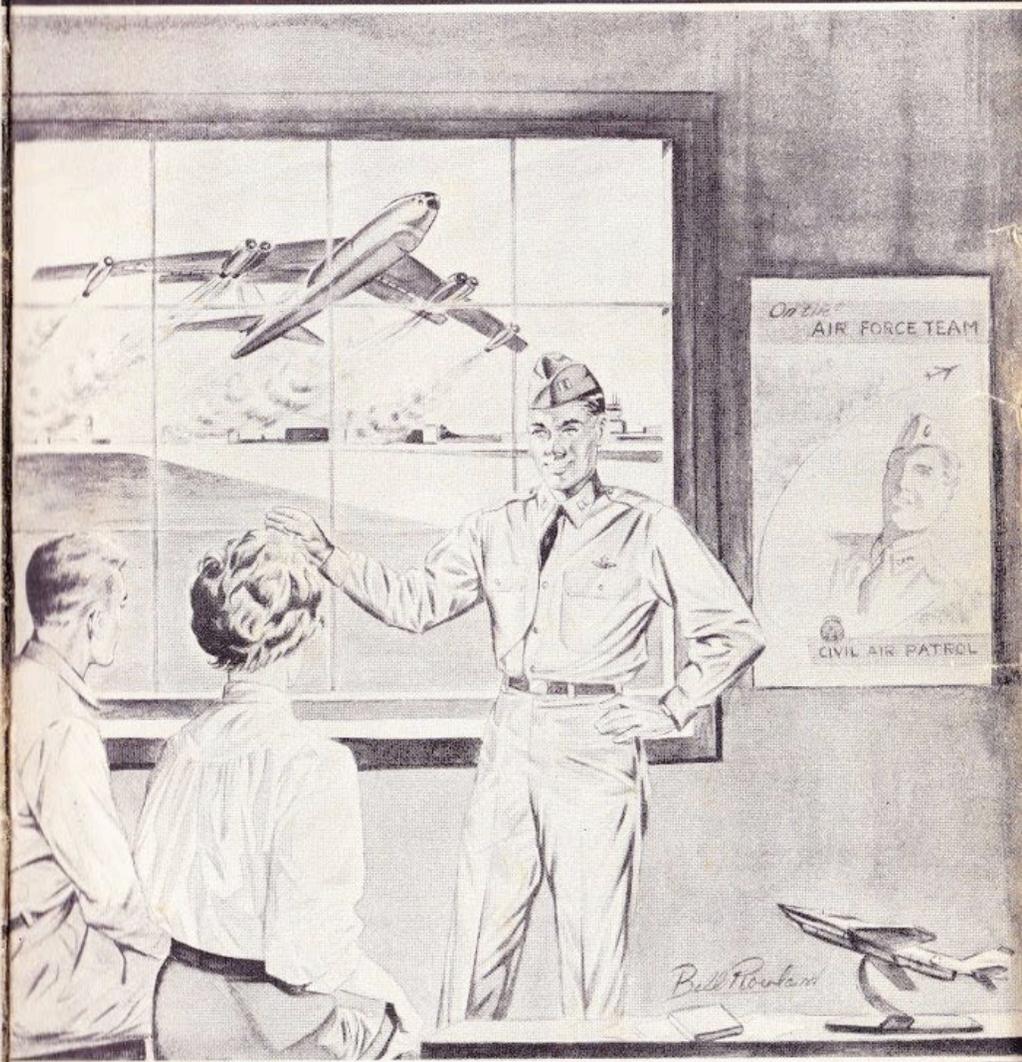


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AVIATION

AND YOU



WORK BOOK



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PREFACE

The exercises and activities prescribed in this workbook will help you attain the purposes of each lesson. These purposes will be brought to your attention by your instructor. No exercise is to be attempted until your reading assignment has been completed. Do not attempt the exercises until you have made preparation after planning with the instructor and paying heed to his presentation at the first lesson session. Do not hesitate to use every method at your command in order to obtain essential information. Observe, read, ask questions of your instructor and the resource people that visit your classroom. You will note that lessons are numbered in accordance with a natural sequence and not with reference to a particular workbook; for example, the first lesson of the workbook: Aircraft in Flight is Lesson VII; that of the workbook: Power for Flight is Lesson XIV. This procedure is also used to identify the lesson plans of the several booklets of the Instructor Guide series.

