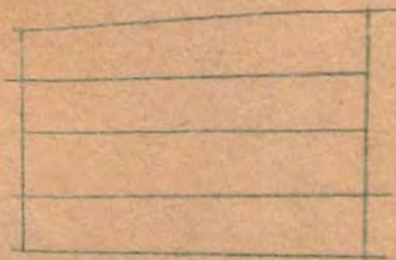
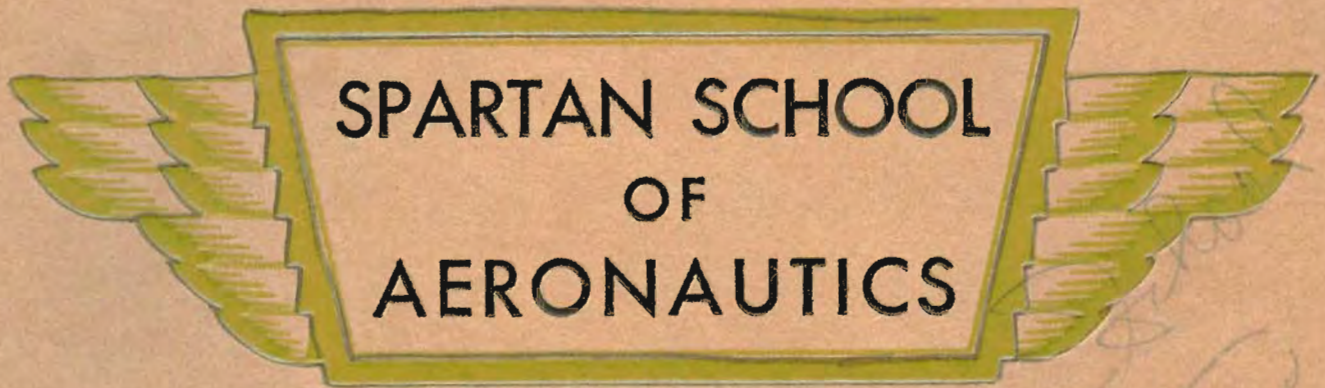


SPARTAN SCHOOL OF AERONAUTICS



SPARTAN SCHOOL  
OF  
AERONAUTICS



1930

MUNICIPAL AIRPORT  
TULSA, OKLAHOMA





*The airplane knows no bounds — its highway  
is the sky*

# Foreword



THE EMINENT WRITER on financial topics, Mr. B. C. Forbes, recently discussed in his column, which appears in many leading newspapers, the question of great fortunes and how they are made.

He mentioned the names of the Harrimans, the Carnegies, the Rockefellers, the Schwabs, and others. In each case the fortune in question was made by *pioneering*. The Harriman money was made in railroads, the Carnegie money in steel, and the Rockefeller fortune in oil, and so on. But in every case these vast fortunes were built up because the founder was a *pioneer*. He saw a golden opportunity in an industry or business which was *new*. And he seized the opportunity and cashed in because he had the vision and the courage of a pioneer.

Bearing on the same question, Henry Ford recently said that a young man need not save money. Rather, the young man should spend his money as fast as he can make it to *improve himself*.

In these few words is a moral and a message to every young man or even young woman interested in aviation. Aviation is still new, still fresh. You have an opportunity to be a pioneer in aviation.





THIRD EDITION



# Producing Better Pilots



**S**CHOOLS OF AVIATION no longer spring into existence overnight, flourish on the strength of sensational advertising—and prosper. The modern flying school is a business institution and

commands the respect of its community. There are two reasons for this change of complexion.

First, the public has become educated to accept aviation. The various fields of aeronautical endeavor are no longer mysterious to the ordinary citizen. Those who have followed aviation to any extent at all have learned to recognize the makes of various airplanes by their silhouettes. They can distinguish by markings the licensed from the unlicensed airplanes. They know that airplanes, pilots and schools are subject to examinations on competence, and that pilots with Government licenses have passed exacting tests.

Second, the United States Government has taken an active interest in flying schools. To protect the prospective flying student it has established a series of rigid examinations for schools—on courses offered, equipment used, and instructors employed. Any school may apply for Government examination and recognition, yet to gain this recognition a school must have sufficient capital to maintain excellent flying and ground equipment, a staff of expert instructors and a high standard of general efficiency. So when the Government issued a license to our school

of aviation it said in effect: "We have examined this school. All of its equipment and all of its instructors measure up to Government requirements. It is rated as a transport school, both in flying and ground instruction."

Early in the commercial era of aviation the public learned that a Government license, either for airplane or pilot, was the only established safeguard for those who traveled by air, and transport lines took pains to inform the traveler that their airplanes and pilots were Government-licensed. Now the public has learned to recognize the same distinction in flying schools. The only difference is that the number of schools with transport rating are few indeed compared to the number of licensed airplanes and licensed pilots.

The Spartan School of Aeronautics is proud of its Government recognition as both transport flying and ground school. This obligates Spartan to pass 90 percent of its active students in their respective courses, which means that every student receives more than full value on his investment in a Spartan course. It means

that Spartan equipment—one airplane for every five students in place of the Government requirement of one for every fifteen students—has been found modern and dependable; that Spartan licensed instructors are men of high character and that Spartan is fully capable of producing pilots thoroughly trained in the classifications established by the Government.



S. L. Willits,  
Director





# Business Administration



THE INFORMATION IN this chapter on Business Administration may not prove to be romantic reading and yet it should be of essential interest to those who expect to get thorough, complete training—both in the air and on the ground—in preparing themselves for a future in aviation. For without effective operation methods upon which students learn to depend for constant progress towards a goal, a school may take not only a student's money, but eliminate incentive, and encourage the development of careless habits. And carelessness has no place in aviation.

The point may best be illustrated by drawing a comparison between the school without sound methods of operation and the school that makes a business of seeing that its students show steady progress.

Consider the hundreds of "flying schools" which bravely struggled against all manner of odds several years ago. In competition with the modern school they have passed or are passing out of the picture. They were under-capitalized; their equipment usually consisted of cast-off Army airplanes and their instructors, even when blessed with unusual ability, were, nevertheless, hopelessly handicapped under a multitude of responsibilities, one of which was "giving flying time."

Proper business administration requires a large amount of exacting office work and a staff of competent clerks. For this reason the old style "flying school" had no business administration, because it was regarded as an overhead expense. As a result, students of such schools wasted long hours at the flying field waiting for an airplane to come down, to be repaired, or for the instructor to return from a cross-country trip. Flying periods were not fixed, ground school instruction was almost entirely neglected and records were kept in a haphazard manner. And usually the student was hurried through his period in the air because there were others on the field waiting their turn.

The new system of aeronautical instruction at the Spartan school under the transport rating requirements of the U. S. Department of Commerce, is radically different from that of the "old style" school.

Norman G. Souther,  
Business Manager



A Spartan  
school flight  
record card



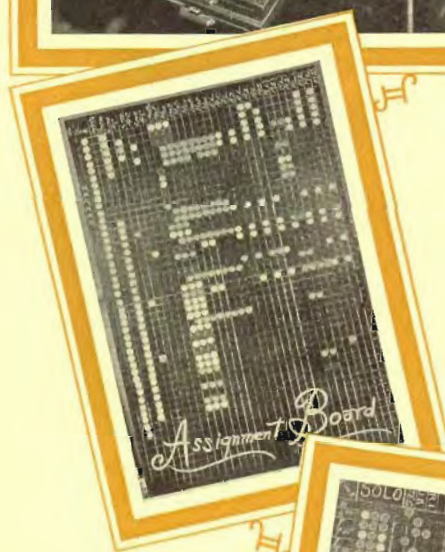
A weekly schedule card indicating the classes which the student must attend. Every Spartan student receives a schedule card at the beginning of the week.







One of the  
Rand-Kardex  
record files



The assignment  
board for  
mechanics  
courses



The flight assignment board

A Spartan student knows at least one week in advance the hours of each day that he is to devote to certain school activities—when he is to report to classroom and when he is to report for flight—and he has the satisfaction of knowing that regardless of the number of students, a training airplane is always ready for his use. He will be expected to be on time for each class, he will be graded system-

atically and he will not be permitted to transfer from one subject to another until the first is satisfactorily mastered—with *passing grade*. He will have a progressive record of his own, and from start to finish the chief instructor will supervise his work.

When a student enrolls at the Spartan School of Aeronautics he is requested to fill out a history card. This card then becomes a record of information which may prove of benefit in case the student's future employer desires references after the student has left school.

One section of this Rand-Kardex record will show the student's progress through the ground school. It will indicate what subjects have been studied, and what grades resulted. It will show which instructor he has been assigned to, and when successive subjects are to be taken up.

A second section of the card will be devoted to an exact financial account for the student, and the reverse side will show his flight record for his entire period of attendance at the school—the date, the hours and the minutes he was in the air.

One portion of each card is reserved for the student's final examination record, which is required before a student may go before a Government inspector to be examined for a pilot's license. This final Spartan examination will be purposely strict, so that the student passing is practically assured of a license in the grade he desires, thus reducing possibility of failure to the minimum.

The Spartan flight board indicates each student's flight schedule for an entire week—when he is to fly, and the number of the airplane he will use. On the other hand, the assignment board indicates ground school subjects covered, grades earned, future classes and subjects that remain to be studied.

The flight card is another interesting phase of this system. It indicates maneuvers the student is to master in the air, so that when a student goes up he knows in advance whether he is to practice turns, stalls, spins, or landings. This flight card eliminates useless flying and waste of time.

Norman G. Souther, business manager, heads the Spartan staff. For a young man Mr. Souther has had an unusual amount of experience in aeronautical business administration, and his wide experience has made him known to pilots, flying students and prospective students wherever aeronautical journals are read. Whether a prospective or regular student, Mr. Souther will answer all questions concerning the reception a Spartan graduate may expect in commercial aviation.



# Semi-Military Training



**I**N THE INTEREST of efficiency Spartan has adopted a policy which, in the regulation of a student's flight and ground school training, is akin to military exactness. This system is obviously created to help—not to restrict—the Spartan student.

A Spartan student is not expected to arise or retire at a certain hour. There is neither reveille nor retreat, and his activities outside of training hours are in no way governed by the school. But during school hours he is expected strictly to abide by the schedule that has been laid out for him, unless he has an excuse from the business office, the chief flying instructor, or the ground instructor.

Many schools promise to teach a student to fly in a remarkably short period of time. The Spartan promise is to teach the student in the shortest time possible—but to teach him thoroughly—and since the U. S. Department of Commerce requires certain minimum hours of preparation and a certain standard of competence from pilots, this semi-military training system is the Spartan method of reducing a training period to the shortest possible time. It functions through a schedule card system.

