

15¢ **BILL BARNES** **AIR TRAILS** NOVEMBER 1936

**THE MIDNIGHT SUN AIR LINES**

*500 Miles North of The Arctic  
Circle with Airmail in Norway*

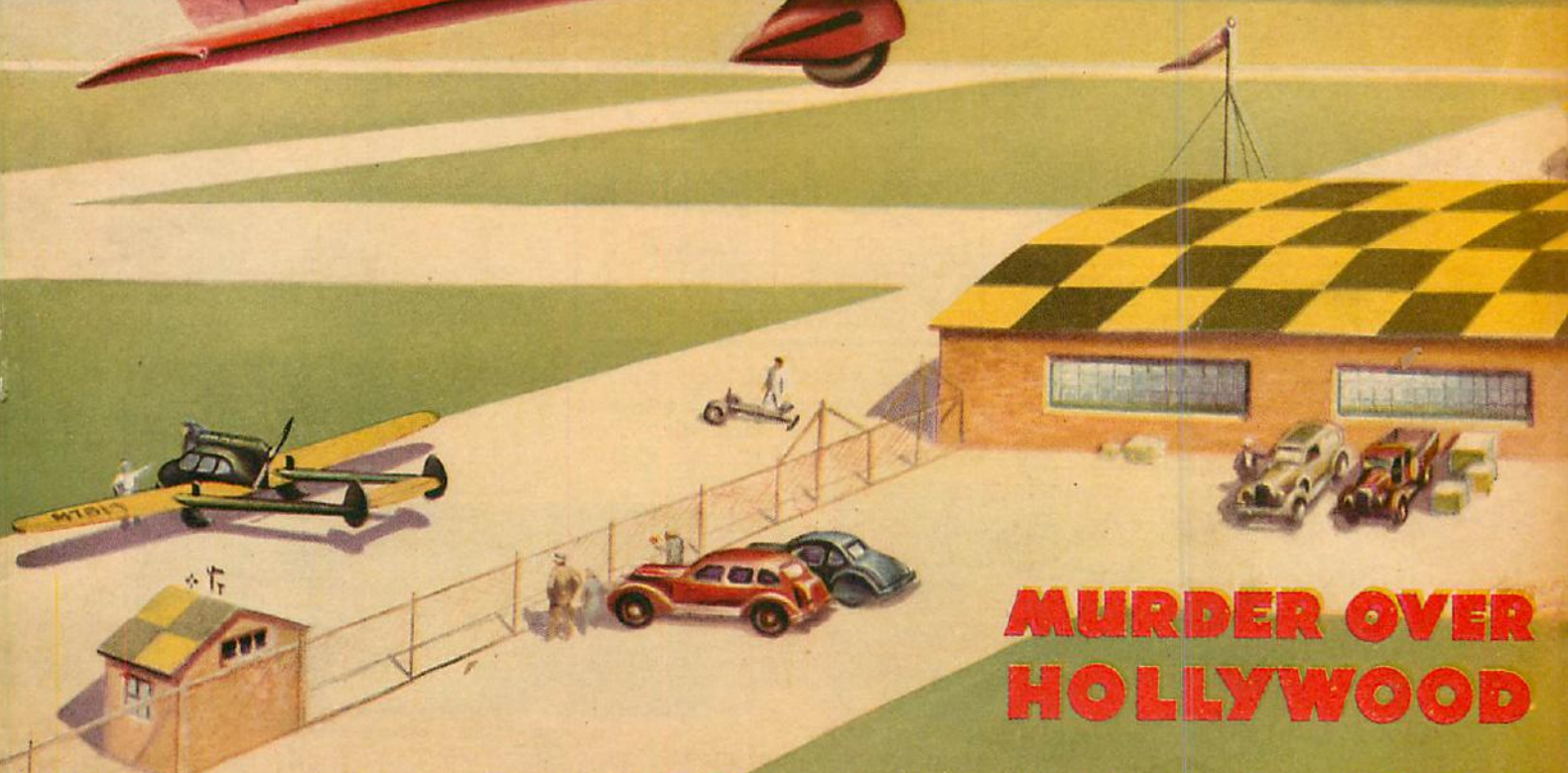
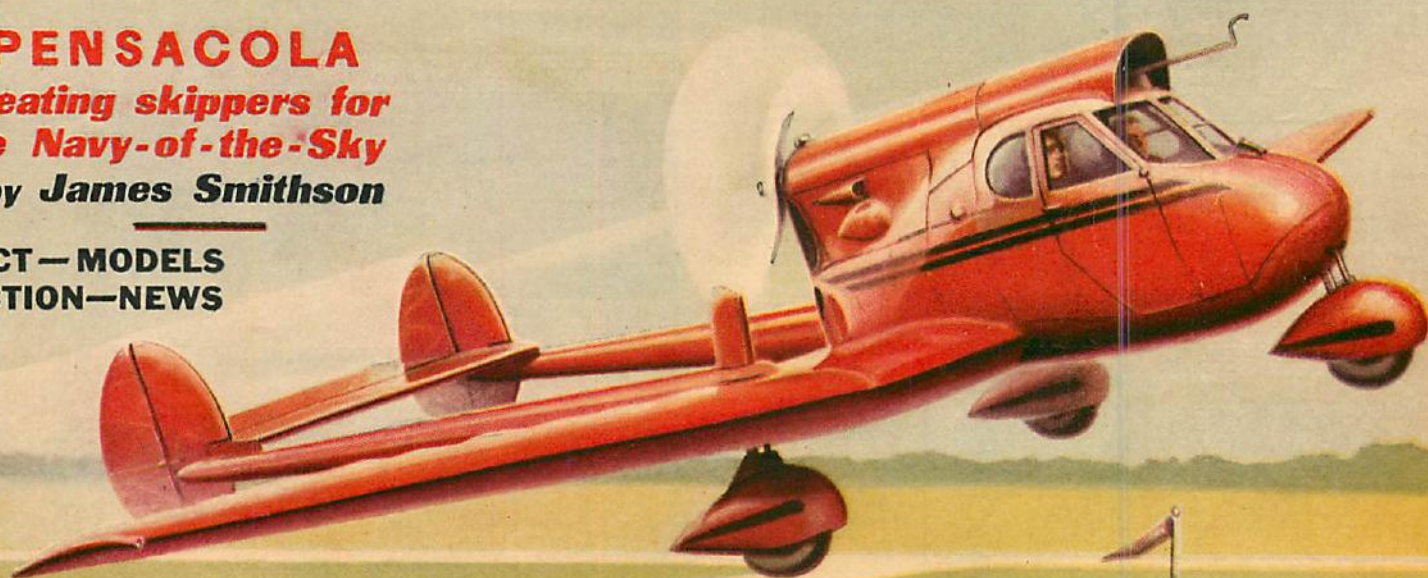
By **BERNT BALCHEN**

**PENSACOLA**

*Creating skippers for  
the Navy-of-the-Sky*

by **James Smithson**

**FACT—MODELS  
FICTION—NEWS**



**MURDER OVER  
HOLLYWOOD**

**A GREAT BILL BARNES AIR ADVENTURE NOVEL**



# Quality In Every Detail, Aircraft One Quarter Inch to the Foot Solid Scale Models The "Taylor Made" Kit With An International Reputation

M  
A  
R  
T  
I  
N



B  
O  
M  
B  
E  
R

## A PERFECT MODEL OF AMERICA'S MOST BEAUTIFUL BOMBER

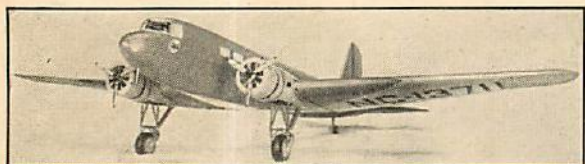
The Kit To Build The Model Of This Modern Giant Contains: selected balsa parts cut to outline shape, turned hardwood cowl and wheels, 3 super-detailed pilot busts, 2 three-bladed Hamilton propellers, a replica aircraft machine gun, a finished transparent gunner's turret, formed to shape, drilled Aluminum landing gear struts, liberal portions of authentic army colored lacquers, wood filler and fillet making material, colored insignia, full-size detailed drawings, etc. \$1.00. Plus 20c packing and postage.



LOCKHEED "ELECTRA" 14" span all Silver, Black detail \$1.00 Plus 20c postage.



FAIRCHILD AMPHIBIAN 14" span White and Blue \$1.00 Plus 20c postage.



DOUGLAS TRANSPORT 22 1/2" span color all silver with black detail or blue and yellow as shown \$1.50 plus 25 cents postage. Also furnished in 16" size at \$1.00 plus 20 cents postage.



MARTIN "CHINA CLIPPER" 1/4" TO THE FOOT SCALE, SPAN, 16" \$1.00 Plus 20 cents postage.



BOEING F4B4, Colored white and yellow \$.35



DeH "Comet" Winner of London to Melbourne Race 50 Cents.

## EACH AIRCRAFT KIT CONTAINS

Liberal portions of colored lacquers and cement, finished pine wheels, colored insignias, rigging wires, most difficult parts cut to outline shape, detailed drawings, die cast Propellers and Pilots and many other fine features too numerous to mention.

All Wartime kits contain super detailed Machine guns. The following Kits contain detailed Radial Engines and spun metal Cowlings, Boeing P 26 A, Boeing F 4B1, Boeing P 4B3, Boeing P 12 E, Boeing P 12 F and Curtiss Goshawk.

In addition to the large Kits illustrated at the top of the page, we carry in stock the following kits, ready for immediate shipment.

Spad 13  
Fokker D 7  
Fokker D 8  
Fokker Tripe  
S. E. 5. Pursult  
Waco Model "A"  
Nieuport 17 C1  
Sopwith Camel  
New Monocoupe  
Albatross D5  
Curtiss Hawk P6E  
Howard Mulligan

25 Cents Each

Boeing F4B3  
Boeing F4B4  
Boeing P26A  
Curtiss Goshawk  
Curtiss BF2CI  
Boeing P12E  
Boeing P12F

35 Cents Each

DE HAVILAND COMET 50c

## BUILDING MODEL AIRPLANES

The most complete manual ever published, a 32 page book with blue prints and simplified instructions, for building ten model Airplanes.

PRICE 25c POSTPAID

For single kits add 10c for packing & postage. For 2 or more kits add 5c for each kit. Personal checks add 10c. No C.O.D.



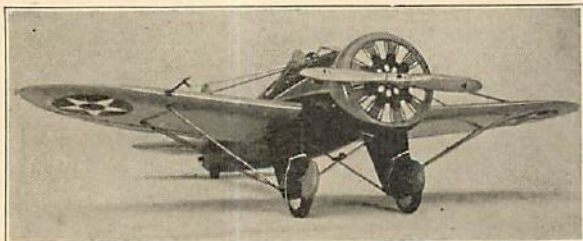
NEW MONOCOUCPE Colored all yellow, red trim \$.25



SPAD 13 All yellow, black detail \$.25



SOPWITH CAMEL Blue wings, olive body \$.25



BOEING P26A Colored olive drab and yellow \$.35

Add 20% to these prices for shipments to Foreign Countries.



MR. MULLIGAN All white, Gold letters \$.25

NOTE. These are actual photographs of models built from AIRCRAFT kits.

AIRCRAFT, 3502 NORTH CICERO AVE., DEPT. B.10, CHICAGO



# THIS EMPTY

# MEANS

# THIS EMPTY



**I**t takes brain to  
earn money—trained brain!

The man without training is  
usually the man without  
cash. You can train your  
brain! Thousands of men  
have done it through spare-  
time study of I. C. S. Courses.  
Be a cash man—be a trained  
man—mail this coupon!

## INTERNATIONAL CORRESPONDENCE SCHOOLS

BOX 4927-B, SCRANTON, PENNA.

★ Without cost or obligation, please send me a copy of your booklet, "Who Wins and Why," ★  
and full particulars about the subject *before* which I have marked X:

### TECHNICAL AND INDUSTRIAL COURSES

- ☐ Architect
- ☐ Architectural Draftsman
- ☐ Building Estimating
- ☐ Contractor and Builder
- ☐ Structural Draftsman
- ☐ Structural Engineer
- ☐ Electrical Engineer
- ☐ Electric Lighting
- ☐ Telegraph Engineer
- ☐ Telephone Work
- ☐ Refrigeration

- ☐ Wiring
- ☐ Radio

- ☐ Welding, Electric and Gas
- ☐ Reading Shop Blueprints
- ☐ Machinist
- ☐ Patternmaker
- ☐ Sheet Metal Worker
- ☐ Plumbing
- ☐ Heating
- ☐ Pipefitter
- ☐ Air Conditioning
- ☐ Automobile Mechanic
- ☐ Coal Mining
- ☐ Toolmaker
- ☐ Foundry Practice
- ☐ Roller-maker
- ☐ Steam Fitting
- ☐ Ventilation
- ☐ Tinsmith
- ☐ Navigation

- ☐ Bridge Engineer
- ☐ Bridge and Building Foreman
- ☐ Highway Engineer
- ☐ Civil Engineer
- ☐ Surveying and Mapping
- ☐ R. R. Locomotives
- ☐ R. R. Section Foreman
- ☐ R. R. Signalmen
- ☐ Air Brakes
- ☐ Diesel Engines
- ☐ Aviation Engines
- ☐ Train Operation

- ☐ Mechanical Engineer
- ☐ Mechanical Draftsman
- ☐ Steam Engineer
- ☐ Steam Electric Engineer
- ☐ Marine Engineer
- ☐ Chemistry
- ☐ Cotton Manufacturing
- ☐ Woolen Manufacturing
- ☐ Agriculture
- ☐ Fruit Growing
- ☐ Poultry Farming
- ☐ Pharmacy

### BUSINESS TRAINING COURSES

- ☐ Business Management
- ☐ Industrial Management
- ☐ Traffic Management
- ☐ Accountancy
- ☐ Cost Accountant
- ☐ C. P. Accountant

- ☐ Bookkeeping
- ☐ Secretarial Work
- ☐ Spanish
- ☐ Advertising
- ☐ Salesmanship
- ☐ Complete Commercial
- ☐ French

- ☐ Business Correspondence
- ☐ Stenography and Typing
- ☐ Civil Service
- ☐ Mail Carrier
- ☐ Railway Mail Clerk
- ☐ Grade School Subjects

- ☐ High School Subjects
- ☐ College Preparatory
- ☐ First Year College Subjects
- ☐ Illustrating
- ☐ Cartooning
- ☐ Lettering Show Cards
- ☐ Signs

### DOMESTIC SCIENCE COURSES

- ☐ Professional Dressmaking and Designing
- ☐ Home Dressmaking
- ☐ Advanced Dressmaking

- ☐ Tea Room and Cafeteria Management, Catering
- ☐ Millinery
- ☐ Foods and Cookery

Name.....Age.....Address.....

City.....State.....Present Position.....

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada



# BILL BARNES AIR TRAILS

Reg. U. S. Pat. Off.

A STREET & SMITH PUBLICATION

## CONTENTS

### 2 Stories:

BILL BARNES AIR NOVEL:

#### MURDER OVER HOLLYWOOD 8

*Death took wings and struck in mid-air—again and again—And there were motion pictures of every death! A great Bill Barnes Air Adventure Novel.*

by George L. Eaton

#### Grandpa Burns by Harold Montanye 24

*The trick was ingenious—but a pilot's eyes are trained to observe everything.*

### 9 Features:

#### This Winged World . . . . . 4

*Notable photos picturing current air events.*

#### Pursuit Plane Development . . . . . 17

*Another delineation of aero development.*

#### The Flier's Dictionary by C. B. Colby 21

*Cloud formations and weather forecast—the fourteenth lesson in the technical terminology of the airman.*

#### Air Trails Gallery . . . . . 27

*Pictures of modern airplanes for the collector.*

#### Pictorial History of Man in the Air . 33

*More episodes for your aeronautic scrapbook.*

#### Air Progress . . . . . 34

*News of what's happening in aviation.*

#### Split-second Action . . . . . 35

*Aerial adventures that come once in a lifetime.*

#### Gullible's Travels . Major Hunt 37

*A cash-prize contest with plenty of fun.*

#### Air Cannon . . . . . 93

*Describing the 37mm. rapid firer.*

### 2 Departments:

#### What's Your Question?

*Conducted by Clyde Pangborn 36*

*A page of interesting, expert information.*

#### Air Adventurers Club

*Conducted by Albert J. Carlson 38*

*It's all Flying!*

### 12 Model Building Items:

#### The Model Workshop

*Conducted by Gordon S. Light 39*

#### The Contest Calendar . . . . . 39

*A schedule of competitive events.*

#### Navy Hawk . by Alan D. Booton and Ralph Pickard 40

*Flying Scale Model of the Curtiss Hawk—Type III*

#### It's the Finish

*by Nicholas E. D'Apuzzo 45*

*Paint, dope and detail make a model.*

#### Record Threat

*by Lawrence N. Smithline 46*

*An indoor, Class B fuselage.*

#### Fun Afloat . by Gordon S. Light 48

*Building floats successfully is an art.*

#### Private Air Bus by William Winter 53

*Solid Scale Model of the "Hammond Y."*

#### Lightweight . by Gordon S. Light 56

*The Zephyr—a flying model for beginners.*

#### The Discussion Corner . . . . . 59

*Air Trails readers discuss their chosen subject for the current month.*

#### The ? Mark . . . . . 60

*Answers to questions; information for all.*

#### Fast Transport

*by Nicholas E. D'Apuzzo 61*

*Model plans of the Heinkel He 70.*

#### Model Matters . . . . . 62

*Contest times, club notes, news about modelers' activities.*

### 4 Articles:

#### Orders to Pensacola

*by James Smithson 18*

*Things you want to know about this great training station.*

#### The New Hammond Pusher

*by Frank Tinsley 22*

*A detailed discussion of the plane on the cover.*

#### Air Lines in the Land of the Midnight Sun . . . . . 28

*What is happening in Norway, as told to John Du Barry.*

#### America's First Flight

*by Kenneth P. Wood 32*

*How President Washington sponsored a balloon ascension.*

Single Copy, 15 Cents



Yearly Subscription, \$1.50

The entire contents of this magazine are protected by copyright, and must not be reprinted without the publishers' permission.  
Monthly publication issued by Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y. George C. Smith, Jr., President; Ormond V. Gould, Vice President and Treasurer; Artemas Holmes, Vice President and Secretary; Clarence C. Vernam, Vice President. Copyright, 1936, by Street & Smith Publications, Inc., New York. Copyright, 1936, by Street & Smith Publications, Inc., Great Britain. Entered as Second-class Matter, October 10, 1935, at the Post Office at New York, N. Y., under Act of Congress of March 3, 1879. Subscriptions to Cuba, Dom. Republic, Haiti, Spain, Central and South American Countries except The Guianas and British Honduras, \$1.75 per year. To all other Foreign Countries, including The Guianas and British Honduras, \$2.25 per year.  
We do not accept responsibility for the return of unsolicited manuscripts.  
To facilitate handling, the author should inclose a self-addressed envelope with the requisite postage attached.

STREET & SMITH PUBLICATIONS, INC.

79 7th AVENUE, NEW YORK, N. Y.



## Earn \$40 a Week and Up in the FAST GROWING Aviation Industry

### Course Helped Pass Government Examination

"I am a holder of an airplane and engine mechanic's license and a private pilot's license. Your Course helped me a great deal to pass the examinations." JOHN HALENDA, 329 S. Ballet St., Frackville, Pa.

## Make Me PROVE I Can Train You at Home in Your Spare Time Send Coupon for FREE Lesson

Don't take my word for it. Make me PROVE that I can give you at home in your spare time, the vital ground training you need for success in the growing Aviation Industry. How can I prove it? Just mail the coupon, and I'll send you a sample lesson absolutely free, with no strings attached. Go over it for yourself. Note the clear, easily understood way in which everything is explained. See how easy it is to learn—right from the start. Then read my free book, "Wings of Opportunity." It will give you the facts on Aviation—tell you how you can train at home in spare time for a good job—show you what a big future there is in Aviation—give you all the latest information on the fascinating business of Aviation. You will see what my graduates are doing, what they make, how they got jobs, etc. Mail the coupon now for my FREE BOOK and FREE LESSON. It may start you toward a good pay job in Aviation.

My up-to-date home-study Course gives you the ground work you need to get and keep a real job in this fascinating, fast-growing industry. Many of my graduates, who didn't know a thing about Aviation when they started training are holding down fine jobs right now—in the air and on the ground. Over forty different types of jobs to choose from, once you have the necessary training. Get the facts about my practical training and Money-Back Agreement NOW!

### I Teach You QUICKLY—at Home in Your Spare Time

You don't need to give up your present job—don't need to leave home, to get your training in Aviation. I've made it easy for you. I've put my own eighteen years of experience—five years of instructing the Navy—all into my thorough, quickly mastered home study Course.

### No Previous Experience Needed

You don't need a high school education—don't have to know anything about planes or engines to learn the ground work of Aviation with my Course. Everything is clearly explained—illustrated by hundreds of pictures, drawings and charts—made as simple and easy as possible. You get all the information you need to pass the Government's written examinations for Mechanic's or Pilot's Licenses, in a few short months. If you want to learn to fly, I can probably save you more than the cost of my Course at good airports all over the country.

### There's No Time to Lose--- Get My FREE Book Now!

Aviation is growing fast. Don't wait and let the other fellow get ahead of you. Think about your own future. Get the FACTS. Mail the handy coupon on the right today—right now—while you're thinking about it. I'll send you my sample lesson and my big FREE Book—packed with interesting facts about your opportunities in Aviation. Mail coupon NOW.

**WALTER HINTON, President**  
Aviation Institute of America, Inc.  
1115 Connecticut Avenue, Washington, D. C.



**Walter Hinton**  
President Aviation Institute

First to fly the Atlantic; first to fly from North to South America; first to explore the upper regions of the Amazon by plane. Flying Instructor in Navy for five years. Now giving ambitious men practical ground work training in Aviation at home. Mail the coupon below for your copy of his big new FREE Book today.

### AIRPLANE FLIGHT INCLUDED

Just as soon as you complete my training, I arrange a flight for you at an accredited Flying Field. There is no extra charge for this. My book tells all about it. Mail coupon.



## Mail for my big FREE BOOK on AVIATION NOW!

**Walter Hinton, President**  
Aviation Institute of America, Inc.  
1115 Connecticut Avenue, Washington, D. C.

A3A

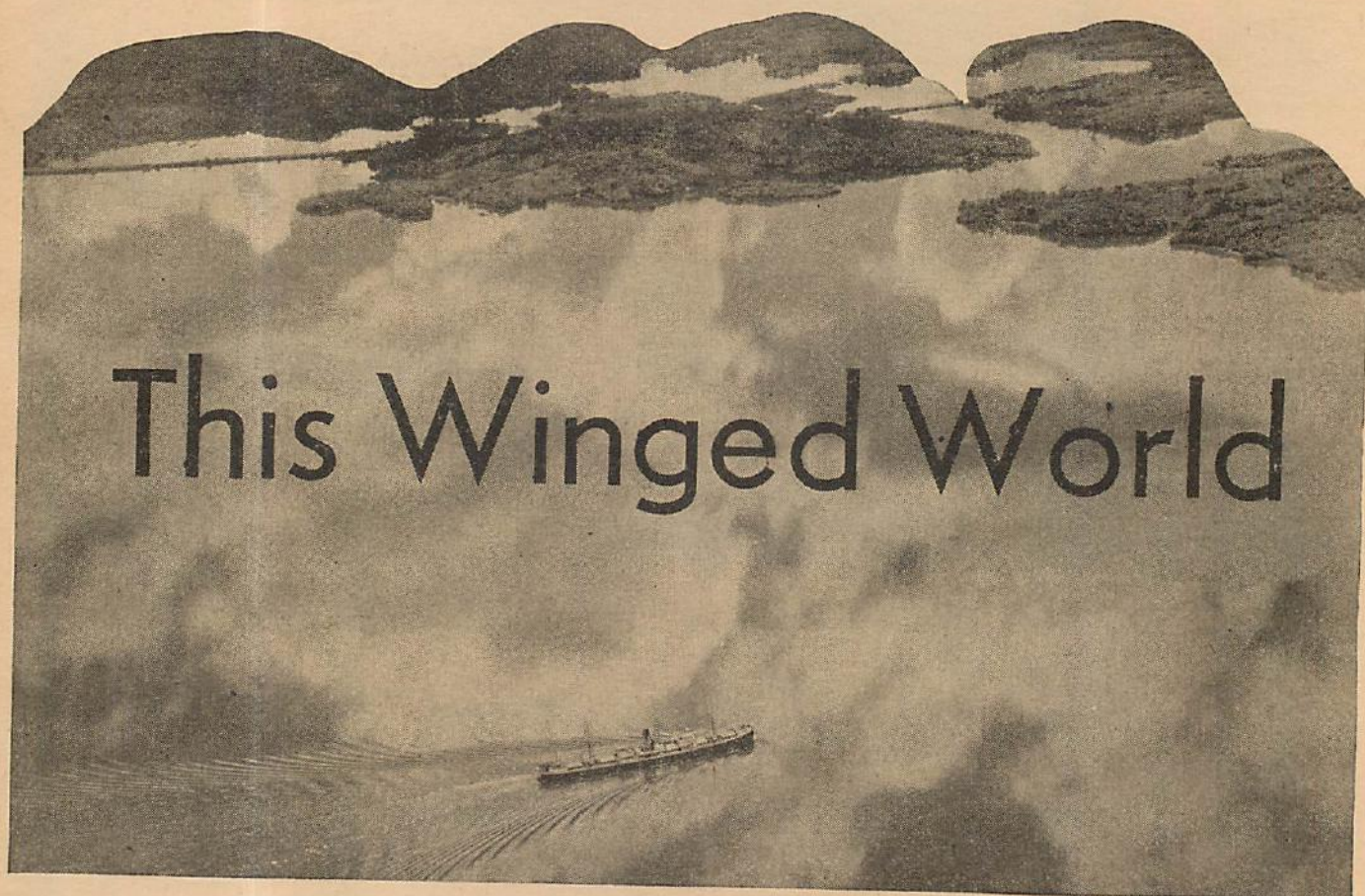
I am anxious to have you prove to me that you can train me at home in my spare time for Aviation. Send me, without obligation, your free sample lesson, and your free book, "Wings of Opportunity."

Name.....  
(Print Clearly)

Address..... Age.....

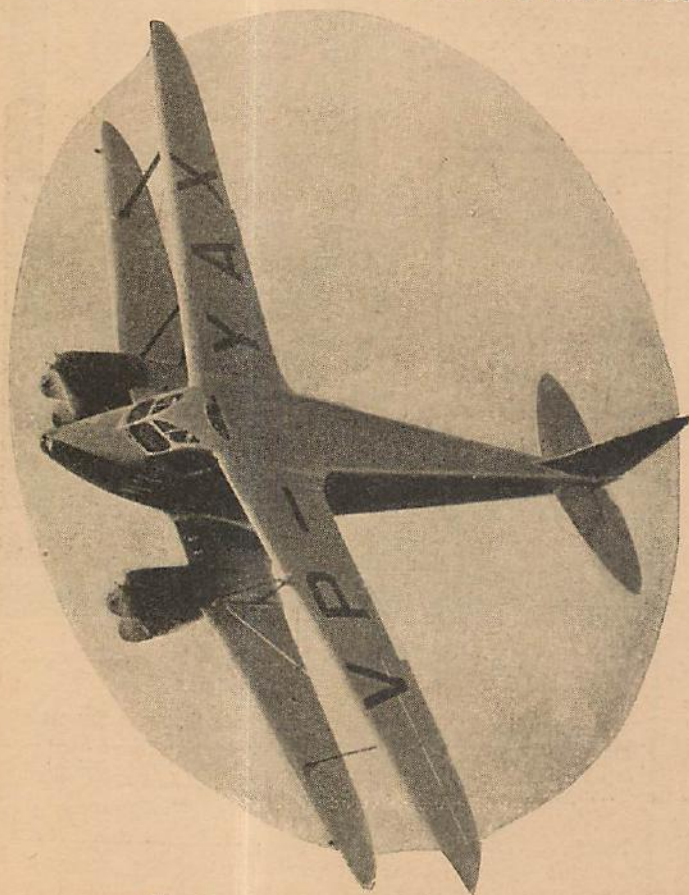
City..... State.....



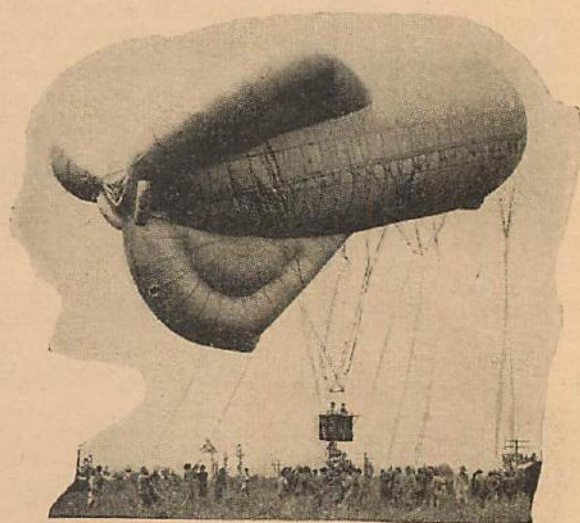


# This Winged World

Gazing into the cloud reflections in Gatun Lake, C. Z., the flier could almost feel he was traveling upside-down.