By means of a key your instructor will help you correct Exercises 1, 2, and 3 of each lesson. Since it has not been possible to key the responses to Exercise 4, the quality of these should be appraised during discussion by students and instructor.

HAROLD E. MEHRENS, Editor

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AVIATION AND YOU

Lesson I

EXERCISE NO. 1

(You have 5 minutes to complete this exercise.)

1. Place a T in the blank space preceding a true statement; place an F in the blank space preceding a false statement.

a. T Aviation has an influence in the life of every individual citizen of our nation.

b. F The features of aviation are so well known to all persons that there is no need for an aviation education program in the United States.

c. T The first controlled powered flight by man was made on December 17, 1903.

d. T Orville and Wilbur Wright made the most outstanding contribution to the history of aviation.

e. F The term "aviation" has one common meaning to all citizens.

f. T The shortest direct air route to Japan from New York would be to the north.

g. F Helicopters, like airplanes, must operate from runways.

h. IX The early development of our country was accomplished in the age of the wheel.

i. F Aviation has very little effect on the local community life in our small towns.

j. T History indicates that since the beginning of time men have always envied the ability of birds to soar through the air.

EXERCISE NO. 2

(You have 10 minutes to complete this exercise.)

1. Fill in the blank spaces with the word, or words, that properly complete the statement.

a. The magnitude of aviation's effects on civilization has increased as new developments in aviation aircraft have progressed.

b. Our young citizens cannot properly prepare to meet the challenge of the air age unless they receive proper instructions.

✓ c. The Wright brothers first powered flight was in the year 1903 and covered a distance of 12.0 ft in the time of 12 sec.

d. In pre-Biblical times travel over the surface of the earth was made much easier for men by the invention of the wheel.

e. The advent of the boat made it possible for men to travel great distances on the surface of the water.

X f. The invention of a lighter-than-air airplane made it possible for men to travel through the air in airplanes. Wing

g. The dictionary says that the act and practice of operating heavier-than-air craft is known as aviation.

h. The only means of transportation that can easily overcome such obstacles as mountains, deserts, swamps and ice caps is air travel.

X i. Aviation has made unbelievable advances during the past 150 years.

X j. Today regular commercial passenger flights are made from New York to London in approximately 12 hours.

EXERCISE NO. 3

(You have 5 minutes to complete this exercise.)

1. Draw a circle around the number preceding the phrase which is best to make the statement a correct expression.

a. The first successful powered flight by heavier-than-air craft was made at:

1. Dayton, Ohio.
2. Maxwell Field, Alabama.
- ③ Kitty Hawk, North Carolina.
4. Langley Field, Virginia.

b. The outstanding event in the history of aviation was:

1. The development of helium for lift.
2. The invention of the wheel.
3. The invention of the gasoline engine.
- ④ The invention of the wing.

c. Recent rapid advances in air transportation are based upon:

1. Mythology.
- ② Scientific research.
3. Philosophy.
4. Man's eagerness to fly.

d. Among other things, aviation means:

1. Increased expenses.
2. Increased obstacles.
- ③ The air age.
4. Misunderstandings with foreign countries.

✓ e. It took six months for pioneers to travel in wagons from Missouri to California. Today we can travel by air from Maine to California in less than:

- ① One day.
2. Two days.
3. Two hours.
4. One week.

EXERCISE NO. 4

(You have 15 minutes to complete this exercise.)

1. Draw your impression of what the airplane first flown by the Wright brothers looked like.

2. List the outstanding differences that you believe existed between the "Wright Flyer" airplane and a typical single engine World War II fighter airplane.

3. State in your own words what the term "aviation" means to you.

Lesson II

EXERCISE NO. 1

(You have 5 minutes to complete this exercise.)