Each student receives a schedule card at the beginning of each week. The card indicates when he is to attend classes and where. Suppose his first class is at 8 o'clock. At 7:55 the warning bell rings. When the second bell rings at 8:00 the student

should be in his seat ready for work. His first class may be dismissed at 9:30, the second alarm bell will ring at 9:40 and he should be seated for work at the next bell—9:45.

If a student's card indicates that he should report to the line at the Spartan hangar at 1 o'clock, he must be there promptly, for his airplane will be warmed up and ready to take the air at the specified time. The student is expected to take advantage of this effort by the school to give full value in every course.

Outside of school hours, Spartan instructors rely upon their students to conduct themselves as representatives of the Spartan School of Aeronautics, as symbolized by the silver pin presented to each student upon enrollment. As long as this idea is recognized, school executives do not interfere with a student's leisure hours. There are no rules and regulations, for the Spartan honor system prevails entirely.

Experience has satisfactorily established this honor system to the mutual advantage of both school and student. Students recognize their responsibility and co-operate with school executives in regulating their own as well as the conduct of other students. It is also readily recognized that where there are rules and regulations to break, the average student body will take pleasure in breaking them, but where a student's honor is involved, he usually thinks twice before permitting anything to occur that will have a bearing on his record.



*A Spartan  
graduating class*



*H. E. Boggs,  
Personnel Director*



*An instructor  
and student*



# Spartan Flight Equipment



**T**HOSE WHO ARE seriously planning an aeronautical career should take the precaution of first becoming familiar with the visible, elementary factors of commercial aviation. A liberal beginner's education may be obtained at almost any airport in America.

Go to the nearest airport or flying field and note the kind of equipment in use. If the field is a base for student flying activities, airplanes powered with obsolete water-cooled engines are likely to be found. Although you will rarely see a cast-off Army "Jenny" in commercial service, many schools still employ the old type of equipment for training because it is modest in cost and considered "good enough" for student instruction purposes.

If the airport is active at all, it will be noticed that the majority of airplanes in use are maintained for business or transport purposes. Whether of the open-cockpit or cabin type, most of them will be powered with modern, radial type, air-cooled engines. This is because the highly developed, efficient, air-cooled engine has proved itself more useful and dependable in commercial aviation.

Prospective aviation students should take particular note of this fact, and select a school where the

training equipment used is of exactly the same type as that which they will be called upon to fly in the future.

The reason for this suggestion is obvious. Let the flying student train in obsolete equipment and apply for employment at any aviation office. He will discover that without extensive experience with modern airplanes and modern engines, his application will receive scant attention.

Spartan flight equipment is strictly modern in every detail. All training airplanes are licensed by the U. S. Department of Commerce, regularly inspected by licensed mechanics, and are all powered with radial, air-cooled engines. The equipment in which the student learns to fly at the Spartan school is the same as that used in all branches of commercial aviation.

Spartan training airplanes are manufactured by Spartan Aircraft Company, with the exception of two other models maintained by the school to give students a wide range of experience in flight instruction. Spartans are in use throughout the United States and several foreign countries. They have proved their reliability under every known condition of flight and are, therefore, admirably suited for student training.



*Ellis M. Fagan,  
Chief Instructor*



*T. E. Caraway,  
Senior Instructor*



*J. J. Keiffer,  
Flight Instructor*



*Roger Inman,  
Flight Instructor*



SPARTAN "J6"



*A Spartan G-3-165, powered with the Wright "Whirlwind Five" engine, used for advance Spartan student instruction*

All Spartan training airplanes are housed and serviced in one of the largest stucco-steel hangars in the country, built and maintained by Spartan Aircraft Company. The building is occupied in part by the offices of the Spartan School executives, the Spartan sales department and an unique airplane showroom. The balance is given over to the Spartan sales department and storage space for school training airplanes. This in itself is an added advantage for the Spartan student, because during his daily routine he comes into contact with men engaged in the business side of aviation, and thus becomes imbued with the spirit of aviation as a tremendous new institution.

A Spartan student's flight training begins at the modern Spartan hangar. At each appointed flight hour mechanics have the training airplanes in readiness. They are rolled from the hangar onto the wide spread of concrete and are thoroughly warmed up. When they are ready, instructors and students take their places and one by one they taxi across the field into position for the take off.

From the Tulsa Municipal Airport instructors and students fly one mile due east to an auxiliary field, leased and equipped by the Spartan school for the exclusive use of its students. This field is of ample proportions, flat and covered with turf. Its boundaries are distinctly marked, the regulation white

circle indicates its exact center and, except for hangars and similar equipment, it is an airport in itself.

The advantage of an auxiliary field is obvious. Flight training goes forward rapidly and without interruption, whereas on the busy airport, with airplanes constantly coming and going, student training is seriously interrupted; for the student-pilot, like others, must wait until the runways are clear for take-offs or landings.

From an opposite viewpoint, however, the proximity of such an airport is of great interest and advantage to the average student. Because of its excellent facilities for housing both transient pilots and their airplanes, the Tulsa Municipal Airport daily attracts a wide variety of aircraft. Army and Navy airplanes, casually en route from coast to coast, are seen almost daily and it has been observed that in one week almost every prominent American and foreign made airplane has landed at the Tulsa airport. In addition, four large transport companies operate from this base. Two use heavy, 14-passenger, tri-motored transports and augment their service with various types of smaller airplanes.

Southwest Air Fast Express, one of the country's largest transport companies, has base headquarters in a hangar adjoining that of Spartan. Here the Ford tri-motor airplanes of the Safeway Lines are



being serviced constantly by crews of mechanics, and Spartan students thus have the opportunity of studying this type of craft in detail.

On the opposite side of the field is located the hangar and operations headquarters of a division of the Universal Air Lines. This company operates tri-motored and single motored Fokkers, as well as all-metal, single-motored cabin airplanes. All of this equipment, too, may be studied and inspected by Spartan school students.

After each flight period Spartan training airplanes are returned to the base of operations at the Municipal Airport and are inspected before they are used for the next flight period. Licensed mechanics check over every detail and if an airplane is not functioning properly it comes out of the line for that day and one of the reserve airplanes takes its place.

The number of Spartan training airplanes available is not restricted, and is regulated only in relation to the number of students enrolled. The U. S. Department of Commerce demands that every licensed school maintain one training airplane for every fifteen students enrolled. Spartan more than meets this requirement by maintaining one training airplane for every five students.

A brief description of several types of airplanes in use will interest the prospective student. Training airplane Number 12, for example, is a biplane. It is trim of line and sturdy of construction. From its 135-horsepower radial engine to its distinctively Spartan tail group, it has the appearance of a thoroughbred. It is neatly streamlined and cowled, and appears to be equal to and ready for a transcontinental flight—rather than a practice hop—in strong contrast to the widely advertised “light training airplanes” of many schools. Its seats are deep, roomy and well fitted for protection and comfort, and the airplane is equipped with the necessary instruments for day flight.

Another airplane of interest is that used in night flying. It is a biplane, but more completely equipped than its mates. It is powered with a radial type, air-cooled engine and fitted with powerful directional-controlled landing lights. Its instrument boards seem to be filled with an array of dials which record the impulses of delicate mechanisms behind them. These various shining faces seem so numerous that at first thought the student wonders if he will ever be able to watch them all at once—only to learn that it soon becomes second nature for the experienced pilot to consult them.

A four-passenger cabin monoplane, powered with another Wright “Whirlwind,” provides the Spartan student with his cabin flight instruction.

At various periods during the Spartan student’s course he is shifted from one training airplane to another. This is to teach him constant alertness, for no two airplanes, regardless of painstaking construction, fly exactly alike. This may be compared to the control “feel” of two identical motor cars. In the feel of control there is a slight difference. Like motor cars, airplanes growing old in service become less responsive to control, and as a result are harder to fly, whereas new equipment, constantly maintained in perfect order, gives the student confidence in his ability as he progresses.

Location of living accommodations for Spartan students is particularly convenient for flight periods. The group of Spartan school buildings, consisting of class rooms, dormitories, laboratory, restaurant and garage, is not more than fifty yards from the Spartan hangar. The entire arrangement was planned in the interest of an efficiently operating school of aviation, where waste time could be reduced to the minimum, if not eliminated entirely—and where the student-pilot could almost step from the classroom into the cockpit of a training airplane.

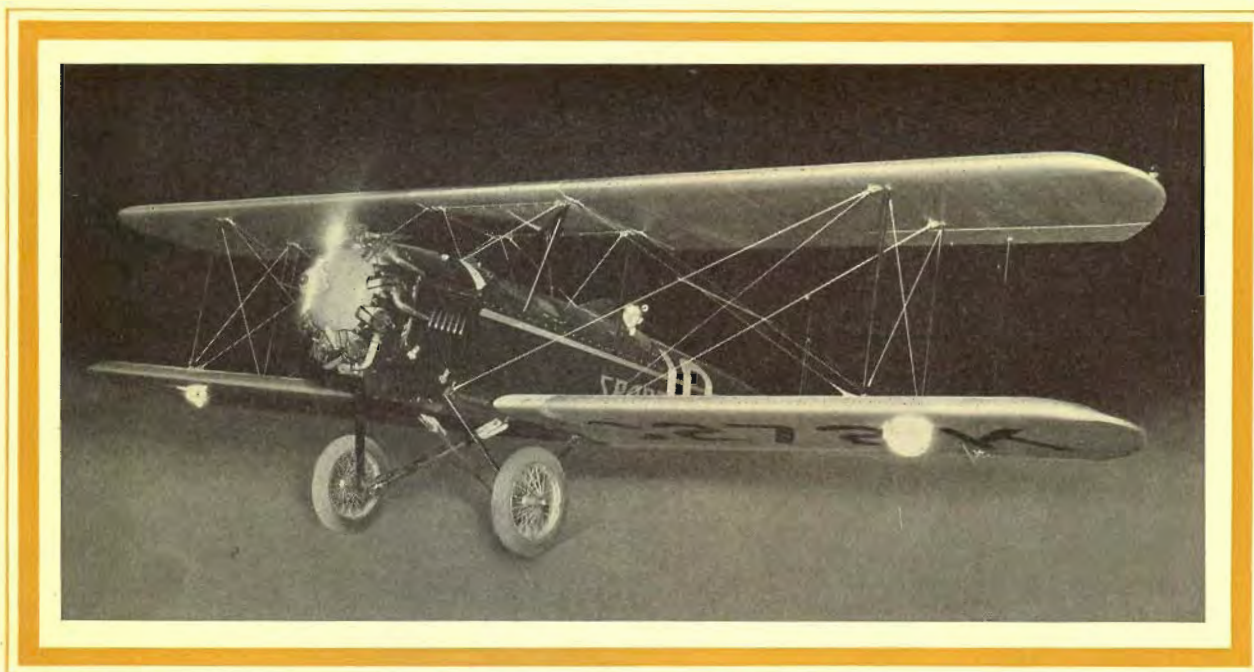


*A Spartan instrument board*

*A cabin training plane*

*Controls of cabin trainer*





*A Spartan training airplane equipped for night flying instruction*

# Night Flying Instruction



**R**EGULATIONS OF THE U. S. Department of Commerce require that the student pursuing a transport course must have at least ten hours of solo night flying practice before he is eligible for license as a transport pilot. This is one of a series of the Department's requirements which give the transport pilot experience under all flying conditions.