The De Havilland Dragonfly, Britain's latest air yacht, is streamlined, fast, luxurious.

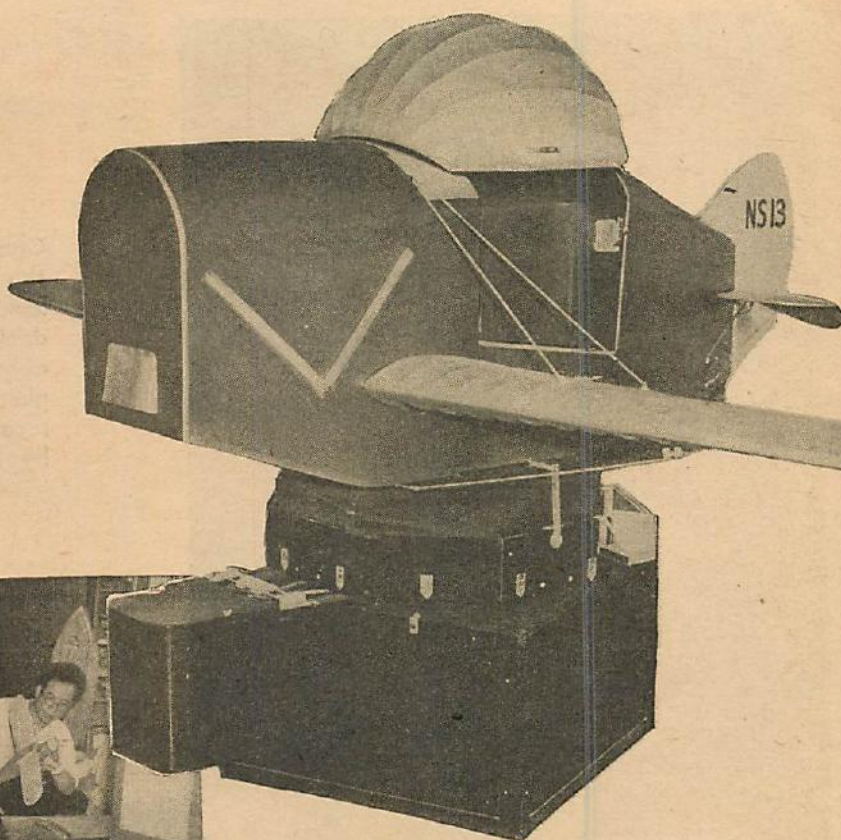


After 1500-foot observation flight, blimp from Second Balloon Squad is pulled down during war games at Fort Bragg, N. C.



The Link Trainer ship can reproduce all the conditions a pilot experiences in actual flight. Its purpose is to teach flying blind by instrument.

Mr. Moriichi Kitamura of Tokyo has been manufacturing models for the past 30 years. More than 1000 ships of all types have been turned out in his "factory"—many of them ordered by movie companies.

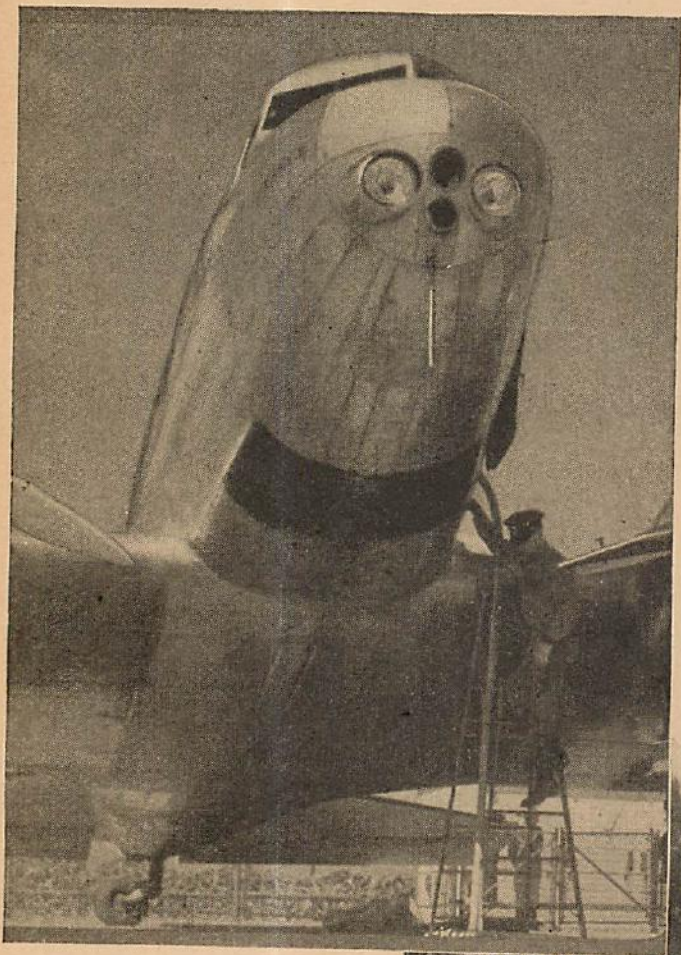


Their biggest leap—zoo-bound antelope on arrival at Newark Airport after 2000-mile trip from Wyoming.



They're both giants, but the Empire State Building can't fly. The Hindenburg can. Wonder if the zep wishes it could use the mooring mast atop the skyscraper?





Comic expression on the "face" of this Douglas transport makes it look as if it needed that long, cool drink of gasoline. Which it probably did, for it's the special TWA plane that set a lot of performance records. It was recently acquired by Howard Hughes for experimental purposes.

A baby Clipper amphibian of the Pan American-Grace Airways is given the once-over by curious river Indians of Colombia.



This smoking cabin is only a minor item in the new class of Empire flying boat scheduled for service between England and America. The ship itself is a composite craft consisting of one enormous flying boat with a small, high-powered seaplane riding on its back.

Worm's-eye view of the ST25, the special feature of which is a wing construction using only one spar.



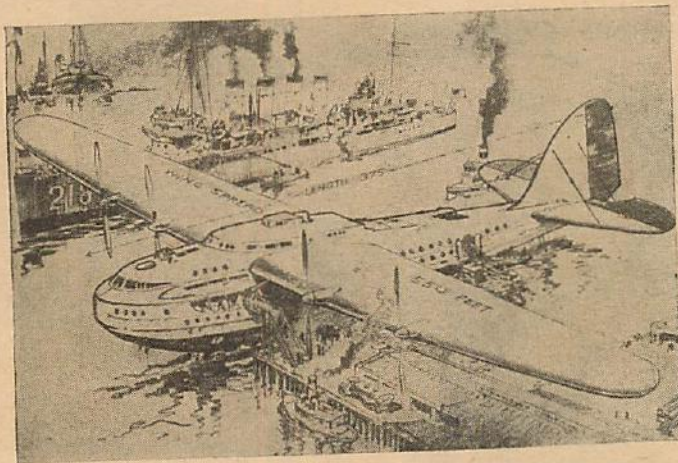


## AIR TRAILS

The new light Cierva Autogiro takes off and lands "plumb" vertically. No taxiing or forward movement is necessary.



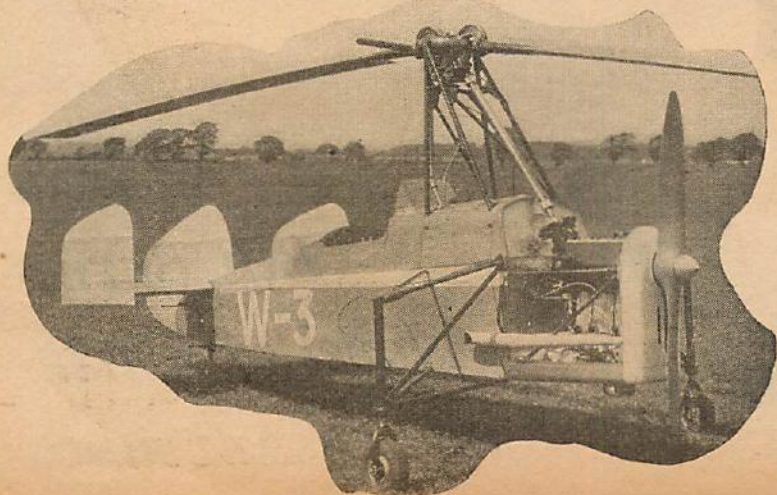
This Seversky twin-engine, all-metal bomber (or transport) is a sleek-looking sky horse, eh, cowboy? It can be used with floats.



The sketch in the center is Designer Schuler Kleinhans' idea of the flying boat of the future. It would weigh 1500 tons, and in general, resemble the China Clipper—though deep-hulled, multi-decked, and twice as fast. Its length would be that of a destroyer. Only 11 hours would be required to transport 500 passengers from New York to Liverpool.

Woe to the enemy craft that fly across the beam of this 800,000-candle-power searchlight. It rakes the night heavens for seven miles.

Another model of the new Cierva Autogiro. New type of rotor system now makes it possible to land on that dime.





# Murder Over Hollywood

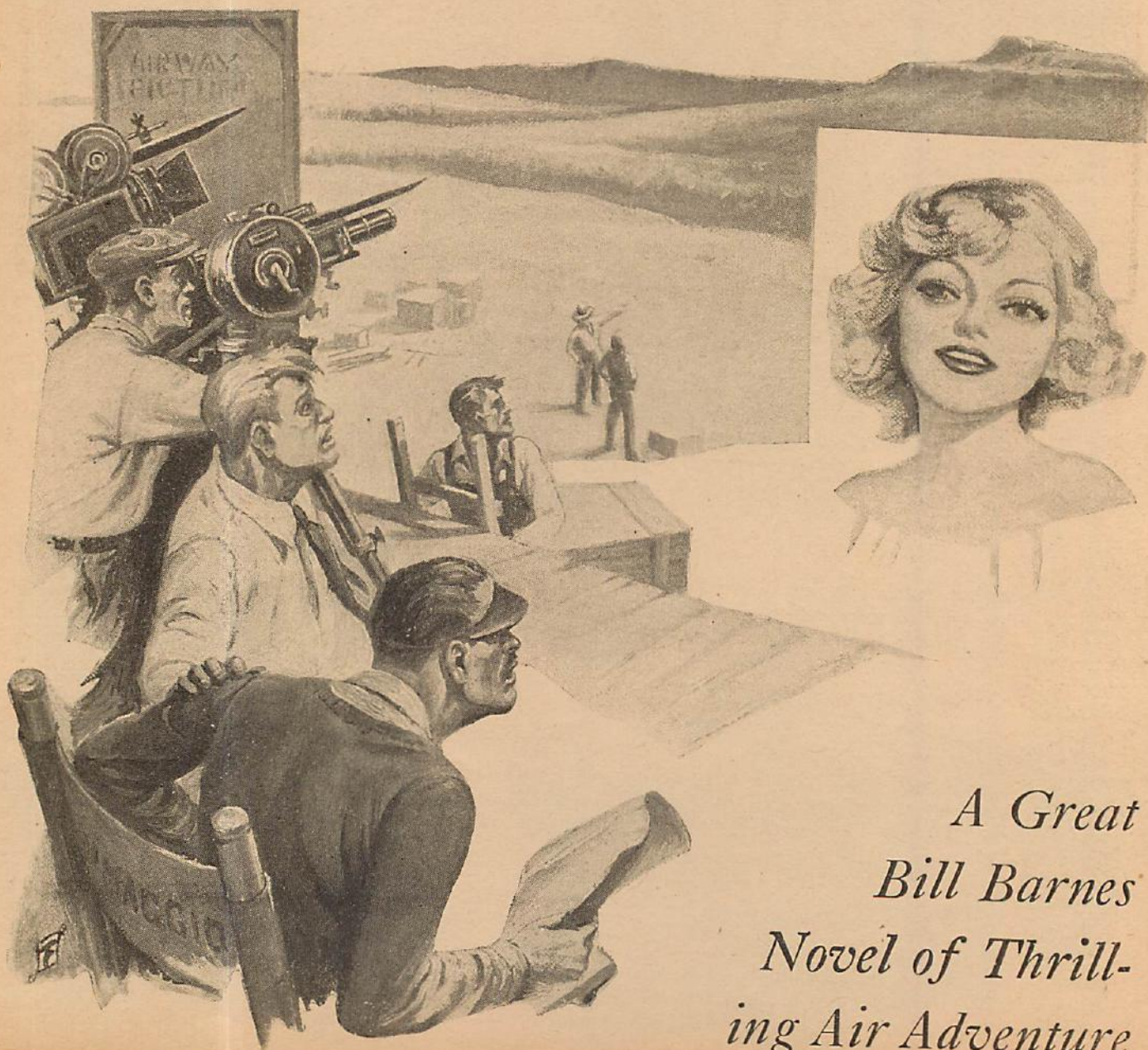
by George L. Eaton

THE GIRL who stood in the doorway of the little white bungalow was certainly beautiful. That is, she would have been beautiful if it hadn't been for the stark terror and fear in her eyes.

She stood there with the front of her clenched hand pressed against her half-open lips and gazed upward at the three tiny specks eight thousand feet in the air. Each time one of the three specks—which were airplanes—zoomed over on its back or went into a screaming dive, her breath hissed through her nostrils and a little sob sounded in her throat.

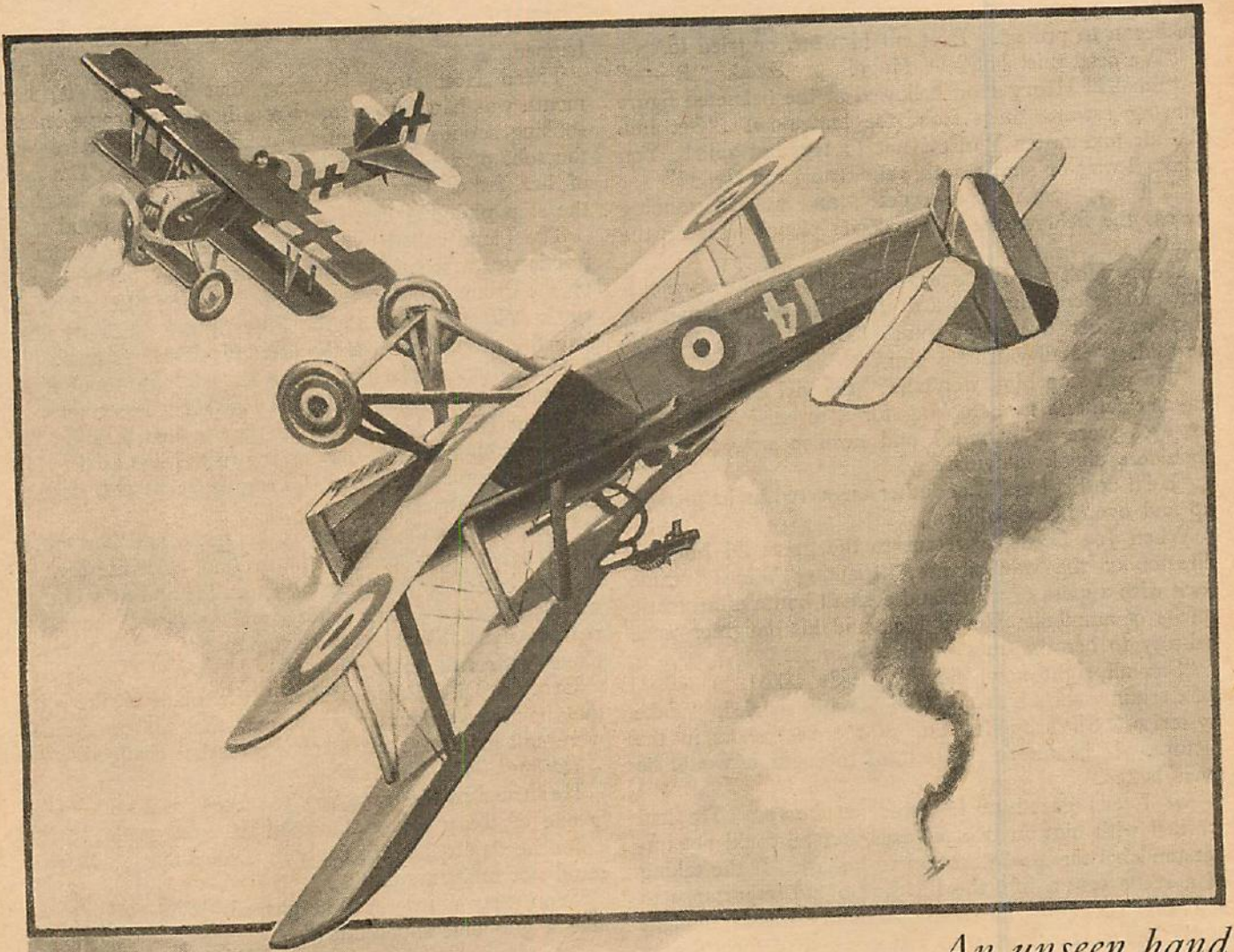
"I'm frightened, Len," she said to the sandy-haired, gray-eyed man who stood beside her. "What is the continuity? Why do they have those cameras panned all around the field?"

"They're taking some long shots of a dog fight between a Fokker and an S. E. 5," Lennard Small answered. His thin, lined face was expressionless, his gray-blue eyes like pieces of ice as he watched the darting ships high overhead. "The S. E. 5 is supposed to be shot out of control. Young Lefty Wolcott is riding her. He's supposed to spin her down so the ground



*A Great  
Bill Barnes  
Novel of Thrill-  
ing Air Adventure*





*An unseen hand  
shattered the old war-time  
crates, sending men to flaming funeral  
pyres, turning a lovely star's film into a holocaust!*

cameras can get him before he pulls out of the spin."  
"But suppose he can't pull out?" the girl, Helen Holt, whispered.

"They'll pick up the pieces and send them home to his father," Small said. "He's supposed to pull out. He's getting paid for the chances he takes. He——"

The girl gasped and stifled a scream as she stared at him.

"How can you be so utterly without—without——"

"Listen, kid," Small said. "I've been watching 'em dig 'em out of the ground ever since I was nineteen years old, since the War. I'm thirty-eight now. After you've watched 'em die that long you get used to it."

"And if he doesn't pull out," she said, "he'll be the third one to die while we've made this picture. I can't stand it! I can't stand it!"

She ran across the porch, down the steps, and started across the lot, shouting as she ran. A gray-haired man who was talking with two other men whirled as he heard her voice. His kindly face became alarmed as he moved toward her.

"Daddy! Daddy!" she screamed. "Stop him! Stop

him! He'll never come out of that spin. He'll be the third one to die. I can feel it!"

Henry Holt gathered his daughter into his arms and tried to quiet her. Georgio Di Maggio, the man he had been talking to, turned to his assistant and ordered him to get some water and some aromatic spirits of ammonia.

"There's nothing to be afraid of, baby," Henry Holt said to his daughter. "Wolcott knows his business. He's done this kind of thing a hundred times before."

"What about those other two—who—who died?" she sobbed. "They knew their business, too. I can feel it. I can feel that something terrible is going to happen again. You must stop him!"

Henry Holt put a finger under his daughter's chin and looked deeply into her tear-dimmed eyes.

"Does young Wolcott mean so much to you?" he asked her.

"Yes," she said in a whisper.

Holt whirled and barked at Di Maggio. "Get some one up there to call off that spin!" he snapped. "There's Small; he can signal to Wolcott in the air."



Di Maggio's face darkened and his eyes gleamed as he began to protest. Holt cut him off, or tried to.

"We need this shot," Di Maggio protested. "It—"

"Small!" Henry Holt bellowed at the helmeted figure moving toward them from the bungalow. "Get into the air and order Wolcott not to try that spin! You can tail-wag or signal with your arms, can't you?"

"I'll try," Small said quietly, and started running across the field where a half dozen planes were on the line.

Henry Holt put his arm around his daughter's shoulder and steered her toward the little white bungalow that was her dressing room. "Don't worry, honey," he said. "Small will stop him."

"He will stop him, won't he?" the girl asked, searching her father's face, looking for a promise. Her violet eyes were red-rimmed and swollen now, and her shoulders shook convulsively.

"He'll do his best," her father answered as he glanced up and over his shoulder.

When Joe Leeds, assistant to the great Di Maggio, director of the war picture, "Flaming Wings," came back with a glass of water and a small bottle of aromatic spirits of ammonia, Henry Holt and his daughter were halfway to her dressing room.

"She all right now, chief?" Leeds asked.

"Certainly she's all right," Di Maggio snarled. "Fake hysterics. She's spoiled one of the best shots in the picture. If he didn't pull out of the spin it would be even better."

Joe Leeds gazed at his chief in horror. He had worked with him on two pictures, but he could not understand his fanatical devotion to his art. If the taking of a scene cost a life, the life was of no importance to Di Maggio. Only the scene counted. Leeds thought of the other two fliers who had crashed to their deaths within the past few days. His gaze circled the lot and noted the "dolly" and number of cameras that were mounted on trucks and platforms.

He asked himself if Di Maggio expected young Wolcott to crash and had set his cameras so that he could catch the shot from every angle.

Henry Holt and his daughter spun about as they heard the howl of Small's light Boeing roar down the field into the wind and race into the sky. They saw him take it upward in tight spirals at its maximum climb. They saw him level off as he got a little below the two pursuit ships.

Then they saw the S. E. 5 pull up on its back and start into a spin at the bottom of a loop. They saw Small stick the nose of his Boeing down and could hear the rising crescendo of his powerful motor. They saw him pull out in a shallow dive and wave his arms at the man in the S. E. 5 as it spun toward the earth.

A thousand feet above the ground the pilot of the S. E. 5 began to fight his controls. The wings seemed to stop twisting for a moment. The men at the cameras ground away while their throats were gripped by an icy hand that brought terror to their hearts.

Di Maggio, one of the greatest directors in Hollywood, watched the ship plunge to its death without a quiver of expression on his face. His cold, calculating eye circled the field, took in every detail.

Joe Leeds, standing beside him, fists clenched and the muscles in his jaws bulging, was chanting what might have been a litany or a childhood verse. A roar

came from his throat as he realized what was going to happen.

Helen Holt stood watching that fearful sight; her mouth was hanging open. From her throat came queer, sobbing sounds that had no meaning. They were like the sobs of a baby that has exhausted itself. The face of her father was white and strained as he watched the ship plunging closer and closer to the ground.

The plane rolled over and seemed to hesitate for a fraction of a second. Then it plunged on. The people on the ground could see the top of young "Lefty" Wolcott's helmeted head as the little fighter stuck its nose into the ground with a thunderous, sickening crash.

Dust, dirt, smoke and flame leaped high about it as the single crash was followed by a dozen lesser ones.

Helen Holt's hands went to her mouth to stifle the blood-curdling scream that sprang to her lips as the ship hit the ground and drove the engine backward, ripping through the fuselage.

Then her hands dropped to her side, and her father lowered her inert form to the ground. All life seemed to have left her. Her face was waxlike and as white as marble. Henry Holt's voice could be heard above the roar of the half-mad mob trying to get to the burning plane with fire extinguishers.

Georgio Di Maggio watched the plane strike with that horrible, sickening crash, saw that his cameramen were still grinding; his blank expression changed.

He smiled!

He turned to the trembling Joe Leeds and said, "That is one of the greatest shots I have ever made!"

Joe Leeds croaked his reply in a voice that Di Maggio could not understand.

"You dirty murderer!" he gasped. "Why didn't you take a gun and shoot him?"

LATE THAT EVENING two men sat in a small office in a corner of a hangar on the MRO lot. The door of the office was open, so that they could command a view of the hangar, in which only one dim light burned. The hangar doors were closed. A lone watchman sat in a chair tilted against a wall. He was reading a newspaper in the dim light.

The faces of the two men were inscrutable masks behind the light of their cigarettes. They were silent for a moment while one of them drummed nervously on a desk, and they both listened for any sound in the great building.

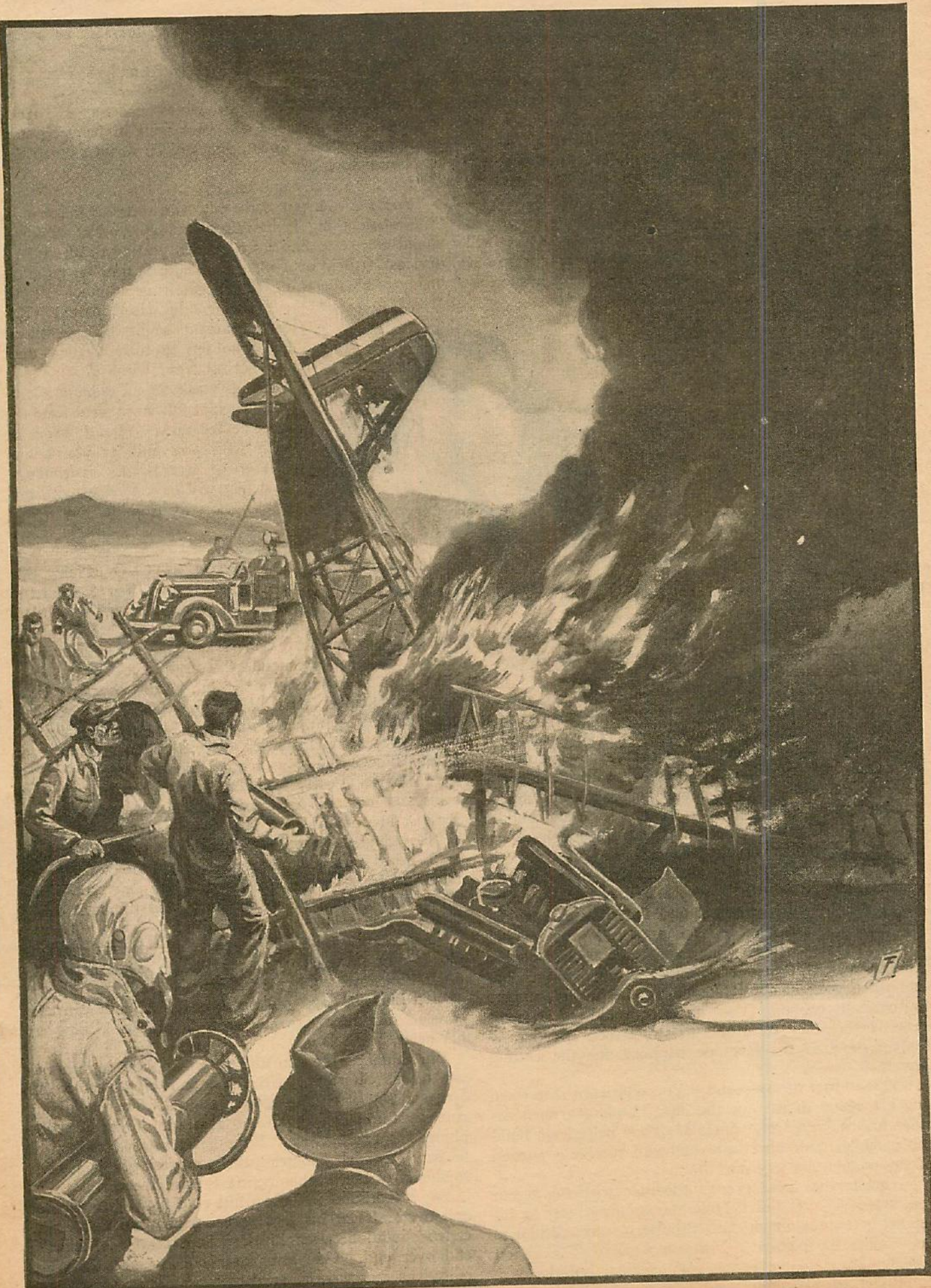
"You are sure no one can hear us?" one of them asked of the other. His English was the English of a man who spoke many languages well.

"I am certain no one can hear us," the other said in cold, precise words. "If there was a chance of our being overheard, I would have taken you some other place." He leaned forward in his chair, and his eyes were blazing like the eyes of a cat at night.

"What is your decision?" he asked.

"I must have more proof," the man said. "I do not see that the idea is practicable. It is true that you have told me three times when planes would crash and which plane would crash. But I do not know the secret of why they crashed. What caused them to crash? How could such a device be used by one power against another power? You are asking a tremendous amount of money for your invention. I cannot buy a thing in the dark."





They tried to get to the horrible wreck with fire extinguishers. The director, Di Maggio—smiled!



"Well, listen to me," the other said in precise words. "The success of my idea is based on the oldest principles of espionage."