1. Place a T in the blank space preceding a true statement; place an F in the blank space preceding a false statement.

a. F Your social life is not affected by aviation.

b. T Under today's conditions of air travel it is relatively easy for world leaders to assemble for conference.

c. T Our political and economic surroundings are definitely influenced by aviation.

d. T It is now quite common for us to measure distance by time rather than miles.

e. T Our main defense against aggression is the retaliatory threat of air power.

f. ~~F~~ F In spite of Germany's complete control of the skies, the Allies emerged victorious in World War II.

g. F The North American continent is not vulnerable to attack by enemy aircraft.

h. T New planes are designed in the engineering section of aircraft manufacturing plants.

i. T In 1957 the aircraft industry needed thousands more aeronautical engineers than were available.

j. T It often takes several years from the time an airplane is designed until it goes on operational status.

EXERCISE NO. 2

(You have 10 minutes to complete this exercise.)

1. Fill in the blank spaces with the word, or words, that properly complete the statement.

a. Two new great industries brought into being by aviation are the engineering and the aviation industries.

b. The best design of an airfoil to give adequate performance is often discovered in wind tunnel tests.

c. To avoid unnecessary expense, aircraft designs are first tested by small scale models.

d. The first flying model of a new airplane is called a prototype.

e. The production line in an aircraft factory is more commonly called the assembly line.

f. On its first flight a new plane is always flown by a test pilot.

g. Since aviation has brought all nations so close together in terms of travel, we can no longer give serious consideration to isolationism as a national policy.

h. All parts of scale models of airplanes that an aircraft manufacturer proposes to build should be constructed in exact scale to those of the proposed plane.

i. There are approximately 100 manufacturing corporations in the United States which make airplanes, airplane engines, or propellers.

EXERCISE NO. 3

(You have 5 minutes to complete this exercise.)

1. Draw a circle around the number preceding the phrase which best makes the statement a correct expression.

a. The greatest changes caused by aviation in the ideas held by the average American are those about our relations with:

1. Our friends.
2. Our neighbors.
- ③ Other countries.
4. Unknown obstacles.

b. By the end of World War II the United States had become a world leader in aviation because of:

1. Unlimited funds.
2. Lack of interest in other countries.
3. The aid offered by our few scientific wizards.
- ④ The combined efforts of thousands of interested men, women and youth.

c. Scale models of airplanes are tested for desirable aerodynamic performance in a:

- ① Wind tunnel.
2. Smoke streamer.
3. Laboratory.
4. Pressure chamber.

d. The largest single industry directly affected by increased developments in aviation is:

1. The manufacturers of aluminum.
- ② The aircraft manufacturing industry.
3. The rubber industry.
4. The scientific research industry.

e. The engineering section of a single aircraft manufacturing industry may employ as many as:

1. 150 people.
2. 500 people.
3. 700 people.
- ④ 1000 people.

EXERCISE NO. 4

(You have 15 minutes to complete this exercise.)

1. Draw a diagram of a wind tunnel showing a scale model under test.
2. List the career fields open to you in the aircraft industry.
3. In fifty words state your thoughts on why the accomplishments of aviation are still daily news.

Lesson III

EXERCISE NO. 1

(You have 5 minutes to complete this exercise.)

1. Place a T in the blank space preceding a true statement; place an F in the blank space preceding a false statement.
 - a. F In 1939 the value of all aircraft manufactured in the United States was about \$250,000,000.
 - b. F In 1953 the value of all aircraft manufactured in the United States was about \$8,500,000.
 - c. T Our military aircraft are designed to meet certain specifications as determined by the purpose for which the plane is to be used.
 - d. F The aircraft industry offers very few vocational opportunities to today's young people.
 - e. T The rapid growth of the airlines and their services would not have been possible without the teamwork of their employees.
 - f. T All air transport companies have extremely high standards for performing periodic service checks of equipment.
 - g. F The scheduled civilian airlines maintain a military bureau to recruit military pilots for future airline employment.
 - h. T It takes operating, maintenance and administrative personnel to run an airline.
 - i. T Each transport plane is given a careful check by the pilot and crew before each flight.
 - j. F None of our airline pilots received their flight training in the United States Armed Forces.

EXERCISE NO. 2

(You have 10 minutes to complete this exercise.)