Solo night flying must be preceded by a preliminary period of dual-control instruction. The Spartan school is prepared with both instructors and equipment to provide thorough training in this phase of aviation.

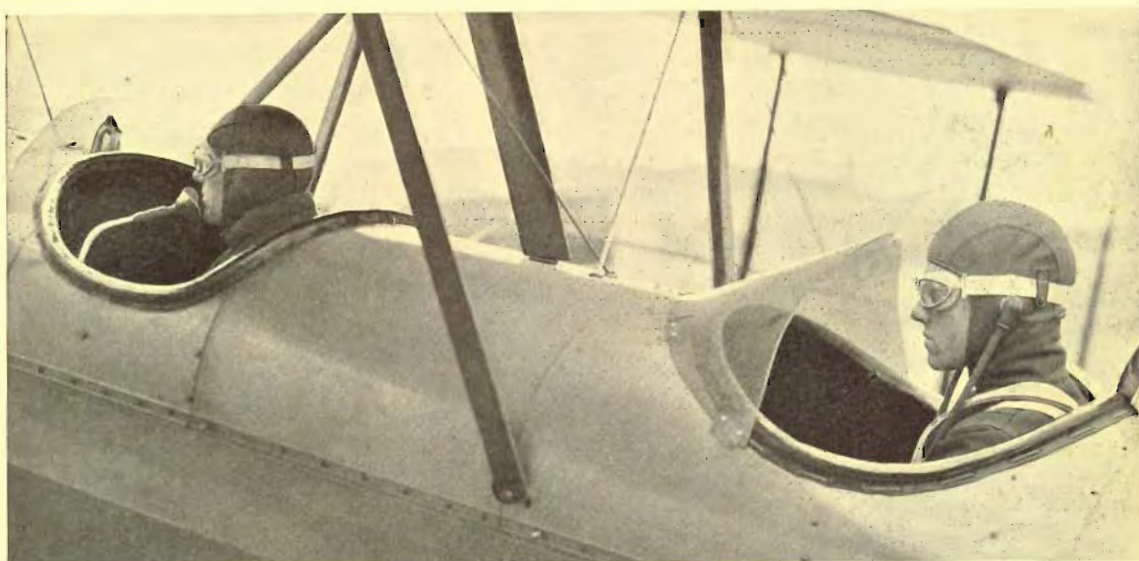
A Spartan training airplane has been especially equipped for night flying practice. The airplane that goes into the air at night must be in perfect condition. It must have a motor of proven power and dependability and it must be equipped with every scientific aid to blind flying. The Spartan night training airplane, as pointed out above, is powered with an air-cooled engine, fully equipped

with instruments, navigation and landing lights. Night flying instructors at the Spartan school are men of extensive experience in night aircraft navigation. They have traveled many hundreds of miles in the dark, and therefore are qualified to teach this phase of flying.

In night flying the equipment of the Tulsa Municipal Airport is of considerable benefit to the Spartan student. The Tulsa airport meets every Government lighting requirement for night flying. All obstructions of unusual height within gliding distance of the airport are marked with red lights, as are the various hangars and school buildings. The boundaries of the landing area are plainly marked, while flood lights can be switched on at a moment's notice for landings. In addition, a rotating beacon turns a finger of light in a constant circle, and on the same tower is an illuminated wind cone.

Thus the night flying student at the Spartan school becomes thoroughly versed in standard systems of lighting at a modern commercial airport.





*Instructor and student—showing Gosport system of communication*

# Spartan Training Methods



Whenever a Spartan student receives dual-control instruction the Gosport system of communication between instructor and student is employed. This equipment consists of a speaking tube connecting the two cockpits. In the instructor's cockpit is a conveniently placed transmitter or mouthpiece, while a special helmet fitted with earphones is worn by the student. In cabin airplane flying, instruc-

tor and pilot sit side by side at dual controls.

Spartan students wear parachutes in all cross-country and acrobatic flying. This is the ultimate precaution in the interest of safety for both instructor and student, yet an advantage which many schools are unable to offer because of the investment involved. Spartan school parachutes are regularly inspected, tested and folded by experts.



*In flight above the airport*



*Student equipped for acrobatic flying*



*Making a steep climb*





# Spartan Ground School



**I**NSTRUCTOR J. A. REECE, a man of broad experience, who was doing difficult flying when aviation was a fickle instrument of warfare, is in charge of the Spartan ground school.

Instructor Reece saw active service with the Royal Flying Corps from 1915 to 1920 in France, Russia and the Near East. He is officially credited with two airplanes shot down in conflict and has over 2,300 hours of flying time in many types of airplanes.

Following the war Instructor Reece graduated from Liverpool University's school of electrical engineering, and returned to his home in Canada. He then flew for the Laurentide Airways until 1925 when he came to the United States as pilot for a west coast transport company, leaving that position to join the Spartan staff. He has American, Canadian, British and French transport licenses, airplane and engine licenses in the same countries, and England's Class A navigation papers. In a recent periodic examination by the U. S. Department of Commerce for ground school instructors, he passed with high honors.

In co-operation with Spartan officials, Instructor Reece has laid out a ground school course designed not only to include both time and subject requirements of the U. S. Department of Commerce, but further instruction in subjects not required by the Department. In every course Spartan requirements are even stricter than those of the U. S. Department of Commerce. This policy is justified by the fact that to date each student graduated from the Spartan school has successfully passed Department examinations, and has been awarded the license sought. This record is the direct result of Spartan school thoroughness.

The Spartan course may therefore require more time and thorough application on the part of the student, but when he graduates the results show plainly in his technical knowledge and flying ability.

Examples and comparisons of requirements in

three major Spartan school courses will be cited to illustrate the thoroughness of the school's instruction.

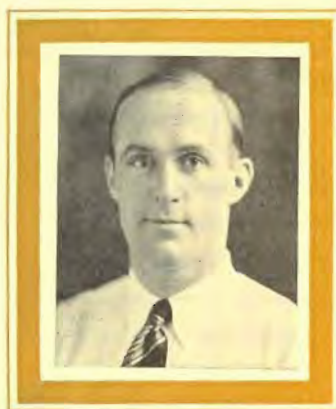
In the private pilot's course the Government makes the following requirements: In flight, 10 hours dual-control instruction and 8 hours solo flying. Ground school—air commerce regulations, 5 hours; airplanes and engines, 10 hours each. Spartan, however, provides the required 10 hours of dual instruction and 10 hours of solo flying instead of the required 8 hours, while the following number of hours are devoted to ground school instruction: 10 hours air commerce regulations, 20 hours each on engines and airplanes, and adds 40 hours of shop work in both subjects. Although the U. S. Department of Commerce does not require instrument or parachute instruction in

this course, Spartan students must attend six comprehensive lectures on instruments and three lectures on parachute operation. Navigation and meteorology are optional.

In the higher grades—limited commercial and transport courses—the Government is more particular. In brief, the requirements are: In flight, a minimum of 15 hours dual and 35 hours solo for the limited commercial pilot; 35 hours dual and 165 hours solo for the transport pilot. Ground school as follows: 30 hours airplanes, 15 hours meteorology, 15 hours navigation, 25 hours engines, 10 hours instruments, radio and parachutes.

In contrast, the Spartan course requires: 30 hours airplanes (with 49 hours practical work), 15 hours meteorology, 15 hours navigation and radio, 30 hours engines (with 74 hours practical work), 12 hours instruments, 6 hours parachutes and aircraft welding. The necessary number of flying hours as required by the Department of Commerce are also provided.

For the convenience of students who cannot attend school during the day, the Spartan night ground school has been established. Classes cover the same subjects as the day school.



*Lieut. J. A. Reece,  
Chief Ground School Instructor*



## ADVANCED NAVIGATION

Navigation is the science of holding an airplane on its course, regardless of weather and atmospheric conditions, so that the airplane traverses the shortest distance between two points without loss of time. Speed is the airplane's strongest claim to usefulness. Without navigation—without the use of those scientific aids which enable a pilot to fly a true course—the advantage of great speed is lost.

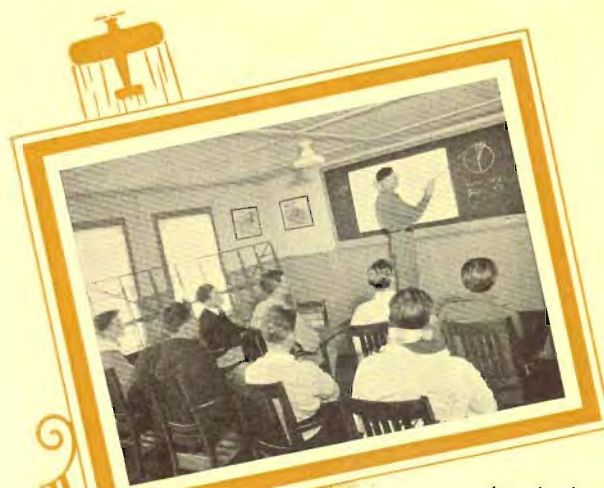
A pilot with passengers, for example, leaves the Tulsa airport for a point 200 miles away. The trip should not require more than two hours. But what of the fog or the strong cross wind? A trained pilot has the ability to lay his course accordingly. But another, less thoroughly trained, might miscalculate and at the end of two hours look for his destination in vain, finally discover his error, recheck his course, and eventually arrive thirty minutes or an hour late—with a load of disgruntled passengers, their confidence in air travel at least temporarily destroyed.

Furthermore, the pilot's employers may have a word to say. To operate any transport airplane costs money and the passenger fare has been computed on a positive basis of air miles. A direct flight from point to point enables the transport company to realize a profit. But half an hour or more of additional flight by a pilot who has lost his course would destroy this margin of profit.