"First, your country, or the persons you represent, place your men in the service of the countries with whom you are most apt to go to war. That is a simple matter. Every country does it. In other words, you will have a half dozen men on every military airport of the enemy. If war comes—and the next war will be won by the first successful blow from the air—your men will be in position to place my device in every enemy plane before it takes the air. It will then be only a question of time until the planes go out of control; they will be useless. It will work successfully on the largest plane or the smallest one. Your country can have the enemy on its knees begging for mercy within twenty-four hours, because it will not be able to combat your air forces."

"You will also place a half dozen men aboard airplane carriers. They will be catapulted into the air—never to return. You will have to choose your men well. They will have to be citizens of the enemy country. Men who have a grievance or want money badly and do not care how they make it. After they have entered your employ they will have to follow your directions. To betray themselves will put them in jail for most of their lives in peace times. In time of war it will mean death."

"But the device itself. What is it?"

"That I will not tell you until you have paid me for it. I will only tell you that it is a burning and cutting device which can be fastened to the control cables in a moment. It is not any larger than a silver dollar in diameter. It looks like a silver ball. Inside the ball is a vial of acid. The acid will be broken and spilled on the control wires as soon as the stick and rudder are used. The acid alone is powerful enough to cut through the cables. But to be sure, a knife is set in the center, a cutting knife that tightens each time the controls are moved. It is only a matter of a few minutes until the cables are cut and the stick and rudder are useless. You saw what happened to three ships. The same thing can be done to a whole fleet of planes. The success of the idea depends on how you choose and place your men. It should not be difficult if they are carefully trained. Your enemies would defeat themselves before they were able to strike their first blow."

"But how is the leverage supplied for the cutting knife?"

"That is part of my secret. You will learn that when you are ready to pay for the idea. Only two men besides myself know the principle. They helped me build the machines to make them, and will receive a portion of the money you pay me."

"I must have more proof," the man with the accent said smoothly. "I heard Holt, the producer, say he intended getting in touch with Bill Barnes to ask him to help finish the picture. Can you work the device on a plane Barnes, or even one of his men, is flying?"

"I can," the cold voice said. "It will be an easy matter if Barnes takes the job. Although I doubt if Barnes

will touch it. It's too small a job for him to bother with."

"Holt said he knew Barnes personally. That may make a difference."

"Perhaps. Now let's get down to business. If Barnes comes out here and I am successful in bringing him or one of his men down, you will be ready to turn the cash over to me?"

"I will be ready and eager."

"You see"—a purr came into the voice of the man—"the whole thing is inordinately simple. No air force would expect to find its own men putting death-dealing devices in their own planes. There is nothing quite as insidious as the thing that bores from within."

"That is only too apparent," the foreign accent said. "Those three men who fell to their deaths—that was boring from within?"

"I didn't ask for an opinion about them," the cold voice said, and it was like ice now. "I will keep in touch with you and let you know whether or not Barnes is coming. Then you will have to deal with me or lose your opportunity."

II—S O S

AT NINE O'CLOCK in the morning, the day after the fateful plunge of young Lefty Wolcott in Hollywood, Bill Barnes stood on the

apron at Barnes Field, Long Island, talking to his majordomo and chief technician, "Scotty" MacCloskey.

A spotless white overall flying suit covered Bill's broad-shouldered, muscular body. His flying goggles were pushed back over his bronzed forehead and humorous blue eyes. He was chuckling as he listened to things Scotty MacCloskey was telling him.

"He says," Scotty went on, "that when he opens his arms and legs and his canvas wings are spread, he can fly just like a bird."

"How high is he going before he jumps?" Bill asked.

"I heard him tell Shorty he would bail out at ten thousand feet," Scotty answered. "He saw that fellow Sohn do the stunt at an air show, and thinks it ought to teach him a lot."

"Yeah," Bill said, "if his parachute doesn't get tangled up in his trick wings. I have half a notion to order him down without the jump."

"Let him go, boy," old Scotty said. "Sandy can take care of himself. A young colt is always kicking up his heels."

Bill thumbed the sun and gazed at the dot that was one of his Snorters. He put a pair of glasses to his eyes and saw it circling slowly around. Then one wing rose as the tail was kicked upward. Over the side plunged a small figure. Bill's heart seemed to stop as he saw "Sandy" Sanders, the youngest of his famous squadron of fliers, plummeting toward the earth.

For a thousand feet the white-clad figure turned over and over. Then his legs spread slowly apart and the canvas finail between his legs kept him from turning end over end. One arm came out to spread a piece of canvas that was fastened to his wrist and to his hip and shoulder. Slowly the other arm came out, and his rapid plunge to earth was checked.



Giorgio Di Maggio



Bill Barnes gasped as he saw young Sandy soaring through the air in perfect imitation of a sea gull. Then, as Sandy got the feel of his wings, he grew more ambitious. He zoomed to the right and to the left, leveled off and shot upward and over to complete a perfect loop.

Four times he came up and over in a loop, while Bill groaned.

"He's all right, Bill," Scotty said. "He's as much at home in the air as a bird."

At two thousand feet Sandy flattened out, and they saw the pilot 'chute flutter out behind him. A sigh of relief escaped Bill as Sandy's main 'chute opened and he jockeyed his shrouds to land in the center of Barnes Field.

"Whew!" Bill said, wiping the perspiration off his forehead. "I'd rather hear him tell about it than watch him. He'll break his fool neck."

"Leave the kid alone, Bill," Scotty said. "Tell him you saw him. Encourage him. He's learning a lot about aerodynamics, things the rest of us don't know. Some day that boy is going to surprise you."

"Some day?" Bill said, grinning. "I'm looking forward to the day he *doesn't* surprise me!"

He whirled as a boy called "Mr. Barnes! Mr. Barnes!" from the steps of the administration building. "Long distance is trying to get you."

"Tell Sandy I want to see him," Bill said to Scotty as he whirled and trotted toward the administration building and his private office.

Inside the building, Bill stepped into the little office that was occupied by young Sandy in his capacity of secretary. He crossed to a closet and pressed a con-

cealed switch, and the whole back of the closet swung open, revealing a flight of steps leading downward.

He went down the steps two at a time and turned into a brightly lighted corridor. At the end of the corridor an armed guard saluted smartly and unlocked a steel door. Bill produced another key and turned it in a second lock. The massive steel door swung open to admit him to his secret study.

He wound his way around three large drafting tables and sat down at the large, flat desk in a corner. Lifting the receiver on one of the telephones on the desk, he spoke to Tony Lamport, the chief radio operator of the field.

"Who's calling, Tony?" he asked.

"A man named Holt, from Hollywood, California,"

Tony answered. "He seems to be in a terrible stew, and is anxious to get you."

"O. K., Tony. Put him on," Bill said.

"Hello! Hello, Bill?" a voice said over the wire.

"Hello, Mr. Holt," Bill answered.

"Dammit! Will you stop calling me Mr. Holt?" Henry Holt asked.

"Yes, Mr. Holt," Bill said. "I mean—yes, Henry."

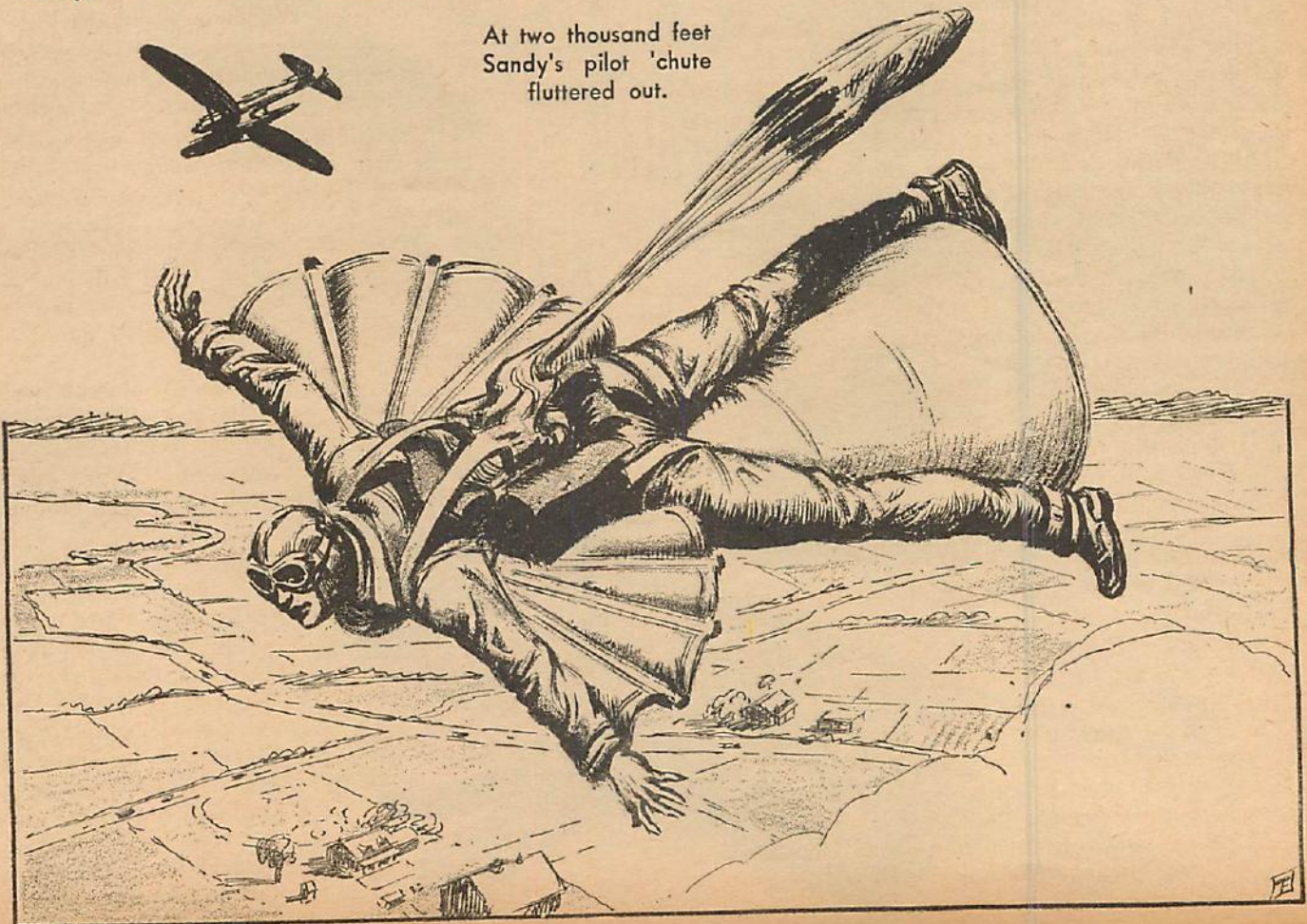
"That's better," Holt said. "Don't forget I knew you the first day you were born."

Bill frowned and reflected that Henry Holt sounded a little batty.

"Listen, Bill!" Holt went on, and his voice was charged with intensity. "I need your help again."

Bill's heart dropped down into his shoes. He had already contributed two thousand dollars to help Henry Holt make a comeback as a moving-picture producer. He couldn't afford to contribute any more, even though

At two thousand feet  
Sandy's pilot 'chute  
fluttered out.





Henry Holt had been his father's oldest and dearest friend.

"What's the matter?" Bill asked. "I'll help if I can."

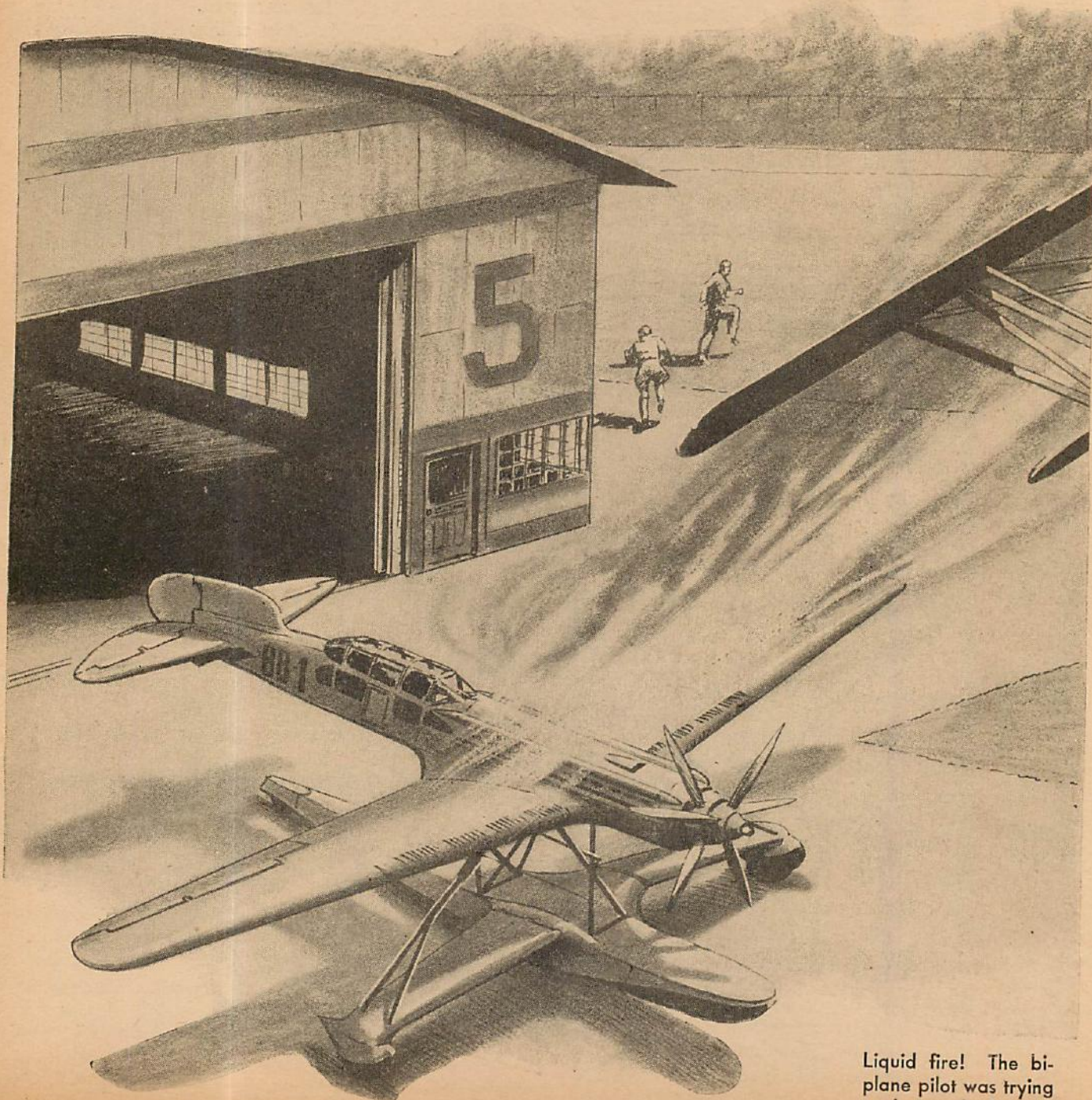
"I'll try to explain as quickly as I can," Holt said, and Bill wondered at the curious huskiness of his voice. He spoke like a man whispering in the dark.

"Everything has gone haywire, Bill. You know the set-up. You know I have only a limited amount of capital to make this picture. It is a sure thing if I can finish it. It isn't money. It's something I can't put my finger on. There have been delays. Something is always holding us up."

"You know MRO Pictures loaned me one of their lots with a war-time air set on it. You know they loaned me Di Maggio and his assistant, Leeds, and four of their fliers."

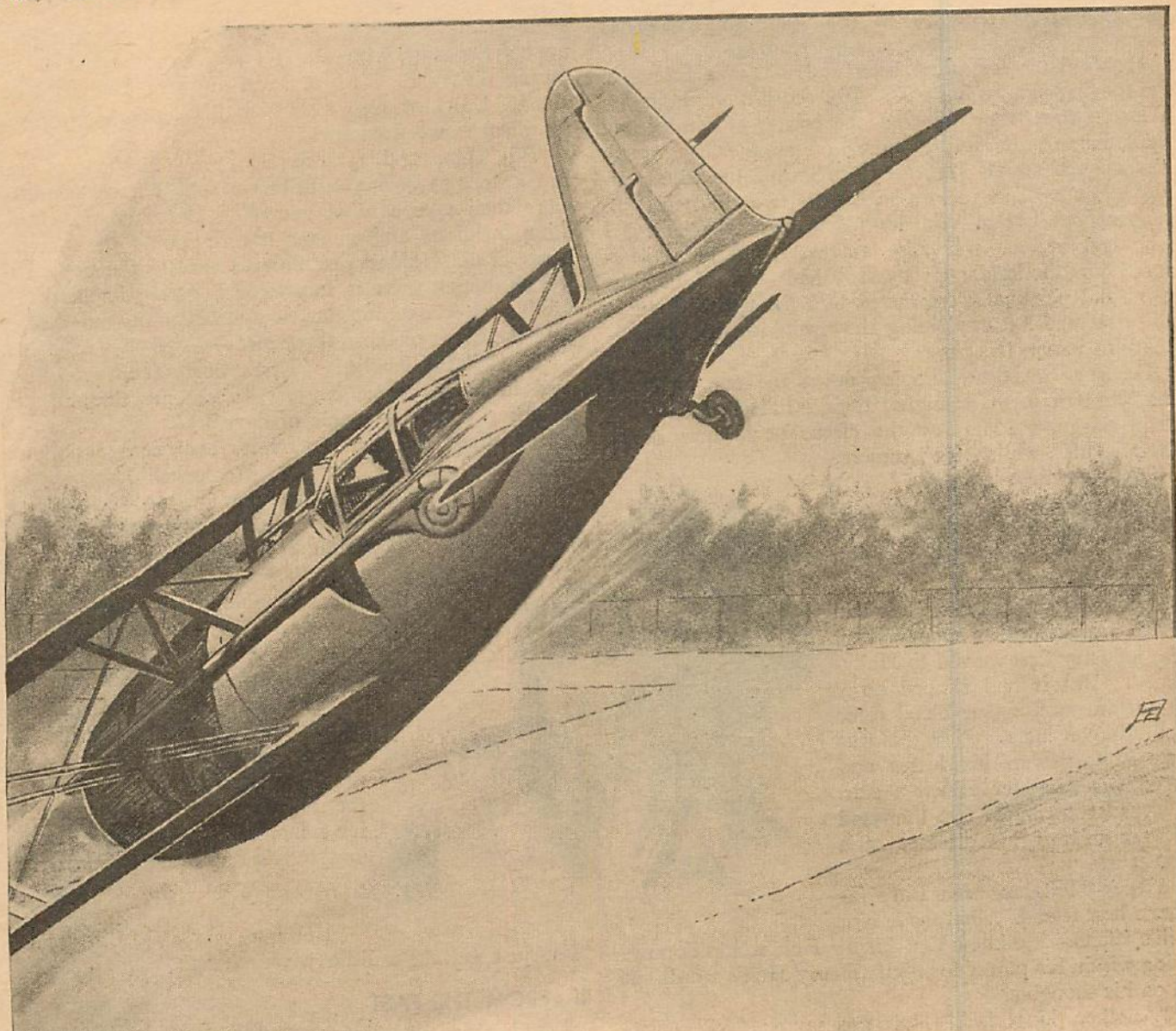
"Judging by the price you're paying, I don't think they loaned them to you," Bill said dryly.

"All right, rented them to me," Holt said. "But I'm talking in circles. I'm up against a stone wall, Bill. Three stunt fliers have been killed working for me. Their deaths were logical. Yet there is something sinister, something terrible, Bill, hanging over the lot. I can't get any stunt fliers to work for me. The MRO fliers will work in the regular dog-fight sequences, but they won't touch the stunt shots. They claim there is a jinx on them. The boy who was killed yesterday, spinning an S. E. 5, was a dear friend of Helen's. She is in pretty bad shape because of it. I'm afraid she won't be able to finish the picture. You know what that will mean to her career. This is her big chance. She wasn't engaged to the boy. But she was close to it. If I can keep her busy for another week I can keep



Liquid fire! The biplane pilot was trying to destroy the Lancer.





her mind off the tragedy and it will mean her future is assured. This means everything in the world to me, Bill. If you would come out and——"

"What kind of planes are you using in your air shots?" Bill asked.

"Spads, S. E. 5s, Fokkers and DH bombers," Holt answered. "They've all been rebuilt, strengthened. They're safe enough."

"How were the three men killed?" Bill asked.

"One of them was flying a DH bomber. He was flying low, ready to drop bombs on a partially destroyed French village. He was diving and couldn't bring the nose up. He crashed into the ground and his bombs exploded. Yesterday Wolcott was supposed to be shot down by a Fokker. He was in an S. E. 5. He was supposed to fall out of control, in a spin, to within a few hundred feet of the ground, where the cameras on the ground could get him. When he tried to bring his ship out of the spin it didn't respond. He crashed."

"Did you have some one make an investigation after those crashes?" Bill asked.

"There wasn't much left of the planes. Major Small,

the man in command of the MRO fliers, looked the ships over. He couldn't find anything wrong with them."

"That's Lennard Small?" Bill asked.

"That's right," Holt answered. "The other man was trying to come out of a power dive. Something gave way. He didn't come out."

"I'd be glad to help you any other time," Bill said. "But I'm tied up here with my own work. I don't see how I can get away."

"Bill!" Holt said, his voice rising shrilly. "You've got to help me! Don't you understand I'm going to lose everything if I don't finish this picture immediately? I've got to have men to do these stunt shots. The picture will be nothing without them."

"Len Small won't touch 'em?" Bill asked, for lack of something better to say while he turned the thing over in his mind.

"No," Holt said. "He says his contract doesn't call for that kind of thing. He says——"

But Bill wasn't listening to Henry Holt now. He was thinking of the time when he was only eight or nine years old and his father had taken him out to the



old Monograph Studios in the Flatbush section of Brooklyn to see his friend, Henry Holt.

Henry Holt had then been one of the pioneers in the moving-picture business. Bill recalled the imitation Western town that occupied one corner of the lot and the miniature three-ring circus on another spot. He remembered seeing Maurice Costello and his wife making a Santa Claus picture with their two children. He remembered Lillian Walker, a Brooklyn telephone girl who had become suddenly famous. And he remembered how the kindly Henry Holt had taken him by the hand and personally conducted him through the studio and over the lot, explaining the mysteries of the then-youthful movie business.

He saw cowboys galloping down the one street of the Western town, swinging their lariats and shooting their six-guns. He saw the circus performers doing their stuff while the cameras ground out their story.

It had been one of the biggest thrills of Bill's life. One that he could forget no more than he could forget his own father.

He knew that Henry Holt had made a great deal of money when the industry first moved to Hollywood. But it had slipped away from him as younger blood came into the business. Now he was trying to recoup his losses and make his daughter Helen a star. Bill had contributed two thousand dollars toward his attempt at a comeback.

Henry Holt had been Bill's father's best friend. That made him Bill's friend. He knew that Henry Holt would do anything within his power for him. Henry Holt's words cut in on his thoughts.

"Another thing, Bill," Holt was saying, "MRO Pictures know I have a big box-office attraction in this picture. They've been watching it while we've been shooting. They've offered me a fraction of what the picture is worth for it. They want to buy me out and finish it. You know I have a time-limit lease on their lot. If I don't finish within that time they'll squeeze me out. It seems to me that their man, Di Maggio, is slowing things up whenever he can. I have so many things working against me that I won't be able to fight through if you don't help me. I'm an old man now, Bill. I—"

"O. K.," Bill said, and he cursed himself as he said it. "It will take me to-day and to-morrow to clean up things here. Day after to-morrow I'll hop down to Washington to look over the collection of War-time Spads, DH bombers, S. E. 5s and Fokkers they have in the Smithsonian Institution. Perhaps I can find the weakness in them that is causing you trouble. Then"—Bill paused for a moment, knowing he was throwing away several weeks of his time—"I'll come on out to Hollywood and have a talk with you. I'll be there late in the evening, day after to-morrow."

"I knew you'd come through, Bill," Holt said excitedly.

"After I have a talk with you," Bill went on, "I can tell whether or not I'll need the rest of my men. I'll

bring young Sanders, and perhaps Shorty Hassfurth, my chief of staff, with me. He flew Spads and S. E. 5s during the War. Two more of my men, Red Gleason and Cy Hawkins, were also War-time fliers. I can send for them if we need them."

"Bill," Holt said, "you're making a young man of me. But I want to warn you to be careful. I know you can more than take care of yourself. But there is something insidious and sinister hovering over the lot out here. I don't know just how to explain the thing. I feel as though there is something lingering in the dark, waiting to choke my hopes and ambitions to death. And the death of those three men—I—I—"

"O. K.," Bill laughed. "Don't worry about me. I'm used to having some one try to cut my throat. I'll be seeing you in a couple of days."

Bill placed the receiver on its hook and cursed at himself. He looked longingly at the drafting boards around the room. At the rows of books on aviation lining the walls.

"What else can I do?" he asked himself. He picked up the receiver of the 'phone again and asked to be connected with Scotty MacCloskey.

"Tune up the Lancer for a hop across the continent," he ordered. "Take your time. I won't need it until day after to-morrow, early in the morning. And"—he hesitated for a moment—"you'd better tune up Sandy's Eaglet and a Snorter." "Anything on, boy?" old Scotty asked.

"Nothing special," Bill said. "I'm just getting a little weak-minded."

Len Small



### III—FROM THE PAST

LATE the next afternoon Bill was sitting on a stool in front of a drafting board in that same secret study. He was stripped to the waist, and his powerful torso and face were covered with perspiration. He had not been satisfied with the dihedral angle of the auxiliary wings of the Silver Lancer when she was making a water landing, and he was trying to do something about it on paper before he made the actual changes on the plane.

As a telephone on his desk beckoned him he climbed off his stool and crossed the room, muttering to himself. He lifted the receiver and said a gruff "Hello," into the mouthpiece.

"Tony speaking, Bill," the chief radio officer's voice came to him. "A plane just made contact with me. The pilot says he is Major Lennard Small. He wants permission to land on the field and wants to see you. What shall I tell him?"

An expression of mild surprise flitted across Bill's face. Perhaps, he thought, Len Small could give him some dope on Holt's troubles.

"Tell him O. K.," Bill said. "Tell him I'll be glad to see him. How soon will he be in?"

"Fifteen minutes," Tony answered.

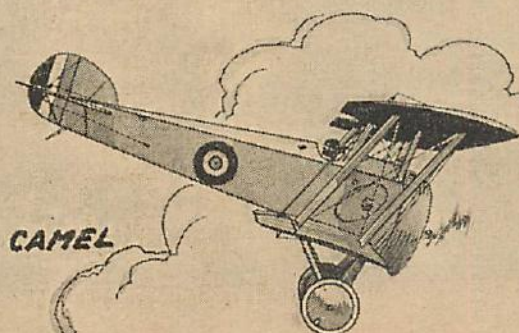
"Send him down here," Bill instructed.

A guard escorted the angular, gray-eyed Major Small into Bill's secret study twenty

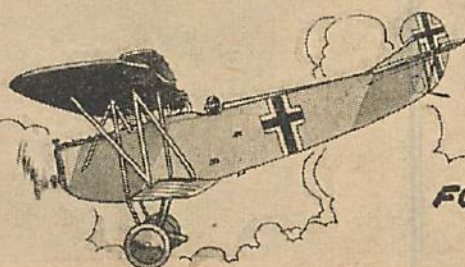
(Turn to page 64)



# Pursuit Development



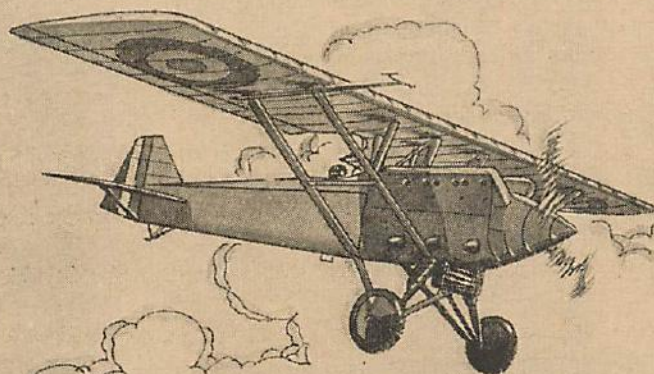
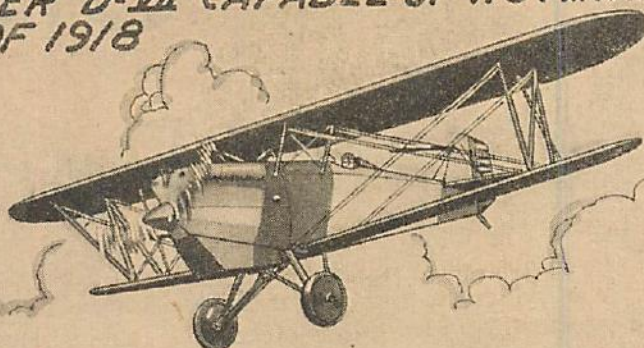
CAMEL



FOK.D-7

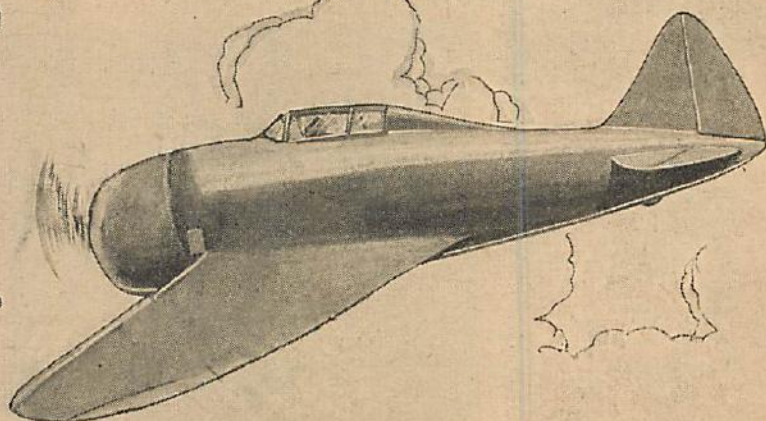
DURING THE WORLD WAR THE PURSUIT PLANE MADE ITS APPEARANCE. THE SOPWITH "CAMEL" WITH A SPEED OF 113 M.P.H. AND THE FOKKER D-*VII* CAPABLE OF 116 M.P.H. WERE OUTSTANDING TYPES OF 1918

IN 1925 APPEARED THE CURTISS "HAWK" WITH A SPEED OF 178 M.P.H. AND A CEILING OF OVER 4 MILES.