1. Fill in the blank spaces with the word, or words, that properly complete the statement.

- a. Between 1903 and 1938 only 50000 airplanes were built.
- b. Between 1939 and 1953 450000 airplanes were built.
- c. In the last 15 years the manufacture of airplanes has become Big business.
- d. Commercial airlines are a vital part of the air transport industry.
- e. Airline service includes the transportation of passengers, mail, express and freight.
- f. An airplane is kept in condition for safe flight by proper operation, check and overhead.
- g. People who make observations and forecasts of weather for flight planning are called meteorologists.
- h. Freight must be properly stowed in the aircraft so that weight distribution is balanced.
- i. As a safety precaution, airframes are rebuilt after a certain number of 8000 operating hours.
- j. The air crew member responsible for the airplane and its contents while in flight is the maintenance man.

EXERCISE NO. 3

(You have 5 minutes to complete this exercise.)

1. Draw a circle around the number preceding the phrase which is best to make the statement a correct expression.
 - a. The aircrew member responsible for planning the flight to be made is the:
 1. Pilot.
 2. Engineer.
 3. Navigator.
 4. Stewardess.

Lesson IV

EXERCISE NO. 1

(You have 5 minutes to complete this exercise.)

1. Place a *T* in the blank space which precedes a true statement; place an *F* in the blank space which precedes a false statement.

a. *T*..... Airplane parts that are worn beyond prescribed tolerances are replaced.

b. *F*..... Aircraft mechanics are required to have only a general knowledge and mechanical aptitude.

c. *T*..... A CAA regulation requires that major alterations and repair of aircraft must be made or supervised by certified mechanics.

d. *T*..... In addition to periodic checks and overhauls, airlines require that any needed aircraft repairs which would affect safety of flight are made on the spot.

e. *PF*..... It is not necessary for control tower operators to be certified by CAA.

f. *IT*..... The airport hangar or repair station may appear to be a mass of confusion to the casual observer.

g. *T*..... The air transport industry requires top standards in its employees but at the same time offers challenging careers and good salaries.

h. *T*..... In 1938 scheduled airlines in the United States employed 1,135 pilots and 9,008 other trained personnel.

i. *T*..... By 1954 the scheduled airlines in the United States employed 9,437 pilots and 109,392 other trained personnel.

EXERCISE NO. 2

(You have 10 minutes to complete this exercise.)

1. Fill in the blank spaces with the word, or words, that properly complete the statement.

a. After finishing high school and college, if you want employment with an airline you would apply to the airline *personnel*..... office.

b. The United States government agency that assures us of the proficiency of all airline aircrew members is the *CAA*.....

b. An airline hostess is generally considered to be:

- 1*. An aircrew member.
2. An administrative employee.
3. A maintenance employee.
4. A dispatcher.

c. The airline employee that must make certain all required conditions are met by the pilot, his crew, and his aircraft before authorizing departure of a flight is the:

1. Test pilot.
2. Engineer.
3. Meteorologist.
- 4*. Dispatcher.

d. All airlines check every aircraft and its power plant before each flight, as well as make daily or "turn-around" inspection of equipment. However, different companies do vary their procedure in the handling of period service checks of:

1. Cargo.
2. Passengers.
- 3*. Equipment.
4. Flight plans.

e. In the year 1954 the carrying of almost a million military passengers on scheduled airlines resulted in:

1. Little effect on our military.
2. No saving in manpower.
3. A reduction in civilian passenger service.
- 4*. A huge saving in military manpower.

EXERCISE NO. 4

(You have 15 minutes to complete this exercise.)

1. Write a brief statement of why, in your opinion, engineers are so vitally needed and are so important to future development of the aircraft manufacturing industry.

2. Make a list of ten jobs in the air transport industry.

3. List three reasons why it is essential having an aircraft manufacturing plant adjacent to an airfield.

c. Within a period of 15 years (1939-1954) the air transport industry has increased its profits 820 times.

d. Even farmers and ranchers of today are directly affected by the aviation industry.

X e. The need for strong lightweight metals in aviation has stimulated metallurgical research.

X f. In 1954 the scheduled airlines used 10,000,000 gallons of oil.

X g. In 1954 the scheduled airlines used 1 billion gallons of gasoline.

h. The oil and gasoline used by scheduled airlines was enough to keep 25,000 automobiles operating for 50 years.

X i. Aviation both serves and is served by all industrial areas.

X j. The distance flown by scheduled airlines in 1954 would be the equivalent of 3 round trips to the moon.

