a) torn, (b) cheated, (c) paid, (d) deducted, (e) repressed
13. LASSITUDE: (a) beauty, (b) weariness, (c) anger, (d) obstinacy, (e) politeness
14. IMPROVISE: (a) impose, (b) waste, (c) extemporize, (d) prophesy, (e) improve
15. PRECEPT: (a) interruption, (b) deceit, (c) rule, (d) foresight, (e) preference
16. DEPLETED: (a) unfolded, (b) marked off, (c) drained out, (d) sent away, (e) composed
17. FLAGRANT: (a) wandering, (b) scented, (c) wavy, (d) conspicuous, (e) carefree
18. ARBITER: (a) messenger, (b) orchard, (c) farmer, (d) referee, (e) ancient weapon
19. SOMNOLENT: (a) wise, (b) sleepy, (c) conceited, (d) tuneful, (e) melancholy
20. JEOPARDY: (a) disgrace, (b) partnership, (c) ecstacy, (d) peril, (e) ridicule

Check your answers against the Key.

Vocabulary Test No. 8

1. CONSCRIPT: (a) rewrite, (b) encircle, (c) draft, (d) make holy, (e) count
2. SUPINE: (a) delicate, (b) neat, (c) reclining, (d) sharp, (e) splendid
3. DEMOLITION: (a) destruction, (b) blame, (c) ammunition, (d) democracy, (e) distrust
4. DEPLOY: (a) spread out, (b) rob, (c) blame, (d) dismiss, (e) entice
5. RESURGENCE: (a) removal, (b) relapse, (c) obstinacy, (d) rebirth, (e) violence
6. CREDULOUS: (a) trustworthy, (b) indebted, (c) pious, (d) sincere, (e) gullible
7. PECUNIARY: (a) fishy, (b) thieving, (c) stingy, (d) queer, (e) financial
8. SEDITION: (a) planting, (b) erosion, (c) loyalty, (d) treason, (e) persistence
9. ABROGATE: (a) question, (b) dissent, (c) approve, (d) reduce, (e) repeal
10. EPAULETS: (a) shoulder insignia, (b) letters, (c) disciples, (d) monks, (e) directives
11. ABRASIVE: (a) cruel, (b) abusive, (c) smooth, (d) brief, (e) grinding
12. PRECARIOUS: (a) valuable, (b) indirect, (c) metallic, (d) risky, (e) intelligent
13. SURVEILLANCE: (a) survival, (b) drapery, (c) obedience, (d) supervision, (e) suburb
14. EXTORT: (a) laud, (b) exact, (c) disclaim, (d) detect, (e) garble
15. PATHOLOGIST: (a) bontanist, (b) debater, (c) warden, (d) prophet, (e) physician
16. PREPOSTEROUS, (a) too large, (b) too small, (c) absurd, (d) vague, (e) misleading

17. DEPREDATIONS: (a) debts, (b) regrets, (c) robberies, (d) disguises, (e) sermons

18. BENEFICIARY: (a) undertaker, (b) surplus, (c) kindness, (d) heir, (e) legacy

19. IRIDESCENT: (a) rainbowlike, (b) flavored, (c) obsolete, (d) bent, (e) irate

(20) TOXIC: (a) poisonous, (b) stimulating, (c) nervous, (d) cruel, (e) polished

Check your answers against the Key.

Vocabulary Test No. 9

1. BILATERAL: (a) bilious, (b) two-sided, (c) semi-solid, (d) unbalanced, (e) tardy

2. ATTRITION: (a) growth, (b) mediation, (c) penalty, (d) wearing away, (e) penetration

3. IMPAIRED: (a) coupled, (b) weakened, (c) hinted, (d) objected, (e) improved

4. METICULOUS: (a) jealous, (b) metallic, (c) old fashioned, (d) fussy, (e) overburdened

5. CIRCUITOUS: (a) limited, (b) round-about, (c) concerted, (d) disc shaped, (e) cut off

6. ALLEVIATED: (a) relieved, (b) climbed, (c) envied, (d) summoned, (e) force

7. PROGNOSTICATION: (a) antagonism, (b) fear, (c) delay, (d) prediction, (e) boredom

8. CELESTIAL: (a) famous, (b) heavenly, (c) chaste, (d) critical, (e) wintry

9. AUXILIARY: (a) remote, (b) eager, (c) supplementary, (d) austere, (e) defective

10. CAPITULATE: (a) rehearse, (b) protest, (c) weep, (d) surrender, (e) congratulate

11. RIGOROUS: (a) severe, (b) righteous, (c) sparkling, (d) gory, (e) uncouth

12. MANDATORY: (a) compulsory, (b) temporary, (c) stationary, (d) territory, (e) wicked

13. DEVIATED: (a) arrived, (b) denied, (c) digressed, (d) learned, (e) fallen

14. ALLEVIATE: (a) raise, (b) lessen, (c) order, (d) gather, (e) lower

15. ALLOCATE: (a) collect, (b) seek, (c) resolve, (d) replace, (e) assign

16. JETTISON: (a) jut, (b) discard, (c) zoom, (d) blacken, (e) rave

17. INGENUITY: (a) influence, (b) originality, (c) modesty, (d) deceit, (e) refinement

18. VOLATILE: (a) violent, (b) rash, (c) vaporizing, (d) corrupt, (e) dependable

19. RESIST: (a) desist, (b) insist, (c) incite, (d) repel, (e) compel

20. PROTOTYPE: (a) photograph, (b) original, (c) exception, (d) shorthand, (e) copy

Check your answers against the Key.