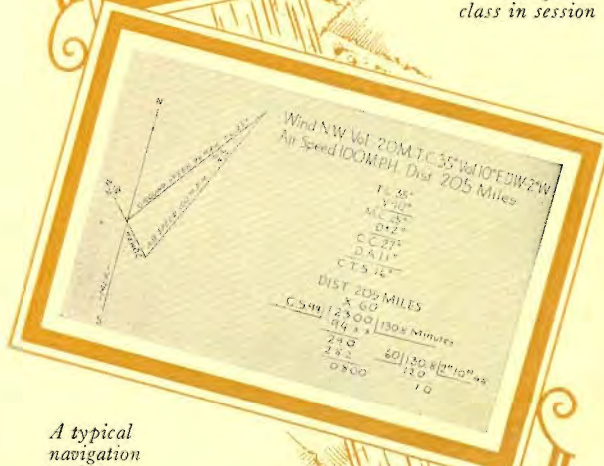
Passengers on established air routes, or those who have observed transport airplanes passing overhead on an apparently fixed course day after day, soon reach the conclusion that to guide an airplane from point to point is quite simple. This is true in the case of an established route where the pilot has flown it so often that he almost unconsciously follows his line of landmarks. But on an unfamiliar "track" a pilot must chart his course and must be keenly alert for any condition that might "throw him off."

Navigation is not difficult to learn. It merely involves an understanding of the problems that confront the pilot—the instruments, the known factors and the means of using them. Technical terms and descriptions may sound imposing to the beginner, but any sensible course of instruction will remove the mystery and leave valuable knowledge in its place.

The Spartan course in navigation is complete in detail, and the student progresses step by step from the simple to the more complicated problems.



*A navigation class in session*



*A typical navigation problem*



*Students plotting a course*

Latitude and longitude, the sphere, time and arc are among the earlier examples. Then follow charts, scales, projections, air navigation maps, contours, plotting the course, and other navigation aids related to those named.



## ADVANCED METEOROLOGY

The Spartan course in meteorology has for a background the years of research and development which the United States Government has devoted to the subject. Near Tulsa is located one of the five weather stations which the Government maintains for the observation of upper air currents. The station operates under the U. S. Department of Agriculture, is completely equipped with instruments, and its staff of five meteorologists will give special attention to Spartan students interested in this work.

Spartan students are also fortunate in that the operations base of a transport company, using the Government observation system for its own pilots, adjoins the Spartan school properties. In charge of meteorology for the transport company is a meteorologist of extensive experience. He takes daily observations and his reports either keep a fleet of large transports on the ground or send them on their routes. His equipment is the same as

that used by the nearby Government meteorologists. The only difference in the two stations is in the mass of records accumulated. The Government station has been in operation for twenty years, the private transport station less than a year.

Spartan students are allowed to assist the transport meteorologist in starting pilot balloon runs, observing the results and recording them. From these records, maps duplicating those used by the Government are charted and posted daily.

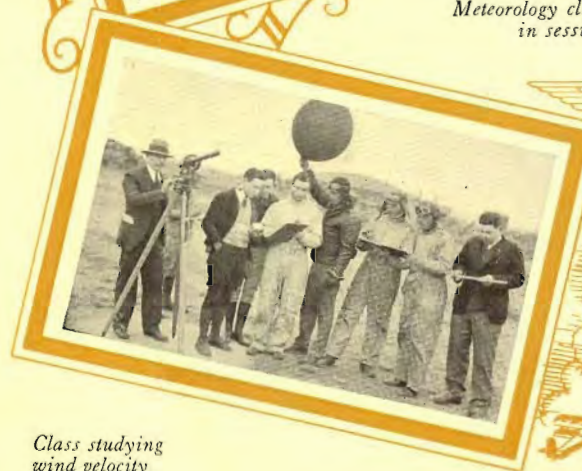
Students in the Spartan advanced meteorology class soon become amateur weather prophets. They learn to recognize the significance of atmospheric pressure, discover the causes of different winds, learn why air is bumpy over different types of surfaces, and can distinguish cloud formations which produce rain and high winds. Thunderstorms—their normal rate of travel, when they are most likely to be encountered, and how to steer a course to miss them—are all fully explained.

Judging of surface wind velocity, and forecasting of weather conditions from a weather map are two valuable lessons taught in the meteorology course. The course also covers tornadoes, explaining where they are most likely to occur and why, and instructs in the plotting of long distance flights with reference to weather conditions along the route. Weather instruments, how they are constructed, what they are used for and how they are operated, are studied closely.

No course in meteorology would be complete without a study of clouds, for the pilot is often either among them or dodging them, and it is to his interest to know them intimately. The Spartan course explains the causes and results of cloud formations, and teaches how to distinguish dangerous clouds from harmless ones.



*Meteorology class  
in session*



*Class studying  
wind velocity*



*Flying above  
the clouds*



## PARACHUTE INSTRUCTION

The Spartan School of Aeronautics has never experienced a serious accident with a training airplane. No instructor or student has suffered serious injury from a training accident. Yet parachutes have been introduced in the school as the ultimate precaution on behalf of students and instructors engaged in acrobatic or cross-country flying.

Thus the natural sequence to this introduction is a course of instruction in the operation of parachutes, so that in case of necessity the Spartan student knows, not only all that he need know about the parachute, but exactly how to use it.

Six lecture periods of one hour each comprise the Spartan course in parachute instruction. The course first goes fully into the history of the parachute, explaining various types of construction and the advantage or disadvantage of each. The modern parachute is a combination of principles developed during long years of experimentation. Each part of the parachute harness has its own particular function. Students are instructed in these functions so that they become thoroughly familiar with their inspection and operation.

The shroud lines, "D" rings, various pads—each have their correct positions and functions when the parachute is ready for use. The student comes to know all these parts thoroughly. Finally he is taught that particular task of packing the parachute. This is a thoroughly responsible undertaking and involves principles of operation which in themselves are highly instructive, so that when a Spartan student has completed his course in parachutes he understands them fully and is capable of packing, repairing and adjusting several popular types.

The next step in this course is simulation of prac-

tice—imitation of conditions under which the parachute operates—illustrated in the school laboratory.

Under various conditions there are timely instants at which a passenger should leave an airplane in time of danger. The airplane may be expected to behave in a certain manner, depending on the cause of the accident, and one of a number of methods is the best by which to leave the cockpit.

After leaving the airplane there are certain other fundamental rules to follow to insure a safe descent. All these details involving the actual use of parachutes are explained in full during the lecture course, which has two purposes.

First, it is designed to give students a thorough knowledge of parachute construction and parachute principles.

Second, having established this knowledge, to give practical demonstrations of the manner best suited to take advantage of the parachute in an emergency.

It will be found on investigation that the more progressive schools of aviation now include a course in parachute instruction. Smaller schools do not ordinarily extend this advantage, for one parachute is a costly piece of equipment.



*Folding a  
standard parachute*



*Students ballooning  
a 'chute*



*Adjusting seat  
pack 'chutes*



## [[ AERONAUTICAL INSTRUMENTS ]]

Commercial aviation has given to inventors of aeronautical instruments incentive, encouragement, and in many cases, prosperity. Those few instruments which aided the military or commercial pilot a few years ago are no longer sufficient. Better airplanes are being built, better engines are pulling them on longer flights and more cargo is being carried. And instrument makers have been alert and progressive.

Many transport companies have adopted the policy of installing duplicate sets of the more common instruments for the benefit of passengers, and public familiarity with them has grown rapidly, but information of this sort is scant and of little value. The student-pilot must have specific information concerning the various instruments in use. He must develop the habit of reading his instruments at a glance, and instantly translating the information conveyed by a quivering needle.

Spartan begins with those instruments which show altitude. The various types of altimeters and

the construction and principle of each is explained. Then follows instruction in barographs, involving types and weights.

One of the most important airplane instruments—and sometimes one of the most inconsistent under varying conditions—is the compass. Compass readings may bring the pilot safely into port, or they may cause him to miss his mark by a hundred miles or more, depending on his knowledge of that particular compass and his ability to compute its deviation and error factors. The Spartan course goes completely into the history of the compass and its development, various types, installation and care.

Tachometers—those instruments which reveal motor speed—are thoroughly studied and formulas for testing are reviewed. Gasoline gauges, level gauges and flow gauges—where placed and why—take relative places of importance in this course.

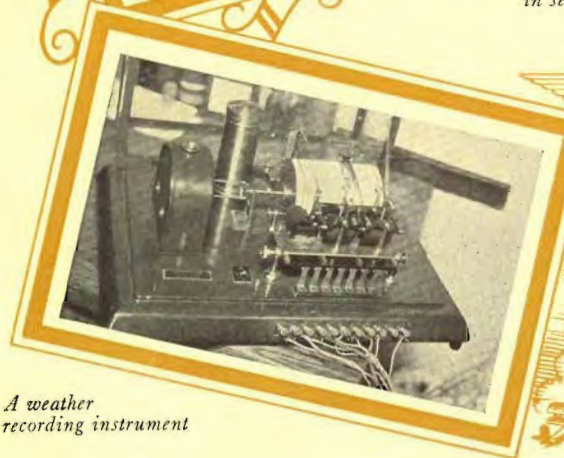
All other instruments are considered in the order of their importance, including: the earth inductor compass, generators, drift indicators, sight sextants, Guertz sun compass, bank and turn indicators, gyroscopes, capillary leak type rate of climb indicators, air speed instruments, ground speed indicators and types.

This brief resume demonstrates that the Spartan course of instruction in aeronautical instruments is thoroughly modern, and that every type of instrument in daily use in the more completely equipped airplane is studied from both a theoretical and practical standpoint, for the lecture course is by no means confined to oral explanations. Instruments are actually taken down, inspected, and all parts and their functions explained to students.

Such a course gives a student a comprehensive understanding of instruments and also prepares him to keep pace with the rapid scientific development in this field.



*Instrument class  
in session*



*A weather  
recording instrument*



*Studying instru-  
ment construction*



## 【 AIRPLANE THEORY 】

For centuries man has traversed land and water, but for the first time he now travels through the air at a tremendous rate of speed *with safety*.

That is the attraction of aviation. That man has thus after centuries devised a means of travel through a thin, transparent strata of air, has stirred the curiosity and fired the imagination of the masses. This fact has given the airplane an attraction that nothing before it has ever exercised. With the advent of commercial aviation the question arose, to be clamorously and universally repeated, "How does an airplane fly?" In the study of airplane theory will be found the answer.

Every effort of man to fly in the past has been met with disapproval. Even in the present century these efforts were considered foolhardy in the extreme. Each successive effort excited sympathetic newspaper comment concerning the experiments, until over a period of years it became established that man was making progress in his conquest, and aviation enthusiasm began to grow, slowly but steadily.

