At Istanbul, Turkey, on August 2nd, Russell Boardman and John Polando completed a non-stop flight of 5000 miles across the Atlantic Ocean and most of Europe in a plane equipped with Firestone Gum-Dipped Tires. Their plane started on the record-breaking flight with two and one-half times its normal load—the gas and oil alone weighing three tons.

At Indianapolis on May 30th, Louis Schneider won the 500-mile Endurance Race on Firestone Gum-Dipped Tires. All the forty cars starting were equipped with Firestone Tires—bought and paid for by the drivers. This makes the 12th consecutive year that Firestone Tires have been on the winning cars.

They were on the winning cars in the Pike's Peak race where a slip meant death.

They were on the C. M. C. Truck that hung up a coast to coast endurance record.

They were on a Studebaker car which went 30,000 miles in 26,326 minutes.

They were on 125 buses of the Washington Electric and Railway Company that totaled 3,674,266 miles in 1930 with only 13 tire delays.

They were on Safeway Stores trucks that covered 1,500,000 miles in 12 months without one single hour of tire delay.

Firestone Tires hold all world's records on road and track for safety, mileage, speed and endurance. Drive in and have your car equipped for greatest safety and performance with Firestone High Speed Heavy Duty Tires. Prices are lowest in history.

Firestone
HIGH SPEED
HEAVY DUTY

In this newest Firestone
HIGH SPEED HEAVY DUTY you get
26% Greater Protection against Blowouts
58% Longer Flexing Life in Every Cord
56% Stronger Union between Tread and Cord Body
25% Longer Non-Skid Wear
Which means 25 to 40% longer tire life.

The Gold Standard
of Tire Values

Louis Schneider and his mechanic, Jackman, at the Indianapolis Speedway, practicing victory smiles. Schneider won the 500-mile grind.

Boardman and Polando—seated with their plane, their epic 5000 mile non-stop flight to Turkey and fame.

Firestone
MOST MILES PER DOLLAR

Copyright, 1931, The Firestone Tire & Rubber Co.
You are Invited to visit . . . . . .

"The HOME in the SKY"
and "Sky City"

Eighteen stories above the street, in the heart of downtown Cleveland, stands the "HOME in the SKY." It is a full size six room house, completely furnished from basement to bedrooms ... containing all that is new and fine in home building materials and furnishings.

On the surrounding exhibit floors, are scores of permanent built-in displays, showing everything needed for a modern, attractive home.

The "COURT in the SKY," first unit of "SKY CITY" shows many interesting new uses and treatments of fine building materials. You are invited to visit the "HOME in the SKY" and "SKY CITY" while in Cleveland. Nothing is on sale, and there is no charge for admission.

BUILDING ARTS EXHIBIT INC
BUILDERS EXCHANGE BUILDING — ENTRANCE ACROSS PROSPECT FROM THE TERMINAL TOWER
CLEVELAND

The Exhibit is open daily from 9:30 A.M. to 5:30 P.M. Closed all day Sunday. Convenient parking is provided in the Terminal Garage, on the lower floors of the same building.
For SAFETY'S SAKE • • •

KEEP TIRES AIRTIGHT

In the operation of automobiles, trucks, motor coaches or planes, it pays to keep tires inflated to the proper pressure. • • • Proper inflation is a safeguard against accident — very often THE margin of safety. • • • Because of their easily demonstrated superiority, Dill Tire Valves and Valve Parts merit the acceptance accorded them throughout the world. • • • They are easily the choice of the motorist who is concerned with the safe operation of his car. They are used by 90% of all tire manufacturers for all or a substantial share of standard factory equipment requirements.

The DILL MANUFACTURING Co.
CLEVELAND, OHIO
Manufactured in Canada by the Dill Manufacturing Company of Canada, Ltd., Toronto, Ontario

DILL

TIRE SERVICE PARTS
Tire Valves • Valve Insides
Valve Caps • Dust Caps
Pressure Testers • Valve Tools
Are Your Planes Equipped for THE ERA OF NIGHT FLYING?

Night-flying did not have to await airline lighting. But it was forced to await other things.

More than ten years ago Leece-Neville began to prepare for night-flying by developing suitable generators for army aircraft and special types for special services.

Now, with beacons flashing along the airways, with better lighting of airports, with night-flying as a fixed part of aviation, Leece-Neville electrical equipment offers a time-tested source of current for the lighting of planes, for the operating of radio equipment and for many other aeronautical purposes.

Years of service on aircraft in commercial, military, private and expeditionary work have proved the wisdom of developing generators for specific needs—have shown that aircraft generators must have certain features and characteristics not obtainable in ordinary automotive units.

With engines “revving” close to the top RPM, and with wide variations in the lamp load, or in the current needed for radio, heated garments, etc.—under such conditions the generating system must insure a dependable, adequate output and, at the same time, the lamps, contacts, windings, battery and all other connected accessories must be protected against excessive rise in voltage.

Leece-Neville Voltage Regulation does this. And much MORE.

Manufacturers and Operating Companies are invited to consult our engineers relative to electrical equipment.

We are manufacturing 12 to 15 volt aviation generators designed to fit S. A. E. standard mountings in capacities of 15, 25, and 50 amperes at engine operating speeds.

We are also manufacturing double voltage generators giving 15 volts and 500 volts, also 15 volts and 1000 volts which provide suitable plate potential and filament current for radio transmitters and receivers.

Leece-Neville Voltage Regulation

Patented Voltage Regulation

1931—NATIONAL AIR RACES
AUTHORITIES Always Select Continental Lithography

15 out of 64

- Posters judged by the Advertising Council of Chicago as the best of 1930 were lithographed by the CONTINENTAL LITHO. CORP.

Men who know the TRUTH IN REPRODUCTION always select CONTINENTAL LITHOGRAPHY

This exhibition was held in Chicago Civic Opera Bldg., October 12th to 18th. Thirteen companies were represented. Almost 25% of the exhibited posters were made by Continental. Nearest competitor had nine.
OFFICIAL PROGRAM

ELEVENTH ANNUAL

NATIONAL AIR RACES

CLEVELAND AIRPORT
CLEVELAND, OHIO

AUGUST 29 to SEPTEMBER 7
1931

SANCTIONED BY THE NATIONAL AERONAUTIC ASSOCIATION
HELD UNDER RULES OF THE FEDERATION AERONAUTIC INTERNATIONALE

SPONSORED BY
NATIONAL AIR RACES OF CLEVELAND, Inc.
EXECUTIVE HEADQUARTERS
HOTEL CLEVELAND
CLEVELAND, OHIO
Presenting the 1931 National Air Races

We are entering the second decade of National Air Race competition and, at the same time, presenting the first air race program of Cleveland's five-year schedule.

This gigantic spectacle is made possible through the efforts of a group of corporations and individuals who have formed a non-profit organization, for the sole purpose of giving America the greatest aviation exhibition obtainable in the world.

The advantageous geographical location of this city and its ever increasing importance in the sphere of aviation make it fitting that the metropolis of Ohio should be host to this Classic of the Air.

Since the first National Air Races in 1921, the event has, year by year, become larger in its scope and more important to the industry, until today it has attained world significance.

With participation this year by pilots of England, Germany, Poland, Italy, Czechoslovakia and Canada, the air races become in reality an international event. We welcome most heartily these fliers from Europe and our friendly neighbor, Canada. We admire them for their ability and their sportsmanship, and we appreciate their cordial expressions of good will. All America welcomes them, too.

Our own government has co-operated enthusiastically in permitting us to have demonstrations by our great American air forces. To these intrepid birdmen of the Army, Navy and Marine Corps, Cleveland opens its arms.

Participating, too, are famous civilian pilots, both men and women. They are assembled here from all corners of America to demonstrate the nation's progress in aviation. Their splendid achievements have been of untold value to the progress of aviation. The community is theirs.

Surely, with such an assemblage of pilots, the utmost in aerial accomplishments will be presented during the ten days of this epochal event.

The 1931 National Air Races inaugurate a significant era in Aviation progress and those responsible for it are happy to show visitors what has been done for their entertainment and comfort.

We welcome you who are visitors to Cleveland. We hope you will enjoy the races and your stay in our city, and we hope you will return each year to witness these annual air classics.

To all who have given support we extend our thanks.

We present the 1931 National Air Races.

President.
In 1909 . . . and in 1931

The pioneer plane that Glen Curtiss used to "defy the law of Gravitation" in 1909 was finished with Sherwin-Williams Products.

This unusual photo shows 52 U. S. Army planes in flight formation over Downtown Cleveland, during maneuvers in Spring, 1931. These planes are protected with S-W Aeronautical finishes, which have the government's approval.

The pioneer plane that Glen Curtiss flew in 1909 was protected with S-W finishes, and the hundreds of army planes that took part in the preparedness maneuvers of 1931 were protected with Sherwin-Williams Aeronautical Finishes.

It is a far cry from the frail experimental aircraft of 1909 to the modern tri-motored Army Bombing Planes of 1931, but Sherwin-Williams have kept pace with the aircraft industry and today S-W Aeronautical Finishes are approved by government engineers and used on U. S. Army Planes, and are standard in the plants of some of the country's leading aircraft manufacturers.

The Sherwin-Williams Co.

Paints—Varnishes
Aeronautical Sales Div.

Lacquers—Enamels
101 Prospect Ave., Cleveland, Ohio
The Rendezvous of An Industry

THE National Air Race project was developed not as a dazzling spectacle, but rather as a serious competitive laboratory challenging aeronautical engineering genius, manufacturing ability and flying skill. It offers a broad panorama of aviation achievements and is a true barometer of subsequent development.

Truly, it is designed to appeal to every motivating human emotion, yet it concentrates the executive, engineering and flying personnel for the purpose of supplying a medium for common discourse and serious competition.

The annual classic inspires progress which is reflected in more efficient airplanes; more reliable motors, and higher cruising speeds.

As a source of education, entertainment and clean sporting competition, it appeals not only to the many thousands who witness it, but to the millions who follow it through the mediums of the daily press and radio.

This year's events, we believe, will signal new record-breaking achievements that will gain international recognition and significance, the benefits of which will accrue to both the Industry and this community.

The race organization, built of several hundred serious-minded men and women, has executed its assigned tasks with permanent effectiveness and efficiency despite its temporary nature.

I take no little personal pride in the loyalty, aggressiveness and accelerated tempo which the staff and committee organizations have manifested in the brief span of a few weeks of preparation. All of us have taken seriously our obligation to the young but determined and potentially great industry which we serve, and to Cleveland, our host city.

To make the pageantry and achievements of this air classic epochal in aviation history has been the goal of our concerted efforts.

Cliff Henderson
Managing Director.
Executive Officers and Board of Directors Sponsoring the NATIONAL AIR RACES

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1931—NATIONAL AIR RACES

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PAGE 12

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HOME of the FERRO PUMP

Used for Aeronautical and Automotive Gasoline Dispensing

Because of its speed—its convenience—its reliability—the Ferro Remote Control Gasoline Pump is first choice for modern airport use.

The FERRO MACHINE and FOUNDRY CO.

CLEVELAND, OHIO

FERRO PUMPS
General Rules and Regulations Governing All Events

PLANE ELIGIBILITY
(1) All airplanes entitled to Department of Commerce Commercial (C. or N. C.) license shall be eligible to enter all events.

(NOTE: This includes aircraft manufactured either under an approved type Certificate or Group 2 Department of Commerce Classification.)

(a) Experimental (X) and Restricted (R) licensed planes are only eligible to enter Free-for-All events and Transcontinental Free-for-All Derby.

(b) Foreign airplanes from foreign countries are eligible to enter any event provided they have been registered or licensed by their respective governments, and meet the proper license requirements as set forth by the Department of Commerce.

(2) Definition of Open and Cabin Type Airplanes.

(a) Airplanes shall be classified as Open or Cabin Type, depending on pilot seat location. If pilot enclosed (providing enclosure part of permanent structure)—the aircraft will be classed as cabin type.

(b) Streamlining.

Streamlining will be permitted on all aircraft entered—providing that on "C" licensed aircraft the structure is not altered or the license status affected by addition of such streamlining.

Auxiliary cowling, such as Townsend ring or N. A. C. A. cowling over engine will be permitted on all entries providing the installation meets the requirements of the Department of Commerce.

(3) Engines.

(a) No change may be made in engines that will affect the eligibility of the aircraft for "C" licenses except that in the Thompson Trophy Race, all Free-for-All Events and the Transcontinental Free-for-All Derby, any type of super-charger or engine may be used, subject to approval of the Contest Committee and providing the aircraft entered is eligible for the type of license displayed.

(b) License cards must be prominently displayed in all aircraft entered in any event in order to be eligible to start in any event in which entered.

TO BE ELIGIBLE FOR FREE-FOR-ALL EVENTS ALL AIRPLANES MUST QUALIFY.

PILOTS
(1) Eligibility—Pilots must be licensed by the Department of Commerce and hold F. A. I. certificate and annual sporting license issued by the Contest Committee of the National Aeronautical Association, Dupont Circle, Washington, D. C.

(2) Members of the National Aeronautical Association receive sporting licenses without charge.

(3) Pilots not holding F. A. I. Certificate and annual sporting license must procure these from the National Aeronautical Association, Dupont Circle, Washington, D. C., before submitting their entry.

1931—NATIONAL AIR RACES

(4) Men and women pilots will not be allowed to compete in the same events, unless they be selected by the Contest Committee for a special event.

(5) Sportsman pilot is one not engaged in flying as a means of livelihood and one who has never contested for cash purses in aeronautical events.

(6) No pilot with less than 150 hours—fifty of which shall be cross country—will be eligible to enter any racing event.—Special Regulations.

PAY LOAD REGULATIONS
(1) All civilian airplanes entered in any of the events need not carry any pay load except where specifically required to do so under terms of the event.

(2) See regulations governing Derbies and Closed Course Events regarding carrying of passengers.

(3) When ballast is carried in lieu of passengers, or if weight of passenger or passengers does not meet the pay load requirements for that event and plane, then the necessary ballast or additional ballast to meet pay load requirements, must be securely fastened on or under the seat or seats of the passengers or in luggage compartment if such compartment is permanently built into the airplane.

(4) Pay load in all instances should be composed of inert and non-utilizable ballast.

NUMBER OF PRIZES
(1) There will be three prizes in each event, paying 50, 30 and 20 percent of total cash prizes for the event or derbies.

PRIZE MONEY WILL BE PAID AT THE PILOTS' MEETING EACH DAY ON EVENTS ON WHICH NO PROTESTS HAVE BEEN FILED.

In the event of a tie, the tie will be flown off (pylon course) in a manner satisfactory to contestants involved.

There will be no duplication of prizes.

WEARING OF PARACHUTES
(1) It is required that pilots and crew in all derbies be equipped with parachutes. It is also desirable in all other events.

REJECTION AND EXCLUSION OF ENTRANTS
(1) The Contest Committee specifically reserves the right to reject any entrant or exclude any entrant for cause at any time, and without any obligation to rejected or excluded entrant or to anyone because of rejection or exclusion. Entry fee will be refunded.

(2) Among grounds for rejection or exclusion will be:

(a) Fraud in representing, by his or her entry or attempted entry, that the plane, motor or pilot is qualified to compete in that specific event when the facts are otherwise.