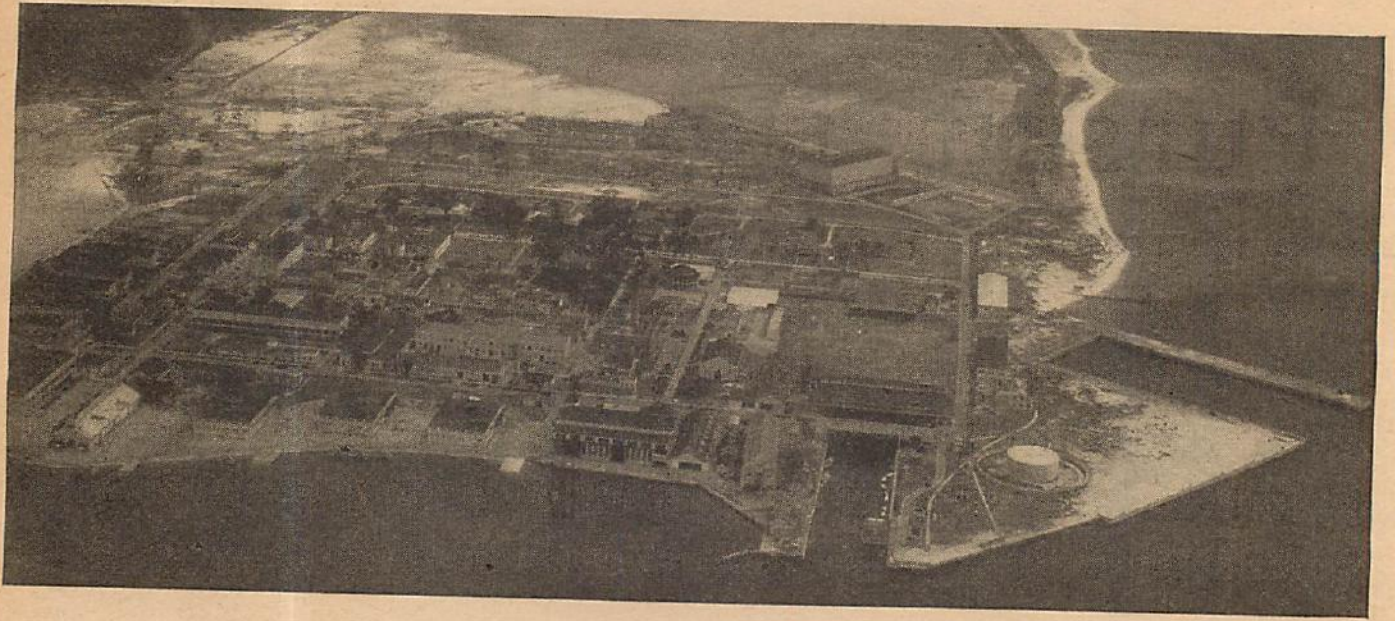


1929 SAW THE PRODUCTION OF SUCH PURSUIT PLANES AS THE FRENCH WIBAULT 130-C1, A PARASOL MONOPLANE OF 450 H.P., DOING OVER 150 M.P.H.

AND NOW THE MODERN VERSION OF A PURSUIT PLANE: THE SEVERSKY, WITH A CEILING OF OVER FIVE MILES AND A TOP SPEED OF OVER 300 M.P.H.







**P**ENSACOLA! To the layman, just a Florida town on the northern shore of the Gulf of Mexico. To the potential naval aviator, a city of destiny, for it is there the navy's wings are fledged.

For the man entering training at the Pensacola Naval Air Station, the world takes on a new aspect. Whether he was formerly a young civilian who has won through his elimination training to the status of cadet, or a watch officer on a battleship, an admiral's aide, a marine corps or a coast guard officer, or a destroyer engineer, makes little difference; he, like the others in his training class, is a student, a novice, with everything to learn about flying.

Upon arrival he presents his orders to the officer-of-the-day, is assigned quarters, and given a thorough physical examination. Then his apprenticeship begins.

He finds that the day is equally divided between ground-school work and flying instruction. Perhaps he is in that half of his class designated as the "Left Wing." That means he will fly in the morning and attend ground school in the afternoon, until it is time to swap schedules with the other half of his class, the "Right Wing." He learns that the flying course is divided into five stages or "squadrons," and that ground school will continue throughout a little more than one half his year's training period.

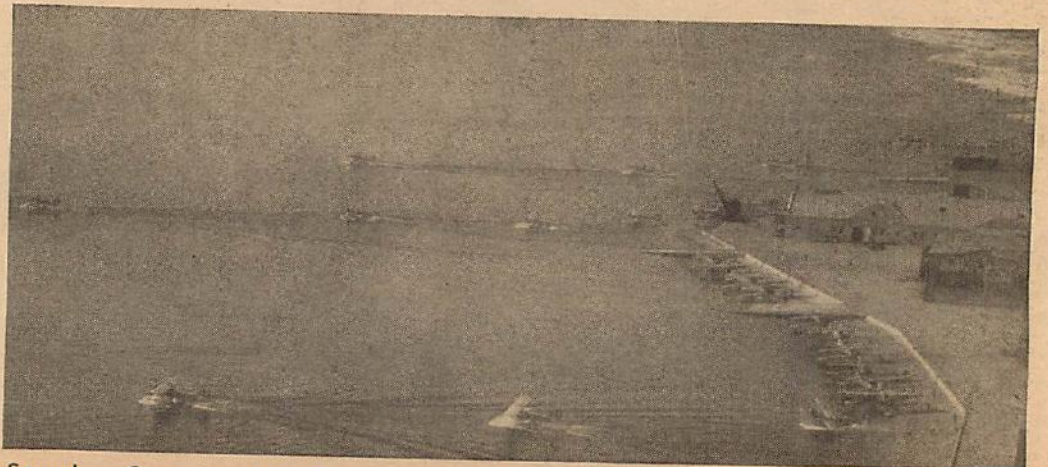
During the first 8 o'clock muster of his class at Squadron One, he gets a glimpse of his fellow students as a body. There are perhaps fifty of them in all—cadets and naval, coast guard and marine corps officers, banded together in a single ambition. The senior student of the class takes the muster and reports to the squadron duty officer. The class is marched into the

# Orders to Pensacola

hangar for preliminary greeting and words of advice from the squadron commander. As he speaks, the drone of planes warming up on the line mingles with the hum of his voice. The commander concludes his talk with a curt "Good luck!" and leaves the students to meet their instructors.

"Your name?" asks a pleasant young officer in forestry green uniform. "Guess we're scheduled for a first-hour hop. Come on into the ready room and I'll give you a little dope before we go out."

"Yes—yes, sir!" returns the student as the two shake hands. He adds to himself, "Say, he doesn't seem like



Squadron One planes taxiing to the take-off area; Squadron Four beach is at upper right.



a bad fellow. Why, he's the same rank as I am—wonder what made me 'sir' him!"

As they don helmet and goggles, the instructor outlines the Squadron One course rules and the safety precautions and inspections the pilot is required to perform on his plane before he takes it from the line.

"Plane 31 is ours," he says. "See you down there in three minutes."

As the student approaches the parachute window, a fellow member of his class pulls at his sleeve.

"You're supposed to carry your instructor's 'chute down to the plane," he whispers. "Don't make the mistake I did of arriving there without it!"

With a 'chute under each arm, our student proceeds to the designated plane and disposes of his burden by donning one half of it and placing the other in the forward cockpit for his instructor. He then surveys the seaplane which is to carry him for the first time, perhaps, away from his familiar earth. It is a two-place open cockpit biplane, mounted on a single wooden float;

*Gold-braided officers  
and plain cadets, take  
the same thrilling course  
at one of the world's  
finest flying schools, as  
described*

by James Smithson

wings, tail surfaces and fuselage are painted a bright yellow—to make them, he learns later on, readily discernible in the air. The red, white and blue insignia of naval aviation decorates the wings, top and bottom. On each side of the fuselage the number of the plane, 31, is painted in black numerals. The tail carries in small black letters the designation NY-2; N signifying Training, Y signifying Consolidated Aircraft Co., the builder, and 2 signifying model #2. In other words, the plane is a Consolidated training plane, model 2.

The instructor arrives, inspects the plane and climbs into the forward cockpit; the student climbs into the rear cockpit, fastens his safety belt, and passes the end of his gosport—speaking tube—to the instructor ahead of him. After the plane has been swung away from the beach by a mechanic, the instructor taxis it out to the take-off position.

"I'll fly her around for about a half hour before we start your instruction," come the drafty words through the gosport. "Just observe how I do it—put your feet lightly on the rudder bars and follow me through with the stick—but don't hang on to it! Watch me closely!"

A dozen other yellow planes taxi out into the take-off area near them.

"Stand by," says the instructor.

The throttle is pushed forward, the stick comes back toward the student's lap, the nose of the plane slowly rises, then settles down again as speed is gathered. A few moments of skimming along on the surface of the water, then a slight tug of freedom and the plane is in the air. There follows a pleasant half hour, during which the instructor puts the plane through the series of evolutions employed in normal flying—turns, climbs, glides, landings and take-offs, explaining meanwhile the mechanics of each.

"Now," he says, "you take her."

From this point on, life seems to the student to have suddenly run *amok*. The fire and brimstone now pouring through the gosport could not possibly have the same source as did those pleasant, conversational words of the previous half hour. The person now in that front cockpit must be a madman or a devil incarnate.

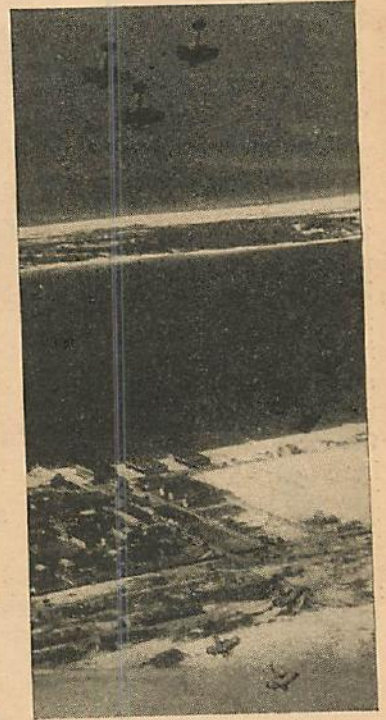
In obedience to orders, the student tries a left turn. "Wrong! Lousy! You're skidding!"

He tries a right turn. "Awful! Slipping!"

He puts her into a climb. "Too steep! You'll kill us both!"

There is a sudden quiet—an appalling quiet. What has happened? He is terrified.

"Get her NOSE DOWN—do you want to



Fighters in dive-bombing practice.



In V of Vs formation over Corey Field, with the fateful circle-shooting spot below.



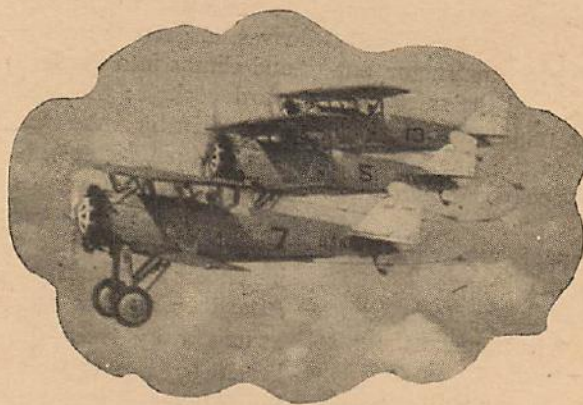
spin us in? Don't sit there fat, dumb, and happy when I cut the throttle—nose her down into a glide!"

An eternity passes and the world of chaos finally ends, its pandemonium ceasing like the passage of a summer thunderstorm. They are back at the beach at Squadron One. The man in front is not a demon—no, he is the same smiling chap as when they first shook hands. All the same, that ride couldn't have been a dream. The fellow will bear watching lest he suddenly turn again into Mr. Hyde!

As the student clammers from the plane and starts to mount the sea wall, two thoughts run in confused procession through his brain; "Aviation is the thing I want more than anything else in the world!" And, "I mustn't sit there fat, dumb and happy!"

After lunch, the left wing attends ground school; a copy of the curriculum informs them that the course will include radio, aerodynamics, aerial navigation, engineering, electricity, gunnery, photography, and aerology, as well as airplane maintenance and practical shop work.

The practical side of each subject is stressed wherever feasible. The student is required not only to know the theory of radio, but to become an efficient code operator capable of sending and receiving a minimum of twenty-two words a minute. He must be able to navigate in the cockpit of an airplane as efficiently as he can in a



An air-station stunt team tied together.

struction before the student takes his "solo check." When that time comes he will be required to demonstrate his fitness to be retained in aviation training. If his work has been satisfactory to his instructor, the student goes up for the test with a clean slate. If it has not, he has one strike against him.

The check consists in flying for a pilot other than the student's own instructor—usually a senior member of the squadron—during which time the student is carefully graded on his ability to handle the ship and his judgment in emergencies. If he fails to pass this check he has the chance to redeem himself in another try with a different check pilot. If he receives a "down" the second time, however, he must appear before what is known as the Advisory Board, which body will determine whether he shall be given additional instruction time or be dropped from the course.

If, however, the student has come up for the check with a clean slate and has flown to the satisfaction of the "check pilot," he is turned loose for the most important and thrilling flight of his life—his first solo hop! Should he have the combined good and bad luck to be the first student in his class to solo, he is in for a ducking at the hands of his classmates.

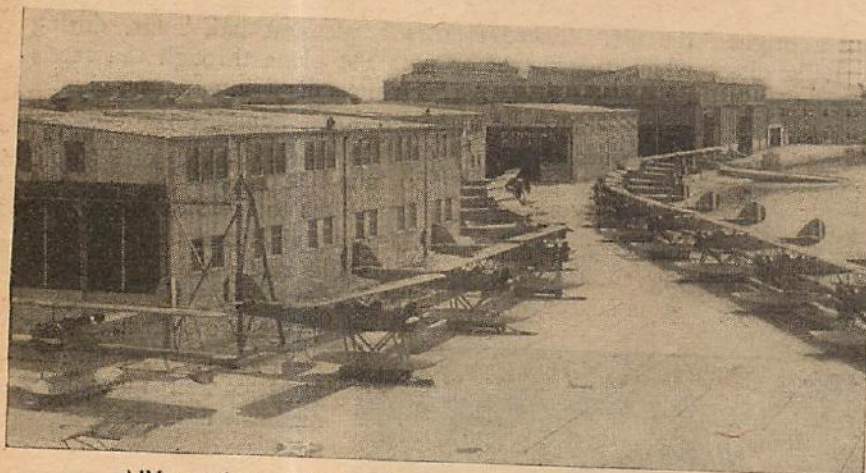
The student is now allotted fifteen hours of solo practice, with instruction at the end of the first and second five-hour periods. After the third, he must pass another check flight similar in scope but more rigid than his solo check.

His general flying must show improvement. His turns must be smooth, his spirals executed without slipping or skidding, and his landings fully stalled. Above all, he must demonstrate improve-

ment in his reaction to emergencies. By that is meant his ability to handle the plane safely, without power, any and every time the check pilot may cut the throttle in an attempt to surprise him. One of the primary laws of seaplane training is that landings must be made directly into the wind. Woe to the student who forgets this and turns out of the wind without sufficient altitude to spiral back into it!

At this stage he should also have attained a certain amount of skill at handling the plane on the water, particularly in executing the "beach approach." Often there is but a small space left open for him in the line of planes on the squadron apron, and

(Turn to page 88)



NY seaplanes of Squadron One lined up for inspection.

classroom. He must be able to overhaul an engine, take a good aerial picture, or shoot a machine gun. His skill as an aviator is largely dependent on his success as a practical man.

The evening of the first, and largest, day of the student's career finds him swapping experiences with the other bewildered members of his class. What a confusing thing life is! A few weeks ago—a few days past—each was sublimely aware of his importance and his own particular degree of professional attainment; now all that seems suddenly to have moved very far away.

In the days that follow, however, life becomes less perplexing. Aviation and aviation training begin to take



# THE FLIER'S DICTIONARY

The fourteenth lesson in the technical terminology  
of the air. Save your files!

## WEATHER MAP

The weather map is published daily by the U. S. Weather Bureau with the assistance of several meteorologists in all parts of the country. At 7:45 a. m. and 7:45 p. m. these men, in their various stations, in coöperation with about thirty stations in Canada, begin taking observations.

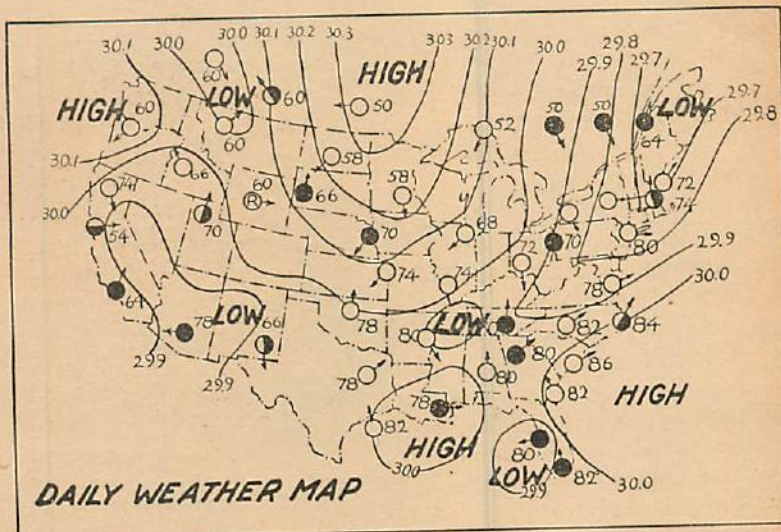
These reports are sent to the central office in Washington in code messages, not to be secret, but to save time. These are relayed to the rest of the stations so that all have a complete picture of the conditions over the rest of the country and in order that each may fill out his weather map at the same time.

The arrows showing the wind on the map fly with the wind. The small circles and their meanings are located at the different stations of importance and show the visibility or type of precipitation at that point.

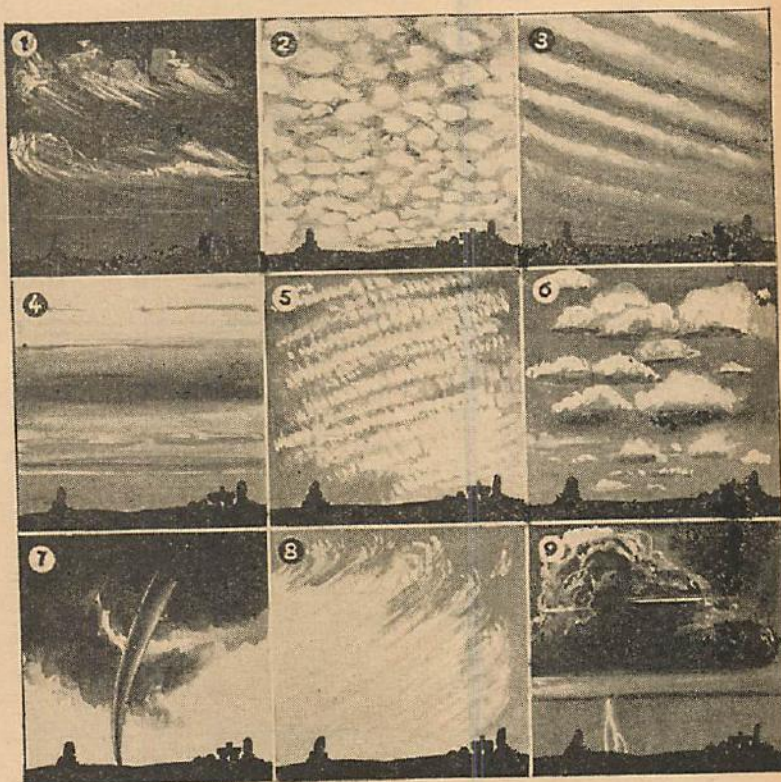
The solid lines running over the map run through points of equal pressure and enable the weather bureau men to plot high- and low-pressure areas and consequently storm areas.

The two digit numbers by the circles represent the temperature at that point. High- and low-pressure areas are so marked to enable the layman to locate them rapidly without having to stop and trace the pressure bars over the map. These solid lines, running through points of equal pressure, are known as isobars. Other solid lines on the master map running through points of equal temperature are called isotherms.

These maps are published daily, and may be obtained from your nearest weather bureau or in some daily papers.



○ CLEAR ● PARTLY CLOUDY ● CLOUDY ® RAIN  
Ⓕ FOG Ⓗ SNOW Ⓜ REPORT MISSING



## CLOUD FORMATIONS

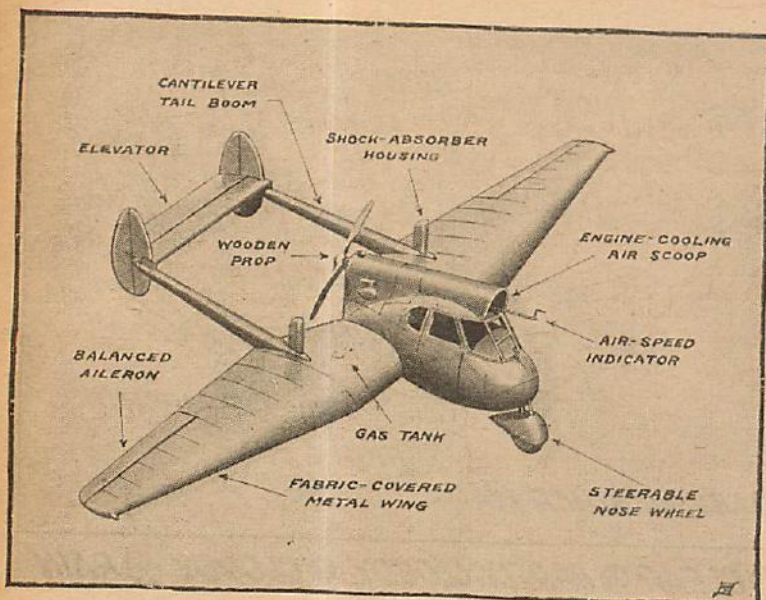
- 1 CIRRUS, TUFTED FORM: If rapidly moving from the southeast a storm is on the way. Stationary or slowly moving cirrus indicates fair weather for at least twenty-four hours.
- 2 ALTO-CUMULUS: Usually a fair-weather indication.
- 3 STRATO-CUMULUS ROLLS: Quite often precede rain period.
- 4 STRATUS: Merely fog layers at an altitude.
- 5 CIRRO-CUMULUS: Fair-weather cloud, with slight indication of a change.
- 6 CUMULUS: Fair-weather cloud caused by rising thermal currents of hot air.
- 7 TORNADO: This needs no explanation.

8 CIRRO-STRATUS: Fair-weather cloud that may, under certain conditions, indicate a change to wet weather.

9 NIMBUS: Thunder storms are formed by nimbus clouds. Quite often in hot weather the cumulus (6) clouds will change into nimbus thunder heads and are then known as cumulus-nimbus clouds.

Of course, predicting weather from cloud formations is somewhat risky and often apt to be incorrect, but clouds do give the careful observer a means of knowing when a change is to take place, and also what to expect for the present. By noting the cloud shapes and then the following weather over a period of days and then using this as a reference, interesting predictions may be made, with a good percentage of accurate predictions possible.





# The New Hammond Pusher

*About the government-approved plane on the cover.*

by Frank Tinsley

**M**ORE than two long years of painstaking planning, exhaustive research and constant flight-testing have recently culminated in the award of Approved Type Certificate #599 to the Hammond Aircraft Corporation's redesigned Model Y light airplane. This company, organized in 1931 to take over the Ryan Speedster from the Detroit Aircraft Corp., has been hard at work since 1934 in Ypsilanti, Mich., developing a low-cost ship to conform with the requirements of the U. S. Bureau of Air Commerce. These specifications called for an aircraft suitable for private-owner operation, featuring safety, ease of operation and simplicity of construction.

To the designer meeting these requirements, the Department of Commerce promised a contract for fifteen of the accepted ships, to be used for routine flying by Federal inspectors attached to the bureau. Various organizations and independent engineers set to work on the problem, and a number of unusual and interesting aircraft were produced. Some of them, notably the Pitcairn roadable autogiro and the Waterman Arrowplane, have been featured in cover paintings and articles appearing in earlier issues of AIR TRAILS. The first Model Y was not written up, as we were informed by Washington that while it came closer to meeting the department's specifications than any of its rivals, the Hammond proved to have too low a speed range. The Bureau of Air Commerce thereupon extended the time limit of the contest and suggested a clean-up re-designing of this interesting "pusher."

Encouraged by their partial success, the Hammond engineers redoubled their efforts to improve on the original machine. The 95 h.p. B-4 Menasco engine was replaced with the more powerful C-4 model developing 125 h.p. The double inclined struts which transferred land-

ing loads from the stub wing to the cabin structure of the earlier Model Y were completely eliminated and a heavier cantilever form of construction substituted. Small twin fins and rudders, situated at the terminal ends of the tail booms, replaced the original large center vertical surface. This permitted the elimination of two pairs of bracing struts and resulted in improved streamlines. The projecting ends of the stabilizer group were then clipped off and a single elevator equipped with a trimming tab was provided. A complete re-design of the tail booms did away with the old cross-bracing wires. The long, streamlined "pants" covering the landing wheels were thrown out and neat, efficient "spat"-type housings substituted.

As soon as the preliminary sketch and engineering data were approved, the drafting of the actual plans was pushed forward rapidly. Construction work followed, and the first of the new model pushers was soon receiving its practical tests in the air.

It has proven to be a great advance over the original ship. Meeting all the department requirements with the greatest ease, the new Hammond has been declared the winner of the Bureau of Air Commerce competition, and as such the Ypsilanti company has received the coveted government contract for fourteen sister ships.

The prize-winning Model Y is unusual in appearance and is a distinct departure from conventional airplane designs. It is one of the few rear-engine, pusher-type planes made in America today, and is the first ship to be offered to the public equipped with a stable or nose-wheel type landing gear.

The new Hammond is a low-wing cantilever monoplane of metal construction and fabric-covered supporting surfaces. The wing, of Clark Y section, is assembled in three parts. A center section, built integrally with the

## HAMMOND Y

Engine, 125 h.p. Menasco C-4	
Wing span	40 ft.
Overall length	26 ft. 11 $\frac{3}{4}$ in.
Overall height	7 ft. 7 in.
Wing area	210.00 sq. ft.
Aileron area (total)	14.25 sq. ft.
Flap area	25.50 sq. ft.
Stabilizer area	22.45 sq. ft.
Elevator area	13.28 sq. ft.
Fin area (total)	10.50 sq. ft.
Rudder area (total)	10.50 sq. ft.
Fuel capacity	30 gals.
Oil capacity	3 gals.
Baggage capacity	99 lbs.
Pilot and passenger	340 lbs.
Two parachutes	40 lbs.
Gross weight	2,150 lbs.
Maximum speed	123 m.p.h.
Cruising speed (75% power)	112 m.p.h.
Minimum speed	39 m.p.h.



fuselage, supports the tail booms and outboard landing wheels. Two outer panels complete the span. These taper sharply in plan form from a 29-inch chord at the wing tip to 83 inches at the boom connection. Differential tapered metal ailerons, 100% statically balanced, provide excellent lateral control. The balance of the trailing edge of the wing (57%), is occupied by split flaps of generous proportions. These are operated directly by a single lever in the cabin through a system of push-rods and bell cranks. The wing structure is a simple one of metal covered with fabric. It consists of a large central spar of dural with corrugated flanges and flat sheet webs to which are fastened ribs of square dural tubing.