Airplane theory has been inseparably linked with actual flight throughout the history of heavier-than-air machines. The builders of early airplanes produced some queer looking contraptions, flew them and learned to build better ones. All manner of machines were built, many of them employing principles basically incorrect, some using applications of a theory, far from perfect then, yet universally recognized today.

The theory of airplane flight at the Spartan School of Aeronautics involves a study of the airplane from engine to tail-skid and from wing tip to wing tip.

Surfaces presented by the airplane to the air and how these surfaces are designed both to resist and utilize air pressure, are thoroughly studied by the Spartan student. This includes a review of the various and most effective airfoils, or types of wing sections. The student discovers why certain wing sections are used for certain types of airplanes, and why one particular wing design has proved itself most effective and has therefore been widely adopted.

Some airplanes, before leaving a designer's drawing board, have given every indication of proving to be a sensational success, yet the first flight test has demonstrated some inequality of surfaces, and then there was the task of redesigning and rebuilding. By this process engineers have learned what features to eliminate. Design has become generally the same, except that some engineers have evolved distinctive features which made the performance of an airplane outstanding.

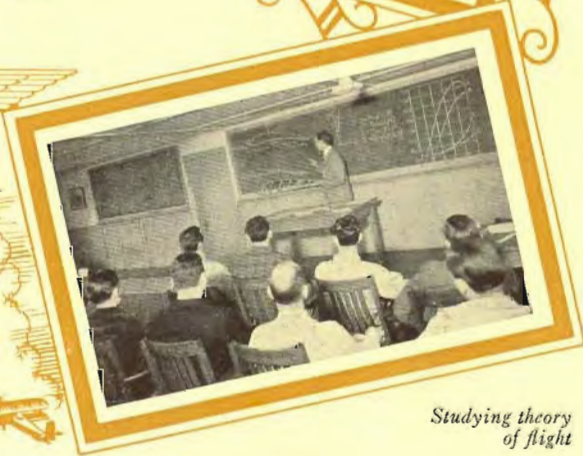
For example, this is true of the Spartan, which is so designed as to resist the tail spin. A Spartan will not spin accidentally—is must be forced—which



*Students assembling  
a plane*



*A wing construction  
class*



*Studying theory  
of flight*



## [[ AIRPLANE SHOP ]]

adds instantly to its value as a training airplane for student-pilots.

Airplane theory includes a study of the materials of which an airplane is made—metal, wood and fabric. Because both lightness and great strength are demanded of an airplane, the selection and preparation of these materials requires experienced and careful craftsmen. At every aircraft factory an almost endless series of tests are being made. These determine the strength of metals, the proper stage of seasoning of timber and the efficiency of various other airplane parts.

The Spartan laboratory is equipped for actual demonstration of the principles involved in the theory of airplane flight. In the laboratory airplanes are taken apart and the theory of different construction practices is explained. Thus the student receives more than mere blackboard and lecture information.

In addition to the laboratory, theory of airplane flight takes the student into the Spartan hangar and shop. Transient airplanes in for repair give students ample opportunity for visual experience. This will enable them to examine an airplane's rigging, to inspect both internal and external truss systems and to discover the purpose of truss tension and rigging. They learn that one of the important phases of airplane inspection is rigging—the adjustment of wing surfaces and control surfaces in their proper relation to each other.

Students help with this work where it is practical, but the greatest value lies in the fact that they may observe licensed mechanics in action. Their work is highly important, for when mechanics err, trouble for a pilot ordinarily follows. The student, therefore, learns to appreciate the fact that accuracy is the constant watchword in aviation.

Spartan instruction in the theory of airplane flight is under the supervision of instructors with extensive experience. They are licensed by the U. S. Department of Commerce as both mechanics and instructors in airplanes.

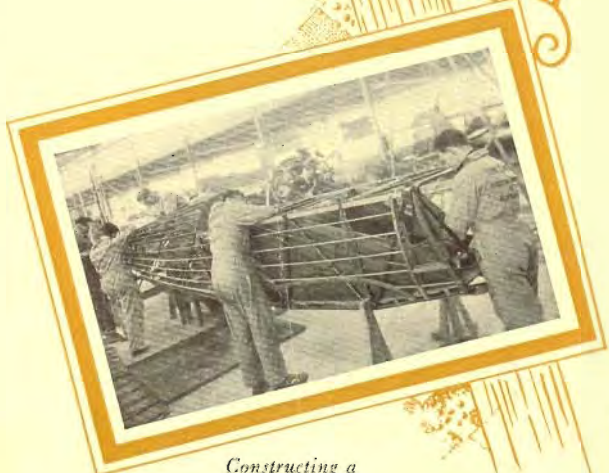
Spartan students actually construct modern airplane ribs and wings. Their work includes cutting, fitting and nailing together the pieces of wood and metal that eventually take the form of a wing. Covering, repairing, patching, assembling, testing and many other details of aircraft maintenance and repair, are actually practiced by the student.



*Aligning a  
steel propeller*



*Students con-  
structing wings*



*Constructing a  
fuselage*

The Spartan shop is so arranged that a fully rigged airplane may be moved in as an object of close study, and as a means by which students may learn every phase of repair and maintenance.



## [[ MOTOR THEORY ]]

Engines of every standard type are thoroughly studied in Spartan school engine theory and shop work. The U. S. Department of Commerce regulations insist that the modern pilot be thoroughly capable of diagnosing engine trouble and supervising, if not actually making, repairs himself.

Before the U. S. Department of Commerce observed the danger of licensing as pilots men with a meager aeronautical education, obtaining a pilot's license without a comprehensive knowledge of engines was not difficult, and mainly involved "flying time."

Ground school work lacks the appeal of actual flight training, but time thus spent is universally recognized as a good investment. A pilot forced down between airports by the development of some minor engine trouble is helpless if he is without a practical working knowledge of the power plant, and the airplane must remain on the ground until a mechanic arrives. On the other hand, the practical pilot makes a quick inspection, and from the resources of his training may be able to make temporary repairs that will take him into port. He is probably begrimed and grease-smeared when he brings in the airplane, but the point is that he gets it there.

Principles of engine operation are explained fully in the Spartan course of engine lectures. Both the four-stroke and two-stroke types are studied. Comparisons are drawn between aeronautical and automotive engines; their lubrication and cooling systems, their weights and their construction.

The lectures take up in turn practically all of the engines used widely in American commercial aviation, and some which have become by-words in Europe. Among those studied by Spartan students are: the Siemens-Halske and the Walter, one developed in Germany and the other in Czecho-Slovakia; the several sizes of Wright Whirlwinds; the Curtiss Challenger, Pratt & Whitney Wasp and Hornet, and the Cirrus Mark III, the latter being a British air-cooled engine of considerable popularity. Water-cooled engines which give practically the complete range of popular types, and which are studied by the Spartan student, include the OX-5 and the Hispano-Suisa.

The mechanics of engine ignition, the basic principles involved, cams and cam operation, are thoroughly reviewed. Two magnetos—the Scintilla and the Berlin—are studied in particular. Carburetors



*Assembling a  
water-cooled  
engine*



*Studying Cirrus  
Mark III air-  
cooled engine*



*Rebuilding a  
radial type engine*

come in for their share of investigation with particular attention to two makes, Zenith and Stromberg.

Aircraft engine starters are divided into several distinct classes established by their contrasting



# 

principles. These include hand inertia, gas, and air. The purpose of a super-charger is also explained. In addition, the lectures include instruction in the care and maintenance of aircraft engines, and "trouble shooting."

The Spartan lecture course on airplane engine theory is amplified for students by actual experience and demonstration in the Spartan shop. The work is not confined to one type or one make of engine, since airplanes of all kinds are repaired and serviced in the Spartan shop.

Lectures and shop work are co-ordinated in a helpful manner under the Spartan system. Because of the nature of engine instruction, one instructor can capably teach all classes in engine theory. Students receive their shop experience under the same instructor. He therefore knows what progress each student has made and a student's practical experience may thus be made to fit in with his lecture course.

Many students who have previously been employed in engine repair shops are greatly amazed at the cleanliness and orderliness of the Spartan shop, which has been used as a model for many modern aircraft repair departments.

From the first shop session to the last, two things are impressed upon the students—extreme cleanliness and system. The tool racks, valued at many hundreds of dollars, are examples of Spartan system. Contained in the racks is an impressive array of modern aircraft tools, each in its place, ready for use by the students. As a result of the completeness of equipment, every Spartan graduate is familiar with all types of tools used in modern aircraft repair.

Whenever an airplane is ordered to the shop for major engine repair practice, the students dismount the engine, place it upon an especially constructed stand, and entirely dismantle it. As the parts are removed, they are arranged in sequence on a clean, zinc-topped bench.

When the necessary repairs have been made, the parts are thoroughly cleaned, inspected and assembled. The motor is then mounted on the test block for the purpose of determining the exactness of the students' repair work.

Spartan has spared neither expense nor pains to organize a thoroughly efficient system of instruction. This removes for students the mystery that may have previously existed concerning aircraft engines. The engine is the heart of the airplane. Therefore Spartan has sought to perfect an engine school which will enable its graduates to detect and remedy engine troubles—just as the Spartan flying school trains pilots not just to fly, but to fly and think.



*Assembling a  
Siemens-Halske  
engine*



*Airplane engine  
theory class*



*Mounting an  
air-cooled engine*



## 【 PRODUCTION METHODS 】

The system by which airplanes are conceived and produced at the Spartan Aircraft Company factory is an interesting process to students since they have the opportunity of observing it as an additional step in the direction of complete training.

All departments of Spartan Aircraft Company operate under jurisdiction of the president and the board of directors, although the airplanes actually originate in the engineering, or designing department.

Plans are delivered to the plant superintendent and he in turn issues instructions to the various departments. The fuselage department is ordered to produce a certain number of skeleton bodies, the wood working department turns out a set of wings for each airplane and other departments co-ordinate to build units necessary for that particular order.

Once these skeleton units are finished they are turned to the covering department for fabric covering, thence to the doping department, and then progress through final assembly to inspection and test flights.

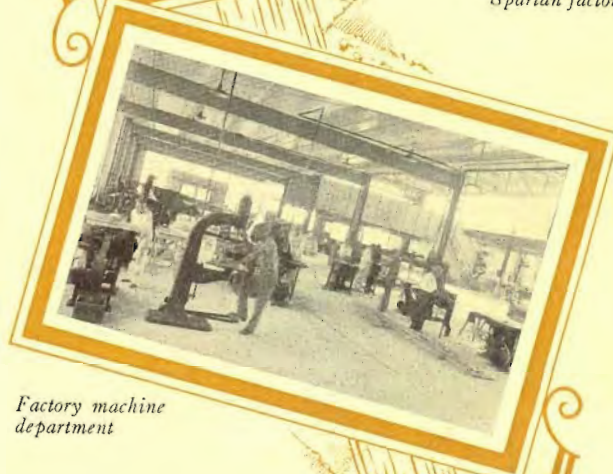
On the surface these manifold activities, going forward at the same time, seem to be without any check as to accuracy of each manufacturing detail, but such is not the case. Every manufacturing operation passes under the critical eyes of inspection, not only of Spartan Aircraft Company, but of the U. S. Department of Commerce as well.