(b) Failure of plane, motor or pilot to be qualified to compete in event in which entry is sought or has been made.

(c) Plane, engine or pilot being in an unsatisfactory condition to compete, having due regard for safety of plane, engine, pilot, mechanic, public or other contestants.
Ask to

"PRESS THE BUTTONS"

at the N. A. T. Hangar

Next to the Air Depot on Cleveland Airport is a very remarkable hangar. Executives and pilots are invited to drop in there while attending the National Air Races. Ask to "Press the Buttons." You'll have a surprise when you see the action and performance of Austin Kanopy Doors.

These doors surprised N. A. T. at first, but after 2 years of actual operation they were so satisfactory that 5 hangars for Divisions of U. A. & T. Corporation are now equipped with them. The most recent of these hangars has just been completed by The Austin Company at Kansas City.

Austin Kanopy Doors have all the good features found in other types of doors plus several exclusive advantages... all at no price premium. They raise and lower as individual units or as one large door—no posts in between, no rails in the floor—they permit limitless clear door opening.

In Cleveland, as at other airports, from Coast to Coast, Austin has designed and built hangars, depots, service and manufacturing plants, complete airports, with unique, practical features exclusive with The Austin Company. An Austin Office is near you, wherever you land or take off. For additional information and approximate costs of Austin Kanopy Doors, hangars, aircraft factories or airport engineering service wire, phone, write or use the convenient memo below.

THE AUSTIN COMPANY

Airport Engineers and Builders • Cleveland

New York Chicago Philadelphia Newark Detroit Boston Cincinnati Pittsburgh St. Louis Seattle Portland The Austin Company of California Ltd. Los Angeles, Oakland and San Francisco

The Austin Company of Texas: Dallas

The Austin Company, Limited, Toronto

---

Memo to The Austin Company, Cleveland—We are interested in □ Airport (Municipal) (Private) containing □ acres □ Hangar □ with □ ft. clearance □ Factory area □ sq. ft. □ Send copy of "Airports and Aviation Buildings," □ Send Austin Kanopy Door folder □ Name

Position □ Firm □ City

PAGE 16

OFFICIAL PROGRAM
(d) Unfair or reckless competition, resorting to methods in competition that are unsportsmanlike.

(e) Disobedience of F. A. I. Rules or the published Rules of the National Air Races of Cleveland, or the Department of Commerce Air Traffic Rules and Regulations.

(f) Authority is vested in the Referee of the National Air Races to reject or exclude entrants in any race or races which in his mind are overcrowded. In the exercise of such authority, selection shall be made in accordance with the order in which the entries were received.

(3) The right to exclude any contestant in any event is vested in the Referee of the National Air Races and will be exercised at the starting or control points of any of the derbies. The chairman or referee of any derby may exercise this authority over the Derby of which he has control.

MARKINGS ON PLANE

(1) Each plane shall have a racing number assigned it by the Contest Committee, which number will be assigned in order of receipt of entries. This number shall be painted on the bottom surface of the right, lower wing and on each side of the fuselage, clear of the wing, in characters as large as possible. It shall have no other numbering over twelve (12) inches in height.

(2) Entrants will be permitted to have advertising on their planes, provided that such advertising does not in any way obscure the racing number or the Department of Commerce number and meets with the approval of the contest committee.

PROTESTS

(1) The right to protest is possessed by contestants only; the proper officials of the National Air Races of Cleveland however, may always act by virtue of their office, even when no protest has been filed (F. A. I. Rules No. 208).

(2) Protests will be considered only when presented in writing and accompanied by the sum of $25.00, which amount shall not be refunded unless the validity of the protest is recognized.

(3) Protests on eligibility of plane, engine or pilot must be filed before the start of the race. This does not prevent the contest committee from disqualifying on the grounds of ineligibility after the start of the race.

(4) The prize won by the contestant who is involved in a protest shall be withheld for 48 hours after a final decision has been rendered concerning such protest.

(5) The parties involved in a protest must be duly summoned and given a hearing within a period of time determined by the Contest Committee of the National Air Races. If they fail to present themselves at the time fixed upon, they may not plead such absence against the decision that was rendered in the case.

(6) Notice of rejection of a protest shall be given immediately in writing to the protestant at the address which must be set forth in the protest itself, or such notice be immediately delivered to the protestant in person.

(7) Appeal—Pilots may appeal from decision of the local Contest Committee, to the Contest Committee of the National Aeronautical Association whose decision shall be final. This appeal must be in writing and accompanied by $50.00, which amount shall not be refunded unless validity of protest is recognized, and must be made within 48 hours after the decision of the local Contest Committee is announced.

EXPENSES OF PILOTS, PASSENGERS AND MECHANICS

(1) The National Air Races of Cleveland, Inc., will not bear the hotel or living expenses of any visiting pilot, passenger or mechanic. It is felt likely, however, that at many derby control points, hospitality may be extended by the local committee.

NATIONAL AIR RACES

Assumes no responsibility or liability in case of accident or damage to any person or aircraft.

General Rules and Regulations Governing All Air Derbies

PLANE ELIGIBILITY

(1) All airplanes entered in any of the derby events must meet the requirements as outlined in Paragraph 1, under main heading "Plane Eligibility" in "General Rules and Regulations Governing All Events."

PILOTS

(1) Pilots must meet requirements as outlined in General Rules and Regulations governing all events.

(2) Contestants in any of the derbies may either fly alone or carry an additional person or persons of either sex, except in the Women's Derby where only one additional person may be carried and that person must be a woman.

MINIMUM NUMBER OF CONTESTANTS

(1) A minimum number of five must actually start in each derby.

RULES OF RACE

(1) Start of Race.

(a) Each entrant will be furnished with detailed information as to the time of starting, the place of starting and the time and place of meeting for final instructions. Also schedule showing starting time each morning and length of stop at each control point.

(b) Start at starting cities will be made from "at rest" position with motors idling.

(c) Flying time starts when the plane is scheduled to leave, whether or not the pilot takes off at that time.

(d) Planes will be started singly at all control stops. Planes will be started at one-minute intervals.

(2) Maps—Each entrant must furnish his or her own maps of the route between cities. The Contest Committee will furnish maps of control cities showing the location of the airport that will be used in landing.

(3) Fuel—Should a contestant desire a special brand of gas or oil, it will be necessary for that contestant to make arrangements to secure a supply at each of the control stops and the matter becomes his or her own responsibility.

(4) Servicing Planes—Each contestant shall in any event be responsible for servicing and fueling his or her ship.

(5) No derby plane will be permitted to be preceded by a pilot or other non-competing plane closer than one-half
In presenting "Miss Silvertown" (Dorothy Hester) at the 1931 National Air Races, the B. F. Goodrich Rubber Company hopes to further the cause of aviation, particularly among women. The ease with which this young aviatrix performs her many difficult maneuvers proves that aviation holds no secrets or handicaps for any woman who yearns to fly.

Many of the aerobatic maneuvers with which Miss Hester will entertain each day of the races, were developed and used during the World War as means of attack and escape.

Aerobatics are essential to safe flying, since without them the pilot of an airplane might not be able to meet successfully any emergencies which may confront him. Before commercial or transport pilots are licensed by the Department of Commerce, they must successfully perform many of the maneuvers demonstrated by Miss Hester.

"Miss Silvertown" was born at Portland, Oregon, September 14th, 1910. She learned to fly at The Rankin School of Flying in that city and has to her credit approximately 350 hours in the air.

She holds the women's world record for aviation's most hazardous stunt—the Outside Loop—making 62 consecutively at Omaha Air Races, May 17th, 1931. Miss Hester also holds the world record for either men or women for aviation's most difficult stunt—the Upside Down Barrel Roll. She also performed consecutively 56 of these maneuvers at Omaha Air Races this year.

Miss Hester considers each of her more than forty different aerial gyrations a contribution to safe flying.
hour elapsed time, nor followed by any relief or non-contesting airplane closer than one mile to the rear.

(6) Control Stops—Stops will be compulsory at all control stations. No plane will be permitted to leave any control stop before time scheduled for departure, and all planes between control stops and behind schedule will be under control of referee at station they have left.

(7) No airplane will be allowed to leave any control stop unless in the opinion of the referee the time of the day and the weather conditions ahead are such that the next control stop can be reached in safety.

FINISH OF THE RACE

(1) At the last control stop before reaching Cleveland, all contestants will be given definite instructions about crossing the finish line and landing at the Cleveland Municipal Airport, so as not to interfere with any Closed Course event which may be in progress when the derby arrives. The finish of the race will be made over a white line in front of, and at right angles to the grandstand.

WINNER OF THE RACE

(1) Each contestant in the derby before starting will be furnished with an identification card upon which will be printed the names of all control stops. The contestant will be charged with the responsibility of seeing that the time of landing at each control stop is properly entered and signed by the chairman or referee in charge of that control station.

(2) The winner of any derby will be the contestant whose identification card shows the shortest elapsed flying time between the starting point and Cleveland, providing that elapsed time as shown, is confirmed by the official time sheets, carried by the Chairman of that derby and provided further, that pilot is not disqualified.

(3) When airplanes are held by officials time credit allowance will be made.

LAP WINNERS

(1) The winner of any lap will be the plane making that lap in the shortest elapsed time, subject to handicap, if any, provided pilot is not disqualified.

DIVISION OF LAP PRIZE MONEY

(1) Lap prize money, if any, shall be allotted on a 50-30-20 percent basis.

DIVISION OF PRIZE MONEY

(1) The prize money shall be divided among three winners as follows: 50% to the first; 30% to the second; and 20% to the third.

(2) If the required number of planes do not start in any event, then there shall be no race.

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**Bendix Trophy Race**

Transcontinental Free-For-All Total Purse $10,000

Both Men and Women Pilots Eligible

The Bendix Trophy Race, a transcontinental free-for-all Derby will be from United Airport, Burbank, Cal., to Cleveland and awards will be made entirely upon elapsed time from the point of departure to Cleveland. Landings may be made, or the flight may be made non-stop. Any type of plane or engine may be used, subject to conditions as outlined in General Rules and Regulations Concerning All Events, concerning free-for-all events (Refer Plane Eligibility 3-A). Superchargers may be used. The date and time of start will be between August 31 and September 5, in order that the planes may arrive at Cleveland before 6 P. M. Eastern Time, the same day.

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**National Sweepstake Handicap Derby**

Santa Monica, Cal., to Cleveland

Sweepstake Award

SPECIAL CORD FRONT WHEEL DRIVE CABRIOLET—Value $2500

Men's Division

Total Purse $6,000

$150 Consolation Purse for All Contestants Finishing on Schedule

Women's Division

Total Purse $6,000

The Men's Derby will be from Santa Monica, California, to Cleveland. This race open to any cubic inch displacement, cabin or open type plane, complying with general regulations governing plane eligibility for derbies.

The Women's Derby will be from Santa Monica, California, to Cleveland, following the route of the Men's Derby. This race is open to any cubic inch piston displacement, cabin or open type plane, complying with general regulations governing plane eligibility for derbies.

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**Method of Handicapping**

All airplanes will be flown four times over a one-mile course, at the point of starting the derby by the contestants' choice of any one of three disinterested pilots.

A schedule based on the average speed of these four flights and the air line distance from the starting city to Cleveland will be developed and used as a basis to establish a par (of 100%) for each contesting airplane.

Better performance will be credited as percentage over par and lesser performance will be a percentage deducted from par. The percentage, addition or deduction, will be the number of minutes over or under the original time allowance calculated on that original time allowance.

(1) Propellers should be varnished to prevent change of pitch. Inspections will be made at any stopping point. Any change in propeller will disqualify the contestant.

1931—NATIONAL AIR RACES

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**EXAMPLES**

<table>
<thead>
<tr>
<th>Plane</th>
<th>Average of Air Line Allowance, Par</th>
<th>Finish, Per Cent Minutes Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>105 mph 2:00 1200 100 1200 90.00</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>140 mph 2:00 900 100 900 85.00 105.22</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>140 mph 2:00 900 100 900 90.00</td>
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</tr>
<tr>
<td>D</td>
<td>150 mph 2:00 840 100 800 80.00 104.73</td>
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</tr>
<tr>
<td>E</td>
<td>200 mph 2:00 630 100 630 80.00 105.00</td>
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</tr>
<tr>
<td>F</td>
<td>210 mph 2:00 600 100 600 70.00 90.00</td>
<td></td>
</tr>
</tbody>
</table>

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PAGE 19
Quality in an automobile is not a fixed attribute. It is determined only by comparison with other cars. The standing of any automobile today depends, not so much upon past reputation, as upon how far its builders have forged ahead, or lagged behind present competition. The five new Straight Eight Auburn cars of today not only establish a totally new standard of quality, but also increase the buying power of the consumer's dollar. Auburn's success in again pioneering is reflected in the rapid increase in public acceptance.
General Rules and Regulations Governing
Closed Course Events

PLANE ELIGIBILITY
(1) Refer to General Rules and Regulations for Engine
or Plane Eligibility on Closed Course Events.

PILOTS
(1) Refer to General Rules and Regulations governing
pilots.

LOAD REGULATIONS
(1) In all Closed Course Events, ballast instead of pas-
sengers must be carried.

RULES OF THE RACE
(1) Method of Starting:
(a) Race Horse Start—If this method of starting proves
practical, it will be continued throughout the entire series
of Closed Course Events.
(b) Planes entered in any Closed Course Event will be
lined up on the starting line, with engines idling, from left
to right in order of receipt of entries. At a given signal,
all planes will take off together.
(c) In taking off in the “Race Horse” start, no plane
shall cut in front of another until a safe distance has been
gained. Any plane passing another plane must keep at
least 150 feet to the right, or 50 feet above the plane being
overtaken.
(2) All pylon turns must be made to the left and out-
side of the pylon.
(3) A plane overtaken must hold its altitude and a true
course in order that it may not in any way impede or inter-
ference with a faster, overtaking ship.
(4) A plane overtaking a slower plane shall never at-
tempt to pass between that plane and any pylon.
(5) After crossing the finish line, all planes shall con-
tinue on their course until they have attained an altitude
of 1,000 feet, then they may turn and return to the airport
and land in that part of the field assigned for landing and
in so doing, shall not cross the course of the finish line.
(6) Pilots shall pass all turning points in plain view of
the observing officials, stationed at each turning point, and
at an altitude of not over 500 feet.

FOULING MARK: “Any competitor who has failed
to turn a pylon properly, may validly continue on the cir-
cuit provided he makes a complete turn of the said pylon,
and then continues his course in the proper direction.”

FINISH OF THE RACE
(1) The finish of all Closed Course Events will be
made by passing over the finish line in front of and at right
angles to the grandstand, after completing the required
number of laps allowed in the Closed Course or other pre-
scribed course.

WINNER OF THE RACE
(1) The winner of first place, in any event, where
speed is the determining factor, shall be the pilot who has
completed a full course in the shortest elapsed time, and of
second place, the second best time, etc., provided the pilot
is not disqualified.