The booms supporting the tail surfaces are of all-metal, stressed-skin construction. They are tapered from root to tail, and are elliptical in section. The metal used is 17-ST dural. Experiments proved this type of structure to have the greatest strength and rigidity for its weight. It has the further advantage of being cheaper and easier to build. The tail surfaces are all metal, and of full cantilever construction. The fins and stabilizer are fixed, trim being obtained by means of tabs. Little if any use of the rudders is needed when flying, banking and turning being possible solely by operation of the control stick. Research is under way to eliminate separate rudder control altogether.

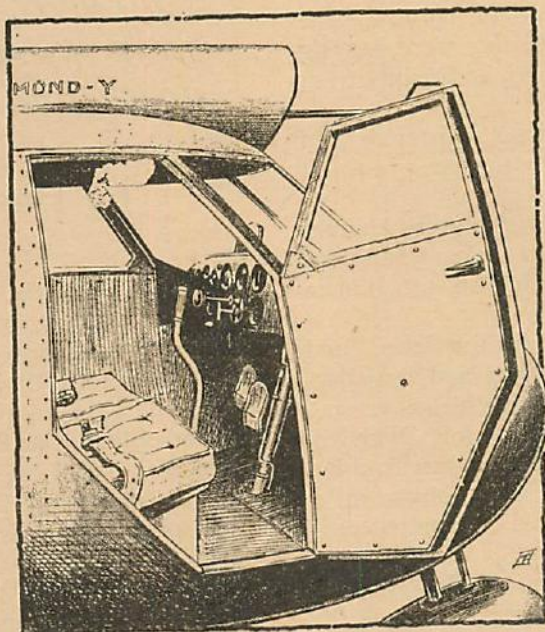
Simplicity and strength characterize the landing-gear design. All three wheel assemblies are similar, consisting in each case of a cast wheel fork of heat-treated aluminum alloy, a long-travel (18-inch) hydraulic shock-absorber strut, and a cast aluminum fitting securing the strut to the wing structure. Three Goodyear airwheels equipped with hydraulic brakes are provided. The landing gear is stressed to absorb a vertical velocity of 20 feet per second, which is the equivalent of a free drop of 76 inches.

Probably the most sensational feature of the Hammond stable, three-wheel landing gear is the impossibility of nosing over or ground-looping by even the most inexperienced pilot. Since the ship rests on the ground

in a level position with the wings at a zero angle of attack, all landings are good, whether made with excess speed or with unconventional approaches. As the wing immediately loses lift upon contact with the ground, it is obvious that bouncing is impossible. In landing the Model Y at any speed from stall to 80 m.p.h., the brakes may be applied fully and immediately without any danger of nosing over. These brakes are capable of stopping the fully loaded ship at take-off speed in the space of 140 feet, a feature of the Hammond which permits unusual latitude of action to the pilot. These landing advantages also apply to taxiing. The nose wheel is steered by the rudder pedals, thus giving the pilot posi-

tive directional control on the ground at all speeds. The anti-nose-over feature permits fast taxiing over rough fields and sudden stops from all speeds. Take-off is accomplished by merely opening the throttle. Flying speed is reached at the same time that the tail load becomes sufficient to raise the nose, when the ship assumes its best climbing attitude.

A glance at the cabin of the Model Y reveals the thought that has been given to the comfort and convenience of the occupants. A large door on either side provides easy entrance directly from the ground. The height, width and leg-room of the interior duplicate the latest automobile practice. Complete interior lining plus the liberal use of sound-proofing material has reduced the noise level of

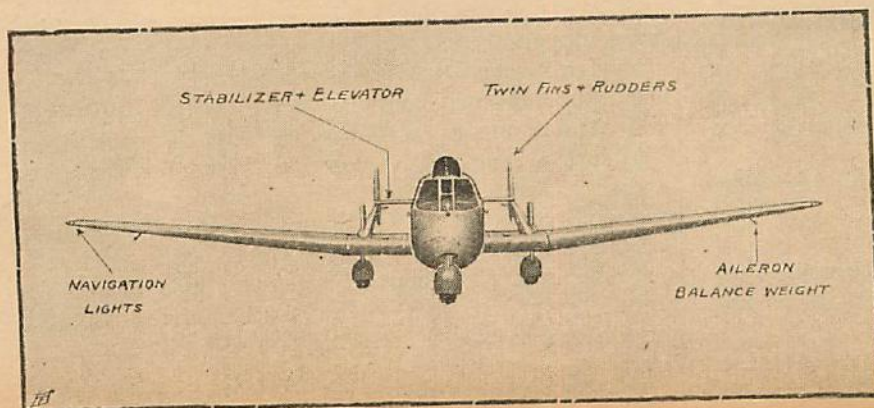


The cabin is spacious and comfortable.

the cabin to an amazing degree. The rearward position of the engine and propeller blast also contribute to quietness. Live rubber mountings at all points eliminate unpleasant vibration.

The cabin is upholstered in two-tone brown broadcloth which matches the grained instrument panel and moldings. Deeply upholstered seats are designed so that the cushions may be removed when parachutes are worn. Behind the seats is a wide shelf for maps and incidentals. Below it we find a large compartment, accessible in flight, with a baggage capacity of 99 pounds. An efficient ventilation system provides complete control of both movement and temperature of air within the cabin.

Special attention has been given to the instrument panel, which is indirectly lighted. The intensity of illumination is automatically controlled by means of a rheostat. The throttle, starter, mixture and trimming controls are conveniently located, while below the panel are found the flap controls and parking-brake levers in a position where they may be easily operated from either seat. The center section of the windshield is fitted with a sliding panel to permit cleaning and a clear view ahead in bad weather. (Turn to page 92)





JIMMIE ALBERT sat in the co-pilot's seat in the nose of the big twin-motored Douglas transport. On the breast of his jaunty uniform he wore golden wings that sparkled in the sunlight like a morning sun on water. On the side of his blond head was perched a jaunty cap with "Atlantic Air Lines" embroidered across the front.

The girl who sat in the pilot's seat also wore a jaunty uniform, and looking at her from any direction she was something to look at. A little plate on the wall of the passengers' cabin told the world that her name was Marilyn Banner, and that she was the stewardess.

Outside on the Atlantic airport there were a hundred men in action—field traffic men and dispatchers, radio inspectors and mechanics, passengers and porters. The loud-speakers inside the terminal building were bawling "Plane leaving for Louisville, Chicago, and points west, in ten minutes!"

Passengers were having their tickets registered, then moving over the barrier that led to the gayly colored canopy and the big Douglas.

But those two in the nose of the ship were entirely oblivious to the noises outside. They were as happy as two people in their condition can ever be, yet Jimmie Albert was scowling.

He was scowling while he turned the levers and switches in front of him with one hand and held desperately to Marilyn Banner's hand with his other one.

"If they would only give you that job, Jimmie," Marilyn said, her brown eyes shining. "Just imagine being a full-fledged pilot, with your own ship—with a co-pilot and a stewardess and a couple of hundred people on the ground taking your orders."

"The heck with that!" young Jimmie said. "What I want is the salary so we can get married. I could be home every other night and would have a couple of days' lay-over each week. This is no kind of a life for a man. Living in hotels and—"

"No light burning in the window when you get there," Marilyn interrupted. "If you think I'm going to sit around at home while you're flying transports over hill and dale, you're crazy! I'd be so worried about you. Why, I'd be scared half to death all the time that something might happen."

Jimmie looked at her and shook his head.

"You'd want to be the stewardess on my ship, I suppose?" he said.

"Certainly," Marilyn answered. "I'm frightened to death even now that something might happen to you. I don't know what I'd ever do if anything happened to you, Jimmie."

"Listen, nit-wit," Jimmie half shouted, "aren't you with me on every leg? If anything happens to me, you'll get a dose from the same bottle. Besides, I don't want my wife around telling me how to fly my ship. A woman's place is in the home."

"Is that so!" Marilyn answered. "A woman's place is—"

"Scram!" Jimmie said as he gazed into his rear-view mirror. "Here comes Grandpa!"

Miss Marilyn Banner scrambled. She was out of the pilot's seat in one jump and walking down the runway between the seats before Pilot Stephen Burns noticed where she had come from.

He bowed to her and said, "A nice morning, Miss Banner." But he did not smile. His uniform cap was

# Grandpa Burns

*Another transport story by a favorite author about unruly passengers, sudden death, and a nursery rhyme!*

by Harold Montanye

sitting straight on the top of his head instead of being worn in the natty manner young Jimmie Albert affected. Below the rim of his cap his temples were graying. His uniform fitted him perfectly, but he did not wear it with the jauntiness of Jimmie Albert. His wings were not as bright, and his black shoes looked as though he had hard-boiled eggs stuffed into the toes.

"A nice morning, Mr. Albert," he said to Jimmie as he prepared to stuff the bag of registered mail away in a locker.

"Nice for the birds, the bees and the hollyhocks," the irrepressible Jimmie answered.

Pilot Burns did not smile, nor did he answer. It was rumored that he never answered facetious remarks for the simple reason that he did not understand them. Many people claimed he did not smile because he didn't know how.

He was considered a dour old man by his fellow pilots. They marveled that Atlantic Air Lines kept him on as a pilot, until they became aware of his record.

First they found out that Stephen Burns had been Major Stephen Burns during the late War in Europe. If they snooped around enough they learned that he had been decorated four times, and had shot down sixteen German planes. He had come to France from the north of Scotland as a boy of nineteen in 1915. Over a period of a year he shot down sixteen planes in his own quiet, methodical manner. After that they saw that he would be of more value as an instructor than as a fighting pilot. The young men who trained under him in the R. A. F. during the next two years of warfare proved that his commanders had been right. They got their men, and they brought their ships back with a minimum of machine-gun bullet holes in them.

After the War he had come to the United States to become a citizen. He had been a pioneer in commercial aviation. The year 1936 found him piloting one of Atlantic Air Lines' enormous Douglas transports over a regular run. He might have had a position on the ground as an executive if he had wished it. When it was offered to him he replied, "I like to fly and meditate."

The officials of Atlantic Air Lines frowned and won-



dered if they ought to ground him. When they hinted at doing just that, he told them he would leave them if they grounded him. He explained that he had a couple of days a week to spend on his avocation. As an executive he would not have that time. Those of them that knew what avocation meant wondered what this strange Scotsman did in his spare time. But they didn't ask him. And they let him go on flying.

They knew he was the kind of a man men set their clocks by. He had never had an accident. He always knew what to do under any circumstances.

Because of his slightly bent figure—he was six feet in height—his slightly graying hair and his solemn, reserved manner he was called "Grandpa" from one end of the line to the other.

After he had disposed of the registered mail on this particular morning he began to tune up his motors. First the one on the starboard side, then the

Banner stepped in. She stood silently while Burns slipped back his earphones so that he could hear what she had to say.

"I wish you would come back and speak to two of the passengers," she said to him when he nodded. "They are sitting across from one another—a Mr. Walter Ellis in No. 6 on the starboard side, and his nephew, Sidney Ellis, in No. 5, on the port side."

"What's the matter with them?" Burns asked.

"They are both drunk," the stewardess told him. "I didn't notice it so much when they came aboard. They didn't seem so bad. But they've both been drinking from a bottle since we took off. The young man is



Grandpa Burns grabbed at the hand that held the package.

one to port. In a few minutes they were singing a smooth and powerful duet.

As the passengers filed down the runway and into the ship and were seated by the stewardess, Jimmie Albert checked over the passenger and cargo lists.

An "All-ll a-board!" rang out for the last time.

The metal doors were closed, and Pilot Burns taxied the big ship to the longest runway into the wind. As the dispatch tower flashed a white light, he fed the two powerful engines juice and skimmed down the runway. The tail came up, the ship spiraled upward like a bolt of quicksilver kissed by the sun.

As Stephen Burns leveled the ship off at ten thousand feet, the door into the bridge opened and Marilyn

becoming offensive." She spoke quietly, because she didn't want Jimmie Albert to hear her. She knew that Jimmie took a special pleasure in socking offensive drunks on the nose.

"I'll be back in a moment," Grandpa Burns said, the lines in his leathery face deepening as he pursed his lips disapprovingly.

"Mr. Albert," he said to Jimmie, "will you be good enough to take the controls?" Jimmie nodded, and Burns slipped out from under the wheel.

He walked up the runway, inspecting the passengers without seeming to notice them. In Seat No. 6 on the starboard side he saw an elderly gentleman of about sixty years. His face was flushed and he was half asleep. Grandpa Burns noticed that he was wearing



a loud checked suit, a dark-blue shirt, a multi-colored striped necktie, and a pair of light-blue socks with red clocks on them. Burns' eyes lingered on the clocks for a moment. He had always had a desire to wear such socks, but had never had the courage.

Across from Mr. Ellis, in Seat No. 5 on the port side, was a younger man. That they were related, Burns could tell in a glance. The only real difference between them was the sleek, black hair and waxed mustache of the younger man. Both were dressed with the same flamboyant disregard for good taste.

As Grandpa Burns was about to go by the younger man, he saw him lift a bottle out of his open bag and put it to his lips. He stopped after glancing swiftly around to be sure the other passengers were not watching him. He leaned over young Mr. Ellis.

"I would be careful of that," Burns warned gravely. "You are apt to get sick."

Young Mr. Ellis' expression was pleasant enough as he looked up at Stephen Burns. He blinked his eyes and a rather inane smile broke across his face. He looked down at the bottle and then back at Burns.

"How about a shot of the stuff that made the Bourbons run backward?" he asked. "You'll be able to do things with this ship you've never done before."

"I never use it," Grandpa Burns said.

"That is probably what is wrong with you," young Mr. Ellis said. "Look at my esteemed uncle across the aisle. He has been a steady drinker since he was five years old. He'll probably live to be a hundred. Which is a tough break for me, because I'm his only heir."

Two young ladies in Seats 3 and 4 giggled as Ellis finished speaking, but Grandpa Burns still wore his dour expression. He was trying to make up his mind what to do when an arm brushed him aside from behind. He turned to see the elderly man from across the aisle glaring at his nephew.

"Shut up, you fool!" the old man roared. "Put that bottle away!"

Grandpa Burns almost smiled as he saw the alacrity with which young Mr. Ellis obeyed his uncle. He went on down the aisle and spoke to the stewardess.

"Just keep your eye on them, Miss Banner," he said. "I don't think they'll make any trouble. The young one is just feeling his oats and might become sick. The other one is half asleep."

Grandpa Burns went back up to the bridge and took over the controls. Jimmie Albert tuned in on Louisville and got the direction of the wind and the ceiling. Then he sat back and took general observations, while he ruminated on his chances of being made a pilot on the new leg Atlantic Air Lines was opening up.

He would, he thought, give about anything to get away from being co-pilot with the old sourball next to him. He wondered at length what Grandpa Burns did when he wasn't on duty. He knew he wasn't married, and he never seemed to go any place or do anything about which he wished to talk. Jimmie glanced at him out of the corners of his eyes. He certainly was a strange old fellow. Yet, come to think about it, he wasn't so much older than Jimmie. He was only forty, according to his record. Jimmie was twenty-eight.

Jimmie came out of his sleepy reverie when the door to the pilot's office opened again and the stewardess stepped in and closed the door behind her. He could tell by Marilyn's white face and the excitement in her

eyes that something was wrong. He pushed back his earphones and tried to listen as she spoke to Grandpa Burns again.

"Anyway," Jimmie thought, "we're only a little way out of Louisville. We'll be sitting down soon."

"I—I think something dreadful has happened," she said in Grandpa Burns' ear. "It's the old man in No. 6, Mr. Ellis."

"Yes, yes," Burns said. Then to Jimmie: "Take the controls, please, Mr. Albert."

"He—he suddenly slumped in his chair in a funny way," Marilyn went on. "He seemed to be sleeping when we hit that little bump a few minutes ago. I saw his head go forward and thought he would wake up. I waited a moment, then went up beside him. He was bent over in a peculiar way. When I touched him on the shoulder he didn't awaken, so I pulled him back. His face was a ghastly color! I tried to take his pulse and—and there wasn't any!"

Again Grandpa Burns slipped out from under the wheel and went down the runway. He saw that Seat No. 5, occupied by the old man's nephew, was empty.

He didn't have to feel Walter Ellis' pulse to tell that he was dead. He had seen too many dead men in the days of 1915-16 not to know. But Burns felt of the man's pulse, and then he opened his waistcoat and ran a hand under his shirt and over his heart.

His heart had stopped beating.

The other passengers were craning their necks now. They knew that something was wrong. Pilot Burns walked to the front of the runway and spoke to them.

"I am sorry to inform you," he told them, "that one of your fellow passengers has had a heart attack. I can't tell you, of course, how bad it is. But I will inform the airport at Louisville. They will take the necessary steps. Will you please be good enough to remain in your seats until after Mr. Ellis is removed. No doubt you will all be detained for a short time."

There was a buzz of conversation as Burns went aft and pushed open the door of the lavatory. Young Ellis was inside. He was trying to open the lavatory window. He had it open about two inches and was attempting to push a small package through the opening.

"Stop that!" Grandpa Burns said, grabbing at the package he was trying to push out into space. "That may get in one of the propellers. I'll throw it in the refuse can."

"I'm sorry," Ellis grinned. "I thought the backwash would take it backward."

"Anything can happen in the air," Burns said. "It might be carried forward." He tossed the crushed package into a covered receptacle. "I'm afraid, young man," he went on, "I have bad news for you."

"What did you do? Break my bottle?" Ellis asked, grinning.

"No," Burns said. "It's not your bottle. It's your uncle. He has suffered a stroke. I'm afraid he is dead!" He stared at Ellis in amazement as he saw him begin to laugh.

"Don't kid me," Ellis said. "That old buzzard will live to be a thousand."

"Your levity is very much out of place," Grandpa Burns said sternly. "I am not kidding you. I am telling you the truth."

The genial smile disappeared from Ellis' face, and his expression became one of puzzled

(Turn to page 86)

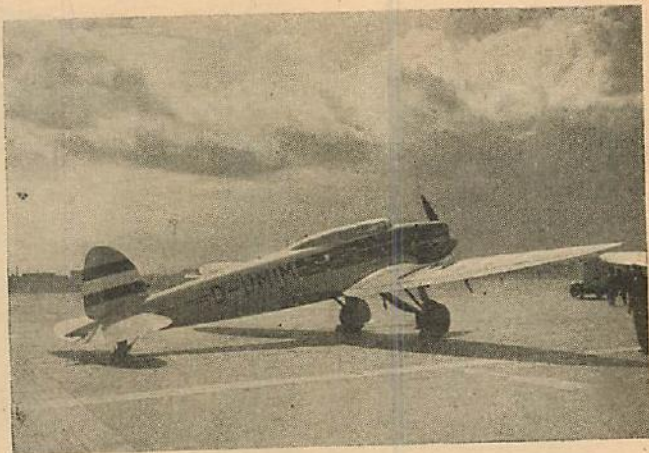


# AIR TRAILS GALLERY

*A Picture Page of Modern Planes for the Collector*



Waco E Q C (C-6 series) with 4-5-place custom cabin. Has Wright 320 h.p. and controllable-pitch propellers.



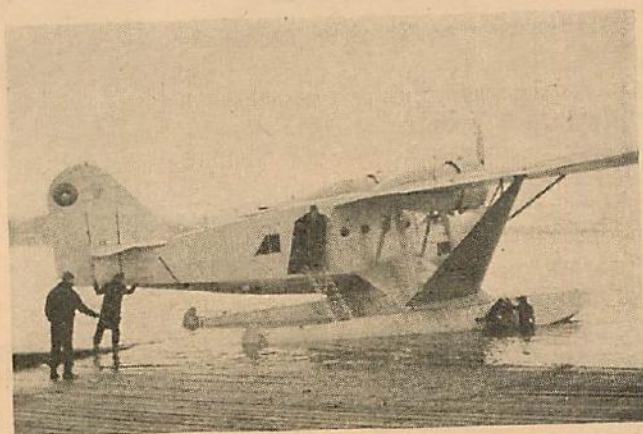
Heinkel He-70, D-UMIM has special interest because of solid-scale-model plans to be found in this issue.



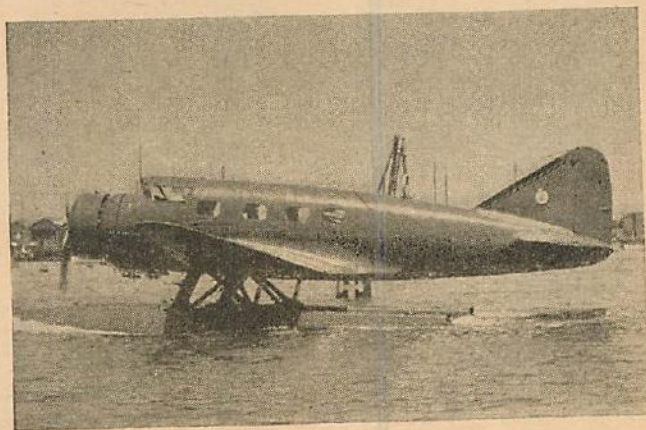
S B A-1 Brewster 2-seater scout bomber. Powered with W V Cyclone, has maximum speed of approximately 215 m.p.h. Landing gear similar to Grumman type.



Grumman X G-1 is late-model staggered-wing biplane with covered cockpit. Wheels fit flush with sides when retracted.



Bellanca Bomber with Curtiss controllable-pitch propellers and Edo floats. Twin Wright Cyclones boast 715 h.p. speed each.



Vultee is all-metal low-wing hydroplane used by two Soviet fliers, Sigismund Levanevsky and Victor Levchenko.



# AIR LINES in the LAND



Bernt Balchen, Technical Director of the Norwegian Air Lines.

(EDITOR'S NOTE: Bernt Balchen has achieved world-wide fame as an airman with Admiral Byrd and others in flights across the Atlantic and in the arctic and antarctic regions. Born in Norway, he became an American citizen in 1931. As technical director of the Norwegian Air Lines, he visited this country recently to purchase American planes. We are privileged to present his account of Norway's air expansion.)



A polar-bear poster of the Norwegian Air Lines.

NORWAY is a land of contrasts. It is mountainous, having many peaks and high altitudes, yet the level of the sea, which in aviation everywhere stands for zero altitude, is never far distant from any part of the country. It is noted for the winter sports, skiing and skating, that go with snow and ice, yet its thousands of miles of indented shore line are not frozen in winter. While much of the country has a climate generally like America's, during the winter in the northern part of Norway there is a night, beginning in November and December, that lasts as long as two months, while in the summer there is a "day" that lasts about as long, during which the sun—the "midnight sun"—never sets.

In aviation, also, Norway offers a contrast, or perhaps I should say it has offered a contrast up until the present. During the dozen or so years following the World War, in which most of the rest of Europe created air lines from city to city and country to country, opening up an elaborate network of aerial transportation, flying made little advance in Norway.

To-day the picture has changed. New air routes are reaching out across Norway's mountains and along her

coast, and her transport system, consolidated in one organization, will soon be equal to those of other nations. This organization—Det Norske Luftfartsselskap, Fred. Olsen & Bergenske A. S., or more simply, in English, the Norwegian Air Lines—has the distinction of operating the world's farthest-north air route.

Adequate air transport service has been long awaited. Land transportation is not easy in Norway because there are comparatively few good roads. Mountains and rocky terrain make road building difficult and expensive. Consequently much of the transportation, especially into the northern half of the country, has been by sea, which is slow. Because of these geographical handicaps, there are few countries to which aviation can offer greater benefit. Airplanes can cross mountains and tie together the communities on the long seacoast in a small part



# of the MIDNIGHT SUN

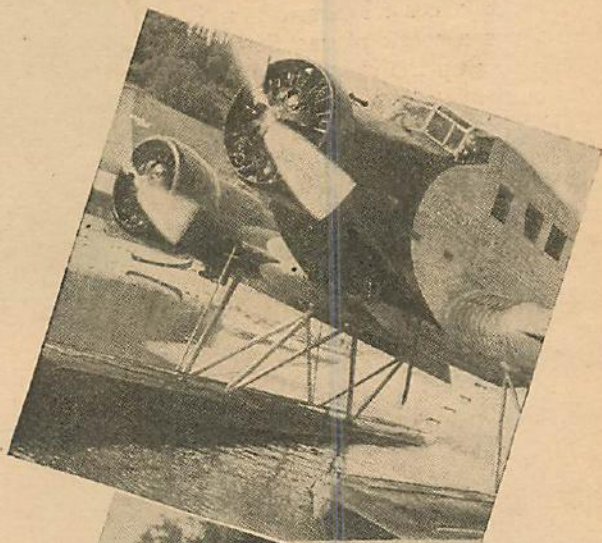


One of the new large passenger amphibians.

of the time that has been required for mail and passenger travel in the past.

Norway has had an air force for defense ever since the War. It was in the government service from 1918 to 1926 that I obtained my flight training. The government maintains for its military and naval air corps several fields and two aircraft factories for building and repairing service types of planes. For civil and commercial aviation, however, little was done until recent years. There were no airports, no marked airways, not more than a half dozen or so private and charter-service planes in Norway. As late as 1927, no Norwegian air-transport company existed. In that year the only air line was an experimental one, established and operated by a German company, which for a few months during the summer flew from Copenhagen, in Denmark, north via Gothenburg in Sweden to Oslo, the Norwegian capital. In 1929, one Norwegian operator, the Norske Luftfart A. S., operated a service in conjunction with the big German company Lufthansa from Oslo to Gothenburg, Malmo, Copenhagen and Lubeck, Germany. This air route has been maintained and gradually expanded up to the present. At first three Dornier-Wal 8-passenger seaplanes were used, later being replaced by two tri-motored 18-passenger Junkers ships.

A large shipping firm, Fred. Olsen & Co., in 1933 entered the field with announcement of plans for a new air line, but did not immediately become active. In



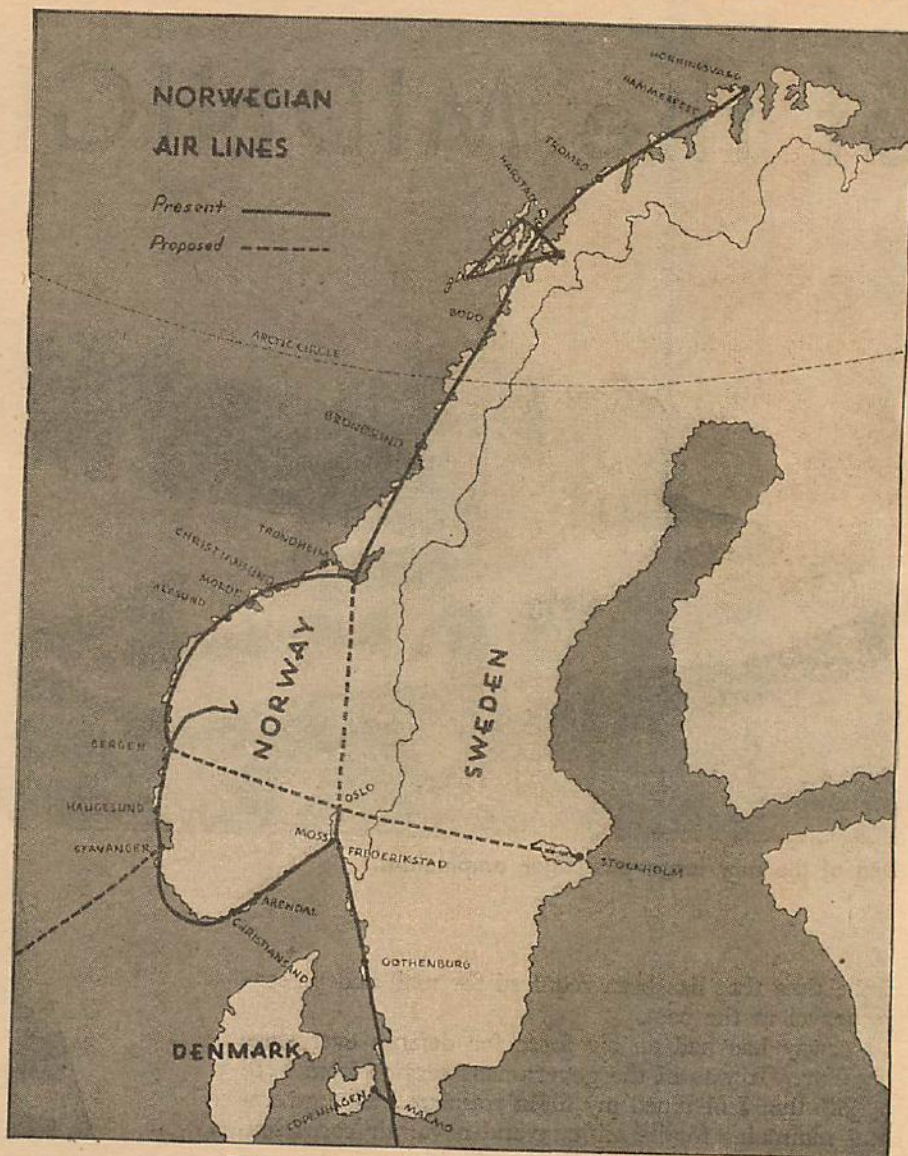
Above we have a tri-motored Junkers on floats. It carries 17 passengers and a crew of 4. Below, a filling station for aviation gas.