Looking Ahead

THIS VOLUME was created on the assumption that a clear presentation of the facts of reading would be convincing enough to prompt you to invest your time and effort in reading improvement. Evidently that assumption has been true, for here you are in the last chapter.

By this time, you have put forth many hours of work. In the 4, 6, or 8 weeks it took you to go through the program, you have turned hundreds of pages and you have read thousands of lines. Whether you increased your comprehension by 20 percent or only 5 percent, increased your vocabulary by a thousand words or only a hundred, or made a gain in reading speed of 100 percent or only 20 percent, you have made a good start along the road to reading success. Keep on going. Whatever you have accomplished by using this volume, you have accomplished on your own. You know enough now to keep going on your own. By continuing the practices you have learned through use of this volume, you will be able to continue your program.

Such work will provide triple and quadruple benefits. Your vocabulary will grow in power. It will not only give you new words to use but, because every new word adds a new fact, idea, or concept, it will also open your eyes to a new world around you. The more you continue to read, the more you will add to your mental storehouse. Your increased knowledge will enable you to notice situations and facts about yourself that you may have never noticed before. Because you will be able to read faster and quickly absorb the information given to you, you will be able to adjust to new situations more rapidly. In short, continued work in reading will mean further improvement in thinking as well as in reading.

There are no special instructions you need for this continuing reading program. Just try to follow a definite schedule, reading for about 20 to 30 minutes a day, 3 days a week. As you do, keep in mind the points made in connection with purposeful reading in Chapter 6. It might be interesting also to time yourself periodically so that you know how fast your speed is. Check your comprehension also.

If the facts and principles presented here have aroused your interet and given you the initial impetus toward reading improvement, this volume has served its purpose. You will agree by now that reading need not be something once learned but never deliberately improved. Continuing this program now rests with you.

Key to Tests

A-1

Speeded Comprehension Tests										
1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b
1. a	1. c	1. b	1. b	1. c	1. b	1. c	1. d	1. b	1. b	1. b
2. c	2. c	2. a	2. b	2. a	2. d	2. c	2. b	2. b	2. b	2. c
3. a	3. c	3. d	3. a	3. d	3. a	3. a	3. d	3. c	3. d	3. d
4. b	4. c	4. c	4. c	4. b	4. c	4. c	4. a	4. b	4. d	4. a
5. d	5. b	5. c	5. a	5. a	5. b	5. a	5. d	5. c	5. a	5. c
6. c	6. b	6. c	6. c	6. a	6. d	6. d	6. b	6. d	6. c	6. a
7. d	7. c	7. b	7. a	7. d	7. a	7. b	7. c	7. a	7. a	7. b
	8. b	8. b	8. d	8. b	8. c	8. b	8. d	8. c	8. b	8. d
	9. b	9. d	9. a	9. c	9. b	9. a	9. a	9. d	9. d	9. d
	10. d	10. a	10. b	10. b	10. d	10. b	10. a	10. a	10. a	10. c

Speeded Word Meaning Tests		
1	2	3
1. a	1. d	1. e
2. d	2. c	2. b
3. c	3. b	3. c
4. b	4. e	4. d
5. b	5. c	5. a
6. e	6. c	6. a
7. c	7. a	7. b
8. d	8. c	8. e
9. a	9. d	9. d
10. c	10. b	10. d
11. e	11. a	11. c
12. e	12. e	12. e
13. b	13. b	13. a
14. b	14. e	14. c
15. a	15. d	15. a
16. d	16. a	16. b
17. e	17. d	17. b
18. c	18. e	18. e
19. a	19. b	19. c
20. b	20. a	20. d

Vocabulary Tests								
1	2	3	4	5	6	7	8	9
1. b	1. c	1. b	1. d	1. b	1. e	1. c	1. c	1. b
2. d	2. e	2. c	2. c	2. d	2. b	2. d	2. c	2. d
3. e	3. b	3. c	3. c	3. a	3. e	3. b	3. a	3. b
4. e	4. d	4. c	4. d	4. e	4. c	4. b	4. a	4. d
5. a	5. e	5. d	5. d	5. c	5. b	5. a	5. d	5. b
6. d	6. a	6. d	6. a	6. d	6. d	6. d	6. e	6. a
7. e	7. c	7. c	. . d	7. d	7. a	7. b	7. e	7. d
8. c	8. d	8. a	8. d	8. c	8. e	8. d	8. d	8. b
9. d	9. c	9. c	9. a	9. d	9. d	9. c	9. e	9. c
10. a	10. a	10. d	10. c	10. b	10. a	10. e	10. a	10. d
11. c	11. b	11. b	11. b	11. c	11. d	11. a	11. e	11. a
12. a	12. a	12. c	12. d	12. d	12. a	12. c	12. d	12. a
13. e	13. c	13. d	13. a	13. c	13. a	13. b	13. d	13. c
14. b	14. b	14. d	14. a	14. b	14. b	14. c	14. b	14. b
15. c	15. e	15. c	15. d	15. e	15. e	15. e	15. e	15. e
16. c	16. c	16. d	16. c	16. a	16. d	16. c	16. c	16. b
17. b	17. c	17. c	17. c	17. d	17. c	17. d	17. c	17. b
18. d	18. a	18. c	18. c	18. b	18. e	18. d	18. d	18. c
19. e	19. d	19. b	19. d	19. b	19. a	19. b	19. a	19. d
20. a	20. e	20. d	20. c	20. e	20. c	20. d	20. a	20. b