Shell Trophies Speed Dashes
Special Straight-Away Speed Events
All Cubic inch Classes
Course—One Mile

Individual Trophies to be Presented to Winner of Each Special Event

The 1931 National Air Races inaugurate a series of
straight-away speed dashes over a certified course directly
in front of the grandstand. The fastest speed obtained in
the individual free-for-all groups during the period of this
year’s races will be set up as American National Air Race
records in the individual cubic inch classes and will be con-
tested from year to year. The timing for these events will
be simultaneous with the qualifying dashes for all free-for-
all entries. The speed trials will be effectuated in straight-
away flight at an altitude of not more than 150 feet. An
approach by diving is prohibited and will disqualify the con-
testant. The contestants will be permitted to make sev-
eral attempts during the period of the Races, during the
periods on the program assigned for qualifying and speed
dashes, subject to approval of the Contest Committee. One
speed dash will be made in each direction to overcome wind
variance and the net speed will be an average of the speed
in both directions. Entrants will fly in straight line level
flight one-half mile prior to crossing the starting line and
continue one-half mile in straight line level flight, after
crossing the finish line.

Trophies for Special Events No. 100 to No. 107 inclusive
and No. 109 and No. 110 presented by Shell Eastern Petrol-
eum Prod., Inc. Perpetual Trophies for Events No. 108 and
No. 111 presented by Shell Petroleum Corp., St. Louis.

SHELL TROPHY Special Event No. 100
(Straightaway) 115 cubic inch displacement or less (men
pilots).

1931—NATIONAL AIR RACES
Here's how the public answers the question:

**WHAT IS THE BEST TIRE MADE?**

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>Percentage</th>
</tr>
</thead>
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<td>30.7%</td>
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<tr>
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<tr>
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<td>F</td>
<td>6.0%</td>
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<tr>
<td>G</td>
<td>3.7%</td>
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<tr>
<td>H</td>
<td>2.7%</td>
</tr>
<tr>
<td>I</td>
<td>2.4%</td>
</tr>
<tr>
<td>J</td>
<td>1.8%</td>
</tr>
<tr>
<td>K</td>
<td>1.2%</td>
</tr>
<tr>
<td>L</td>
<td>0.9%</td>
</tr>
<tr>
<td>ALL OTHERS</td>
<td>10.4%</td>
</tr>
<tr>
<td>NO CHOICE</td>
<td>4.4%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
</tr>
</tbody>
</table>

It will be noted that 30.7% of the car owners of America prefer Goodyear Tires. This preference is more than twice that of any other make of tire.

This tire survey was based on a scientifically mailed questionnaire to car owners in every state in the country and proportioned in terms to cities and rural communities.

The facts shown here were secured by an institution of national reputation, not connected with the tire industry.

More people want Goodyears
More people buy Goodyears
More people ride on Goodyear Tires than on any other kind!
Closed Course Events

Event—A
FREE-FOR-ALL—Men Pilots Only
R. F. Goodrich Co. Trophy
Total Purse $800
(1) Open to any type airplane powered with an engine of not more than 115 cubic inch piston displacement.
(2) Six laps of a five-mile course.
(3) First prize, $400.00; second prize, $240.00; third prize, $160.00.
(4) Required qualifying speed of 70 miles per hour. (See Special Event No. 100.)

Event—B
Men Pilots Only
Total Purse $600
(1) Open to cabin and open type airplanes powered with an engine of not more than 115 cubic inch piston displacement, carrying ATC or Group II license.
(2) Six laps of a five-mile course.
(3) First prize, $300.00; second prize, $180.00; third prize, $120.00.

Event No. 1
FREE-FOR-ALL—Men Pilots Only
Goodyear Tire & Rubber Co. Trophy
Total Purse $1,000
(1) Open to any type airplane powered with an engine having not more than 275 cubic inch piston displacement.
(2) Six laps of a five-mile course.
(3) First prize $500.00, second prize $300.00; third prize $200.00.
(4) Required qualifying speed 75 miles per hour. (See Special Event No. 101.)

Event No. 2
Men Pilots Only
Universal Valve & Fitting Co. Trophy
Total Purse $600
(1) Open to any type airplane powered with an engine of not more than 400 cubic inch piston displacement. A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) First prize $300.00, second prize $180.00, third prize $120.00.

Event No. 3
FREE-FOR-ALL—Men Pilots Only
Goodyear Tire & Rubber Co. Trophy
Total Purse $1,200
(1) Open to any type airplane powered with an engine of not more than 400 cubic inch piston displacement.
(2) Six laps of a five-mile course.
(3) First prize $600.00, second prize $360.00; third prize $240.00.
(4) Required qualifying speed 100 miles per hour. (See Special Event No. 102.)

Event No. 4
Men Pilots Only
J. H. Williams & Co. Prize
Total Purse $800
(1) Open to cabin and open type airplanes powered with engine of not more than 400 cubic inch piston displacement, carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) First prize $400.00, second prize $240.00; third prize $160.00.

Event No. 5
FREE-FOR-ALL—Men Pilots Only
Clifford Henderson Trophy
Total Purse $1,200
(1) Open to any type airplane powered with an engine of not more than 510 cubic inch piston displacement.
(2) Six laps of a five-mile course.
(3) First prize $600.00, second prize $360.00; third prize $240.00.
(4) Required qualifying speed 110 miles per hour. (See Special Event No. 103.)

Event No. 6
Men Pilots Only
R. F. Goodrich Co. Trophy
Total Purse $1,500
(1) Open to cabin and open type airplanes powered with an engine of not more than 510 cubic inch piston displacement carrying A. T. C. or Group II License.
(2) Six laps of a five-mile course.
(3) First prize $400.00, second prize $240.00; third prize $160.00.

Event No. 7
FREE-FOR-ALL—Men Pilots Only
General Tire & Rubber Co. Trophy
Total Purse $1,200
(1) Open to any type airplane powered with an engine of not more than 650 cubic inch piston displacement.
(2) Six laps of a five-mile course.
(3) First prize $900.00, second prize $540.00; third prize $360.00.
(4) Required qualifying speed 120 miles per hour. (See Special Event No. 104.)

Event No. 8
Men Pilots Only
Goodyear Tire & Rubber Co. Trophy
Total Purse $1,200
(1) Open to cabin and open type airplanes powered with an engine of not more than 650 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) First prize $600.00, second prize $360.00; third prize $240.00.

Event No. 9
FREE-FOR-ALL—Men Pilots Only
Carey Machine Co. Trophy
Total Purse $2,400
(1) Open to any type airplane powered with an engine of not more than 800 cubic inch piston displacement.
(2) Ten laps of a five-mile course.
(3) First prize $1,200.00, second prize $720.00; third prize $480.00.
(4) Required qualifying speed 130 miles per hour. (See Special Event No. 105.)

Event No. 10
Men Pilots Only
Goodyear Tire & Rubber Co. Trophy
Total Purse $1,600
(1) Open to cabin and open type airplanes powered with an engine of not less than 400 cubic inches nor more than 800 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Ten laps of a five-mile course.
(3) First prize $800.00, second prize $480.00; third prize $320.00.
Richfield—Outstanding Winner at NATIONAL AIR RACES!

1928—Winner of the Class A Transcontinental, Class C Transcontinental, Class A California derbies and Transcontinental non-stop race...4 of the 6 major events staged!

1929—Winner Oakland to Cleveland and Pittsburg to Cleveland derbies. Also...7 closed course events!

1930—Winner more victories in non-stop, derbies and closed course events than all other gasolines combined...a record of 42 out of 67 events!

Here is conclusive, undeniable proof of quality...dramatic proof that Richfield is unequalled for power, speed and dependability. No other gasoline has even remotely approached this record since the inception of Aviation's annual classic...the National Air Races!

This year...Richfield offers you COMBAT Aviation Gasoline. A new name...and a new high quality that surpasses "fighting grade" specifications as well as the most rigid requirements of commercial flying.

COMBAT is the fightin'est gasoline ever put in a motor...at the price of ordinary gasoline. Available at important airports both east and west of the Mississippi.

Combat Aviation Gasoline and Combat Aviation Oil will be available at 1931 National Air Races at Cleveland

COMBAT
Richfield's Aviation GASOLINE

RICHFIELD OIL COMPANY • LOS ANGELES • NEW YORK CITY
Event No. 11
FREE-FOR-ALL—Men Pilots Only
General Tire & Rubber Co. Trophy
Total Purse $3,000
(1) Open to any type airplane powered with an engine of not more than 1000 cubic inch piston displacement.
(2) Five laps of a ten-mile course.
(3) First prize $1,500.00, second prize $900.00, third prize $600.00.
(4) Required qualifying speed 140 miles per hour. (See Special Event No. 106.)

Event No. 12
Men Pilots Only
Webb C. Ball Co. Trophy
Total Purse $2,000
(1) Open to cabin and open type airplanes powered with an engine of not more than 1000 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Five laps of a ten-mile course.
(3) First prize $1,000.00, second prize $600.00, third prize $400.00.

Event No. 13
FREE-FOR-ALL—Men Pilots Only
Goodyear Tire & Rubber Co. Trophy
Total Purse $3,600
(1) Open to any type airplane powered with an engine of not less than 1200 cubic inch piston displacement.
(2) Five laps of a ten-mile course.
(3) First prize $1,800.00, second prize $1,080.00, third prize $720.00.
(4) Required qualifying speed 150 miles per hour. (See Special Event No. 107.)

Event No. 14
Men Pilots Only
B. F. Goodrich Co. Trophy
Total Purse $2,400
(1) Open to cabin and open type airplanes powered with an engine of not less than 1200 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Five laps of a ten-mile course.
(3) First prize $1,200.00, second prize $720.00, third prize $480.00.

Event No. 15
AMPHIBIAN NOVELTY RACE—Men Pilots Only
Trophy

Event No. 16
AUTOGIRO RACE—Men Pilots Only
Total Purse $1,000

Event No. 17
SPORTSMAN PILOT RACE—Men Pilots Only
Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine not more than 120 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) Prize—Sportsman Pilot Trophy.

Event No. 18
SPORTSMAN PILOT RACE—Men Pilots Only
B. F. Goodrich Co. Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine of not more than 275 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) Prize—Trophy.

Event No. 19
SPORTSMAN PILOT RACE—Men Pilots Only
Cessna Machine Co. Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine of not more than 350 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) Prize—Trophy.

Event No. 20
SPORTSMAN PILOT RACE—Men Pilots Only
Clifford Henderson Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine of not more than 450 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) Prize—Trophy.

Event No. 21
SPORTSMAN PILOT RACE—Men Pilots Only
Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine of not more than 650 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) Prize—Trophy.

Event No. 22
SPORTSMAN PILOT RACE—Men Pilots Only
Senator M. Bingham Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine of not more than 800 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Ten laps of a five-mile course.
(3) Prize—Trophy.

Event No. 23
SPORTSMAN PILOT RACE—Men Pilots Only
Goodyear Tire & Rubber Co. Trophy
(1) Open to sportsman pilots with cabin and open type airplanes powered with an engine of not more than 1000 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Ten laps of a five-mile course.
(3) Prize—Trophy.
Event No. 24
Women Pilots Only
Total Purse $1,000
(1) Open to cabin and open type airplanes powered with an engine of not more than 350 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) First prize $500.00, second prize $300.00, third prize $200.00.

Event No. 25
FREE-FOR-ALL—Women Pilots Only
Goodyear Tire & Rubber Co. Trophy
Total Purse $1,000
(1) Open to any type airplane powered with an engine of not more than 510 cubic inch piston displacement.
(2) Six laps of a five-mile course.
(3) First prize $500.00, second prize $300.00, third prize $200.00.
(4) Required qualifying speed 100 miles per hour.
(See Special Event No. 109.)

Event No. 26
Women Pilots Only
Carey Machine Co. Trophy
Total Purse $1,500
(1) Open to cabin and open type airplanes powered with an engine of not more than 650 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Six laps of a five-mile course.
(3) First prize $750.00, second prize $450.00, third prize $300.00.

Event No. 27
FREE-FOR-ALL—Women Pilots Only
Clifford Henderson Trophy
Total Purse $2,000
(1) Open to any type airplane powered with an engine of not more than 800 cubic inch piston displacement.
(2) Ten laps of a five-mile course.
(3) First prize $1000.00, second prize $600.00, third prize $400.00.
(4) Required qualifying speed 110 miles per hour.
(See Special Event No. 110.)

Event No. 28
Women Pilots Only
B. F. Goodrich Co. Trophy
Total Purse $2,500
(1) Open to cabin and open type airplanes powered with an engine of not more than 1000 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Five laps of a ten-mile course.
(3) First prize $1250.00, second prize $750.00, third prize $500.00.

Event No. 29
Women Pilots Only
Total Purse $3,000
(1) Open to cabin and open type airplanes powered with an engine of not more than 1875 cubic inch piston displacement carrying A. T. C. or Group II license.
(2) Five laps of a ten-mile course.
(3) First prize $1500.00, second prize $900.00, third prize $600.00.

Event No. 30
MIXED RACE BY INVITATION
Total Purse $2,500
First prize $1250.00, second prize $750.00, third prize $500.00.
NOTE: The contest committee will select the contestants for this race which will be free-for-all, for airplanes of approximately 1000 cubic inch piston displacement.

Event No. 31
CIVILIAN ACROBATIC EXHIBITION
Total Purse $3,000
(1) Teams of three airplanes will give demonstrations by invitation. One team each day.
(2) $300.00 each day for team flying that day.

Charles E. Thompson Trophy Race

Event No. 32
Men Pilots Only
Total Purse $15,000
And Gold, Silver and Bronze Plaques of the Thompson Trophy
(1) A free-for-all speed contest for any type of airplane equipped with any type of engine or engines. Superchargers, special fuels, or any other means may be used to increase the speed of planes entered in this race.
(2) Ten laps of a ten-mile course.
(3) First prize $7500.00, second prize $4500.00, third prize $3000.00.
(4) Required qualifying speed 175 miles per hour.
(See Special Event No. 108.)

OFFICIAL PROGRAM
Cleveland Pneumatic Aerol Trophy Race

Event No. 33  Women Pilots Only  Total Purse $7,500

The Cleveland Pneumatic Tool Company of Cleveland, Ohio, has donated a beautiful trophy to be known as The Cleveland Pneumatic Aerol Trophy, to be competed for annually, by women pilots only, at the National Air Races in a free-for-all race for any type of airplane equipped with any type of engine or engines.

The trophy will be awarded annually to the Nation, Organization or Chapter of The National Aeronautical Association represented by the winning pilot. It will be retained by the winning body until one month prior to the date on which it is next to be competed for.

A silver plaque illustrative of the trophy will be awarded to the winning pilot for permanent possession.

1. A free-for-all speed contest for any type of airplane equipped with any type of engine or engines. Superchargers, special fuels or any other means may be used to increase speed of planes entered in this race.

2. Entrants must have had one hundred and fifty hours to be eligible to compete.

3. Five laps of a ten-mile course.

4. First prize $3,750.00, second prize $2,250.00, third prize $1,500.00.

5. Required qualifying speed 140 miles per hour.

(See Special Event No. 111.)

Event No. 34  DEAD STICK LANDING CONTEST—Men Pilots Only  Total Purse $1,100

(1) The following prizes will be awarded for each event for the contestant landing closest to a designated mark, without the use of brakes.