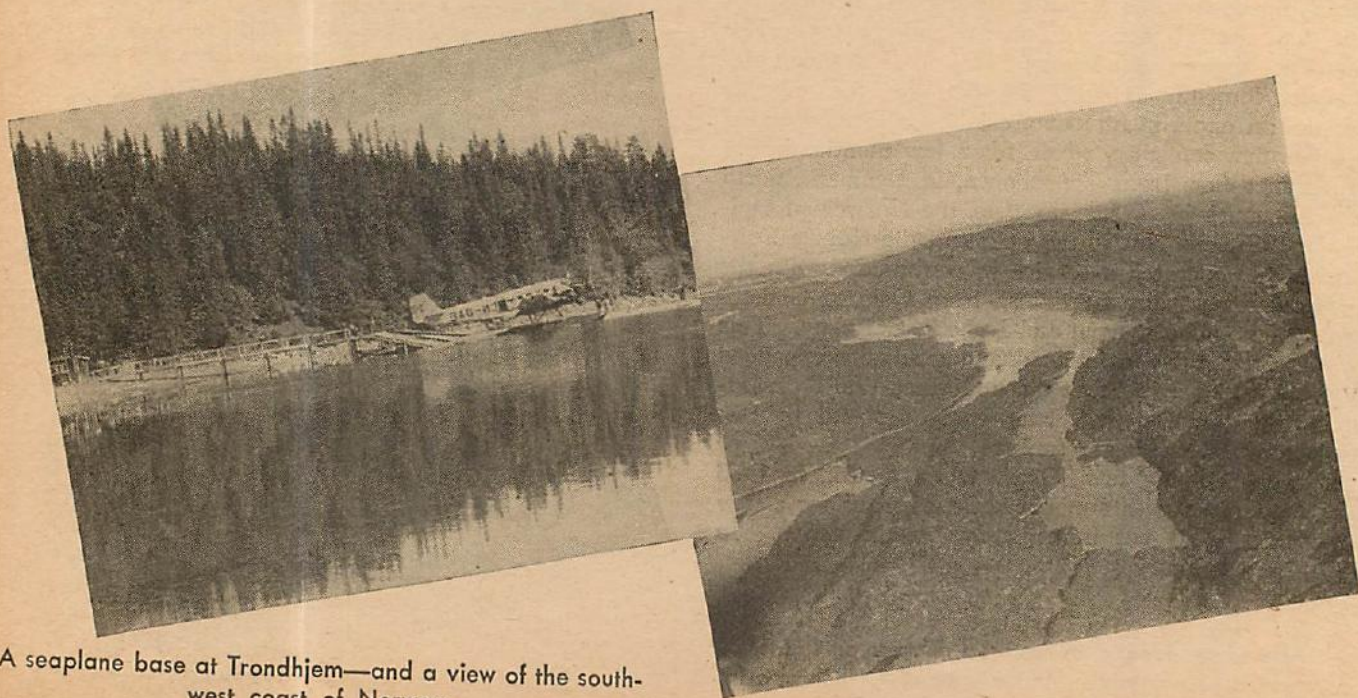
the following year Norway began to prepare for the future with the purchase of ground for an airport near Oslo, to remedy the almost complete lack of large-scale landing facilities. The aviation situation was improving. A new company, Widerøes Flyveselskap A. S., pioneering in air transport inside Norway, started experimentally a two-months' passenger and mail service from Oslo around the southern coast to Christiansand, Stavanger, and Haugesund, to be extended later, if successful, to Bergen, Norway's second largest city. One round trip between Oslo and Haugesund was made daily. On the home trip, an additional stop was made at Frederikstad, below Oslo, to meet the southbound train, and the plane arrived at Oslo just before the northbound train started into the interior. This service greatly shortened the time for travel and mail communication to the western coast.

In 1935 the air-line map continued to grow. Bergen was added in a twice-daily coastal service, and three times a week planes flew to Tromsø, far up the coast above the arctic circle.

This year, consolidation of the several Norwegian transport companies under one management has given new strength to Norwegian flying. The new Oslo airport being built in the city's suburbs at



This map shows the present and proposed air-line route.



A seaplane base at Trondhjem—and a view of the southwest coast of Norway.





Typical Norwegian landscape—and a single-engined Junkers—W-34.

Fornebo we expect to be one of the seven wonders of the world. It is the only great airport that I know which will be built on solid bed rock! This airport is not being dug, or filled in, or leveled. It is being blasted out. It will take about two years to finish, and the cost will probably be about five million dollars.

Underground hangars, excavated level with the field in a low, adjoining hillside, will provide lasting, fireproof storage and servicing space. They will be about 300 feet long, approximately the size of the large TWA hangar at Kansas City.

Oslo will be the hub from which the country's air routes radiate. One of these routes will lead cross-country to Stockholm, the capital of Sweden. As Stockholm has built a new ultra-modern airport this year, Oslo cannot lag behind in the friendly rivalry between these two Scandinavian countries.

Among other routes, one, of course, will follow the already established circuit of the coast. This year the shore-line flights have been pushed all the way up to Honningsvaag, at Norway's most northern point. The upper portion of the route, beginning at Trondheim, is called the Midnight Sun Airway.

Branch routes at present turn off the coastal route at two points. Bergen is the departure point for a daily scenic tour of the Sogne Fjord, a typical Norwegian sea inlet between high mountains and among glaciers. At Harstad, a triangular course, flown three times weekly, takes in the Lofoten Islands.

Additional routes planned for the future—possibly next year—will tap the sports and vacation section that lies inland from the west coast, and connect Oslo with Bergen directly overland, and perhaps join Oslo and Trondheim similarly by land flights.

An even more ambitious development which is still on paper, but for which agreements have already been signed, is a route over the North Sea from Stavanger to England. Test flights were scheduled to start this fall.

Our flight equipment consists of fourteen planes, several of which I have just bought in the United States and which are being shipped to Norway to enter service. More than half of our planes, including the new ones, are of American make. Chief of them is the big, fast Sikorsky S-43 amphibian. Then we have, among others, a Bellanca, two Stinsons, and several Wacos.

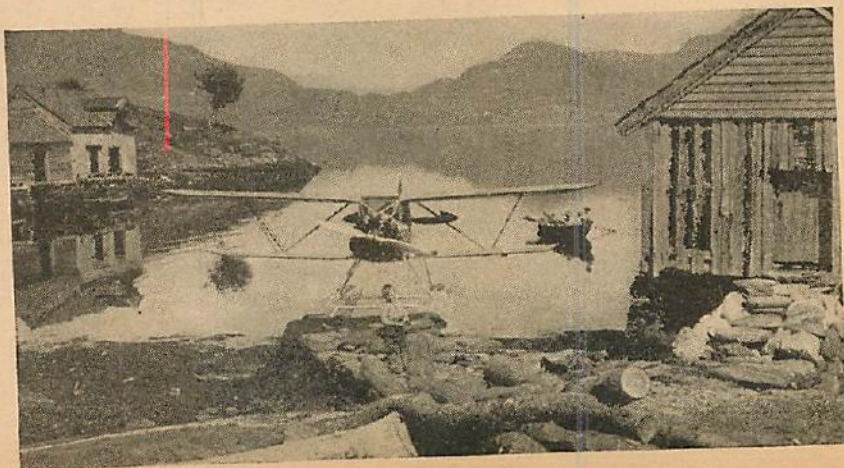
I strongly favor American equipment, for two reasons: American planes are available in the medium sizes we need at present, and they are high-powered and strongly made. European manufacturers, in general, have developed small planes and very large ones, with not very much in between.

Sixteen pilots fly our equipment at present. Three of them are German, the others mostly Norwegian. As the country's aviation grows, we will be able to develop a larger group of pilots trained in the conditions of Norwegian flying.

What are these conditions? Well, right now all planes used in the transport service are on floats, and handling seaplanes requires special skill. Landing fields are scarce, but water is everywhere. For this reason most of our flying is done over the sea.

Despite Norway's reputation for cold, however, we do not have to contend with sea ice. The transport service now operates during the summer months of heavy travel, flying over periods

(Turn to page 95)



A Waco—used for taxi service.



# America's First Flight

*President George Washington did the honors and "the majestic sight was truly awful and interesting" to the spectators of 1793.*

NONE of the biographers of George Washington, so far as known, have recorded the fact

by Kenneth P. Wood

that the Father of His Country was the original American patron of aeronautics, and personally concerned in the first balloon ascension ever made in this country. Of course, the dignity of the Presidential office—this was nearly a century and a half ago, it must be remembered—prevented him from actually being a passenger. But next to the gentleman who did so, Washington

seems to have played the most prominent part in the affair.

It was ten years after Pilatre de Rozier, the first man who ever went up in a balloon, made his initial passages over the heads of the astonished citizens of Paris, in October and November, 1783. That daring pioneer fell to his death after several successful flights. But one of his rival aeronauts, Jean Pierre Blanchard, made longer trips in safety, notably one across the English Channel in January, 1785. After exhibiting his skill and courage in half a dozen European countries, Blanchard shipped his balloon across the Atlantic and inaugurated the history of aeronautics in America by making an ascent in Philadelphia—at that time the capital and chief city of the United States—on the 9th of January, 1793.

The Frenchman financed his own enterprise when he brought from Europe his balloon, the inflating apparatus, and the vitriolic acid necessary for generating hydrogen. The early fliers used either hydrogen—then called "inflammable air"—or hot air to inflate their bags. Blanchard's machine was of the former type, known as the Charliere, to distinguish it from the Montgolfiere, or hot-air balloon.

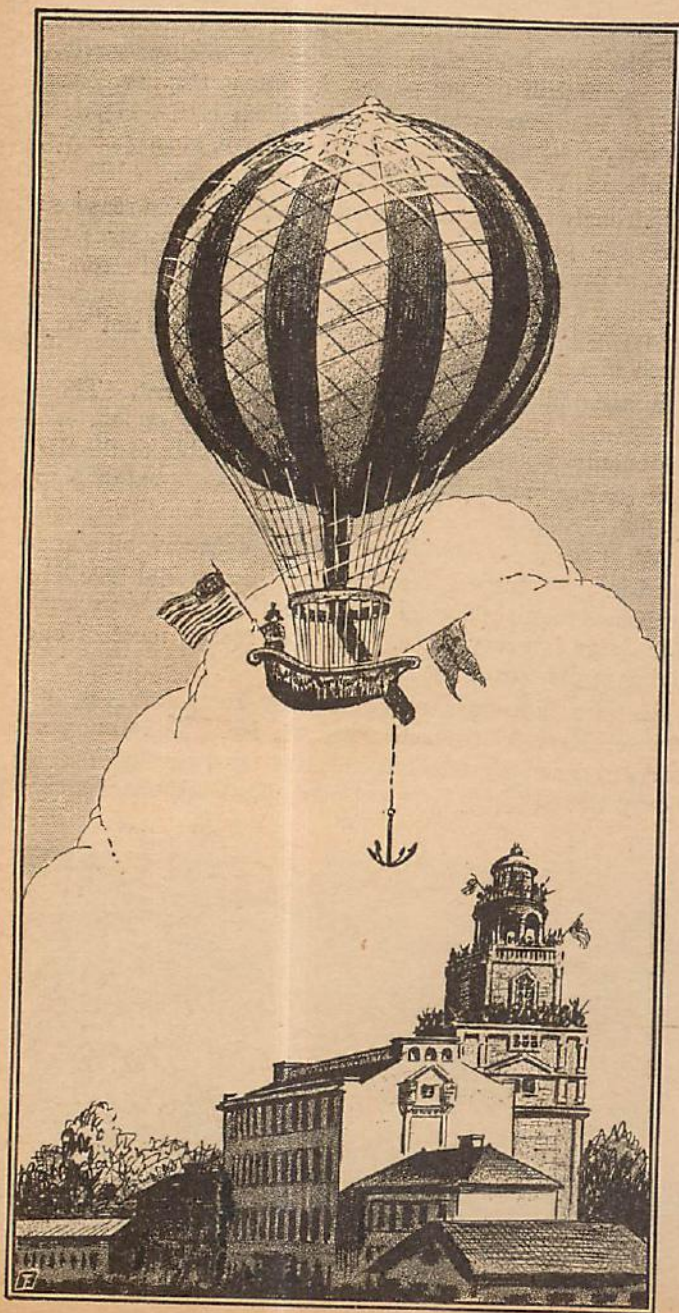
In Philadelphia the only suitable location for such an experiment was the spacious prison courtyard, situated in what is now the downtown section of the city. While the wonderful event was heralded weeks in advance, the five-dollar admission tickets went begging, and as the final day approached, the price dwindled to two dollars, but with little better success. The skeptics and the tight-fisted Quakers preferred to stand on the highways and watch, although near-by windows and housetops commanded but half the regular admission price.

Early on the morning of the 9th of January the streets were crowded with carriages and the housetops around the prison thronged with spectators. Those who enjoyed a point of vantage anxiously watched the balloonist inflate the great silk bag, and lay in ballast and rations. At 10 o'clock President Washington appeared on the scene as official spokesman and presented the aeronaut with a passport he himself had signed, in case the airship and its occupant, who could not speak English, should suddenly and unexpectedly drop down among the backwoods settlers, who were not familiar with such a "contraption." The passport read as follows:

George Washington, President of the United States; to all to whom these presents shall come:

The bearer hereof, Mr. Blanchard, a citizen of France, proposing to ascend in a balloon from the city of Philadelphia at 10 o'clock a. m., this day, to pass in such direction and to descend in such place as circumstances may render most convenient; these are, therefore, to recommend to all citizens of the United States, and others, that in his passage, descent, return, or journeying elsewhere, they oppose no hindrance or

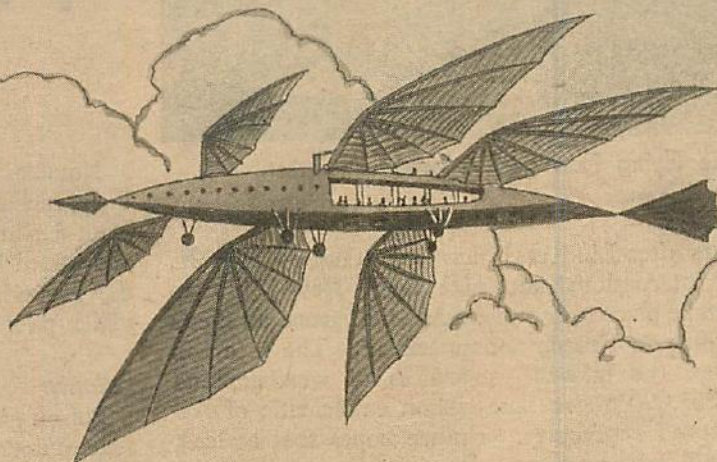
(Turn to page 94)



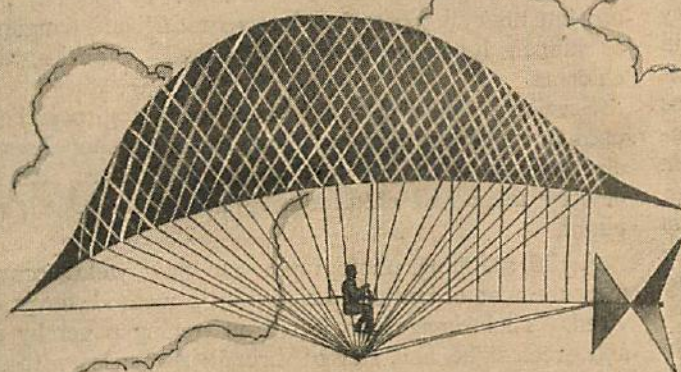


# Pictorial History of Man in the Air

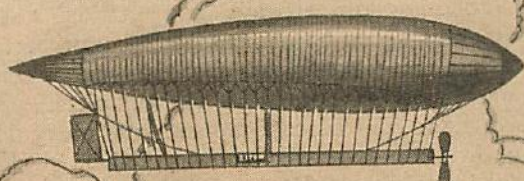
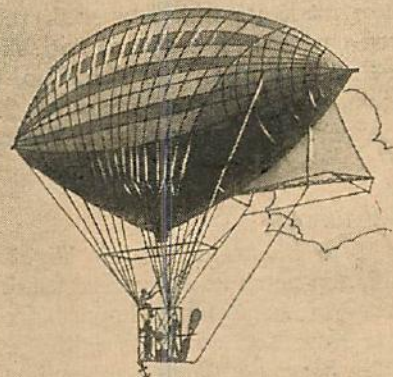
**1880** THE YOUNG THOMAS EDISON IS EXPERIMENTING IN AIRCRAFT. IN FRANCE, M. DIEUAIDE, GOING BY EDISON'S THEORY, PLANS THE "EDISON FLYING SHIP TO TOUR THE WORLD"



**1881** CARL E. MYERS FLIES HIS "SKYCYCLE" OVER A NUMBER OF AMERICAN CITIES. THE PROPELLER WAS HAND AND FOOT DRIVEN

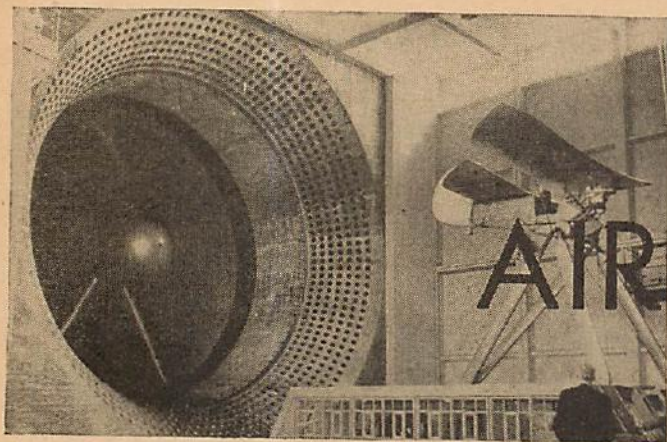


**1883** THE TISSANDIER BROTHERS BUILD FIRST ELECTRIC DIRIGIBLE. A  $1\frac{1}{2}$  H.P. ELECTRIC MOTOR MAKES POSSIBLE A SPEED OF 6 M.P.H.



**1884** CAPT. C. RENARD, AND CAPT. A.C. KREBS, FLY THEIR ELECTRIC DIRIGIBLE IN A CIRCLE AND FIGURE EIGHTS AT A SPEED OF 14 M.P.H.





The Flying Flea gets a wind-tunnel test.

A summary of  
aviation news

# Progress

## Transatlantic

Ten years after Lindbergh flew the Atlantic—May 21, 1937—an international air race from New York to Paris will take place to commemorate the American flier's feat, according to French announcement. The race will be non-stop, the take-off regardless of weather, and the prize \$65,000 and a blue ribbon emblematic of Atlantic air-speed supremacy. France hopes that at least 20 pilots will take part.

In the meantime, Britain has cleared the way for the start of experimental flying by an arrangement with Canada, Newfoundland and the Irish Free State whereby the interests of the four governments will be merged in one new ocean air-transport company. The new company will control all landing rights for 15 years, as well as radio and weather facilities necessary to commercial ocean flying across the upper North Atlantic route. It will share these facilities with Pan American Airways. Bermuda announces that her new airport is ready, and Charleston, Baltimore and New York are contending for the terminal of the Bermuda-U. S. leg of the lower Azores route.

While the British and American heavier-than-air operators laid their plans, Germany's LZ-129 dirigible *Hindenburg* made its fifth and sixth round trips. Wind-favored on her fifth eastward trip, she set a new Lakehurst-Frankfort record of 42h 53m, that received little attention, shortly before the new *Queen Mary*, giant ocean liner, won cheers for a record Cherbourg-New York crossing of 103h 12m.

## Performance

As if to illustrate Atlantic flight discussions, Dick Merrill, top-notch Eastern Air Lines pilot, and Harry Richman of stage fame, hopped from Floyd Bennett Field at New York in the Wright Cyclone powered Vultee *Lady Peace* and landed approximately 17 hours later in the Welsh countryside, only 175 miles east of London's Croydon airport, their goal.

In another Vultee, this one on floats, Sigismund Levanevsky, the "Russian Lindbergh," and Victor Levchenko, made an ambitious journey from San Pedro, Calif., up the west coast, across the Bering Strait into Siberia, and on toward Moscow, 10,000 miles from their starting point.

A new world airplane altitude record of 48,677 feet—subject to F. A. I. approval—was claimed by Lt. Georges Detra of the French army, surpassing by 1,325 feet the long-established official record of Donati of Italy.

Notable air performance of a freak variety marked the parachute jump of the Russian Bydlinsky, who leaped from a plane into storm clouds at 4,000 feet and, lifted and tossed by the strong winds, took 18 minutes to reach the ground. In Italy it was reported that a German glider pilot had sailed across the Alps.

## Science

Poison gas lurks in the stratosphere 15 to 20 miles up, a continuous layer of it, screening us from too great ultraviolet sun radiation, it was announced at an American Chemical Society meeting. The poison gas is ozone, heretofore popularly regarded as a sort of specially pure air, but now shown to be more irritating and dangerous to human lungs, even in very small quantities, than chlorine.

Serving science in a new field, an autogiro is being used in remote regions of New Jersey to spot diseased elm trees from the air so that government workers can destroy them and check the spread of the Dutch elm blight.

Aerial mapping photographs can now yield accurate measurement of contour heights by a method newly devised. Their images projected on tracing paper by red and green light, and viewed through spectacles with one red and one green lens, yield a picture in third-dimensional relief.

## Transport

A government traffic-control system that keeps radio check on the position of every aircraft using regular airways out of Newark, Cleveland and Chicago has been put into operation as one of several recent new safety measures. It will be extended to other large cities.

Another regulation now in effect requires that any pilot who intends to do "blind" flying on regular airways in a private or non-scheduled plane must hold a blind-flying rating, awarded by a government inspector after examination in a hooded dummy cockpit.

Wandering off airways and getting lost in clear weather will soon be inexcusable for any flier. The air-marking drive conducted for the government by five women pilots is more than half completed. When finished, there will be roof-top markers every 15 miles in any direction over the country, labeling visibly from 4,000 feet about 16,000 communities.

United Air Lines will issue stock to spend more than \$3,000,000 next year for 20 Douglas transports. Glenn Martin, builder of the *China Clipper*, declares that planes five times bigger will be built in the near future.

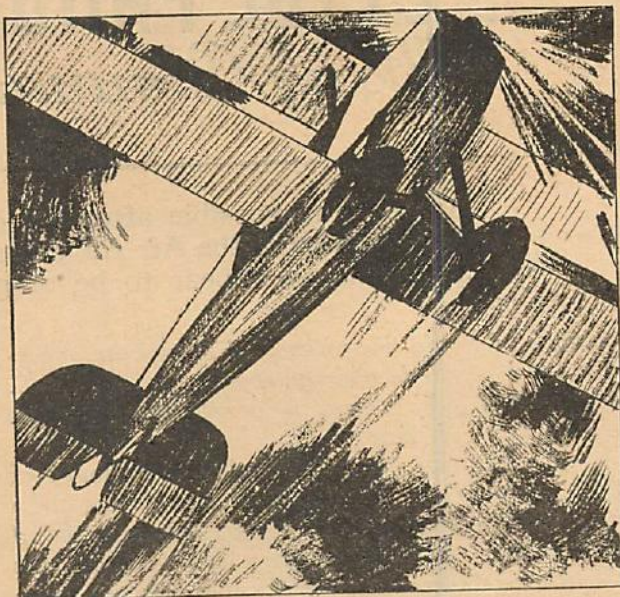


# SPLIT-SECOND ACTION

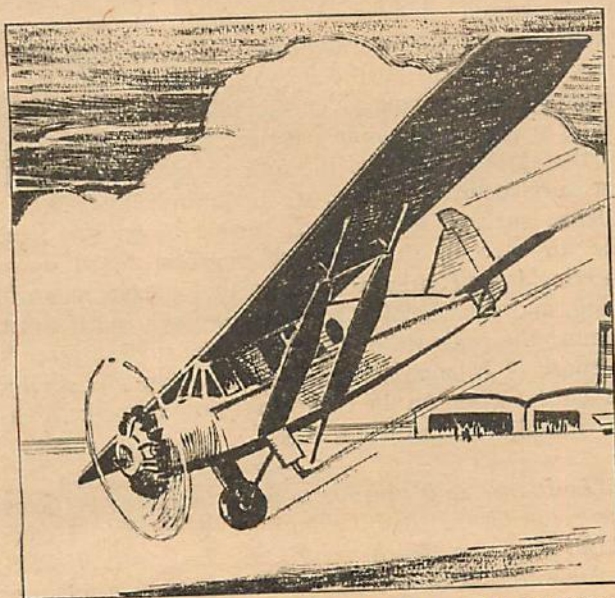
*Hair-breadth escapes, hair-trigger decisions, dangerous moments that come once in a lifetime.*



HIS PARACHUTE TORN AWAY BY THE AIRPLANE FROM WHICH HE LEAPED, NOSKOFF, A RUSSIAN, HURTTLED DOWN. IN MIDAIR HE STRUCK ANOTHER JUMPER AND CLUNG TO HIM. THE ONE CHUTE COULD NOT SUPPORT BOTH MEN. THEY FELL RAPIDLY. NOSKOFF FINALLY FOUND THE RIPCORDER OF HIS COMPANION'S RESERVE CHUTE AND 300 FEET UP IT OPENED. THEIR FALL WAS CHECKED. BOTH MEN LANDED SAFELY.



AFTER THEY HAD CLIMBED NEARLY SEVEN MILES TO TAKE PHOTOS, CAPT. ST. CLAIR AND CAPT. A.W. STEVENS FOUND THEMSELVES UNABLE TO GET DOWN. GOING AT FULL SPEED, THE MOTOR HAD QUEERED DUE TO THE EXTREME COLD AND WOULDN'T THROTTLE. DIVES FAILED AS THE PLANE CLIMBED RIGHT BACK UP. THEIR OXYGEN WAS NEARLY GONE WHEN THE GAS TANK RAN DRY ENABLING THEM TO GLIDE DOWN.



CLARENCE CHAMBERLIN WITH A MECHANIC AND TWO YOUNGSTERS, CHILDREN OF LEVINE, HIS TRANSATLANTIC PARTNER, AS PASSENGERS MADE A SHORT FLIGHT. ON THE TAKE-OFF A WHEEL BROKE FROM THE LANDING GEAR. FRANTIC SIGNALS WARNED HIM OF HIS PLIGHT AS HE CAME IN. SO SKILLFULLY DID HE LAND THE PLANE HIS PASSENGERS WERE UNAWARE OF THEIR PERILOUS POSITION.



A MOTOR WENT DEAD. THE PROPELLER FLEW OFF AND CARRIED WITH IT ONE OF THE STEEL WING STRUTS. THE ENTIRE 1919 TRI-MOTOR SHIP VIBRATED. THE WOMEN PASSENGERS BECAME PANIC-STRICKEN. SCREAMING, THEY THREW THEIR ARMS ABOUT THE PILOT'S NECK. IN SPITE OF ALL THIS, ACOSTA, THE PILOT MANAGED TO SPIRAL DOWN TO A SAFE LANDING.



# What's Your Question?

## By CLYDE PANGBORN

### Wing Commander



As soon as possible after the questions are received, the Wing Commander of the Air Adventurers will answer on this page such questions as appear to be of general interest to our members.

*Question: I would like to know if there is an opportunity to learn a trade in the regular army or in the U. S. coast guard. I prefer airplane or engine mechanics. J. C., New York, N. Y.*

*Answer:* The army gives a considerable number of vocational courses for enlisted men, and among them are many branches of aviation work. I believe that a certain period of service is necessary before one becomes eligible to take the courses, but possibly previous training in the subjects chosen, or previous service elsewhere, such as in the National Guard, will help to shorten the period. As to the coast guard, I'm not familiar with their vocational set-up. I suggest that you write to Coast Guard Headquarters, Treasury Dept., Washington, D. C., for information. For information on army courses write to the Chief of the Air Corps, War Dept.

*Question: What is meant by "blacking out" while flying? R. M., Altoona, Pa.*

*Answer:* Blacking out is a temporary loss of consciousness. It is caused by sudden and violent turns of direction at high speed. It's something not likely to come within the experience of the average flier in the average plane, but it's a real annoyance and even a danger to the racers and to the boys who test the fast, high-powered jobs. What happens is that centrifugal force in a hard turn or pull-out tends to draw the blood somewhat from the brain, causing momentary unconsciousness. It usually passes quickly, but if the flier is at a low altitude, the temporary loss of control may be disastrous.