A Department of Commerce inspector has been stationed at the Spartan factory for the purpose of checking every airplane, in part and in whole, that leaves the factory. He examines parts, he examines fuselage welding, wing structure and assembly. And finally he makes a thorough re-examination of the completed airplane and approves it for delivery. This step is taken by the U. S. Department of Commerce to facilitate delivery and granting of license numbers for each airplane. Previously, a delay of inconveniencing duration slowed up the delivery of airplanes until the Department could make the rounds of various factories, inspecting and approving. Now, at the country's major aircraft factories, a Department inspector is permanently stationed and the arrangement is of mutual benefit. Formerly inspectors were assigned to territories, each territory containing several factories.

When Spartan airplanes are approved and have received license numbers, they are taken to the Spartan hangar at the Municipal airport. Here



*Wing department—  
Spartan factory*



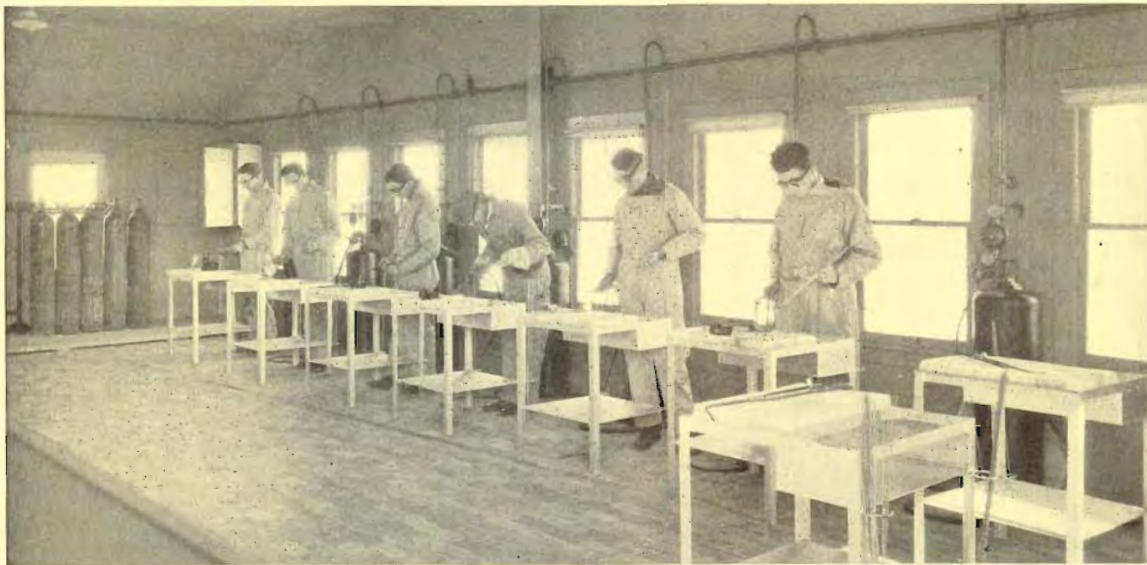
*Factory machine  
department*



*Factory fuselage  
department*

their wings are attached, final adjustments are made, the engine is tuned up and the airplanes are taken up by test pilots. Each Spartan is put through unusual and rigid flight tests before it is delivered to its purchaser.





*A Spartan school aircraft welding class in session*

## WELDING INSTRUCTION

Under the supervision of a welder who has had fifteen years of experience, the Spartan welding school trains men for this trade which has been drawn upon so heavily by aircraft companies. Airplane welders are in constant demand by manufacturers.

The Spartan welding course requires approximately four weeks, devoted to both lectures and actual welding. A graduate of this school is fully qualified to fill any position requiring acetylene welding.

The student's first instruction consists of lectures and simple welding jobs. Then he is shown how

to set up, dismantle and clean his welding equipment, learns the importance of tip sizes, torch lighting, flame regulation, back pressure and back firing, and soon masters flame characteristics, oxidizing, carbonizing and neutral flames. Passing into the advanced class, he then studies expansion and contraction, the importance of "preparation work," ripple welding, torch cutting, pipe layout and design, pipe blending, tube splicing, tobin bronze and its composition, brazing, vertical, flat and overhead welding. Difference in alloys, their melting points and when to use them; the use of spelters, brass and copper, cast and drawn aluminum and sheet aluminum, are also explained.



*Welding a fuselage*



*Cutting heavy metal*



*Repairing an undercarriage*





*View of the Spartan school buildings and hangar*

## Spartan School Accommodations



**C**OMFORT, A CLEAN environment, an aeronautical atmosphere and wholesome living conditions—these have all been provided by the Spartan School of Aeronautics.

Spartan school quarters—a segregated group of green-roofed white buildings—are noticeable for neatness and cleanliness. A graveled drive leads to the entrances of the two main buildings. The building in the left foreground in the above illustration is divided into well-lighted classrooms which are furnished with comfortable arm chairs, blackboards and other equipment necessary for the proper conduct of the various classes. Classrooms are well heated during the infrequent attacks of Oklahoma winter, and in summer the arrangement is particularly suited to cooling ventilation.

The building in the right foreground of the above illustration contains sleeping quarters. It is entirely surrounded by a screened porch, and its south exposure is particularly inviting on summer evenings because of south breezes.

In addition to sleeping quarters, the dormitory building contains a reading, writing and recreation room equipped with a radio receiving set. Maid service, clean linens and blankets are provided, as well as storage and drawer space for clothing. Plumbing is strictly modern, and hot and cold shower facilities are located midway of the main corridor which extends from the front to rear of the building. Sleeping quarters are available here at the rate of three dollars per week per student.

Directly east of the classroom building is the Spartan welding laboratory.

In the rear of this group of four buildings is the Spartan restaurant. It caters not only to Spartan students but to employees of transport companies, airport attaches and transport passengers, and will accommodate one hundred persons at meal time. Popular prices prevail at the Spartan restaurant, and students are entitled to 10 percent discount on all orders.

Under this arrangement both room and board should not cost the Spartan student more than



twelve dollars per week. This amount depends to a large extent upon his appetite and the amount he is willing to spend for meals, but it has been observed by school authorities that a breakfast of sufficient proportions can be obtained for 25 cents, lunch at approximately 40 cents and dinner for 50 cents. These prices are, of course, subject to a 10 percent discount.

Entertainment for the students is not overlooked by those in charge of the school. Twice each month some entertainment feature is arranged.

For the convenience of students who do not own cars, Spartan operates a transport bus on regular schedule between points in the city and the school. This bus also operates for the benefit of night school students, and between the Spartan auxiliary field and the Tulsa Municipal Airport.

Spartan students fully appreciate the advantage in location of their school—convenient to the Spartan hangar and, of equal importance, just a few steps from the constant activity of one of America's busiest airports.

To illustrate the manner in which aviation in

Tulsa has taken the lead from other cities, wealthy oil men, bankers and business men of the city volunteered to guarantee completion of a half million-dollar airport according to the plan approved. The work is being carried forward rapidly under this guaranteed financial set-up, and the majority of the scientific and structural equipment will be in use within a comparatively short time.

The airport includes 405 acres of land located in a corner formed by two paved highways and is thus readily accessible by either car or city bus. It is plainly visible from the windows of Tulsa buildings.

The terrain of the field has been universally complimented by pilots. Boasting a natural sod, it adapts itself readily to all weather flying, its drainage being from the center with a gentle grade in all directions.

Runways are of first importance to an airport. All-direction runways of all-weather quality are afforded by the combination of location and terrain in Tulsa's airport. The shortest runway, for instance, affords a landing area of 3,500 feet in length. Boundary lights of the most improved



*Students' recreation room*

*Spartan school restaurant*

*A dormitory room*

*Dormitory shower room*



type have been adopted and are in use, as are also the latest approved types of B. B. T. floodlights, which are mounted on permanent uprights.

Buildings designed for the airport are of the latest type in beauty and adaptability of structure, and are modern in every respect. The administration building, an attraction in itself, provides for every known advantage to the conduct of a modern airport. It is, in fact, a departure from anything of its kind yet conceived for American airports.

A meteorological bureau with attendants, radio room with its force of experts, waiting rooms, baggage rooms, and most important—pilots' recreational and sleeping quarters with shower baths and other conveniences—are provided for.

As with other airports, it has been found necessary to devise a set of rigid rules governing the conduct of spectators and pilots. This is particularly true in the case of the Tulsa airport where traffic has increased at a tremendous rate.

The airport is prepared for any activity at night. Usually a fair-sized gathering of spectators is there to watch the night air mail take off. This is a

sight worth seeing. The landing area is outlined with a circle of green lights. Red lights, marking obstructions of one kind or another, spot the vicinity of the airport. The rotating beacon flashes continuously and flood lights illuminate the field. The air mail airplane taxies down wind, and turns around while glaring headlights sweep the runways. Its throttle is opened, and in a moment it has roared away. In another minute the navigation lights, moving eerily through the atmosphere, have disappeared.

Night, in fact, is one of the busiest times at the airport hangars. Often mechanics work until daylight repairing or servicing an engine so that an airplane may be ready for an early start on a long journey. At such times the Spartan school student has an excellent opportunity to improve his spare time as the attaches of the airport and the various aviation companies operating out of Tulsa are friendly and willing—always glad to give a word of encouragement to the beginner and an opportunity to learn. The advantage of such an atmosphere is of constant value to the student.



*Garage for  
students' cars*



*A school bus*



*Business Manager's  
office*



*A visiting  
Army blimp*





*Bird's-eye view of a portion of the Tulsa Municipal Airport*

## Tulsa...the Aviation Center



THE SPARTAN SCHOOL of Aeronautics is ideally situated in a city which has already been recognized as the hub of commercial aviation in the great Southwest. The Southwest has gained distinction as a territory particularly adapted to aviation because of the greater distances between centers of population, under-development of other speedy forms of transportation, and the value of the time element in the sector's principal source of wealth—oil. And Tulsa, from its enviable position as Oil Capital of the World, dominates this territory. By taking the lead in aviation it has further distinguished itself as a progressive community.