2. First prize $100.00, second prize $60.00, third prize $40.00.

3. Entry fee $25.00. Returnable after the races, provided one day’s event has been participated in.

NOTE: There will be two Dead Stick Landing Contests each day, one for men and one for women. There will be two classifications in these events, one for airplanes equipped with brakes and one for airplanes not equipped with brakes, alternating daily. Due to the number of these events being doubled (by the brake classification), the prize money has been increased $2,000, making the daily awards total $400.00.

Event No. 35  DEAD STICK LANDING CONTEST—Women Pilots Only  Total Purse $1,000

(1) The following prizes will be awarded for each event for the contestant landing closest to a designated mark without the use of brakes.

2. First prize $100.00, second prize $60.00, third prize $40.00.

3. Entry fee $25.00. Returnable after the races, provided one day’s event has been participated in.

NOTE: There will be two Dead Stick Landing Contests each day, one for men and one for women. There will be two classifications in these events, one for airplanes equipped with brakes and one for airplanes not equipped with brakes, alternating daily. Due to the number of these events being doubled (by the brake classification), the prize money has been increased $2,000, making the daily awards total $400.00.

Event No. 36  AIR TRANSPORT—SPEED AND EFFICIENCY CONTEST  Total Purse $2,000

(Multi Motored Airplanes)

(1) Open to multi-motorized airplanes.

(2) Five laps of a ten-mile course.

(3) The award will be determined by the greatest number of merit points for each ship, according to the 1931 National Air Tour Formula.

(4) To conserve time the altitude requirements for multi-engined ships will be waived, but the ships will be required to demonstrate ability to fly without their most efficient engine and fly on the remaining one or two engines.

1931—NATIONAL AIR RACES

Event No. 36—A  AIR TRANSPORT—SPEED AND EFFICIENCY CONTEST

Single Motored Airplanes (Combination)

Total Purse $1,500

(1) Open to any single motored cabin airplanes, including combination type, i.e., airplanes with open pilot’s cockpit but with cabin space for passengers, freight, mail and express.

(2) Five laps of a ten-mile course.

(3) Award will be determined by the greatest number of merit points for each ship according to the 1931 National Air Tour Formula.

Event No. 37  ARMY, NAVY AND MARINE CLOSED COURSE EVENTS

Total Purse $2,200

(1) Open to military two-place planes only.

(2) Five laps of a ten-mile course.

(3) Trophy will be awarded to winner.

Event No. 38  NATIONAL GUARD RACE

Douglas Trophy

Total Purse $1,500

(1) Open to military two-place planes only.

(2) Five laps of a ten-mile course.

(3) Trophy will be awarded to winner.

Event No. 39  FREE-FOR-ALL—Professionals

PARACHUTE JUMPING CONTEST

Total Purse $2,200

(1) Each contestant will be required to jump from a minimum of 2000 feet, landing as near as possible to a predetermined point of the airport.

(2) This contest is free to all experienced male participants. The Contest Committee will select the jumpers each day from among those entered. Each jumper must furnish his own airplane.

(3) All parachutes must have an inspection ticket dated within 30 days of the start of the races. An air service or National Guard inspection ticket for the service or Guard jumpers and a factory inspection ticket for the civilian jumpers. All parachutes used must be approved by the Department of Commerce and the conditions as set forth in the Department of Commerce Regulations for Exhibition Parachute Jumping must be complied with.

(4) Daily Prizes: First prize, three points, $100.00; second prize, two points, $60.00; third prize, one point, $40.00.

(5) Sweepstakes prize to high point winner for the period of the races—$200.00.

(6) No two parachute jumpers will be allowed to use the same parachute the same day.

(7) Entry fee—$25.00. Returnable after the races, provided one jump has been made or entry rejected.
Pilot a Plane Yourself to a real thrill. The Trainair is a Great Lakes product, made by this famous Cleveland manufacturer of army, navy and commercial airplanes. A ride in the Trainair gives you all the exhilaration—plus the practical experience—of "feeling" a plane zoom, bank, dive and turn under your own control. And it's the fun of a lifetime. Be sure you ride the Trainair before you leave the field today.
Daily Program of Events---1931 National Air Races
Events of necessity may not be run off in the order listed. Watch the Score Board.

SATURDAY, AUGUST 29th
Inaugural Day—Flower Pageant Day—Derby Day.
1:00 P. M. to 9:15 P. M.

Event
Informal Opening Ceremony.
A Arrival Boardman and Polando (made longest non-stop flight in history).
B Navy Planes—Tactical Maneuvers.
C Marine Planes—Tactical Maneuvers.
D Army Pursuit Planes—Tactical Maneuvers.
E Event No. 31—Civilian Acrobatics Exhibition.
F Autogiro Exhibition—Autogiro Co., of America, Pitscairn Aircraft Corp., Kellet Aircraft Corp.
G Formal Inaugural Ceremonial—1931 National Air Races.
H Dedication of P. M.—Flower Pageant (Cleveland Plain Dealer) Massed Bands, Figur Ceremonial.
I Al. Williams and the International Team.
J Glider Exhibition—Hawley Bowlus.
K Miss Silvertown (Dorothy Hester).
L Band Concert.
M Navy Corps Night Flight.
Fireworks Spectacle.
Army Comet Fireworks Flight.

SUNDAY, AUGUST 30th
All Ohio Day
1:00 P. M. to 9:15 P. M.

Event
Opening Ceremony.
A Marine Planes—Tactical Maneuvers.
B Autogiro Exhibition—Autogiro Co, of America, Pitscairn Aircraft Corp., Kellet Aircraft Corp.
C Event No. 31—Civilian Acrobatics Exhibition.
D Event No. 39—Parachute Landing Contest.
E Miss Silvertown (Dorothy Hester).
F Shell Trophy Special Event No. 100—Men's 115 cu. in. Straightaway Speed Dash.
G Event No. 17—Sportsman Pilot Race—120 cu. in. A. T. C.
H Event No. 34—Men’s Dead Stick Landing Contest (with brakes).
I Army Pursuit Planes—Tactical Maneuvers.
J Shell Trophy Special Event No. 101—Men's 275 cu. in. Straightaway Speed Dash.
K Event No. 25—Women's Free-for-all 510 cu. in.
L Navy Planes—Tactical Maneuvers.
M Event No. 35—Women's Dead Stick Landing Contest (with brakes).
N Al. Williams and the International Team.
O Event No. 39—Parachute Landing Contest.
P Band Concert.
Q Marine Corps Night Flight.
Fireworks Spectacle.
Army Comet Fireworks Flight.

MONDAY, AUGUST 31st
12:00 M. to 9:15 P. M.

Event
A Arrival of Lieut. Walter Hinton with the Exchange Club Plane.
B Event No. 34—Men's Dead Stick Landing Contest (without brakes).
C Event No. 35—Women's Dead Stick Landing Contest (without brakes).
D Opening Ceremony.
E Event No. 6—A. T. C. 510 cu. in. Race for Men Pilots.
F Shell Trophy Special Event No. 111—Free-for-all Straightaway Speed Dash for Women—Qualifying for Acrol Trophy Race.
G Navy Planes—Tactical Maneuvers.
H Event “B”—Men's 115 cu. in. Race—A. T. C.
I Autogiro Exhibition—Autogiro Co., of America, Pitscairn Aircraft Corp., Kellet Aircraft Corp.
J Miss Silvertown (Dorothy Hester).
K Shell Trophy Special Event No. 102—Men's 400 cu. in. Straightaway Speed Dash.
L Event No. 26—Women's A. T. C. 650 cu. in. Race.
M Event No. 31—Civilian Acrobatic Exhibition.
M Shell Trophy Special Event No. 103—Men's 510 cu. in. Straightaway Speed Dash.
O Marine Planes—Tactical Maneuvers.
P Goodyear “Doughnut” Tire Plane Demonstration.
Q Al. Williams and the International Team.
R Army Planes—Tactical Maneuvers.
T Arrival (Bendix Trophy Race), Transcontinental Free-for-all Speed Dash from Los Angeles, Cal. (Weather Permitting).
U Event No. 39—Parachute Landing Contest.
V Band Concert.
W Army Corps Night Flight.
Fireworks Spectacle.
Army Comet Fireworks Flight.

TUESDAY, SEPTEMBER 1st
12:00 M. to 9:15 P. M.

Event
A Event No. 34—Men's Dead Stick Landing Contest (with brakes).
B Event No. 35—Women's Dead Stick Landing Contest (with brakes).
C Opening Ceremony.
D Arrival of Entire Army First Pursuit Group.
E Shell Trophy Special Event No. 106—Free-for-all Straightaway Speed Dash for Men Qualifying for Thompson Trophy Race.
De Witt Operated Hotels

In Cleveland It's—The Hollenden
"Within a Block or Two of Everywhere"
1050 Rooms, All with Bath
4-Station Selective Radio Speaker in Every Room.
Rates Starting at $2.50 Single, $4.50 Double,
Moderate Priced Coffee Shop,
300-Car Fireproof Garage in Building.

In Columbus It's—The Neil House
"Across from the Capitol"
655 Rooms, All with Bath
Rates Starting at $2.50 Single, $4.00 Double,
Moderate Priced College Grill Coffee Shop,
Ample Garage Accommodations.

In Akron It's—The Mayflower
450 Rooms, All with Bath
4-Station Selective Radio Speaker in Every Room.
Rates Starting at $2.50 Single, $4.50 Double,
Moderate Priced Colonial Grill Coffee Shop,
Ample Garage Accommodations.

De Witt Operated Hotels
Feature
the Best Food in the City
at moderate prices
Daily Program of Events—Continued

**WEDNESDAY, SEPTEMBER 2nd**

All Kiwanis Day—Q. B. Day—Governors Day—Lake County Day—Mansfield Day—German Day—Marion Day

12:00 M. to 9:15 P. M.

**Event**

A Event No. 34—Men's Dead Stick Landing Contest (with brakes).
B Event No. 35—Women's Dead Stick Landing Contest (without brakes).
C Opening Ceremony.
D Navy Planes—Tactical Maneuvers.
E Event No. 21—Sportsman Pilot Race—650 cu. in.
F Al Williams and the International Team.
G Event No. 4—Men's A. T. C. Race—400 cu. in.
H Army Planes—Tactical Maneuvers.
I Event No. 12—Men's A. T. C. Race—1000 cu. in.
J Goodyear "Doughnut" Tire Plane Demonstration.

**THURSDAY, SEPTEMBER 3rd**


12:00 M. to 9:15 P. M.

**Event**

A Event No. 34—Men's Dead Stick Landing Contest (with brakes).
B Event No. 35—Women's Dead Stick Landing Contest (with brakes).
C Opening Ceremony.
D Shell Trophy Special Event No. 105—Men's 800 cu. in. Straightaway Speed Dash.
E Navy Planes—Tactical Maneuvers.
F Shell Trophy Special Event No. 110—Women's 800 cu. in. Straightway Speed Dash.
G Marine Planes—Tactical Maneuvers.
H Event No. 10—Men's A. T. C. 400 cu. in. Race.
I Autogiro Exhibition—Autogiro Co. of America, Pitcairn Aircraft Corp., Kellett Aircraft Corp.
J Miss Silvertown (Dorothy Hester).
K Shell Trophy Special Event No. 107—Men's 1875 cu. in. Straightway Speed Dash.
L Event No. 36—Air Transport Speed and Efficiency Contest for Single Motorized Planes (For Speed).
M Civilian Acrobatic Exhibition.
N Event No. 19—Sportsman Pilot Race—350 cu. in.
O Al Williams and the International Team.
P Event No. 13—Men's Free-for-all—1200 cu. in.
Q Goodyear "Doughnut" Tire Plane Demonstration.
R Miss Silvertown (Dorothy Hester).
S Event No. 39—Parachute Jumping Contest.
T Band Concert.
U Navy or Marine Corps Night Flight.
V Fireworks Spectacle.
W Army Comet Fireworks Flight.

**FRIDAY, SEPTEMBER 4th**


12:00 M. to 9:15 P. M.

**Event**

A Arrival of Famous Sikorski Flight Canadian Royal Air Force and 15 Planes, Trans-Canada Air Pageant.
B Event No. 34—Men's Dead Stick Landing Contest (without brakes).
C Event No. 35—Women's Dead Stick Landing Contest (without brakes).
D Arrival Post and Gartry (around the world flyers)
E Opening Ceremony.
F Army Planes—Tactical Maneuvers.
G Shell Trophy Special Event No. 111—Free-for-all Straightaway Speed Dash for Women Qualifying for Trophy Race.
H Al Williams and the International Team.
I Event No. 27—Women's Free-for-all—800 cu. in. Race.
In America's Premier Flights...

PrACTICALLY every American plane that has won a place in aviation history since 1925 was aided to success by the unfailing dependability of Thompson Valves.

Among these famous Thompson-equipped ships are the “Spirit of St. Louis,” the “America,” the “Southern Cross,” the “St. Louis Robin,” the “Question Mark,” the “Floyd Bennett,” Hawks’ transcontinental plane and the “Greater St. Louis.”

Consistent success in such grueling flights has influenced the adoption of Thompson Valves for today’s finest aero motors.

THOMPSON PRODUCTS, INCORPORATED
General Office: Cleveland, Ohio, U. S. A.
Factories: CLEVELAND and DETROIT

Thompson Valves
Daily Program of Events—Continued

(Friday, September 5th Continued)

Event J Miss Silvertown (Dorothy Hester).
K Autogiro Exhibition—Autogiro Co. of America, Pitecairn Aircraft Corp., Kellett Aircraft Corp.
L Glider Exhibition.
M Canadian Pageant of Canadian Royal Flying Corps.
N Event No. 28—Women’s A. T. C. 100 cu. in. Race.
O Marine Planes—Tactical Maneuvers.
P Canadian Civilian Aircraft Exhibition.
Q Event No. 30—Men and Women Pilots Mixed Race by Invitation.
R Goodyear Blimp Landing.
T Event No. 39—Parachute Jumping Contest.
U Band Concert.
V Army, Navy or Marine Corps Night Flight. Fireworks Spectacle.
Army Comet Fireworks Flight.

SATURDAY, SEPTEMBER 5th

12:00 M. to 9:15 P. M.

A Akron Day.

Event

A Event No. 34—Men’s Dead Stick Landing Contest (with brakes).
B Event No. 35—Women’s Dead Stick Landing Contest (with brakes).
C Opening Ceremonies.
D Event No. 36—Air Transport Speed and Efficiency Contest for Multi-Motored Planes (Stick and Unstick).
E Navy Planes—Tactical Maneuvers.
F Miss Silvertown (Dorothy Hester).
G Marine Planes—Tactical Maneuvers.
H Event No. 36—Air Transport Speed and Efficiency Contest for Multi-Motored Planes (for speed).
I Shell Trophy Special Event No. 108—Free-for-All Straightaway Speed Dash for Men Qualifying for Thompson Trophy Race. (Qualifying Speed 175 miles per hour).
K Event No. 36-A—Air Transport Speed and Efficiency Contest for Single Motored Planes (Stick and unstick).
L Army Planes—Tactical Maneuvers.
M Al Williams and the International Team.
N Autogiro Exhibition—Autogiro Co. of America, Pitecairn Aircraft Corp., Kellett Aircraft Corp.
O Event No. 11—Men’s Free-for-all 1000 cu. in. Race.
P Event No. 39—Parachute Jumping Contest.
Q Band Concert.
R Navy and Marine Corps Maneuvers. Fireworks Spectacle.
Army Comet Fireworks Flight.