*Question: Are metal-covered planes in any way bullet-proof? D. P., Green Bay, Wis.*

*Answer:* Metal coverings on modern planes are thin, usually being measured in a few hundredths of an inch, and offer no protection against gunfire. Some planes, however, have tougher sheet of the armor variety around the cockpits, which will stop or deflect most bullets that are not fired straight at close range.

*Question: What is the importance of landing wires and flying wires? What is cantilever construction? L. W., Albuquerque, N. M.*

*Answer:* Landing and flying wires are means of bracing the wing structure. They are so called because

of the stresses they carry. The landing wires run from high on the fuselage, or upper-wing center section in a biplane, to the wing spars, and help to support the wing while the plane is on the ground, when gravity tends to cause the wing to sag. The flying wires, running upward from the landing gear or low on the fuselage, help to hold the wing when the plane is flying and the air is exerting a lifting force on the wing.

A cantilever structure is one that is supported only at one end. In airplane construction, therefore, it means a wing, landing strut, or tail surface that has no external bracing such as wires, etc., all support coming from the rigidity of its attachment and the strength of its material.

*Question: Will you please explain what balanced controls are, and how they work? E. M., St. Paul, Minn.*

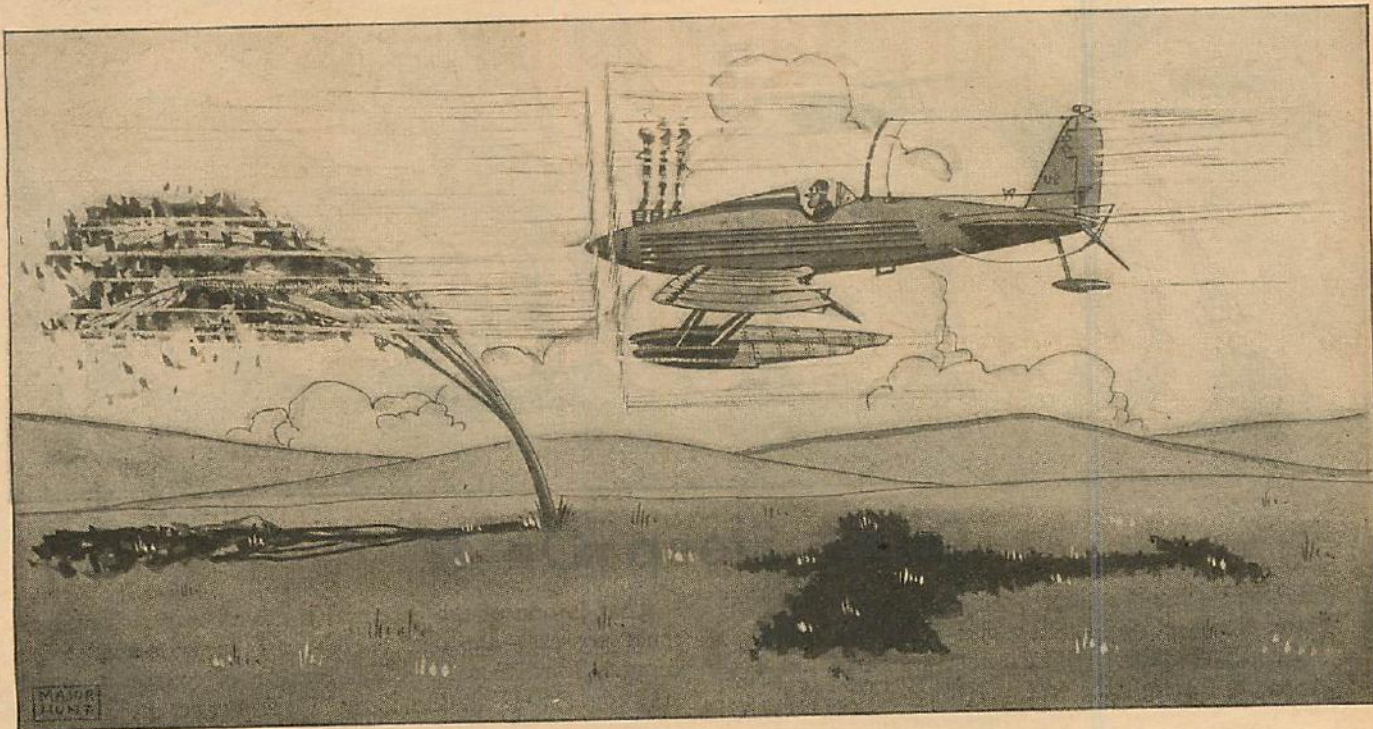
*Answer:* Control surfaces like ailerons and elevators are "balanced" in two ways; statically and dynamically. Static control is the weighting of the forward edge, or of a projection from the forward edge, so that the surface balances in neutral or "middle" position when not being moved. Dynamic balance is the placing of part of the surface ahead of the axis or hinge-line on which the surface turns. Thus, when the main portion of the aileron surface, let's say, is turned downward against the air stream, the "balance" portion turns upward, meeting the air stream that's on the opposite side of the wing, and thus helping to force the main portion lower against the pressure of the air stream underneath. The purpose of balanced controls of both types is simply to lessen the strain on the control system and make it easier for the pilot to push the stick.

*Question: Is it possible to fire a machine gun through the rotor blades of an autogiro? How does it work? E. E. P., Long Beach, N. Y.; E. S., Seattle, Wash.*

*Answer:* It certainly is possible. Interrupter gearing has been used ever since the World War to discharge machine guns between the blades of propellers that rotate at more than two thousand revolutions per minute, so it isn't difficult to shoot through the rotor disk of an autogiro whose vanes turn at a constant rate of about 125 r.p.m. The only difference lies in a slower rate of fire, and provision of a flexible cable running from the rotor spindle to the rear-cockpit gun instead of the fixed gearing of the engine-mounted gun.



# GULLIBLE'S TRAVELS—Major Hunt



**B**ELOW me rolled an endless forest of giant pines, tall and rigid against the sky. Undoubtedly I was flying over Canada, although my compass plainly said Mexico. I ran into the chart room, having tied the controls to the back of the chair in the cockpit, and began to go over the instruments to see if I really was over Mexico after all.

While I was engaged in this delicate duty, the motor began to cough and bark alarmingly. Possibly a bit of water in the radiator, I thought, or some thick gas in the manifold; at any rate, nothing to be alarmed at. Finally, however, when the motor quit completely, I strolled back to the cockpit to see what had happened. The motor was at a standstill, with the double propellers motionless on their crankshaft. I glanced at the gasoline gauge. It was empty. How embarrassing!

As I have mentioned, below me a vast forest of pines and birch trees stretched as far as the eye could see, and here was I with no gasoline and a dead motor. I must land at once, but how to do it safely was a problem, particularly when directly in front of me was a huge pine that was much too tall for me to zoom over with a dead engine. Must I crash headlong into this tree and so end my flight in disaster?

I was within a few feet of the tree when I first noticed it, and so no time was to be lost. I at once began to pace the cockpit, pondering upon a solution. Every time I passed between the rudder bar and the instrument board my trousers caught upon some projection. After several rips had been put in my trousers, I began to notice it and stopped to investigate.

Aha! A solution to my predicament! Quickly switching on the emergency tank of gas and starting the motor, I pulled the projection that had torn my trousers so often. Almost instantly the huge pine bent back and away from me, and I passed over it, missing the top-most branches with my wheels by inches, and soared once more to a safe altitude.

The projection from the instrument board was the reversing handle to the front propeller. Pulling it had reversed the forward prop, sending a terrific blast of air forward which bent the pine down out of the way, while the rear propeller had continued to spin as before, pulling me safely over the obstruction.

Once more my presence of mind and clever brain had saved my ship and myself from an annoying situation, and allowed me to continue to bigger and better adventures.

## Prizes for Mistakes!

1—Each month Bill Barnes-AIR TRAILS will print one picture and story to test your knowledge of aviation conditions and aerodynamics.

2—PRIZES will be awarded for the eleven entries listing the highest number of errors and contradictions in the picture and the story of Gullible's Travels. The First Prize will be \$5.00. There will be 5 prizes of \$2.00 each; and 5 of \$1.00 each. In the case of ties, duplicate prizes will be awarded.

3—List the errors you find in the picture. Then list the errors of fact contained in the story. Then check the story and picture for contradictions. A

contradiction and an error on the same item may be counted separately.

4—This puzzle will serve as a game. It will be fun, but at the same time it will test the knowledge you have gained by reading Bill Barnes-AIR TRAILS.

5—All entries must be neatly written (or typed) on one side of the paper only, listing only one error on each line. Number your errors in the left-hand margin 1, 2, 3, etc.

6—Address your answer to the:  
November Contest Editor  
Bill Barnes-AIR TRAILS  
79 Seventh Avenue, New York, N. Y.

7—The Editors will be the judges and their judgment will be final.

8—No entries will be returned.

9—All entries must be postmarked not later than midnight, November 15, 1936.

10—Prize checks will be mailed not later than December 15, 1936.

11—Every one is eligible to compete except employees of Street & Smith Publications, Inc., and their families.





## Don't Sleep On It

HE stood with his back against the pine, watching the shafts of the sinking sun pierce the forest in the valley below. The effect was like a fan of bright beams through the trees, lighting every limb and leaf. All day, as he remained here on this high knoll, he had been able to see only the tops of those trees. Now—his browned face took on a tired smile—even a squirrel would have a hard time hiding from his keen eyes. For a few minutes he could relax utterly. He placed a leather-sheathed arm across the end of the tall object his other hand held resting against the ground, and leaned his chin on the arm.

The air was very still. Even the intermittent *cheep* and call of birds was hushed. As soon as dark came their voices would be stronger, and other forest sounds would be added. Funny, he thought idly, how a man with his job had to switch senses according to the sun. After nightfall his eyes would play second fiddle, his ears taking on the real work. And that work was vastly important. It involved the lives of thirty-five other men—directly. Indirectly it could affect thousands.

But there was no danger till after sunset, he reflected. Night was the favorite time of those who lurked in the forest's depths. And *he* need worry about only one of the star-filled hours, for in another hour a second man was due to take his place, and he himself could enter through the wooden gate. Yet that single hour would seem the longest, and he let very muscle and nerve ease into complete rest. Once the shadows started creeping he must be more alert than ever.

The next minute the man at the pine tree lay dead with a crushed skull, and not long afterward his thirty-five companions were killed or made prisoners. His work had been sentry duty on the trail leading to the stockade fort, the object in his hand was a musket. Resting on that musket he had closed his eyes for a few moments in sleep—and the skull-shaven Hurons, taking advantage of his lapse, had not waited for darkness to strike.

It was one of the worst Indian massacres in our Colonial history. . . .

That is one of the essential traits an Air Adventurer must possess—alertness. He must be wide-awake, he cannot afford to relax. This means, of course, he must stay abreast of all the latest developments in aviation. It means he should be tuned up to progress in general, for there's no telling when such knowledge may be useful in the interests of flying. *Keep the motor of your mind turning over.*

The pioneer wilderness scouts of yesterday had to be alert—or else. You sky scouts of to-morrow must be equally vigilant. *You can't go to sleep on the stick.*

I want to impress this all too neglected fact especially on those of you who have not yet joined this Club. If you are interested in joining our ranks, and can honestly pledge yourself to observe our seven-point Creed of Self-Reliance, Courage, Initiative, Independence, Loyalty, Integrity, and Obedience, I will be glad to pass on your application. Mail me the coupon below. A membership certificate and the Club's insignia, a winged badge, will be sent you upon official approval.

Happy landings!

Your Flight Commander,

*Albert J. Carlson*

### (MEMBERSHIP COUPON)

To the Flight Commander, Air Adventurers,  
79-89 Seventh Avenue,  
New York, N. Y.

I am interested in aviation and its future developments. To the best of my ability I pledge myself to support the principles and ideals of AIR ADVENTURERS and will do all in my power to further the advance of aviation.

Please enroll me as a member of AIR ADVENTURERS and send me my certificate and badge. I enclose ten cents to cover postage.

Name ..... Age .....

Address .....

☐ Check here if interested in model building.

(This coupon may not be used after December 15, 1936.)





# The MODEL WORK- SHOP



*Conducted by*

*Gordon S. Light*

THE formation of the American Academy for Model Aeronautics should be good news for every person who takes a serious interest in model aviation. The object of the Academy is to coördinate the work of all model builders and add to the science of model airplanes. The work of organizing the Academy has been under way ever since the National Meet at St. Louis in 1935. At that time a group of thirty veteran builders were picked to form the governing council. During the past year the council went ahead with its work, and at the conclusion of the Detroit meet the Academy sprang into active life when the council elected officers and decided on an active program for the coming year.

Officers of the Academy elected at the Detroit meeting are Captain Willis C. Brown of Boston, president; H. M. Jellison of Akron, Ernest Whalen of Springfield, Mass., and C. C. Mosely of Glendale, Calif., vice-presidents; H. W. Alden, in charge of N. A. A. model activities, secretary-treasurer.

Membership in the Academy is open to every genuinely interested model plane enthusiast. The fee for members over 21 is \$3 a year, while \$1.50 is charged for junior members under 21. Outstanding among membership privileges are national and international recognition for record-breaking flights, and access to the results of model plane experiments conducted by Academy members. The results of experiments, together with a report on general activities, will be published in a monthly report which is available to all members.

Academy projects are: construction and operation of a slow-speed wind tunnel for testing flying-model airplanes; creation of a fund for sending a team to England for the 1937 Wakefield contest; experiment in and development of radio-controlled model flight; development of a practical recording altimeter for registering model plane flights; establishment of

a laboratory for testing model plane materials with a view toward scientific application to models; and collection of a library of model plane writings.

Academy members will be the ones to carry out this ambitious program. Commenting on the aims of the Academy, President Brown said: "There is a definite need for unified study and investigation into the various fields of science pertaining to the subject of model aeronautics in order to make the best possible progress in improved methods and performance. New ideas, new methods, improved designs, and higher achievement—all will result from united effort."

Present headquarters of the Academy are at 1733 R. C. A. Building, New York City. Regular meetings will be held. Problems in modeling will be discussed and papers on various branches of the model science will be presented. In this way modelers living outside of New York City can contribute their bit to the Academy's progress despite the handicap of not being present at meetings. Nation-wide representation will be assured at the annual meeting, which will be held as a part of the program of the national meet.

The original nucleus of members are all N. A. A. members who had been carrying on model work throughout the country under the Junior N. A. A. banner. H. W. Alden, secretary-treasurer of the Academy, has been chairman of the N. A. A. Model Plane Committee for the past several years. This affiliation with the N. A. A. assures close coöperation between the two societies with added prestige and influence for the Academy.

No report on the Academy and its work would be complete without special mention of its president, Willis Brown. His good nature and experience, coupled with organizing ability, make him the ideal person to guide the Academy through the strenuous first year of organization.

## The Contest Calendar

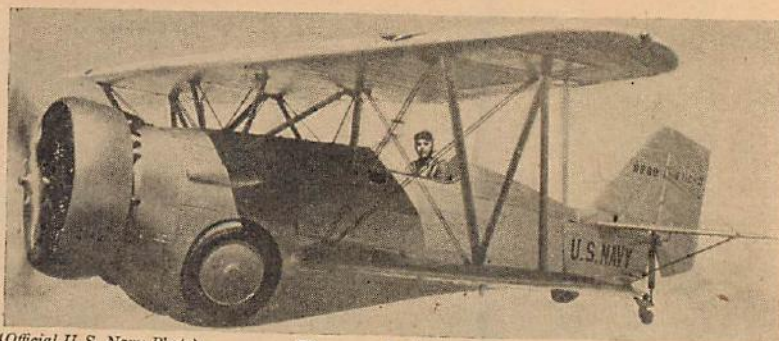
**GOLDEN AIRCRAFTS CORPORATION** gas model contest. Dallas, Texas. Date tentatively set for October. Open to gas modelers from Dallas and vicinity. Rules and information from Golden Aircrafts Corp., P. O. Box 144, Dallas, Texas.

**INTERNATIONAL GAS MODEL AIRPLANE ASSOCIATION** contest. Open to I. G. M. A. A. members. October 10, Hadley Airport, New Brunswick, N. J.

The Model Workshop asks the aid of readers and clubs in developing for their benefit a complete, detailed report of all model contests and exhibitions, large or small, everywhere. Listings should be received by The Contest Calendar, AIR TRAILS, 79 7th Ave., New York City, at least two months in advance; news of winners and results as soon as possible.



# Navy Hawk



(Official U.S. Navy Photo)

The real thing

A FAVORITE among Uncle Sam's war planes with model builders is the high-powered, high-performance single-seat Curtiss biplane

that has come to be known generally as the Type III Hawk. It is in daily active service with the navy in the capacity of light bomber and fighter aboard the aircraft carrier U.S.S. *Ranger*. Designated as the F11C-3 and the BF2C-1, it constitutes a powerful air weapon.

The Type III Hawk's speed reaches a top of 244 m.p.h. at 10,300 feet under the thrust of the Curtiss controllable-pitch propeller turned by a 750 h.p. Wright Cyclone. Plans for a solid model of this plane appeared in *AIR TRAILS* for June, 1936. Part of the Hawk's high performance is due to flush retraction of the landing wheels, which is incorporated in our present flying model.

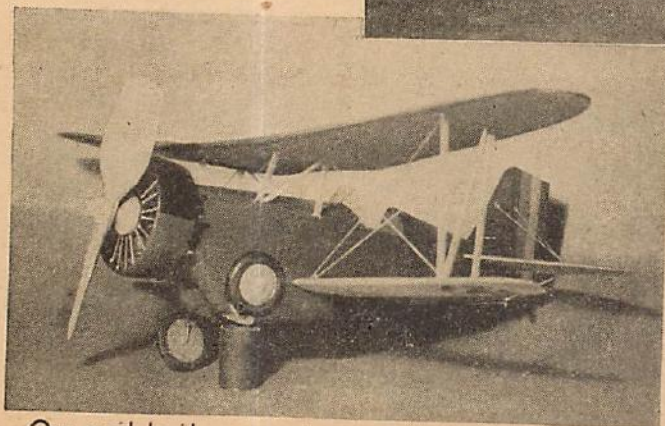
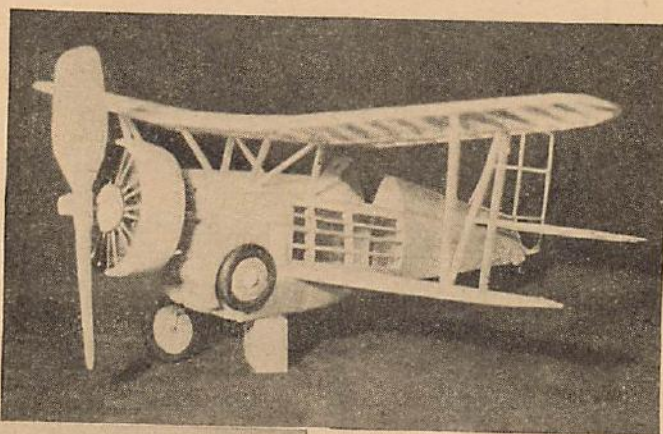
## FUSELAGE

Make a sheet of balsa plywood with two  $\frac{3}{4}$ " sheets cemented cross grain, 6x7". After this is dry, cut two of each of the formers on drawing No. 4. Place the fuselage drawings Nos. 3 and 4 together on a smooth soft board and cover with waxed pa-

*Flying scale model of the Curtiss Type III plane that operates from carrier decks.*

by Alan D. Booton and Ralph Pickard

## CURTISS BF2 C-1



Our models, demonstrating retractable landing gear.

per. Assemble the whole left framework right on the drawing. By doing this, the proper contour of the model is assured. When dry, remove from the

board and build the right half frame to the completed left frame.

Before going further, make the wheels and the "wells" for the retracted wheels. The maximum diameter of the

well blocks is indicated by the broken-line circle on drawing No. 2. Hollow the blocks out so the wheels fit in flush with the back side, then cement  $\frac{1}{8}$ " disks over the openings. To install them in the sides of the fuselage frame, they must be cut into three pieces and fitted in, removing the thickness of the formers from them. This is done to keep the weight down and to get them lined up better. Let the cement dry and then carve and sand away the surplus wood to the contour of the fuselage.

Cover the portions of the fuselage frame shown on drawings Nos. 1 and 2 with  $\frac{1}{64}$ " sheet. Use plenty of pins to hold the sheet to the formers and butt the joints carefully to obtain a smooth surface. The tail-wheel support should be covered with  $\frac{1}{64}$ " sheet, as shown.

Cement two dress snap halves to the front of former 1 in the positions shown on the drawings.

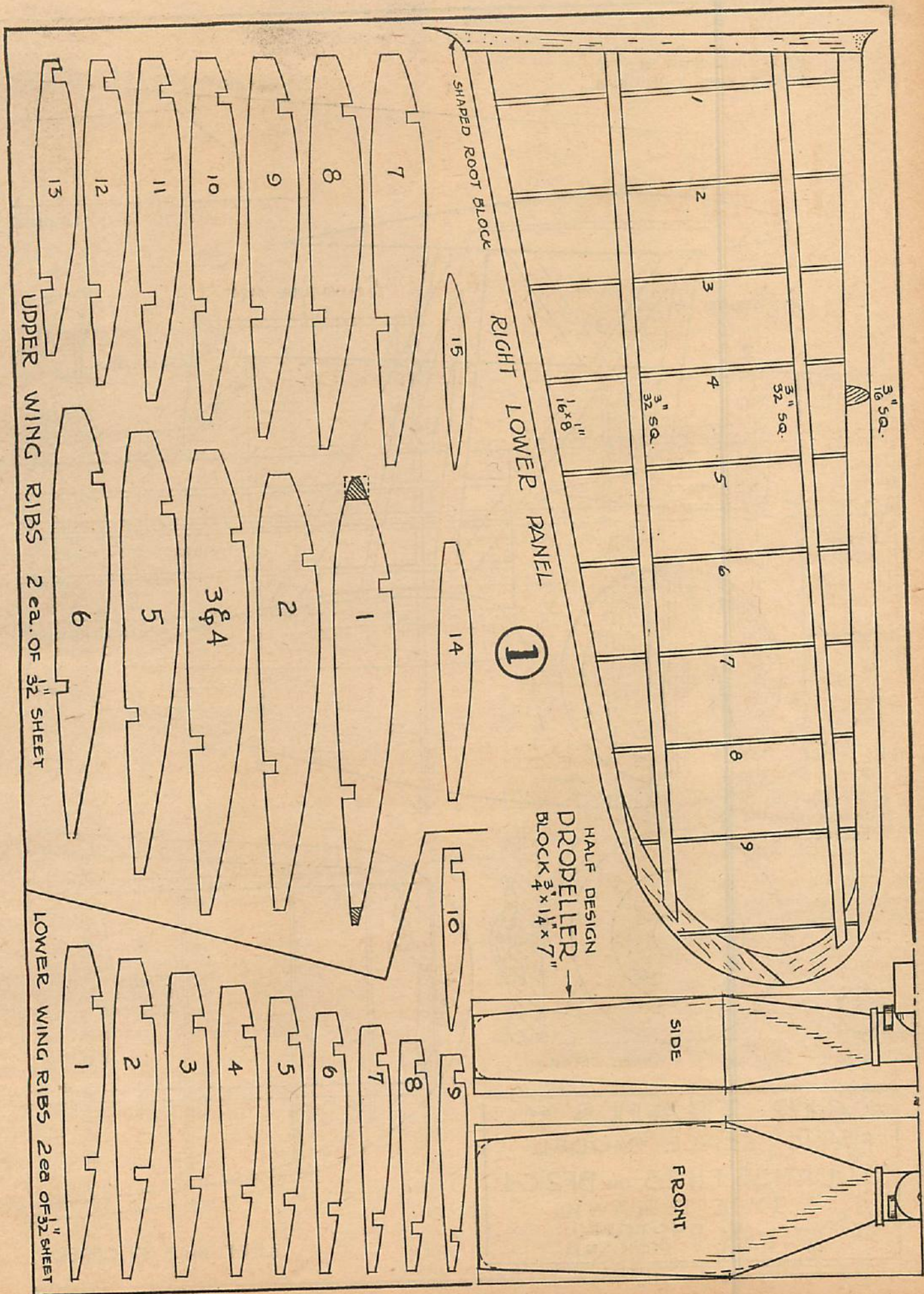
Bend the rear hook from #12 music wire and install it on the rear of former 8 with a piece of  $\frac{1}{8}$ " or  $\frac{3}{16}$ " square.

## MOTOR AND NOSE ASSEMBLY

Carve the nose form to the shape shown on drawing No. 4 and cement the built-up  $\frac{3}{4}$ " sheet crankcase to the front of it, then carve nine balsa cylinders and cement them evenly around the crankcase. Cement two  $\frac{3}{4}$ " square bamboo push-rods to each cylinder as they appear on a real motor. Carve the nose plug to the shape shown and cement a bushing in the shaft hole to prevent wear. The nose plug can be cemented to the crankcase if preferred.