EXERCISE NO. 3

(You have 5 minutes to complete this exercise.)

1. Draw a circle around the number preceding the phrase which is best to make the statement a correct expression.

a. Most airlines make it possible for its employees to become increasingly proficient in their jobs by conducting:

1. A plan for receiving suggestions from the employees.
2. Programs for rapid increases in salary.
- ③ In-service training and instructional programs.
4. Free orientation flights.

b. On the basis of passenger accommodations, the air transport industry of 1954 in comparison to that of 1938 was:

1. Twice as large.
2. Eight times as large.
- ③ Sixteen times as large.
4. Twenty-eight times as large.

c. Today the size and scope of the air transport industry is:

1. Consolidating and slightly reducing its recent rapid gains.
- ② Continuing to expand.
3. Decreasing operations until jet airliners are available.
4. Neither increasing nor decreasing operations.

d. In 1938 the net profit of commercial airlines was approximately:

- X
- ① \$5,000,000.
 2. \$25,000,000.
 3. \$50,000,000.
 4. \$100,000,000.

e. In 1954 the net profit of commercial airlines was approximately:

- X
1. \$5,000,000.
 2. \$25,000,000.
 3. \$50,000,000.
 - ④ \$100,000,000.

EXERCISE NO. 4

(You have 15 minutes to complete this exercise.)

1. Draw a facsimile of the trademark of three major airlines.
2. Draw a picture of what you believe an airliner will look like 25 years from now.
3. State three reasons why there has been such a tremendous growth in the air transportation industry.

Lesson V

EXERCISE NO. 1

(You have 5 minutes to complete this exercise.)

1. Place a T in the blank space which precedes a true statement; place an F in the blank space which precedes a false statement.

a. T General aviation employs more pilots than the scheduled and non-scheduled airlines.

b. F Airplanes are of no particular value to commercial fishermen.

X c. T The forestry service often uses aircraft to re-seed forests.

d. AT Individual businessmen today own approximately 18,000 aircraft.

e. FF Aviation's service to all industrial areas in the United States flies approximately one-half as many plane miles as are flown by airlines.

f. T Action in World War II demonstrated conclusively that modern warfare cannot be successfully waged without air power.

✓ g. I The United States Air Force was made an independent branch of the U. S. Armed Forces in 1947.

h. F To save the taxpayers money the United States Government has, since World War II, continuously decreased the amount of money allotted each year to military aviation.

i. I Most authorities agree that today's greatest deterrent to possible enemy attack on the United States is the U. S. Air Force.

j. PT Some of our experimental military aircraft have been flown at speeds in excess of 1800 miles per hour.

EXERCISE NO. 2

(You have 10 minutes to complete this exercise.)

1. Fill in the blank spaces with the word, or words, that properly complete the statement.

a. Youth interested in an aviation career should make a comparative study of the rewards of civilian and military aviation.

✓ b. The term that designates general uses of the airplane, such as those made by agriculture and small business, is general aviation.

c. The National Security Act of 1947 gave the Air Force equal organizational status with navy and forces.

d. In 1945 commercial air transport aircraft had average speeds of approximately 150 miles per hour.

e. Air transport aircraft in use today which are equipped with turbo-prop engines cruise at over 400 miles per hour.

✓ f. The problem of refrigeration in today's high speed military aircraft is enormous because of heat generated by friction.

g. Flight no longer needs to depend on fantasy in order to challenge the imagination of youth.

h. The control of mosquitoes and other harmful pests today is often handled by gunshots from airplanes.

✓ i. Mining engineers are able to travel quickly to and from isolated mines by the use of helicopters (or) biplanes.

EXERCISE NO. 3

(You have 5 minutes to complete this exercise.)