SUNDAY, SEPTEMBER 6th

12:00 M. to 9:15 P. M.

Event

A Event No. 34—Men’s Dead Stick Landing Contest (without brakes).
B Event No. 35—Women’s Dead Stick Landing Contest (without brakes).
C Opening Ceremonies.
D Navy Planes—Tactical Maneuvers.
E Event No. 23—Sportsman Pilot Race—1000 cu. in.
F Marine Planes—Tactical Maneuvers.
G Event No. 24—Women’s A. T. C. 350 cu. in. Race.
H Al Williams and the International Team.
I Event No. 29—Women’s A. T. C. 1875 cu. in. Race.
K Novelty Flying.
L Event No. 1—Men’s Free-for-all 275 cu. in. Race.
M Navy Planes—Tactical Maneuvers.
N Autogiro Exhibition—Autogiro Co. of America, Pitecairn Aircraft Corp., Kellett Aircraft Corp.
O Miss Silvertown (Dorothy Hester).
P Event No. 9—Men’s Free-for-all—800 cu. in. Race.
Q Event No. 39—Parachute Jumping Contest.
R Band Concert.
S Navy or Marine Corps Night Flight. Fireworks Spectacle.

MONDAY, SEPTEMBER 7th

Labor Day—Wooster Day.

12:00 M. to 9:15 P. M.

Event

A Event No. 34—Men’s Dead Stick Landing Contest (with brakes).
B Event No. 35—Women’s Dead Stick Landing Contest (with brakes).
C Opening Ceremonies.
D Army Planes—Tactical Maneuvers.
E Event No. 2—Men’s A. T. C. 275 cu. in. Race.
F Navy Planes—Tactical Maneuvers.
G Al Williams and the International Team.
H Event No. 3—Men’s Free-for-all 400 cu. in. Race.
I Novelty Flying.
J Glider Exhibition.
K Landing of Goodyear Blimp.
L Manufacturers Demonstration.
M Marine Planes—Tactical Maneuvers.
N Autogiro Exhibition—Autogiro Co. of America, Pitecairn Aircraft Corp., Kellett Aircraft Corp.
O Event No. 18—Sportsman Pilot Race—275 cu. in.
P Event No. 32—Charles E. Thompson Trophy Race—Free-for-all for Men.
Q Introduction of Charles E. Thompson Trophy Race Winner.
R Event No. 39—Parachute Jumping Contest.
S Band Concert—Presentation of Trophies.
T Navy or Marine Corps Night Flight. Fireworks Spectacle.
Army Comet Fireworks Flight.

1931—NATIONAL AIR RACES
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NATIONAL AIR RACES

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1931 National Air Races

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1921—NATIONAL AIR RACES

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Manager, Women’s Division, Transcontinental Handicap Air Derby
Robert E. Dake, Manager, Women’s Division, Transcontinental Handicap Air Derby
Ernie Bronte, Referee, both divisions, Transcontinental Handicap Air Derby
Earle Ovington, Chief Timer, Transcontinental Handicap Air Derby
Wm. E. Arthur, Asst. Timer
Bernie Wickham, Starter, Transcontinental Handicap Air Derby
Jerry McClelland, Asst. Starter, Transcontinental Handicap Air Derby
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Col. Elliott, Vice Chairman, Bendix Trophy Race
M. Doolin, Asst. Chairman
S. S. Chadderton, Advisor

NATIONAL AERONAUTIC ASSOCIATION REPRESENTATIVE
Wm. Enyart, Secy, Contest Committee, National Aeronautic Ass’n

LAISON OFFICERS
Lieut. Commander Frank D. Wagner, Representing U. S. Navy
Max G. H. Brett, Representing U. S. Army
Howard Rough, Representing U. S. Department of Commerce

U. S. WEATHER BUREAU
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Ernest Kliemann C. L. Rock
Lloyd Sykes L. V. Johnson

PAGE 35
ADVERTISING COUNSELLORS
for the
NATIONAL AIR RACES

IT has been our pleasure as advertising counsellors to have been identified with the tremendous projects represented by the National Air Races of 1929 and 1931—and to have interpreted to the nation, through advertising, the magnitude and true significance of these air classics.

The completeness of the campaigns, proving themselves in the success of the projects, are but examples of the ability of this agency to visualize the needs of its clients and carry them through to a successful conclusion.

HUMPHREY & PRENTKE, Inc.
Advertising
948 Engineers Bldg.  Cleveland, Ohio

JAMES H. LANYON
Public Relations Counsel

Directed the local, state and national Publicity Campaign for the

1931 NATIONAL AIR RACES

Publicity Campaigns prepared and executed for all types of attractions, expositions and conventions.

1512 Guarantee Title Building  Tel. C Herr 0925
CLEVELAND, OHIO
Airplane Maneuvers

CLIMB—To ascend at a normal angle in an airplane, not a steep angle.

ZOOM—To climb at an angle greater than that which can be maintained in steady flight.

STALL—A climb so steep that flying speed is lost, sometimes resulting in a spin.

VERTICAL BANK—To turn in a circle with the wings in a position vertical to the earth.

SPIRAL—To descend in large circles not unlike the coils of a spring.

SIDE SLIP—A maneuver in a steep banked position. The airplane slips sideways faster than forward.

FORWARD SLIP—Similar to the side slip with less bank. Sideward and forward speed are about equal.

DIVE—To descend steeply with or without power.

INSIDE LOOP—To describe a vertical circle in which the nose comes up and over.

OUTSIDE LOOP—To describe a vertical circle, nose down and under.

TAIL SPIN—Resulting from loss of air speed. The ship spins nose down.

IMMELMAN TURN—Starting as a loop, concluded in a turn coming out in opposite direction.

ROLL—To make a complete revolution about the fore and aft axis of an airplane.

WHIP STALL—Resulting from a stall wherein the nose whips down and under beyond a vertical position.

CLIMBING TURN—To ascend at an angle and turn while climbing.

3 POINT LANDING—To land an airplane on the wheels and tail skid at the same time.

Illustrations Courtesy of Standard Oil Co. (Ohio)
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Instruments...Pioneer Instruments...and other equipment
A "Big Business" Enterprise

By CLIFFORD GILDERSLIEVE
Executive Vice President, National Air Races

BEHIND the glowing panorama of speed and thrills which feature the National Air Races this year and for the next four years is an interesting story. The plans which have culminated in the concentration of the best airmen and airplanes in the world were initiated before Christmas last year. The permanent administration building and grandstands which constitute the most elaborate accommodations ever erected for such an event are a realization of the combined dreams of foresighted Clevelanders.

It was in 1929 that the city first proved the strategy of its location as the scene of the races. Under the direction of Cliff Henderson, the event attracted more than a half million spectators to the ten-day meet. Almost a fourth of all the licensed airplanes in the United States flocked to Cleveland airport and scores participated in the extensive speed program.

At the close of the National Air Races in Chicago last summer, Cleveland again sought to be chosen as headquarters for the classic, not for one year, but for five. The National Aeronautic Association, the body governing the location and conduct of the event, considered the merits of the proposal and awarded Cleveland the races for a five-year period with an option for an additional five years.

In the words of Senator Hiram Bingham, president of the body: "It is believed that the establishment of a permanent home for the National Air Races will make possible greater emphasis on the development annually of improved types of aircraft. While other cities may have advantages, in certain respects all of the ideal requirements for holding the races are more effectively combined in Cleveland than in any other city. These include such important considerations as central location in an area of large population with demonstrated civic interest and capacity to handle the races successfully; size, accessibility and status of airport, and co-operation of city government, metropolitan papers, Chamber of Commerce, hotels, transportation agencies, and civic leaders."

Cleveland has undertaken a titanic, unique and big business enterprise—titanic because the five-year program involves an expenditure of approximately two and a half million dollars, and unique because the event is not conducted for profit, and operates actively for only ten days in each year. The daily overhead for the ten-day period alone is $50,000.

The number of planes and participants in the speed events depends naturally on the amount of prize money that is offered. Although sportsman pilot events are becoming increasingly popular, the majority of pilots at the races fly for a living and attend the meet for the money prizes they can win as well as for the thrill of competition.

The sponsors of the event have this year underwritten the prize money for $100,000, almost a half of which will be awarded to women pilots in speed dashes, closed course races, and cross country derbies.

The cost of the racing plant at the airport approximated $100,000, which included the new administration building housing executive offices, restaurants, timers’ and scorers’ quarters, club rooms, and press and radio accommodations. Nothing approaching it in completeness or elaboration of detail has ever been attempted at previous national air meets.

An almost inconceivable amount of detail attends the preparations. Months before any plans were laid, a staff was chosen whose members were qualified by former affiliation with similar projects. A board of directors was formed, offering a cross-section of Cleveland’s financial, industrial, and civic life. The men given key positions in the organization were chosen for their ability as administrators and civic leaders. Under their direction, the plans were laid which have resulted in this, the greatest air meet ever held.

Actual preparations for the National Air Races are made in two divisions. On the physical side is the planning and erecting of structures to accommodate spectators, officials, and participants with a minimum of confusion. To accomplish this effectively requires a careful dovetailing of the functions of hundreds of hand-picked field attendants, ushers, gatemen, concessionaires and their employees.

Arrangements must be made to service more than a thousand airplanes, using different fuels and lubricants. Pilots and flying personnel, both civilian and military, require special accommodations. Visiting dignitaries receive special courtesies and consideration. Press representatives totalling 150 are provided with working facilities consisting of typewriters and telegraph operators in addition to the services of a press information bureau.

Not the least problem is that of feeding 50,000 persons daily at the airport with good food at reasonable prices. Parking areas with room for more than 25,000 automobiles have been provided along with equipment for securing visiting planes against damage from wind.

The contest committee bears the responsibility of conducting all speed events to the satisfaction of judges, contestants and spectators. Its work must closely co-operate with that of the timers and judges whose decisions determine winners and consequent distribution of prize money.

Opposed to the physical preparations for the air classic are the less tangible efforts of a large corps of efficient office workers. In nearly every department, contracts are opened to competitive bidding. Reviewing the respective bids and awarding contracts involves tremendous detail and the application of sound business principles.

When publicity, advertising, building, promotion, concessions, and transportation contracts have been let, their (Continued on Page 60)
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CLEVELAND
The Development and Progress of Naval Aviation

By DAVIS S. INGALLS
Assistant Secretary of the Navy for Aeronautics

NAVAL aviation has in the last hour years practically completed its Five-Year Building Program, and today the Navy has on hand approximately 1,000 planes provided at a saving to the government of 23 millions of dollars over the estimated cost of procurement.

With the task accomplished of developing an aerial force adequate to our naval needs as seen at that time, consideration is now being given the adaptation of this aviation development to our Fleet as it is being reorganized under the limitations of our various naval treaties. And with the coming session of Congress the Navy Department intends to lay before the legislative branches of our Government a program that will enable us to continue to afford our country an aerial service at sea that will be second to none.

During the past year our naval aviators have been occupied in carrying on the intensive training in conjunction with the Fleet that has brought to such a high point of efficiency our Navy's aerial forces. Approximately 24½ million miles have been flown in training, in tactical exercises with our ships, and in various aerial maneuvers. A great part of this flying, of course, has been carried out far at sea with the planes based principally upon our carriers, and yet we point with pride to the increased reliability of plane and engine and to the improved training of personnel that has consistently rendered safer performance of the various operations.

One of the principal elements in the greatly increased safety factor of naval aviation lies in research and development of new types. During the year 42 types of planes, various equipment and service installations were tested by the Flying Test Section of the Navy, stationed at the U. S. Naval Air Station, Anacostia, D. C. And this is simply the finale of many long and continued weeks and months of cooperation between the various engineers and manufacturers in our country and the trained officers of our Bureau of Aeronautics, under the able leadership of Rear Admiral William A. Moffett, in a continued effort to provide naval aviation with the best material obtainable.

As part of that original program of expansion for naval aviation, lighter-than-air development has continued in increased proportions during the last year. For the first time the U. S. S. LOS ANGELES was operated in conjunction with Fleet maneuvers and clearly demonstrated the necessity for a continued expansion of this type of aeronautics for aerial warfare over the seas. On her observation mission the LOS ANGELES cruised appreciably over 2,000 miles over the waters of the Pacific, scouting an area estimated at 3,000 square miles per hour. Now with the U. S. S. AKRON completed and undergoing her trial flights, we may rest assured that an important aerial branch of our Navy has been in no wise neglected and we look forward to the time when she and her sister ship, under contract with the Goodyear Company, will be adding their great scouting capacity to our Fleet.

Incident to the high speed development that has been one of the primary interests of the Bureau of Aeronautics, the Navy, with the $220,000 obtained from the last Congress additional for such development, has laid down and is carrying out, in conjunction with the leading aeronautical engineers of this country, an intense program of plane and engine improvement primarily pointing towards speed, but, not disregarding strength and reliability that we can be confident will in due course reap us many benefits.

Thus with a continued energetic and enthusiastic advance, consistent with a proper regard for life and property, the United States Navy is providing, in this latest means of warfare, for our national defense.
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The Influence of the National Air Races on Aviation

By F. TRUBEE DAVISON
Assistant Secretary of War for Aviation

The National Air Races constitute the outstanding aeronautical event every year and may be said to be the outgrowth of the first contest for the Pulitzer Trophy which was staged at Mitchel Field, New York, on Thanksgiving Day in 1920.

Big aviation meets were held in this country before the War, in the early days of aviation, but the number of competitive events were limited, and the participating pilots were the comparatively few veterans in the flying game who had gained recognition through unusual flying achievements. These pre-war aviation meets, however, won nationwide attention and drew large crowds. Flying in those days was considered in the light of a circus performance, and spectators were drawn to aviation meets mainly to "see the things fly." Nowadays, however, the road of an airplane motor overhead furnishes no thrill to the pedestrian, who does not even take the trouble to look up in the air, indicating how commonplace flying has become.

It goes without saying that the National Air Races have exerted a marked influence on aviation, not only in arousing and maintaining public interest in air transportation but in creating the urge for progressive development in design, construction and all-around flying performance of aircraft. The Air Races may be comparable to an annual convention where a goodly number of spectators attending the Air Races these days expect to receive some thrills through witnessing daring acrobatic flying performances, and high speed racing events, it may be said that the majority of them are mostly concerned in making observations of new types of industrial men gather to note the progress made during the year and gain new ideas for the furtherance of their business in the days to come.

While aircraft, engines and accessories; their interest being much the same as that which impels the motorist to pay an admission fee to an automobile show.

There is no truer saying than the time-worn expression to the effect that "Competition is the life of trade." The history of the Air Races during the past eleven years bears striking testimony of the influence which this annual classic has exerted in aircraft development. These Air Races were the urge which prompted aircraft designers and manufacturers to strive to the utmost to outdo each other each year in producing the best airplanes and engines which human ingenuity could devise. Space does not permit a general discussion covering aircraft development brought to public attention during these eleven years, but it may be of interest to point out the progressive trend of one phase, the matter of speed, which is an all-important one, particularly insofar as military aviation is concerned.