In Tulsa there are more companies and more individuals engaged in the oil business than in any other city in the world; and the oil industry, quick to see the value of the airplane, has opened a surprisingly new and

fertile field, not only to the airplane salesman, but to the pilot as well. A recent survey revealed that among all businesses, oil had invested most heavily and eagerly in aircraft, and that the largest number of inquiries concerning trained pilots come from oil companies owning airplanes representing investments ranging from \$3,000 to \$50,000.

Due also to the dominance of Tulsa in oil, the passenger and express lines now operating to and from the city are handling a tremendous volume of business. Within the next year or two this volume will increase to such proportions that, in spite of its size, the facilities of the Tulsa Municipal Airport are likely to become strained.

Tulsa's aviation activities are not confined to one airport. Three airports smaller than the Municipal Airport are in operation in the city, which in itself is a testimonial to the fact that flying is already an established business in Tulsa. No other





city of its size in the country has as many airports in operation or as ambitious a Municipal Airport project.

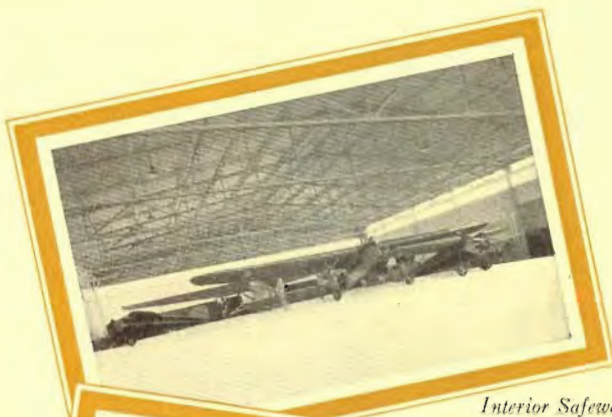
A survey conducted for the Associated Press, internationally famous news gathering association, showed that at the time of the survey the greatest amount of paid commercial flying in the United States was done from Tulsa. The term "commercial flying" in this instance referred to actual transportation service on the same basis as railroad travel or, in other words, non-pleasure flying.

Considering its numerous advantages, there is no better location for a school of aviation in the United States than Tulsa. Meteorological data of years' standing prove that Tulsa, the home of the Spartan School of Aeronautics, enjoys one of the most constant, moderate climates of any inland North American city. Other locations might offer greater climatic attractions, but they represent the extremes where it will be found that living expenses also run to extremes.

Tulsa's winters are mild, the summers moderate and its springs and falls delightful. Just far enough south to escape the rigors of terrific winters, and just far enough north to avoid the extreme heat belt, the city is ideally located. Winds in winter are often from the south. The origin of summer air currents is almost constantly in the south with the Gulf of Mexico adding its cooling touch. Such is the reputation of Tulsa for pleasant weather in winter that families who have habitually favored the southern seaboard resorts are turning to Tulsa for winter residence. And the summers are so attractive that an occasional weekend visit to a nearby Ozark Mountain resort satisfies the appetite of the normal Tulsan for relief from the grind of business.

Thus a climate that has always been an induce-

ment to business, to industry, to the homeseeker and the pleasure hunter, stands again as an attraction to aviation. And such a climate can cause few delays in the progress of the student-pilot,



*Interior Safeway hangar*



*A busy day at the airport*



*Loading a Tulsa mail airplane*

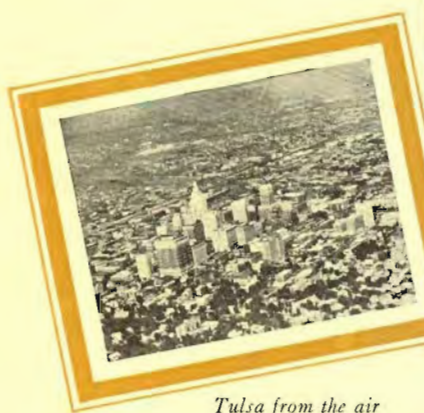


*Passengers entering a Ford*



*Municipal airport pilots' quarters*





*Tulsa from the air*



*Tulsa parachute jumper in action*



*The Los Angeles' visit*

whereas schools even a few hundred miles farther north are subject to constant and long drawn out periods of flying inactivity.

Tulsa's park and playground development and operation is administered by a non-political park board composed of representative citizens of influence. It is maintained under the direction of a superintendent, a man of wide experience in his field, and a corps of able assistants. The park board has anticipated the growth of Tulsa and has obtained for park purposes a number of small tracts, not yet improved or named, pending development of certain residential sections.

Tulsa has a total of 15 parks containing 2,388 acres, well distributed throughout the city. They range in size from one containing 2,200 acres to the smallest tracts containing two acres. Among them is one semi-natural bathing beach and one fully developed and equipped concrete swimming pool. These park properties, in addition to playground equipment and beautifying investments, include six tennis courts.

The 2,200-acre park, known as Mohawk, is one of the finest and largest public park tracts in the country. It contains a zoo, a picturesque public golf course, one natural lake, one artificial reservoir and miles of lagoons for boating and fishing. The reservoir is a link in Tulsa's water system and its over-flow supplies the lagoons so that fish stocking is natural. A polo field is also included, although most of Tulsa's polo is privately played.



*Airport flood light used for night flyers*

The park is being steadily developed in accordance with Tulsa's needs, but a great portion of it will be left permanently in its natural state because of the fact that in its primitive sectors it has been found to contain species of practically every tree, shrub and flower native to Oklahoma. Being but a short drive from the Tulsa residential district, it attracts recreation seekers by the thousands.

Seventy-five miles northeast of Tulsa by motor is Spavinaw Lake and the borderland between the flat agricultural country and the scenic beauties of the famous Ozarks. Hundreds of fishermen travel daily to Spavinaw in season, hundreds of others merely seeking an outing, crowd the little resort town on week ends. The lake is annually stocked by the city with fish and naturally stocked in season with ducks and geese.



*Air Airport boundary light*

A few miles beyond and the motorist, not content with the outing facilities of Spavinaw, finds the Ozark mountains, hundreds of streams and half as many resorts which range in facilities from sleeping cabins placed against the side of a rocky cliff, to pretentious estates where the social side of a vacation is as important as recreation.

Tulsa and the vicinity that is traversed in entering and leaving the city offers many attractions to the Spartan student. The extensive oil producing fields and the refineries, in which are invested vast sums of money, always prove of interest. Fifty miles north of Tulsa is located Pawhuska, capital of the Osage Indian nation, the world's richest Indian tribe. To the east is the famous Cherokee country, its picturesque winding roads, tree-clad



hills and transparent streams. To the south is the land of the Creeks. In Tulsa a shaft marks the three-cornered junction of the boundaries of the Creek, Osage and Choctaw nations and another shaft marks the spot where, on his tour of the prairies, Washington Irving camped, on a hill overlooking the land now occupied by Tulsa.

For the golfer there are a number of tempting golf courses within easy driving distance of the city. Spartan students have access to three public courses and four courses are maintained by private clubs. These include the Tulsa Country Club, Oakhurst, Indian Hills and Lakeview. These courses are picturesque and highly developed, and have been the scene of state and sectional tournaments. Tennis also thrives and in addition to courts maintained by clubs, there are a number of well-kept public courts.

Tulsa has two amusement parks, each about five miles from the business district, namely, Crystal City and Sand Springs. Crystal City is the last word in modern amusement. It has its swimming pool, cooled dance hall and a midway replete with rides, thrills and every other form of attraction. Sand Springs park is older, but its natural beauty offers a special attraction to outing parties and picnickers.

Tulsa's theatrical season has one distinguishing feature in that Tulsa is one of the few inland cities with a regular annual season of grand opera. Each year the Chicago Civic Opera Company comes to the city and at that time hundreds of opera lovers, not only from Oklahoma but from points throughout the Southwest as well, are in Tulsa.

There are a dozen cinema houses of varying size and facilities where first and second-run pictures are shown. Three fine theatres specialize in all-talking, first-run pictures, as well as several outlying picture houses. The Orpheum is the outstanding vaudeville house and several others present vaudeville entertainment of lighter character.

The Tulsa Little Theatre has been an outstanding success from the viewpoints of both box office and critic. It has presented some difficult plays and developed considerable talent.

Tulsa is assured of a constant supply of high class radio entertainment regardless of atmospheric conditions due to the presence of KVOO, the 5,000-watt "Voice of Oklahoma." This station participates in a number of chain programs, but has also developed a wealth of excellent local talent. Its elaborate studio is located in the heart of the business district, but its power station and antennae are ten miles east of Tulsa, so that local broadcasting does not interfere with reception of other stations.



*Some Tulsa skyscrapers. Top to bottom: Exchange National Bank Building, Philtower Building and Mayo Hotel*





## A Factory for a Classroom

**T**HE FACTORY OF the Spartan Aircraft Company is a thoroughly modern structure of steel and brick, designed and built for the specific purpose of manufacturing airplanes.

There are two units of the new factory. The main unit affords 46,000 feet of floor space and is pictured herein. The other unit is in the rear of the main building and was especially constructed for "doping" and applying finishes to fuselages and wings. The complete units of the factory occupy a tract of thirty acres one-half mile from the Spartan School of Aeronautics and the Tulsa Municipal Airport.

If you have never seen a modern airplane plant

in operation and watched the progressive steps in the production of an airplane, with the finished airplanes moving up to the delivery line with measured regularity, you will fully appreciate this spectacle. It involves requirements of speed in production, coupled with painstaking selection of materials, and delicate labor in assembling. It gives every man in the Spartan factory organization a keen share in the responsibility for the airworthiness of every airplane.

In the engineering department, where every bolt is considered of as much importance as a finished fuselage, the student learns under the guidance of a ground school instructor, how the airplane is made to conform in design and balance to the prin-



ciples of aerodynamics, how expert engineering has figured every stress and strain, and how construction has allowed ample safety margins.

Here he comes to appreciate fully the forces that act upon an airplane, the principles of design and construction that have been involved to utilize these forces, the theory of control surfaces and their responsive tendencies.

Here, too, he is initiated into the mysteries of the airplane's heart—its engine. Construction and operating principles of the various accepted types of airplane engines are studied, and the student is thoroughly schooled in the inspection, care and repair of engines.

In short, in the ground school course and during visits to the Spartan factory, the student learns "why," while from his flying instructor he is learning "how."

The Spartan factory is so organized that from minute beginnings there is no waste of effort or time in the movement of an airplane to completion. Each airplane moves steadily forward from one department to the next, gathering, as it goes, its

requirements for flight. The departments are arranged in sequence on both sides of a wide aisle down which the skeleton airplanes progress until, at the end, they stand finished except for attaching the wings, which is done in the Spartan hangar at the Municipal Airport.