1. Draw a circle around the number preceding the phrase which is best to make the statement a correct expression.

a. One of the most important uses which industry and business makes of the airplane is to transport:

1. Engineers.
- ② Administrative personnel.
3. Important documents.
- ④ Unobtainable material.

b. A great barrier to the advancement of speed in our military aircraft, which has now been conquered, is:

1. The thermal barrier.
2. The proficiency of engines.
- ③ The sound barrier.
4. The rapid deceleration barrier.

7/ c. Another barrier not yet completely conquered is:

- ① The thermal barrier.
2. The proficiency of engines.
3. The sound barrier.
4. The rapid deceleration barrier.

d. Any review of career opportunities available to you would be far from complete if you did not consider the opportunities offered by:

1. High school.
2. College.
3. Aviation.
4. Municipal officials.

e. Today there is need for commercial aircraft with cruising speed of 500 miles per hour or better, and landing speed of:

- ① Near 0 miles per hour.
2. Approximately 75 miles per hour.
3. Approximately 100 miles per hour.
- ④ Approximately 150 miles per hour.

EXERCISE NO. 4

(You have 15 minutes to complete this exercise.)

1. State briefly what the term "general aviation" means to you.
2. List ten career opportunities in general aviation.
3. List ten career opportunities in military aviation.

Lesson VI

EXERCISE NO. 1

(You have 5 minutes to complete this exercise.)

1. Place a T in the blank space which precedes a true statement; place an F in the blank space which precedes a false statement.

a. T Many of our colleges now offer courses leading to a degree in aeronautical engineering.

b. T Many of our public schools have altered their courses to enable our young men and women to prepare for their future in the air age.

c. F The combined aviation training programs of public schools, trade schools and airlines are more extensive than the USAF training program.

d. F Recent surveys show that our colleges and professional schools have had a great increase in the number of aeronautical engineering graduates.

e. T In the Civil Air Patrol you will have an opportunity to discover which aviation specialty has the greatest appeal for you.

f. T It is a well known fact that during the past few years the Soviet Union has had more students graduating with engineering degrees than has the United States.

g. T As a Civil Air Patrol cadet you will have opportunities for many new experiences.

h. F You will probably not have an opportunity to visit an airport as a part of your CAP activities.

i. T Aviation is very important to you because its impact actually centers upon you.

j. T As the leaders of tomorrow will come from the youth of today, it is for your own best interests that you are urged to investigate, determine, and start preparing for your future career.

EXERCISE NO. 2

(You have 10 minutes to complete this exercise.)

1. Fill in the blank spaces with the word, or words, that properly complete the statement.

a. Schools have found it necessary to modify their curricula to the degree that each curricula area has been affected by aviation.

b. In a recent survey it was found that 37 7269 United States colleges conferred degrees in aeronautical engineering.

c. The same survey revealed that 25 additional colleges offered a program of studies in either aeronautical administration or other aviation service fields.

✓ d. Every state of the Union has now established aviation trade schools.

e. Airlines, aircraft assembly factories, and aircraft engine plants all maintain schools or apprentice training programs.

f. There is presently a great need in the United States for graduates with an aviation engineering degree.

g. Civilian schools established to teach aviation skills are certified by the CFA.

h. Aviation has a potential for evil insofar as it can aggravate international tensions.

✓ i. The Air Force offers 43 different career fields.

j. A thorough knowledge of mathematics is a prerequisite for a degree in aviation engineering.

EXERCISE NO. 3

(You have 5 minutes to complete this exercise.)

1. Draw a circle around the number preceding the phrase which is best to make the statement a correct expression.

a. The United States Air Force offers a program of aviation training in one or another of the following number of career fields:

1. 23.
2. 43.
3. 65.
4. 72.

b. Both civil and military aviation are presently unable to obtain the needed numbers of:

1. Airplanes.
2. Aeronautical mechanics.
3. Cargo planes.
4. Aeronautical engineers.

c. In 1950 the number of men and women graduated from college with engineering degrees was:

1. 19,000.
2. 35,000.
3. 49,000.
4. 52,000.

d. In 1954 the number of men and women graduated from college with engineering degrees was:

1. 19,000.
2. 35,000.
3. 49,000.
4. 52,000.

e. The number of engineers graduated in the Soviet Union in 1954 was:

1. 19,000.
2. 35,000.
3. 49,000.
4. 52,000.

EXERCISE NO. 4

(You have 15 minutes to complete this exercise.)

1. State briefly why you now should begin to prepare for your future career.
2. Other than piloting, which career in aviation would be most interesting to you? Why?
3. What, in your opinion, is the most profitable experience, careerwise, that you can get out of your membership in Civil Air Patrol?