In the 1920 Pulitzer Race, in which the Army Air Corps predominated both in the number of entrants and prizes won, an Army pilot achieved what was then considered an astounding speed record—178 miles per hour over a 132-mile course.

Two years later, at the National Air Races in Detroit, an Army pilot again sprung a surprise by averaging a speed of 205.8 miles an hour in the Pulitzer Race. This remarkable achievement in speed performance over a closed circuit caused considerable speculation as to the ultimate speed an airplane could attain.

The National Air Races the following year at St. Louis created more speculation on speed performance, when a Navy pilot competing in the Pulitzer Race raised the high speed mark to 243.67 miles per hour.

The climax in high speed performance was reached during the Pulitzer Race at Mitchel Field in the fall of 1925.

(Continued on Page 67)
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The duties of the Aeronautics Branch, although varied in purpose and method of accomplish-
ment, may be summed up under three headings, namely, air regulation, airways establishment and
maintenance, and aeronautical development.

The Air Regulation Service of
the Aeronautics Branch endeavors to
protect the flying public and the
aeronautical industry by eliminating
from flying operations, as far as pos-
sible, insufficiently trained pilots
and unairworthy aircraft. One of
the first activities undertaken by the
Aeronautics Branch upon its estab-
lishment was the licensing of air-
craft and airmen. Licenses are re-
quired for interstate commercial
operations. For commercial oper-
ations which are confined to any one
state and for all pleasure flying, the
Federal law makes licensing op-
tional, but a number of states and
territories require all aircraft
and airmen operating within their borders to be Federally li-
censed, or to have either State or Federal licenses. At the
time that most of the state legislatures convened this year,
22 states and territories required Federal licenses and 6
required Federal or State licenses.

As evidence of the extent of the regulatory activities of
the Aeronautics Branch, it may be pointed out that there
now are 16,268 pilots holding Federal licenses, and 9,222
licensed mechanics. Licensed aircraft number 7,458, and
unlicensed about 2,000. With regard to type approvals,
there are 431 airplanes and 73 engines holding approved
type certificates, and 360 aircraft having Group 2 approvals.

Another picture of the regulatory activities that a re-
cital of statistics cannot give is this: Through its nine
inspection districts, and the inspectors who work out of
these local headquarters, the Aeronautics Branch is in di-
rect contact with the various units of the industry. There
are factory inspectors who examine aircraft as it is built,
and make recommendations as to licensing from the engi-
nering standpoint. There are aeronautical inspectors who
travel throughout their various territories flight testing new
airplanes, examining candidates for airmen licenses and in-
vestigating accidents and violations of the regulations. Also
there are aeronautical school inspectors whose duties in-
volve examination and inspection of schools applying for
approval and checking of approved schools. Finally there
are air line inspectors, who report directly to Washington
and who inspect the scheduled interstate passenger lines.

The various inspectors of the Air Regulation Service
are so located geographically that they are able to make all
of the contacts necessary for their work without unreason-

able delay, and in an emergency
such as an accident, an inspector
usually can reach the scene in a few
hours.

All of the regulatory functions of
the Aeronautics Branch are carried
out in accordance with the funda-
mental principle of affording the
aeronautical industry every possible
opportunity to regulate itself. As a
result of this policy and the coopera-
tion given by the industry in carry-
ing it out, regulation in the last five
years has been largely a matter of
setting standards which would safe-
guard the interests of both the in-
dustry and the public.

The interests of the industry and
the public likewise guide the Aero-
nautics Branch in the establishment
and maintenance of the Federal Air-
ways System.

When the Department undertook
to establish and maintain a system
of aids to air navigation along the
airways of the United States imme-
diately after the Aeronautics Branch was organized, the
only step that had been taken along this line by the Federal
Government was the 2,041 mile airway between Salt Lake
City and New York, which had been equipped with beacon
lights and emergency landing fields by the Post Office De-
partment. This airway was transferred to the Department
for maintenance. Now there are more than 15,500 miles
of lighted airways, and the beacon lights and intermediate
landing fields constitute only a part of the facilities
available.

The airman leaving tonight for a journey along one of
the completed airways may take advantage of a number of
safeguards provided by the Department of Commerce. Be-
fore he takes his place at the controls of his craft he will
obtain a summary of weather conditions along his route
drawn up from reports of Department of Commerce and
Weather Bureau stations, and collected through automatic
telegraph typewriter circuits and radio broadcast stations
provided for this purpose.

Assured by these reports that meteorological conditions
are favorable to flight, the pilot will leave the airport, and
start in the direction of the first rotating airway beacon ten
miles away. Even before reaching the site of the first beacon,
he probably will be able to see the second, ten miles
further.

The direction of his route is also indicated by radio
range beacon signals. Listening to the signals of the aural
beacon in the earphones of his receiving set, or watching
the indicator of the visual beacon on his instrument board,
depending upon the type of equipment in use on the airway,
(Continued on Page 70)
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For the future, Shell's own flyers constantly test new types of planes and motors, to insure that Shell aviation products will continue to set the standard for more reliable service.

Today Shell welcomes the opportunity to participate in the 1931 National Air Races. Famous Shell pilots are entered in many events.

In the belief that valuable new ideas and improvements are developed from competitions of this kind, Shell has donated cups and trophies for various races. Shell believes that the interests of the entire industry are served by such events as the National Air Races.

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The National Air Races Enter a Second Decade of Progress »

By SENATOR HIRAM BINGHAM
President, The National Aeronautic Association of the U. S. A.

WITH the opening of the 1931 National Air Races at the great new air race center at Cleveland, air racing in the United States enters a second decade of usefulness in the promotion of aviation in America.

During the ten eventful years that have passed, these races have portrayed in dramatic fashion the rapid progress of aviation in this country. Each annual meet also has had important influence in accelerating aeronautic development. Pilots, manufacturers, and aircraft engineers have been encouraged to greater accomplishment in the keenly competitive atmosphere of these annual gatherings. Each race has brought greater public interest until last year over one-half million people were in attendance at the meet and millions less fortunate followed the race activity by means of the radio, motion pictures, and the press.

I am pleased to say that each of these annual national aeronautic competitions has been conducted under the sanction of the National Aeronautic Association and in conformance with the rules and regulations governing aeronautic competitions which the Association has established in the United States as the representative in this country of the Federation Aeronautique Internationale.

This Federation, a world-wide organization for the governing and control of sporting aviation and supervision of aeronautic records, was formed in 1905 by representatives of the leading nations in recognition of the need for an international aeronautic sporting tribunal.

Thirty-five nations of the world are represented today on this National Federation—Germany, Argentina, Austria, Belgium, Brazil, Chile, China, Denmark, Egypt, Spain, United States, Finland, France, Great Britain, Hungary, Italy, Japan, Luxembourg, Mexico, Norway, Netherlands, Poland, Portugal, Roumania, Serbia, Sweden, Switzerland, Syria and Lebanon, Turkey, Czechoslovakia, Uruguay, Greece, Canada and Lithuania.

Since its organization in 1922 the National Aeronautic Association has been the representative in the United States of this international sports body. Thus, the Association has long recognized the great value of air races, air tours, and record trials in stimulating aeronautic development and focusing public interest on flying. For many years in its position as a supervisory body for sporting aviation it has guided and encouraged all phases of competitive flying performance.

Since the fostering of air races, air tours and record trials is but one part of the Association's work in the advancement of aviation in the United States, the active guidance and control of aeronautic competition throughout the country is centered in its Contest Committee.

Until this year the National Air Races since their inception have been held in a different city each year. This was in pursuance of a policy of the Association to award this annual meet to a different locality annually in order to develop a widespread interest in aviation. Thus in the first decade of their history Omaha, Detroit, St. Louis, Dayton, New York, Philadelphia, Spokane, Los Angeles, Cleveland and Chicago were hosts to the National Air Races.

In this ten-year period these National Races have grown from a comparatively small event to a great national gathering—the annual classic of American aviation. In fact, in recent years the races have been of such size that the problem of properly handling the scores of planes entered and the hundreds of thousands of spectators attending became an increasingly serious item.

Moreover, the rotation of the races among cities in different sections of the country had resulted in the establishment of a number of well-managed regional air meets and tours, and many local races and airport dedications, events which if assured some established policy in regard to the annual national classic, could be established as continuing events of considerable value in the fostering of aeronautic competition in their respective regions.

In view of these considerations and the importance of making most effective use of these great national air races to develop improved types of aircraft, following the 1930 races and upon the recommendation of the Contest Committee I accepted, as president of the National Aeronautic Association, the offer of the National Air Races, Inc., a group of Cleveland business men, successful sponsors of the 1929 National Air Races, to stage this great annual event at Cleveland for the next five years.

Cleveland, by location, by reason of the unusual interest of its citizens they have displayed in aviation and in view of the splendid ability and long experience of its aeronautic leaders, was exceptionally well qualified to assume the responsibility for the establishment of such an air race center.

Tangible evidence of how well it has met this trust is given in the great new air race center at the Cleveland Airport, in the improved accommodations and facilities at this center for the convenience of the public, the participants and the press, and in the more effective control and consequent improvement in this year's race program.

With the National Air Races permanently located and vying in importance with such great sporting events as the
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national automobile speedway classic at Indianapolis and the famous Kentucky Derby, and this national aeronautic gathering supplemented by well-attended regional meets and by local events and airport dedications, air racing in the United States unquestionably enters a new and greater era of usefulness in the promotion of aviation in America.

When it is considered that pilots from all sections of the United States and from leading nations throughout the world participate in the National Air Races, that scores of aircraft of all types are entered in the more than forty important events on the race program, and that more than $100,000 in prize money and many valuable trophies are offered, the need for sound and proven rules of procedure is evident. The F. A. I. rules for the conduct of competitions of this nature are the result of a quarter century of experience under widely varying conditions and for many years have been accepted as the world standard.

These rules protect alike the pilot, the manufacturer and the public. They promote smooth functioning of the contest program and insure an equal opportunity to all contestants. Special regulations protect each pilot’s winnings by requiring that prize money advertised are placed in escrow before the meet opens. Other regulations insure the competency of each controlling official. Flying rules protect the public by guarding against dangerous flying and the entry of unsafe planes.

Since air racing is by far the speediest sport, extremely accurate and rapid timing is required. To enable split-second timing of the National Air Races the Contest Committee of the National Aeronautic Association has developed an extremely fast and accurate timing system which records the start and flight of racing planes to the remarkable accuracy of 1/100 of a second. This timing system incorporates the most sensitive and highly developed form of electrical printing chronograph and is far faster even than the planes it times.

Specially designed electrical circuits built around this timing mechanism are used for timing the five and ten-mile closed course events. For the mile dashes special timing stands at each end of the straightaway mile course are connected electrically to the main timing station in the control tower of the race administration building. Timers who have been qualified by long experience and who are registered on the headquarters’ records of the Federation Aeronautique Internationale at Paris, France, control the electrical circuits which record 1/100 of a second the precise instant that a plane flashes over the start or finish line or completes a lap in a closed circuit race. Speed calculators with special calculating machines then compute the speed of each contestant in miles per hour so that the official results of a race are known in a remarkably short space of time.

This year’s National Air Races may witness the making of new international records for speed over a straightaway three kilometer course. For this purpose an official three kilometer maximum speed tracx has been surveyed and installed and a permanent speed course license obtained from the F. A. I. in Paris. Speed trials over this record straightaway are timed both electrically and photographically. Photographic flashes record a plane’s exact position as it crosses the start and finishing line and an electric chronograph synchronized with the recording cameras indicates the exact time. Extremely accurate determination of the speed attained is thus made possible.

The F. A. I. requires that a detailed procedure be followed in the observing and recording of a record trial and only by compliance with this procedure can flying marks be recognized as official national or international records and homologated as such on the international record lists of the Federation.

It is interesting to know that during the past year eight new international records have been established in the United States, six of which have been made by women pilots. These records include marks for speed, duration and altitude. Of the international records now recognized by the F. A. I., an analysis of the comparative standing of the United States with other nations shows that of the total airplane records, France holds 24, the United States 15, Germany 12, Italy 4, Czechoslovakia 3, Great Britain 2, Poland 1, and Spain 1.

In the future, as in the past, the National Aeronautic Association through the work of its Contest Committee and with the co-operation of its nation-wide membership and affiliated aero clubs will work to safeguard the interest, material and moral of pilots, manufacturers and promoters interested in sporting aviation. We are pledged to maintain accuracy and reliability in connection with all aeronautic records and to insure fair play and protection to the pilot and the public in connection with air races and air tours. It is our aim, our duty, and our privilege to foster the sporting side of aviation and keep it free from any suspicion of sharp practice or unfairness.
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The Thompson Trophy Race

A MERICA'S air classic—the Thompson Trophy Race—has taken the place of the former Pulitzer Contest as the world's premier landplane speed event.

An air speed contest of major importance had not been held in the United States since 1926 until Charles E. Thompson, president of Thompson Products, Inc., established the Thompson Trophy Race last year, at the National Air Races in Chicago.

The first Thompson Trophy Race was won in 1930 by the late Charles W. (Speed) Holman, flying a Laird Solution biplane 100 miles around a five mile triangular course at an average speed of 201.90 miles an hour. Holman achieved speeds in excess of 265 miles an hour during the contest.

Prize money totaling $15,000 will be awarded the first three pilots in the 1931 Thompson Trophy contest. The organization backing the winning pilot is entitled to possession of the beautiful Thompson Trophy for one year, while gold, silver, and bronze plaques respectively are presented to the first, second and third winners.

A free-for-all speed contest for any type plane powered by any type motor or motors, the Thompson Trophy Race is designed to encourage the development of high speed planes in this country. This year it will consist of ten laps about a ten mile course. Average speed in excess of 250 miles an hour are freely predicted, and a speed of 175 miles an hour is necessary to qualify.

The Thompson Trophy, valued at $10,000, is symbolic of man's aspiration throughout the ages to conquer the air. Surmounting the piece is an exact replica in silver of the plane holding the existing speed record for the contest. At present, this is a model of the Laird Solution.

The trophy is fashioned of gold and silver, mounted on a black marble base. It represents Icarus, the first man to fly, according to Greek mythology, with wings spread and face skyward, symbolizing man's ever-constant desire to fly. A tapered cliff rises behind Icarus, suggesting man's progress in conquering the air throughout the centuries. In bas relief about the cliff are sculptured epochal milestones in man's attainment of great speeds. Above the cliff are billowy clouds, perched eagles, and a rising sun; and surmounting all is the high-speed airplane. Names of winning pilots in the future will be engraved on ten shields mounted beneath the clouds.

Walter A. Sinz of Cleveland, Ohio, sculptured the Thompson Trophy, which is original in design, perfect in workmanship, of beautiful proportions and rich in idealism and significance. His model was chosen in competition from others submitted by a committee consisting of Orville Wright, Hon. David S. Ingalls, Hon. S. Trubee Davison, Col. Clarence M. Young and Dr. Henry Turner Bailey.

For at least ten years the trophy will be in competition, after which it may be retired or continued at the discretion of the National Aeronautic Association. It will be awarded annually to the foreign nation, department of governmental service, or organization represented by the winning pilot, to be properly exhibited until one month prior to the date of the next competition.

The Thompson Trophy Race for 1931 is scheduled to be run on Monday, September 7.