The entire main building, except a section across the front, is devoted to the factory. The front is occupied by executive offices on the main floor and the engineering department on the second floor.

There is nothing about an airplane which cannot be learned at the Spartan factory. How every wing is constructed exactly like its predecessors; why every fuselage is an exact mate to every other fuselage; how the proper initial tension is put in braces and control cables, and how the center of balance in a Spartan is scientifically located. These are things the Spartan student will learn at the factory.

The Spartan factory has been pronounced one of the outstanding examples of what an aircraft factory should be. It is thoroughly adapted in every way to the heavy program of modern aircraft production which has been laid out for it.



*The president's  
office*



*Sales manager's  
office*

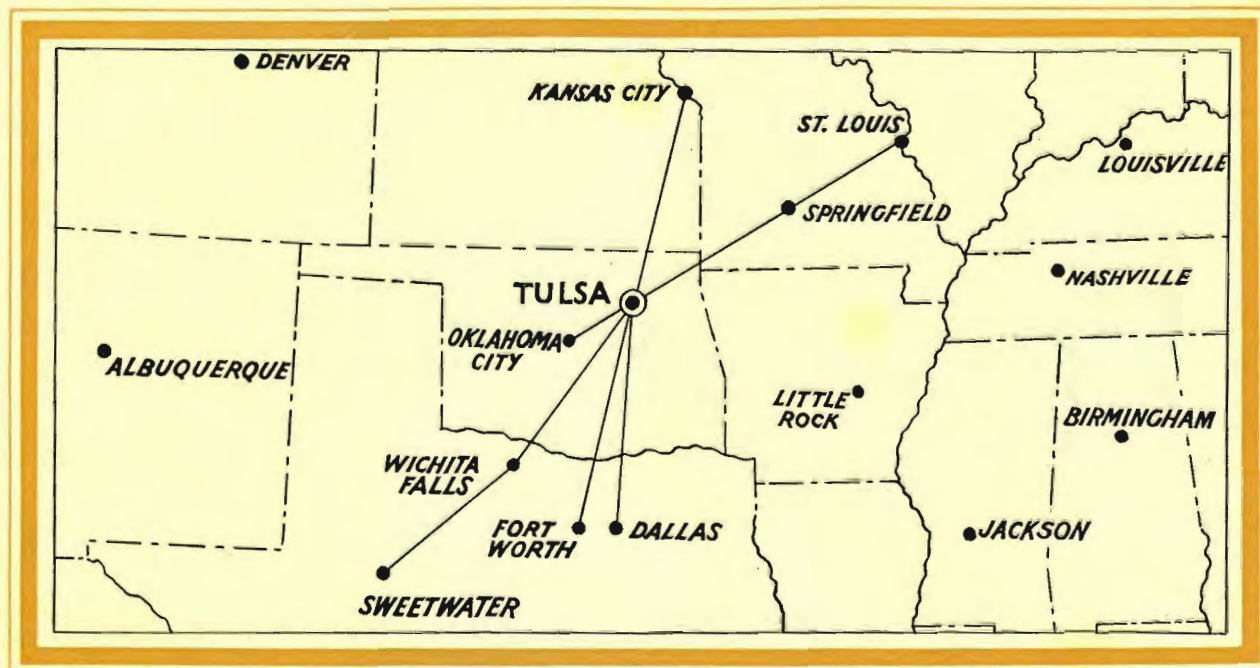


*Accounting department*



*Engineering department*





Map showing Southwest Air Fast Express routes to Tulsa

## Free Air Transportation



THE SPARTAN SCHOOL of Aeronautics invites prospective students to fly to Tulsa, as its guests, from the various points touched by the Southwest Air Fast Express as indicated in the following plan, and from cities shown on the above map.

Limited commercial and transport students' transportation will be paid in full. Private pilots, mechanics and welding students will be allowed half rate, which is now less than railroad fare.

The Southwest Air Fast Express operates airplanes from the following points: St. Louis, Springfield, and Kansas City, Missouri; Coffeyville, Kansas; Oklahoma City, Oklahoma; Dallas, Fort Worth, Wichita Falls, and Sweetwater, Texas.

The student desiring to take advantage of the free air transportation facil-



Sample of free air transportation ticket

ities, will forward his enrollment to the school, indicating the course in which he wishes to enroll. Upon receipt of the enrollment blank and fee, a ticket will be sent to the student, so that he may board the airplanes at whatever point he desires. The Southwest Air Fast Express officials, pilots, and mates, will extend every courtesy to the student and assist him in reaching his destination with the least amount of trouble.

We are sure that you will enjoy this means of transportation to the school. It is clean, comfortable, and safe, and will save considerable time and expense in arriving at your ultimate destination—Tulsa.

For further information regarding this plan, write or wire Mr. Norman G. Souther, Business Manager, Spartan School of Aeronautics, Municipal Airport, Tulsa, Oklahoma.



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OF  
AERONAUTICS

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of  
AERONAUTICS



"ACE OF HEARTS"





# ONLY A MILLION DOLLAR FLYING SCHOOL

**CAN FURNISH SUCH  
COMPLETE INSTRUCTION**

*as found in the*

**SPARTAN SCHOOL OF AERONAUTICS**

**BACKGROUND**—Recognized by the granting of the highest possible rating by the Department of Commerce. The Spartan School has pioneered many of the developments in aviation instruction in use today and is attracting students from every section of the United States and many foreign nations as well, notably many Chinese Pilots have been graduated from the Spartan School.

**BUILDINGS**—Such as the shops, hanger, student barracks, restaurant and school buildings, represent a great investment; along with —

**NAME**—At Spartan the student as he progresses in his flying course has the opportunity to handle various types of ships and the mechanical student is given the opportunity to study not only the various types of planes, but all types of motors that make up this tremendous investment of over a MILLION DOLLARS, that has made Spartan the outstanding flying school in the country. In addition to the facilities of the school, is that its geographic location at Tulsa affords practical year round ideal flying weather with freedom from fogs, factory smoke and haze. Located on the Tulsa Municipal Airport which ranks with Newark in the East, and Chicago in the West in amount of air traffic handled, Spartan students are afforded first hand opportunity to study the operation of the country's leading air lines.

# DAWN PATROL



# SPARTAN

*The*  
**MILLION  
DOLLAR**

SCHOOL OF

AERONAUTICS

## *Aviation's* finest instruction COST'S LESS *at Spartan!*

**WITH A MILLION DOLLAR** investment Spartan guarantees you its facilities for sound training in every branch of Aviation, but we do not stop here for we have priced the cost of Spartan Courses the lowest in the school's history, together with this the student is offered if he desires it **PART TIME WORK** which materially reduces his expenses while here, and **EVERY STUDENT** is given **FREE ROOM RENT**. We maintain our own Restaurant which enables the average student to spend less than \$17.50 per month for board. **FREE** transportation is offered to and from the City of Tulsa in the school's own twenty passenger bus. Thus living expenses at Spartan are **ONE HALF** what they would be elsewhere.

**BUT WE HAVE NOT STOPPED THERE!** Realizing the importance of radio in Aviation, a complete course is offered with each Aviation Course at **NO ADDITIONAL** charge, and with each Transport Course the student receives a three piece wool serge uniform, one pair American Transport Goggles and a Leather Flying Helmet, **FREE**.

With a Limited Commercial Course he receives a pair of Resistal Goggles and a Leather Flying Helmet, **FREE**.  
With a Private Course he receives a pair of Resistal Goggles and a Flying Helmet, **FREE**.

### COMPARE THESE PRICES

Room rent **FREE** with any course during entire period of training. Part time work if desired.

Transport Pilot's Flight and Ground Course \$1,745.00  
Limited Commercial Pilot's Flight and

Ground Course . . . . . 520.00

Private Pilot's Flight and Ground Course . . . 375.00

Master Mechanic's Flight Course (15 hours) . . 300.00

Master Mechanic's Ground Course

(3 months) . . . . . 225.00

Regular Mechanic's Flight Course (15 hours) . . 225.00

Regular Mechanic's Ground Course

(3 months) . . . . . 135.00

Payment plan if desired. Student may enroll at any time.



THE ONLY  
MILLION DOLLAR  
FLYING SCHOOL  
IN THE WORLD  
GOVERNMENT APPROVED

# Today's Graduates Tomorrow's Brightest

STARS

NUMBERED among today's students will be found names of those that will help make aviation history tomorrow! Here are but a few pictures of Spartan graduates that are making names for themselves on America's airways. Follow them! Get your aviation training where over a MILLION DOLLARS has been invested to give you these unsurpassed facilities of SPARTAN, the only commercial flying school in the world with such a tremendous investment in planes, buildings, equipment and a specialized trained personnel.

**JULIAN Q. MYERS, JR.**  
From San Antonio, Texas. He is assistant flight and ground instructor at the Spartan School of Aeronautics.

**CHARLES COWAN**  
From Hobart, New York. Chief Pilot of the E. W. Wiggins Flying Service at Framingham, Mass.



**E. L. "BOB" TAYLOR**  
From Tolet, Texas. Employed as Chief Pilot by the Grilling Oil Company.

**ERNEST LUM**  
From Stockton, California. Employed on the Assembly Line of the Spartan Aircraft Factory.



**EDWARD INGEBRITSON**  
From Minneapolis, Minn. Employed in the Wood Work Department of the Spartan Aircraft Factory.

**GEORGE BANCROFT HALL**  
Chief Pilot for the E. W. Wiggins Airways, Inc. Fitchburg, Leominster, Mass.



**ALFRED T. BROTHERS**  
From Hannibal, Wisconsin. Employed as Night Service Men at the Spartan Hangar.

**THOMAS ASSBURY**  
From Hamburg, Iowa. Engine Overhaul Division, Spartan Service Hangar.



**ROBERT HUMBERT**  
From College Station, Texas. Employed by the U. S. Weather Station at the Tulsa Municipal Airport.

**HENRY C. THOMPSON**  
Head of the Aeronautical Division of Eschinger & Higgs, Inc., Advertising, Tulsa.



**W. F. MAIDINGER**  
From Bay City, Michigan. Night Mechanic at the Spartan Aircraft Factory.



**BART J. WONG**  
From Vancouver, B. C. Canada. Now with the Chinese Air Force stationed at Nanking, China.



**RAMON BOYER**  
From Nowata, Oklahoma. Employed in the Welding Department of the Spartan Aircraft Factory.



**JOHN A. STARR**  
From Tulsa, Oklahoma. Now flying his second year for the Government Weather Bureau at Omaha, Nebraska. In 1931 Starr established the altitude record for this branch of the weather service over a period of one year in his Spartan J-67 Biplane.



SPARTAN SCHOOL OF AERONAUTICS