Mr. Thompson, in promoting this annual, international speed contest, for which the beautiful and valuable Trophy bearing his name serves as the highest award, believes that this contest will not only encourage greater speed and performance, but serve to stimulate and hasten the ultimate perfection of the commercial airplane. It provides a common laboratory for engineers to market and exchange ideas, at the same time affording opportunity to test developments in competition and under public surveillance.
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The Bendix Trophy Race » »

The Bendix Trophy Race, which will be held annually for the next five years as a feature of the National Air Races, is being sponsored by Mr. Vincent Bendix of the Bendix Corporation, South Bend, Ind., in the belief that commercial aviation as well as the military air services will profit from the development of higher cruising and top speeds. Mr. Bendix believes that transcontinental competition will react most readily and favorably to the industry for the development of the above.

The Bendix Trophy Race this year will be a free-for-all transcontinental event from United Airport, Burbank, California, to Cleveland, with special recognition and encouragement given to the individual contestants for the continued flight from Cleveland to New York in the hope of establishing a new transcontinental record. The flight across the continent in a single day by several craft will react most favorably to commercial aviation.

The automotive industry has profited materially from speedway competition and we have today high compression motors, four-wheel brakes and numerous improvements accruing from speedway competition.

Transport aviation has profited materially from past National Air Race competition. Transcontinental speeds have been increased from eighty-five miles to one hundred and thirty miles per hour and in a single instance one hundred and eighty miles per hour during the past two years and this progress was directly traceable to the efforts exerted by aircraft engineers to produce a winning competitive entry at the National Air Races. A dominant instance of this is the present Wasp Tri-motored Ford which was improved in streamline field for the speed and efficiency event in the 1930 National Air Races at Chicago.

The Bendix Trophy Race is an international free-for-all and permits use of experimental motors, including super-charger and special fuels.

Awards will be made entirely upon elapsed time from the point of departure to Cleveland. Landings may be made or the flight may be made non-stop. Any type of plane or engine may be used subject to conditions outlined in the General Rules and Regulations.

The Bendix organization has taken leadership in the development of major fabrication units of aircraft, including aircraft instruments, starters, wheels, brakes, magnetos and propellers, and this event is sponsored in the sincere belief that major benefits will accrue to the aircraft industry.

Vincent Bendix
The object of Mr. Bendix in establishing the Bendix Trophy is to encourage high speed transcontinental flights, believing such races will contribute tremendously to high speed aviation development and serve as an inspiration to engineering genius.

Major James H. Doolittle
Former Army ace and one of America's premier flyers, Cleveland Speed Foundation's entry in the Bendix Trophy and Thompson Trophy Race.

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One of America's premier speed pilots and holder of many international speed records.
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The Cleveland Pneumatic Aerol Trophy Race » »

THE Cleveland Pneumatic Aerol Trophy, a $3000.00 silver perpetual trophy, was established in 1929 by the Cleveland Pneumatic Tool Co. through its president, Mr. L. W. Greve. In 1929 it was won for the first time by Mrs. Phoebe Fairgrave Omlie of Memphis, Tenn., in the first National Women's Derby from Santa Monica to Cleveland. It was awarded to her on the basis of a point formula. She flew a Monocoupe.

In 1930 it was won by Mrs. Gladys O'Donnel in the Women's Derby from Long Beach, California, to Chicago on her elapsed time of 15 hours 13 minutes.

This year and hereafter, the trophy will be awarded to the winner of the free-for-all closed course race, open to women pilots only. The total purse for this race will be $7,500.00. It will consist of five laps of a ten-mile course.

This trophy will be awarded annually to the Nation, Department of Governmental Service, Organization or Chapter of the National Aeronautic Association represented by the winning pilot, to be retained by the winning body until one month prior to the date on which it is next competed for.

The Cleveland Pneumatic Aerol Trophy Race is a free-for-all speed contest for any type of airplane with any type of engine or engine. Superchargers, special fuels or any other means may be used to increase speed of planes entered in this race. Entrants must have had one hundred and fifty hours to be eligible to compete. First prize, $3,750.00, second prize, $2,250.00, third prize, $1,500.00. Required qualifying speed is 140 miles per hour.

The winning airplane of the 1931 Cleveland Pneumatic Aerol Trophy Race will have demonstrated definite and constructive experimental and laboratory development for commercial aviation; it will have proved the courage and ability of some woman pilot and served as an effective and constructive gesture in the acceptance of commercial aviation by American womanhood. It will bring honor and due credit to the designer and constructor and finally, the winning plane and pilot will bring prestige to the city and group of individuals sponsoring it.

The brilliance and color of this achievement is serving as an inspiration to aircraft designers and motor manufacturers throughout the Nation, to develop craft which are potential winners of this event.

The race for which this trophy will be competed will be run off on Ladies' Day, Friday, September 4.

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A Proving Ground for the Industry » »

By E. W. "POP" CLEVELAND
Contest Chairman

THE history of the National Air Races is a story of remarkable aircraft growth and development. From a mere pilots' get-together, they have developed into a proving ground for the industry.

Recovering from its post-war slump, the aviation industry turned its attention to the development of high speed airplanes. Several racing planes were built for entry in Pulitzer Trophy contests, but lack of public interest and indifference among financial backers prevented progress.

The trend then developed toward airplanes which would cruise at higher speeds with heavier loads than the usual commercial airplane powered with the well-known but now practically obsolete Curtis OX-5 motor. The Detroit News posted a trophy to be awarded according to a formula involving both speed and efficiency. The trophy, still contested for, has been instrumental in developing the present-day cabin or transport airplane.

It was the forerunner for the multi-motored air transports that now fly thousands of miles daily over mail and passenger routes throughout the United States. Later we improved power plants such as the Liberty engine, the D-12, and the well-known air-cooled radial motors which have given air transportation motor reliability heretofore unknown.

Until a few years ago, only the Army and Navy designed and developed high speed aircraft, but at the 1929 National Air Races in Cleveland, a radical newcomer appeared. It won the free-for-all race at 194 miles per hour, eclipsing planes of twice the horsepower. It was the immediate stimulus for the radical designs which developed for high speed flight.

Recognizing the importance to aeronautical progress of a contest which would attract the best engineering talent in the nation, Charles E. Thompson posted a trophy last year to be competed for annually by any type of plane powered with any type of engine or engines. The event was won by an abbreviated-wing design which averaged 201 miles per hour. Since manufacturers now realize that the Thompson Trophy race cannot be won by stock type airplanes, they have designed and built special jobs of radical appearance and high performance for entry in the event.

Included in the speed events of this year's meet will be the Bendix Trophy race, a transcontinental free-for-all speed dash. Contestants in the event may fly non-stop or they may land as many times en route as they wish. They also have the privilege of touching the wheels of their ships across the finish line and then proceeding on to New York in an effort to break the transcontinental record of 12 hours and 15 minutes.

The development of commercial aircraft is again brought to the foreground by the fact that airplanes entered in the Thompson Trophy race will have demonstrated their practicability and utility by making long cross country hops. The significance of this is further emphasized by comparing the 100-mile Thompson Trophy race with the distance flown in the Transcontinental Speed Dash. Since several of the speed jobs will be entered in both events, designers have demonstrated that speed airplanes of today are as dependable as they are fast.

The race course encloses the grandstands this year and extends to the west in a large kite ten miles around. The smaller, five-mile course is quadrangular and lies within the larger circuit. The two courses have been inverted to eliminate the necessity of grounding all non-competing ships as was necessary in the past when closed-course events or acrobatic exhibitions were in progress.

Greater speed is expected on the 1931 kite-shaped course due to the fact that while there are more turns, less speed will be lost, for the turns are not as short as those encountered on a short triangular course.

Closed course events will be timed by the latest type of equipment. This timing device is supplied by the National Aeronautic Association, the body sanctioning the meet. Other functions of the N. A. A. are checking eligibility of planes and pilots, refereeing events, and guaranteeing prize money to contestants.

The race-horse start will be used for all closed course races where practicable. Under this system, all the ships in a race line up abreast and take off simultaneously with the drop of the starter's flag. Due to the poor visibility afforded by racing planes and the high speeds at which they travel, the race horse start will not be used in either the Thompson Trophy or Aeroplane Trophy race.

The Transcontinental Sweepstakes Handicap Derby, which will be run in both men's and women's divisions, will be scored on a basis which gives any entrant a chance to win, regardless of the type of plane flown. Navigation, ability to judge upper air currents, and all-round race generalship will be the determining factors. Both divisions of this derby will be flown over the same route with a difference of thirty minutes in starting time. It will be the largest group of commercial airplanes ever assembled in a single convoy.

The Speed and Efficiency events will give the air transports an opportunity to demonstrate their capabilities. These contests are scored according to a formula which gives first place to the ship which takes off the quickest, lands the slowest, and carries the heaviest load at the greatest speed with the least horsepower. The event is conducted in two sections—one for single motor planes and one for multi-motored.

The Army and Navy have made valuable contributions to commercial aeronautics with their practically unlimited subsidies for research and experiment at laboratories such as those maintained at Wright Field, Dayton, Ohio, and Langley Field, Virginia. Service craft have benefited accordingly. Constant practice has resulted in successful close-formation precision flying which was unknown several years ago. Demonstrations of this fascinating art will feature this year's races.

The 1931 National Air Races are attended by celebrities (Continued on page 70)
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An Appreciation

The National Air Race Committee is indebted to The Standard Oil Co. (Ohio) for sponsoring a trip to Continental Europe of Alford J. Williams, to secure foreign participation of the International Team.

We regret that photos were not available of these visiting foreign flyers:

ALFORD J. WILLIAMS
Former Navy Ace and holder of American land plane speed record—and his International Team.

ERNST UDIT
Germany's great war ace, designated by his fatherland to officially represent Germany at the National Air Races.

MAJOR ALOIS KUBITA
Former Military Attache Czechoslovakian Legation, London—representing Czechoslovakia at the National Air Races.

R. L. R. ATHERLEY
Member of the winning 1929 British Schneider Cup Team, representing England at the races.

CAPT. BOLESLAW ORLINSKI
Polish Ace who made a non-stop flight from Warsaw to Tokyo in 1926—will represent Poland at the National Air Races.

MARIO de BERNARDI
Crack Italian air speedster, selected as Italy's exponent of aviation to represent the Italian Government at the Races.

Officials—National Sweepstake Handicap Air Derby

BILLY PARKER
Pathfinder, Transcontinental Air Derby. 1931—NATIONAL AIR RACES

CARL F. LIENESCH
Manager, Women's Handicap Air Derby.

ROBERT E. DAKE
Manager, Men's Handicap Air Derby.
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The Effective Planning of Air Race Traffic

By FRED H. CALEY
Chairman, Traffic Survey Committee

One of the most important preliminary activities of the National Air Races was the preparation of a co-ordinated plan for handling the traffic and parking problems incidental to this ten-day spectacle. Without adequate attention to ways and means of getting to and from the races, the management realized that the rest of the arrangements would lose much of their effectiveness.

From every section of the county and from nearly every country in the world will come spectators and participants to this great event. And even if the race program itself is the most impressive in aviation history, ingress and egress to the airport had to be accomplished as efficiently as possible in order to attract visitors to future races, during the remainder of the five-year program.

Many traffic tieups and delays were avoided through the plans of the Air Race Traffic Survey Committee, which were most ably carried out by the special traffic committee headed by J. Harry Killius of the Cleveland Automobile Club.

The traffic plan as worked out required the full co-operation of county officials, village officials and police departments. First credit, as everyone has learned to know, goes to Traffic Commissioner Edward J. Donahue and his efficient staff of officers.

County and village officials were quick to realize the importance of having every available road and street not only open to traffic, but in the best possible condition. Many corners had to be rounded, poles and other obstructions moved, railroad crossings smoothed over to accommodate vast volumes of traffic and a thousand and one other relatively unimportant details had to be ironed out.

The co-operation of Village Mayors, Marshals and other officers was sought and obtained by the committee.

One of the most painstaking jobs was the planning necessary before proper and efficient assignment of police and traffic officers could be made. The dispatch with which traffic moved during all ten days of the event is adequate testimony of the effectiveness of this planning, but more especially to the practical efficiency of Commissioner Donahue in carrying out the plans.

The arrangement for police escorts was completed by Commissioner Donahue, as was all patrolling of main arteries, railroad crossings and other traffic points.

The obtaining of street car and bus service to the airport; parking arrangements; the planning of rights of way; the mapping of the best ways to reach the airport; the control of the inbound and outbound flow of traffic; these and a hundred other details which came before the Traffic Survey Committee and were passed on to Commissioner Donahue and Killius for action, are unquestionably responsible in large measure for your enjoyment of this mammoth spectacle.

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1931—NATIONAL AIR RACES

PAGE 63
Trophy Awards

Bendix Trophy Race—Transcontinental Free-for-all—Vincent Bendix Trophy

1931 Transcontinental Non-stop Record—Los Angeles to Cleveland—Ohio Seamless Tube Co. Trophy


Shell Trophy Special Events Nos. 100 to 107 inclusive, and No. 109 and No. 110—Shell Eastern Petroleum Prod., Inc.

Shell Trophy Special Events Nos. 108 and 111—Perpetual Trophy—Shell Petroleum Corp., St. Louis.

Event A—B. F. Goodrich Company Trophy

Event No. 1—Goodyear Tire & Rubber Company Trophy

Event No. 2—Universal Valve & Fitting Company Trophy

Event No. 3—General Tire & Rubber Company Trophy

Event No. 4—J. H. Williams & Company Trophy

Event No. 5—Clifford Henderson Trophy

Event No. 6—B. F. Goodrich Company Trophy

Event No. 7—General Tire & Rubber Company Trophy

Event No. 8—Goodyear Tire & Rubber Company Trophy

Event No. 9—Carey Machine Company Trophy

Event No. 10—Goodyear Tire & Rubber Company Trophy

Event No. 11—General Tire & Rubber Company Trophy

Event No. 12—The Webb C. Ball Company Trophy

Event No. 13—Goodyear Tire & Rubber Company Trophy

Event No. 14—B. F. Goodrich Company Trophy

Event No. 18—B. F. Goodrich Company Trophy

Event No. 19—Carey Machine Company Trophy

Event No. 20—Clifford Henderson Trophy

Event No. 22—Senator Hiram Bingham Trophy

Event No. 23—Goodyear Tire & Rubber Company Trophy

Event No. 25—Goodyear Tire & Rubber Company Trophy

Event No. 26—Carey Machine Company Trophy

Event No. 27—Clifford Henderson Trophy

Event No. 28—B. F. Goodrich Company Trophy

Event No. 32—Chas. E. Thompson Trophy Race—Chas. E. Thompson Trophy and Gold, Silver and Bronze Plaques

Event No. 33—Cleveland Pneumatic Aerial Trophy Race—Cleveland Pneumatic Aerial Trophy

Event No. 38—Douglas Trophy

Acknowledgments

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For the use of Cranes—Universal Crane Co.

For the use of Calculating Machines—Marchant Calculating Machine Co.


For the use of Furniture—Conrad-Baecher-Kroehle Co. Corp., and The Bailey Co.

For the use of Ambulances—Klanke Parr, Inc., and A. P. Curtius.

For the use of Air Race Insignia on menus—Cleveland Restaurant Association, Cleveland hotels' Association.

For the use of Siren—Federal Electric Co.

For the use of Piano—Rudolph Wurlitzer Co.

For Legal Counsel—Squire, Sanders & Dempsey.

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For Cooperation in Model Airplane Contest—Harvey, Inc., Cleveland Model & Supply Co., The May Co., Exchange Clubs, Aero Digest, Cleveland Institute of Aviation, Directors of Cleveland and Suburban Schools, City Playgrounds and Public Libraries, Model Aircraft Engineers Society, The House of Hubbard and others.

For Cooperation in Building Model Airport—Northern Ohio Lumber Co., Board of Education, Thomas Edison School.

For Distribution of Windshield Stickers—Hanna Garage, Terminal Garage and others.

For use of Automatic Fountain—Automatic Electric Fountain Co.

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NOTE: We regret that space does not permit the listing of hundreds of other names of those who have generously supported this project.

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OFFICIAL PROGRAM
Cleveland airport was the first municipally sponsored airport in the world, and certain features of its construction and equipment make it a most unique air terminal. The port proper is an all-ways field, excellently drained and usable over its entire surface at all times of the year.

Its 1040 acres' area is twice that required by the Department of Commerce for the A-1-A rating and is responsible, largely, for its being chosen as the scene of the National Air Races for the next four years.

Due to the remarkable foresight of the Cleveland city council in providing a location capable of almost unlimited expansion, it is possible to divide the area in the middle and still have two airports which any and all types of aircraft may use with perfect safety.

When the National Air Races were first held here in 1929, average passenger traffic at the airport amounted to forty per day. In July of this year, a not particularly busy month, there were 7400 passenger movements.

In several conferences with representatives of the Department of Commerce, the race committee, E. W. “Pop” Cleveland, aeronautical expert, and the airport management, methods were devised which would completely eliminate any congestion arising from planes attempting to use a given landing area.

As a further precaution, federal officials have granted a special waiver empowering airport officials to order all planes taking off to turn away from the race area and proceed one mile from the airport before resuming their courses. Further, in case it is deemed advisable to close the port for brief intervals, two one million candle power beacons have been installed on the airport control tower. One is fitted with a green lens and the other with a red. If the airport is to be closed, the red beacon will be lighted as a signal to approaching planes to circle at a distance from the port until the green beacon indicates landing areas are free.

Race and commercial areas of the airport have been divided by a white line, twenty feet in width extending from the extreme south to the extreme north end of the field. Contesting planes and other craft using the airport in connection with the National Air Races confine their operations to the area west of the line, while commercial activities are conducted in the area east of the line.

Locating the air classic on this, one of the busiest commercial airports in the world, affords spectators an opportunity of viewing aviation in all its phases—a situation that would not exist if the races were conducted on a private airport. Slightly more than a half mile directly in front of the grandstands is the terminal for more than eighty scheduled daily air transport operations.

Throughout the day, and far into the night, passenger, express, and mail planes pick up and discharge their cargoes, and all such planes are equipped with radio receivers by means of which the operator in the control tower informs pilots of wind direction and velocity, and conditions in and about the airport prior to landings or takeoffs.

This is the only airport in the United States with such a radio control system. As a plane approaches the field the pilot tunes in on WRDT, the airport radio station, and is immediately and accurately informed if there are other planes in the air near him or occupying the landing area.

Although the radio is maintained primarily for the benefit of airline operators, on several occasions it has been a priceless convenience to passengers aboard transport planes. In one instance a man stopped at the airport office to inquire if a friend of his had taken a certain plane due to arrive in Cleveland a few hours later. Important business required that the individual leave the city unless the passenger in question was actually en route to Cleveland.

A few minutes later the airport radio operator was in communication with the mate aboard the plane and had forwarded the inquiry. Consulting his passenger list, the mate determined that the passenger was aboard and radioed the Cleveland station to that effect—all while the giant plane was several hundred miles away and travelling at more than a hundred miles per hour.

The time is certainly not far distant when every major airport will normally embrace air traffic as heavy as is here encountered these ten days. The presence of the National Air Races offers problems that must sooner or later develop at all air terminals. The cooperation of federal representatives and air race officials in the solution of these problems has been invaluable.

In 1929, over 1000 airplanes made Cleveland Airport their headquarters. Despite this concentration of such a large number of craft, flying activities were conducted without mishap or confusion. This year, with one-half again as many ships participating, details of traffic control have been so completely worked out as to eliminate any possible conflict between scheduled air line operations and racing activities.
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Traffic Control and Safety Measures

By EDWARD J. DONAHUE
Traffic Commissioner, Cleveland Police Department

Following a survey by the Cleveland Automobile Club establishing routes to Cleveland airport, it fell to the Traffic Division of the Cleveland Police Department to outline and co-ordinate the efforts of a large corps of policemen detailed to handle the thousands of automobiles driven daily to the races.

The first step in such preparations involved a careful study of traffic concentration points and an estimate of the capacity of the several arterial routes from downtown Cleveland to the airport. Roads leading to the airport from the south, east and west had also to be considered, for a bulk of the motor traffic was expected from adjacent and distant towns.

Next we were faced with the problem of anticipating congestion and traffic tieups resulting from stalled cars or accidents. Since a tieup at any of the main intersections along Rocky River Drive would paralyze the movements of thousands of cars approaching the airport by that route, a plan had to be devised whereby officers at other traffic concentration points could be informed of the nature and location of the congestion. With this information it would then be possible to detour traffic through several alternative routes.

It was further necessary that officers in charge at important intersections be informed of the moment parking spaces at the airport began to empty to facilitate co-ordination and consequent escape from congestion.

It was decided that the solution to the problem lay in establishing telephone connections between a central station at the airport in charge of a sergeant, and officers detailed at traffic concentration points. Each of these stations in turn are in direct contact with the central police station through the officer in charge at the airport.

In the event that traffic either to or from the airport becomes heavy enough to warrant converting Rocky River Drive to a one-way road, a general call to telephones along the route informs officers accordingly, and the order is executed with a minimum of delay and confusion.

Field telephones are now in operation where Lorain Road, Puritas Road, Brook Park Road and Five Points Road intersect Rocky River Drive, and at the intersection of Brook Park Road and Grayton Road.

To forestall the intentions of those planning to park and witness the races from roads in the vicinity of the airport, officers have been instructed to allow no cars to pass the airport on either the west or east side. Either they must enter the airport gates or else proceed at once to the north or south.

The satisfactory accomplishment of such traffic control requires approximately 100 police officers, including three captains, ten lieutenants, nine sergeants, and ten mounted policemen. A detail of motorcycle policemen has been assigned to the airport area to keep cars in line and otherwise expedite the steady flow of traffic.

1931—NATIONAL AIR RACES

Fire prevention at the National Air Races is under the direction of Fire Chief James Granger, who has detailed more than fifty firemen at strategic points in and about the airport. An entire fire company is stationed at the airport ready at all times for emergencies arising from possible crashes or other accidents. The company is equipped with a pumping truck as well as portable chemical extinguishers.

Extreme precautions are taken in the servicing of airplanes with gasoline and oil, and extinguishers are required as regular equipment on all service trucks. To avoid the possibility of fire resulting from static electricity generated in the transfer of gasoline from truck to plane, the two are joined with a chain, which in turn is in contact with the ground. This precaution dissipates electrical charges always generated in such operations.

Additional firemen are distributed throughout the administration building and grandstands to observe and report possible fires resulting from carelessly thrown cigarettes and matches. In addition at least one fireman will be stationed at each railroad crossing.

The Police and Fire Departments of the city have co-ordinated their efforts that the ten-day air classic, unmarred by accidents or unforeseen emergencies, will reflect favorably on their organization as well as upon officials who have made the show possible.

The Influence of the National Air Races on Aviation

(Continued from page 43)
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racing planes for annual competition. It may be said, however, that the experience gained through the performance of these racing planes in those days of high speed records is largely responsible for the efficient type of single-seater Pursuit planes now possessed by the military services.

The Army Air Corps has participated in the National Air Races each year since their inception. It is only since the 1929 Races held in Cleveland that the Air Corps has failed to enter into the various competitive events. Virtually a military event in the year 1920, the complexion of the annual classic is now entirely changed, being one in which commercial pilots predominate. Under its present policy, the Air Corps appreciating the present character of this national event, does not participate in any of the competitive events, leaving the field to civilian aircraft and personnel. It is satisfied with the part it has played in promoting the growth and importance of these annual races and feels that, with commercial aviation on its present substantial foundation, it can afford to hover in the background. In line with its present policy, however, it continues to extend its cooperation to those sponsoring this annual event and participates therein to the extent of staging demonstrations of aerial military maneuvers.

A "Big Business" Enterprise
(Continued from Page 39)

execution still requires minute supervision. Literally tons of mail are distributed by the ticket, advertising, and publicity departments. Preparation of such correspondence requires a high calibre corps of typists and stenographers.

The publicity campaign is conducted through a national group of newspapers, aviation magazines, and local house organs, weeklies, and trade journals. Advertising is accomplished through a wide range of media ranging from thirty-foot billboards to two-inch stickers for correspondence. Windshield emblems, electrotypes, folders, direct mail literature, tire covers, posters and window cards, newspapers, magazines and other media complete the channels through which the races are advertised. Promotion is carried on with the co-operation of merchants who are encouraged to place air race window displays, and by means of the radio.

Meanwhile the contest committee has outlined air rules, laid out the racing course, determined eligibility requirements, and chose its operating and assisting staffs. The traffic committee has investigated and recommended routes to the airport from all parts of the state. The speaker's bureau has informed luncheon clubs and similar groups of the nature and scope of the event and the director of special events has interested municipalities, civic, and fraternal groups in sponsoring special days.

And behind the scenes are the comptrollers, regulating expenditures, checking receipts and managing the corporation's finances generally. Hundreds of policemen and National Guardsmen perform an invaluable function in maintaining order where a lack of cooperation would result in a costly chaos.

From a dusty, technical, and not particularly interesting exhibition of flying, the National Air Races have become a major sporting event that recognizes no rivals. It is a rendezvous for sportsman, the smart set, the engineer, and executive. Its universal appeal, its steady growth and its valuable scientific function is making its significance known world wide.

1931—NATIONAL AIR RACES
A Proving Ground for the Industry

(Continued from Page 50)

known throughout the world. Among the contestants are men and women, experts in the art of flying. Included in the list this year are two winners of the Schneider Cup Race, and three world's speed champions.

A well-known oil company has brought to the races a contingent of foreign flyers, including four of Europe's most skillful airmen. They are bringing to Cleveland the last word in European flying equipment in which they will go aloft daily for a demonstration of plain and fancy flying.

The advent of the autogiro as a commercial vehicle is being recognized in connection with the races by an autogiro event and daily demonstrations of its practicability.

Cleveland expects this year to establish in the 1931 National Air Races a landmark for all future aeronautical events.

The Department of Commerce and Commercial Aviation

(Continued from Page 45)

be he will know at all times if he is exactly on his course.

Every 40 or 50 miles along his route, the pilot will pass over an intermediate landing field established and maintained by the Aeronautics Branch and if for any reason he finds it necessary to make a landing, he may do so at this field. Normally the fields are spaced at 40 to 50 mile intervals, but in some instances, on difficult routes, they are closer together.

If the plane does land, it may be due to the fact that the pilot has received information of an approaching storm through a Department of Commerce weather broadcasting station. These broadcasts are put on the air usually at half-hour intervals, and the radio communication stations also are available for emergency messages to and from aircraft in flight.

The aid given by the Department extends also to the dispatchers who have sent the airplane along its way or are awaiting its arrival. At each station of the automatic telegraph typewriter circuit, used for weather information dissemination, the operator watches for the airplane and when he sees it, types a report of its passage on his machine. Thus, the progress of the airplane along the airway is known at all times.

Service to all pilots of the character just described is available over airways covering a great part of the United States, and additional facilities are being installed as rapidly as funds are made available and the work can be accomplished. On July 1st there were 15,567 miles of lighted airways in operation, and 2,867 miles under construction, according to a preliminary statement which may be altered slightly by the final check for the end of the fiscal year. The number of intermediate landing fields was 360; radio broadcast stations, 53 with 2 others under construction; radio range beacons, 55 in operation and 14 under construction. There were 9,396 miles of automatic telegraph typewriter circuits for the dissemination of weather information and position reporting of aircraft. When completed, the Federal Airways System will contemplate 25,000 miles of trunk airways.

The third division of the Aeronautics Branch's activities, aeronautic development, embraces a variety of subjects. These include the supplying of information and
statistics on aeronautics through printed bulletins, correspondence, special newspaper and magazine articles and interviews, compilation of airway bulletins; the promotion and correlation of aeronautic research; promotion work in airport development and compilation and publication of air navigation maps.

For the past two years, the Aeronautics Branch has published the Air Commerce Bulletin, a printed publication which is successor to the old mimeographed Domestic Air News. There also is a series of Aeronautics Bulletins dealing with various specific phases of the Department’s work, and with aeronautics in general. Nearly 1,300 airway bulletins have been published. These are leaflets, punched for filing in loose leaf note books, each one describing an airport or landing field; weather conditions in a certain section, listing the aids to air navigation on the airways and special warnings of unusual conditions that might affect the safety of flight.

The research projects of the Aeronautics Branch are carried out in two different ways. First there is the Aeronautics Research Division, which is located at the Bureau of Standards. This division is divided into five sections, each one engaged on problems in its own field. These sections are radio, lighting, aircraft engine, wind tunnel and engineering.

The other phase of research work is carried out by special research committees organized by the Aeronautics Branch with the cooperation of other agencies, which appoint representatives to serve on the committees.

In airport development, the Aeronautics Branch has a group of specialists who travel throughout the country on prepared itineraries, assisting communities in the selection of sites and advising them as to the requirements of the Airport Rating Regulations. The Department rates airports upon application and compliance with the Airport Rating Regulations and the ratings are published in the Department’s list of airports and landing fields.

Air navigation maps published by the Aeronautics Branch of two types, strip maps and sectional airway maps. This work was begun with the publication of the strip maps of the airways, each showing a territory 80 miles in width and of varying length, the average being 250 miles. More recently the compilation of the sectional airways maps has been begun. Each of these maps will portray the territory within two degrees of latitude and six degrees of longitude. A total of 92 maps will chart the entire United States and will eventually supersede the strip maps. The first to be published is known as Lower K-16, Chicago, and covers an area 329 miles from east to west and 153 miles from north to south in upper Illinois and Indiana and extending into Ohio and Michigan. Other maps published are Upper K-16, Milwaukee, showing territory in the region of Lake Michigan and Upper K-17, Detroit-Toronto, which is an international map showing territory partly in the United States and partly in Canada. All of the promotional activities just mentioned are accomplished by divisions and sections of the Aeronautical Development Service, the third major division of the Aeronautics Branch as outlined at the beginning of this article.

In all of its activities, the Aeronautics Branch adheres to the fundamental policy leading to the realization of the following principles: (a) Airworthy aircraft, adequately equipped and efficiently maintained; (b) flown by competent pilots; (c) over suitably equipped airways; (d) in conformity with the standard air-traffic rules. Each division and section has duties relating to some phase of that policy, which, it is believed, is an important factor in the orderly advance that is being made in civil aeronautics.
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