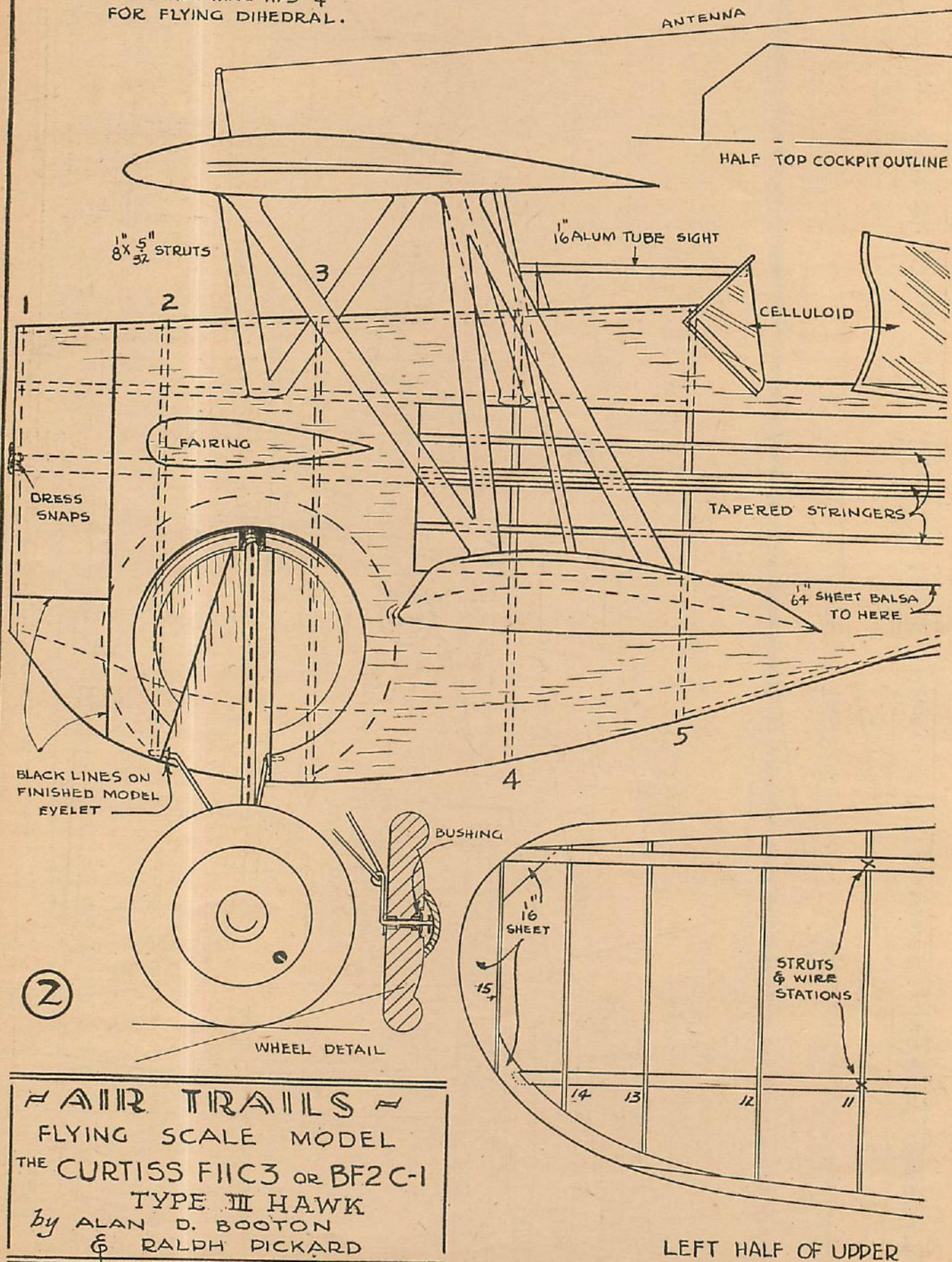
(Turn to page 92)



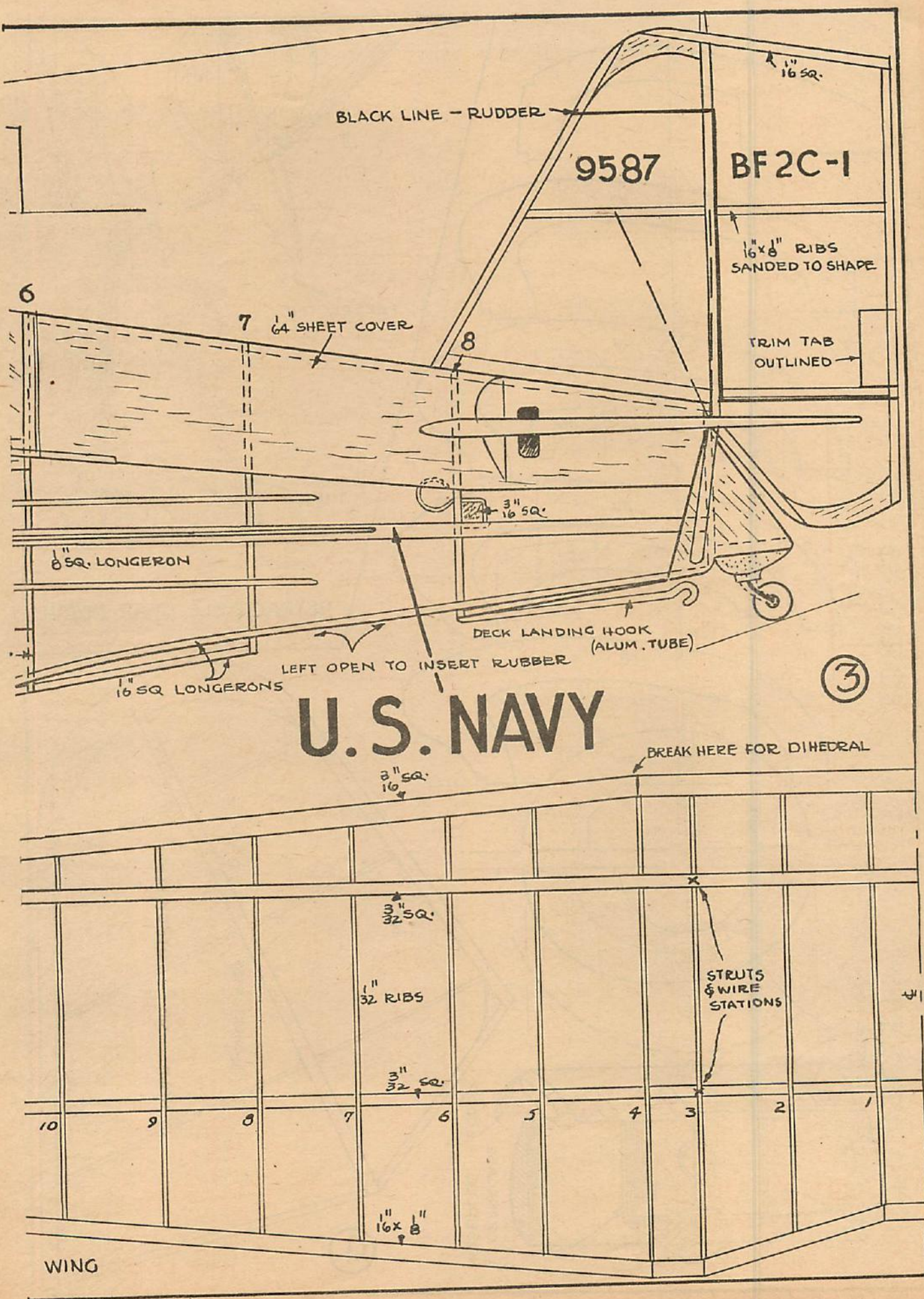




RAISE ALL WING TIPS  $\frac{3}{4}$ "  
FOR FLYING DIHEDRAL.

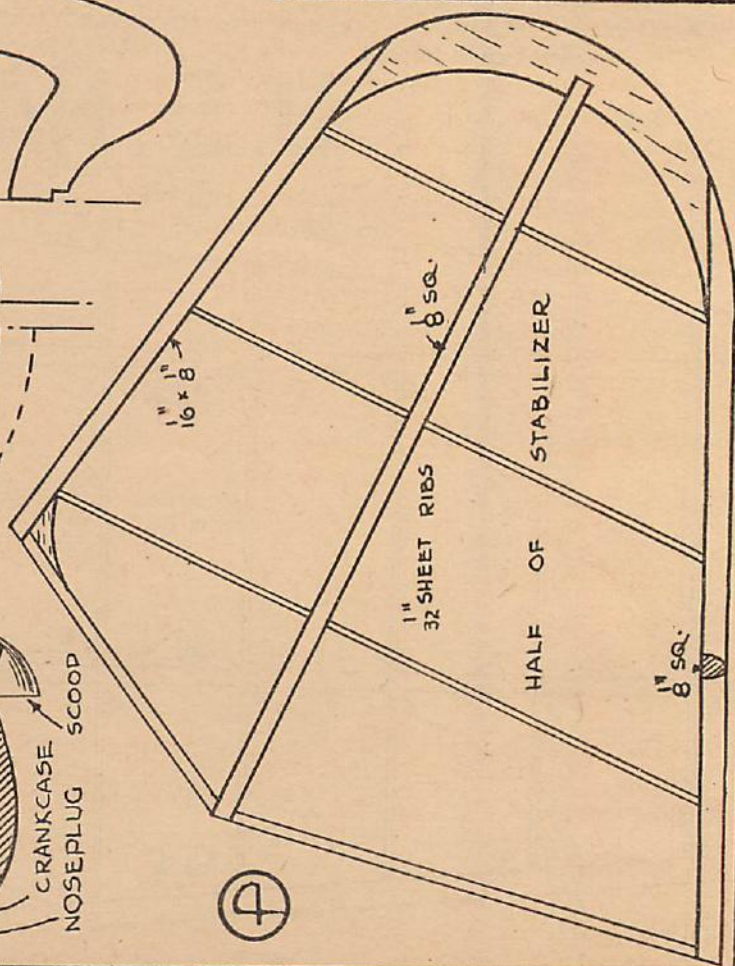
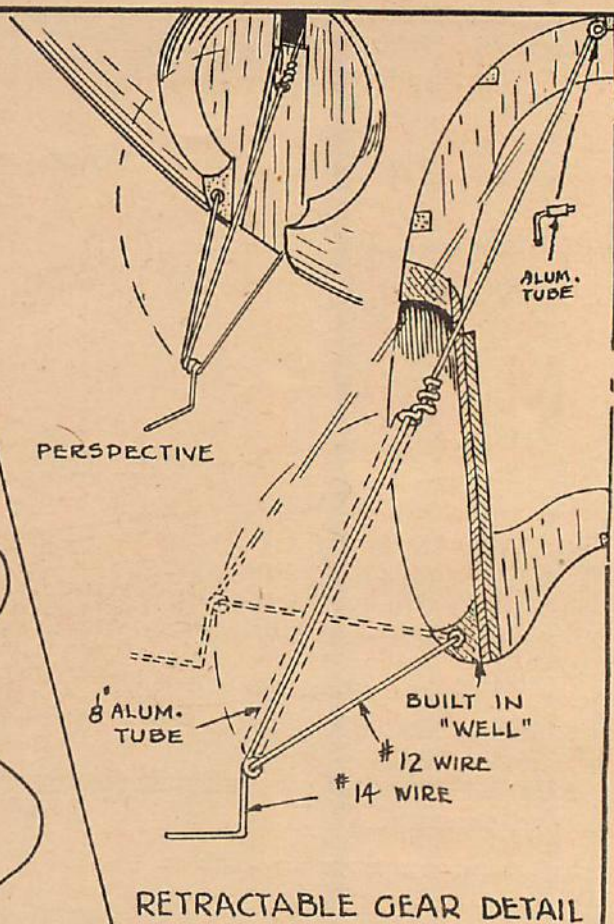
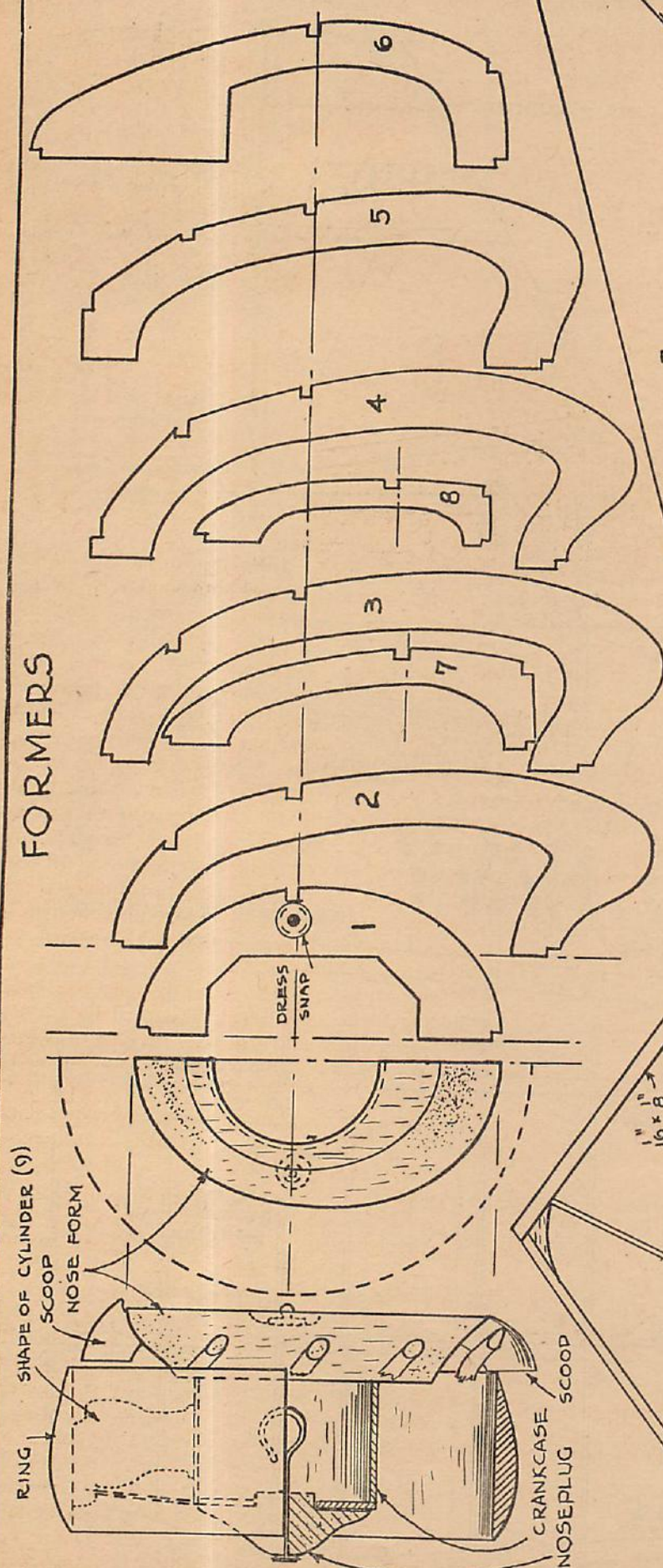








## FORMERS

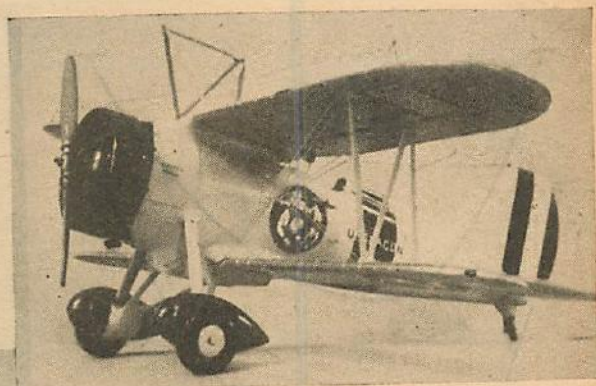


④



*What's most important for realistic appearance in a solid scale model? And what's hardest to achieve? How to get A-1 results is told in this article*

by Nicholas E. D'Apuzzo

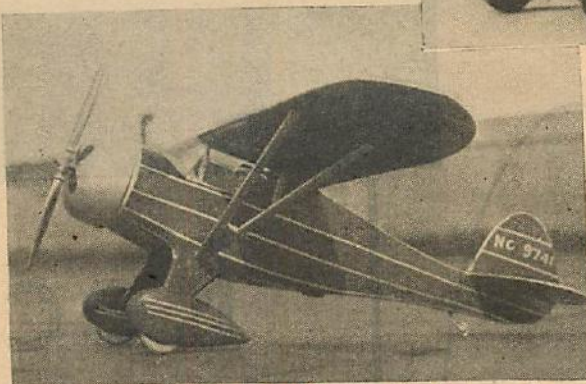


**M**ANY articles have been written about the construction of solid balsa scale models, but few have described in any detail the process of obtaining a fine finish. The time, money and care invested in the building of such a model will be wasted if, in the final assembly, it is not provided with a smooth, neat and glossy paint job. Such a finish can easily be obtained if the following instructions are noted and are carried out faithfully.

The several parts of the plane—fuselage, wings, pants, etc.—are cut to the proper shape and size and carefully sanded smooth with No. "0" sandpaper. They are then given two coats of fairly thick dope, about the consistency of cream. When the dope has thoroughly dried, the parts are sanded smooth again. It is well to state here that if the model is a monoplane of the cantilever type, such as a Lockheed or Northrop, it may be put together first and then painted. If the model is a biplane, it is necessary to paint each part individually before the final assembly. This latter method being slightly more difficult, it will form the basis of these instructions.

After the parts have been doped and sanded, it is

These well-painted Macon fighter and Monocoupe models look real enough to fly.



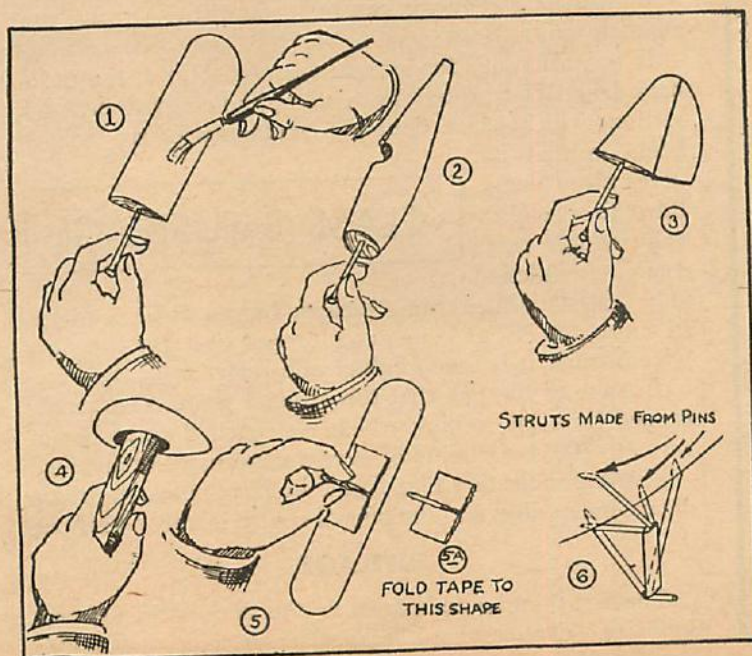
## It's the Finish

necessary to fill the pores of the wood with some sort of filler. Any wood filler may do, but automobile lacquer glazing putty (pyroxylin

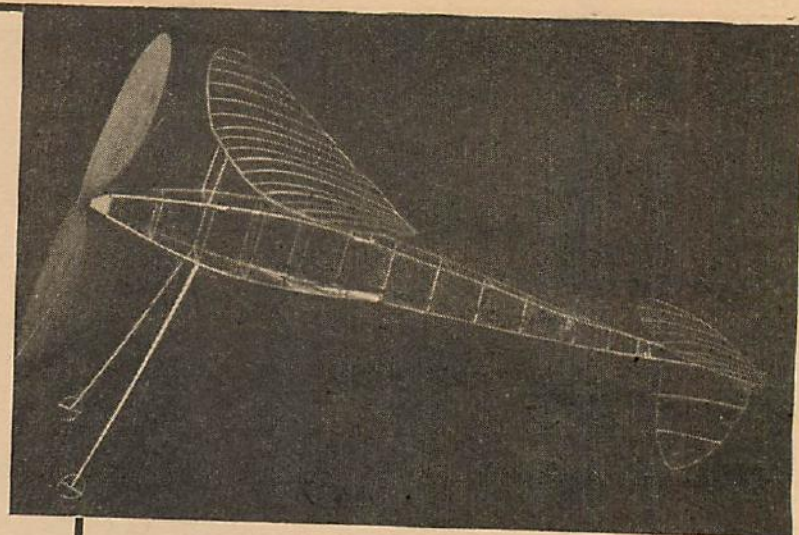
base) is strongly recommended. This may be applied with an ordinary table knife. Spread the putty over the entire surface like butter on bread. Allow this to dry hard before sanding. Use waterproof sandpaper (wet or dry No. 240 or 4/0) and plenty of water. The water removes the grit from the sandpaper and leaves a much smoother surface. Do not use water in sanding the bare wood! Sand away the excess putty until the parts regain their original size and shape. All the pores should now be filled. If perhaps small nicks should still be present, apply more putty and repeat the process until a good smooth base is obtained. The parts are now ready to be painted.

If the parts are small, difficulty may be experienced in holding them. Figures 1, 2, and 3 show how small-sized wings and fuselages may be held for painting. Simply drive a bank pin into one end. This permits the piece to be painted completely in one operation. Figure 4 shows how wheel pants may be held for painting. Just slip them over a stick of such size as to provide a snug fit. Figure 5 and 5a show another method of holding a wing, with masking tape, which cannot be held by the preceding method. Form the piece of masking tape into a T shape. The crossbar of the T holds the wing while the stem is held between the fingers. This leaves the other side free from obstruction and allows it to be completely painted at one time. The advantage of using this method is apparent in that it does away with overlapping of coats, thereby providing a smoother finish. Masking tape is preferred to friction or medical tape as the gum of the latter types sticks to the object when the tape is removed. Masking tape may be obtained at any good paint store.

In choosing the paint for the job, avoid cheap paints and enamels. Duco brushing lacquer is recommended. This is easily (Turn to page 96)







# Record Threat

*A "different" indoor model that has what it takes to hang up new time marks.*

by Lawrence N. Smithline

IT is rather unusual to see an indoor contest model that really can be called "different," and it is even more unusual when this ship performs so well that it threatens the record of its class.

Both these statements can be made of the ship we are about to build.

It is "different" for several reasons. First, the ordinary boom is replaced by a microfilm-covered built-up section, which has a double advantage over the hollow boom in that it

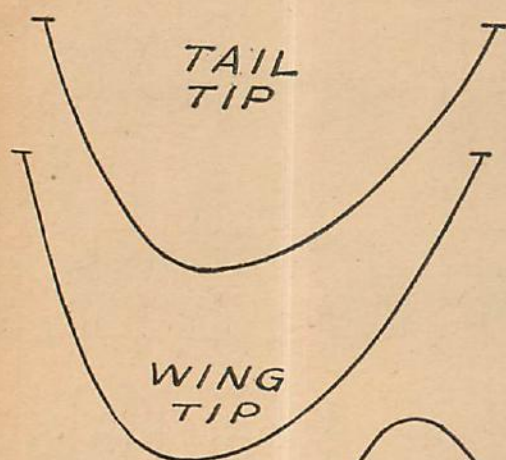
saves about one-third the weight and reduces the drag considerably. Second, instead of the paper braces which are used in most models to counteract torque, we use tungsten wire because it is much lighter and easier to apply.

In spite of the fact that the original model was handicapped by a low ceiling which restricted the number of turns to 800, two flights of over 6 minutes were obtained—a strong indication that flights of 15 minutes are by no means impossible, and the official record is only 14 m. 15s.

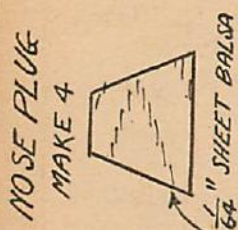
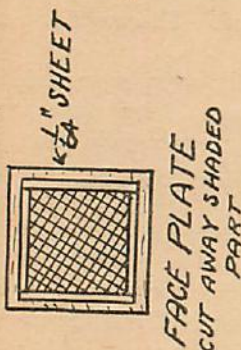
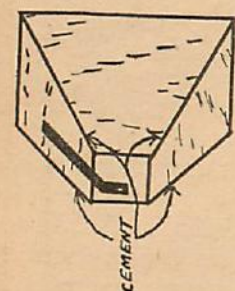
## CLASS B FUSELAGE

### FUSELAGE

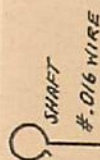
The first thing to do is draw up the sides of the fuselage full size. Notice that the fuselage becomes triangular about halfway back. The longerons (Turn to page 95)



FULL  
SCALE

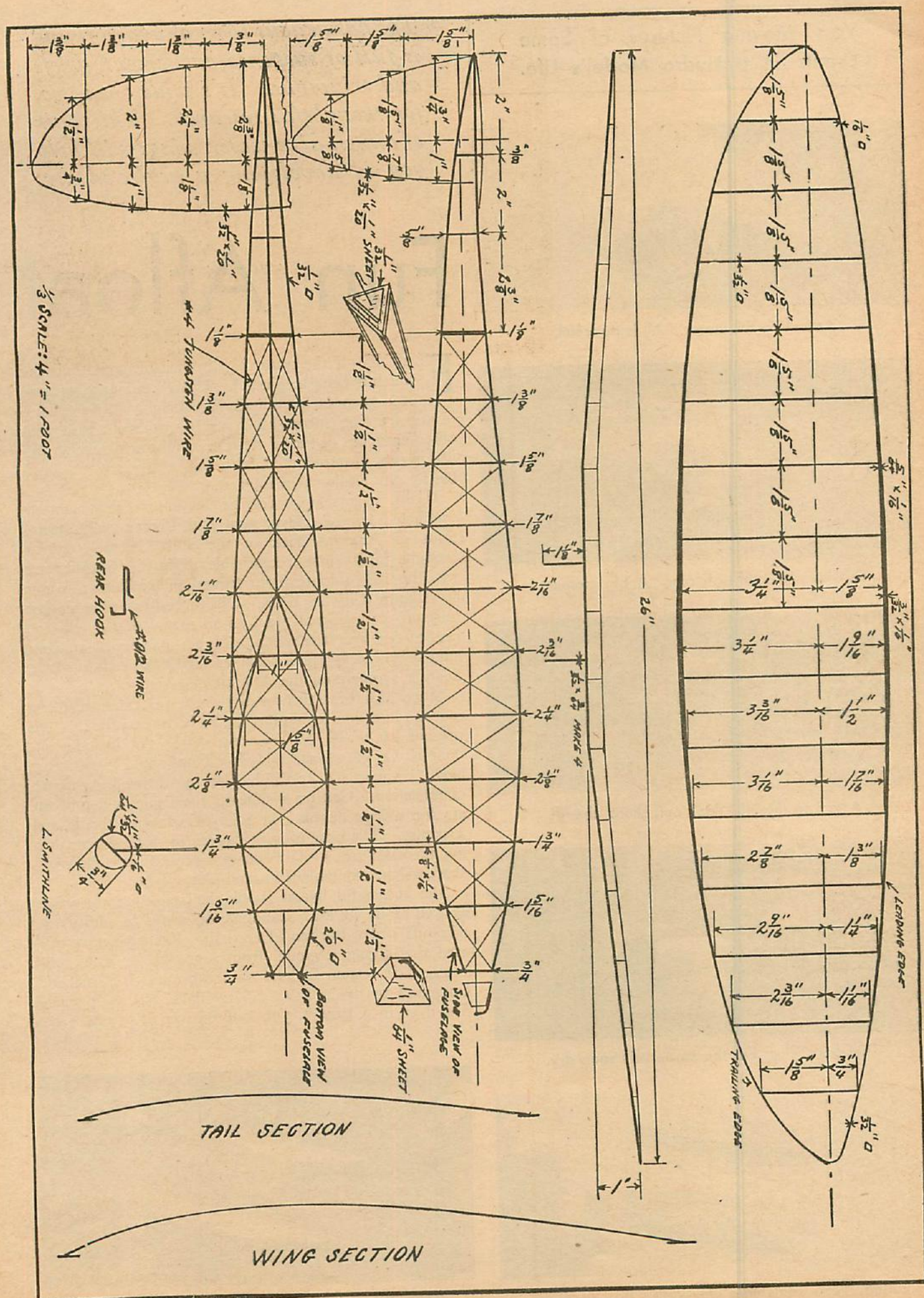


BLADE TEMPLATE



L. SMITHLINE







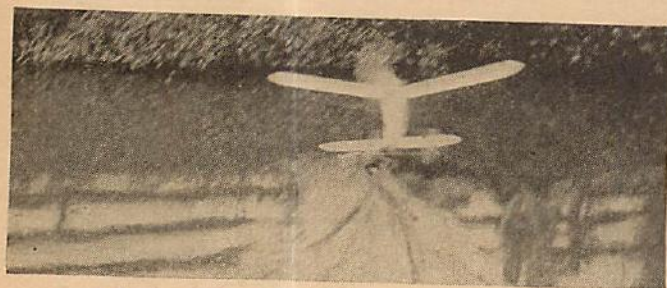
Very Moving Pictures of Some  
Events in a Hydro Model's Life.



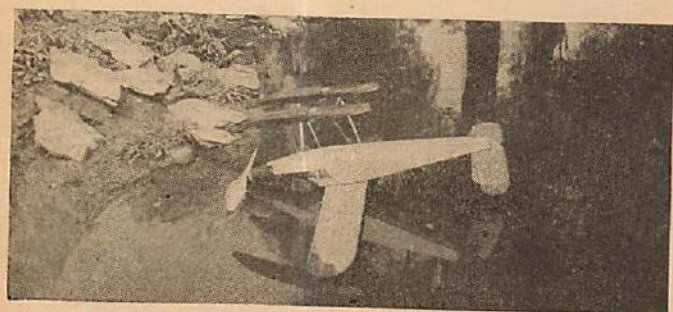
At rest on the water. All is peaceful.



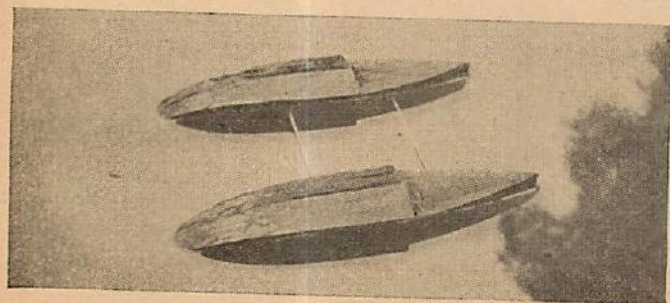
Beginning the take-off run. A big moment.



A turn to the left—look out, shore ahead!



The shore wins; but the model will soon dry.



Bottom view—sometimes only visible part of model.

*The hazardous sport of hydro flying is full of suspense, excitement, griefs and triumphs. It's wide open, too, for thoughtful research. This pair of contest-size water wings will help you in developing a neglected art.*

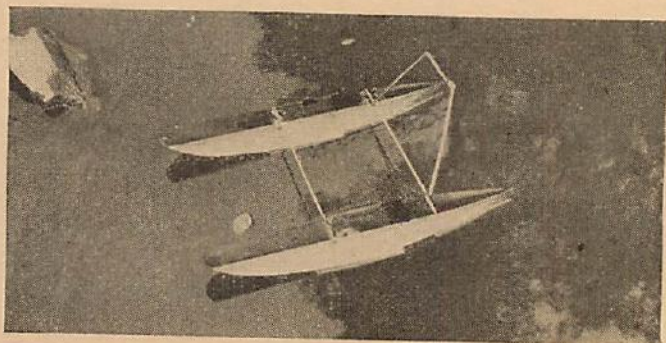
## Fun Afloat

**F**LYING off the water is a branch of model building which is being neglected. A few random shots have been taken at building hydro models, but the science of constructing successful floats has not kept pace with other branches of model design. Failure to include hydro events in outdoor contests has been partly responsible for the let-down in interest.

Hydro events were regular features of the contests conducted by the Playground and Recreation Associations of America back in the '20s. These contests brought forth some remarkable designs. Outstanding was the 12½-minute flight turned in by Tudor Morris at Atlantic City in 1929. His three-float twin pusher took off from a small pool on an inland flying field and headed out over the ocean. Three quarters of an hour later it was picked up a considerable distance from shore, floating serenely on the Atlantic.

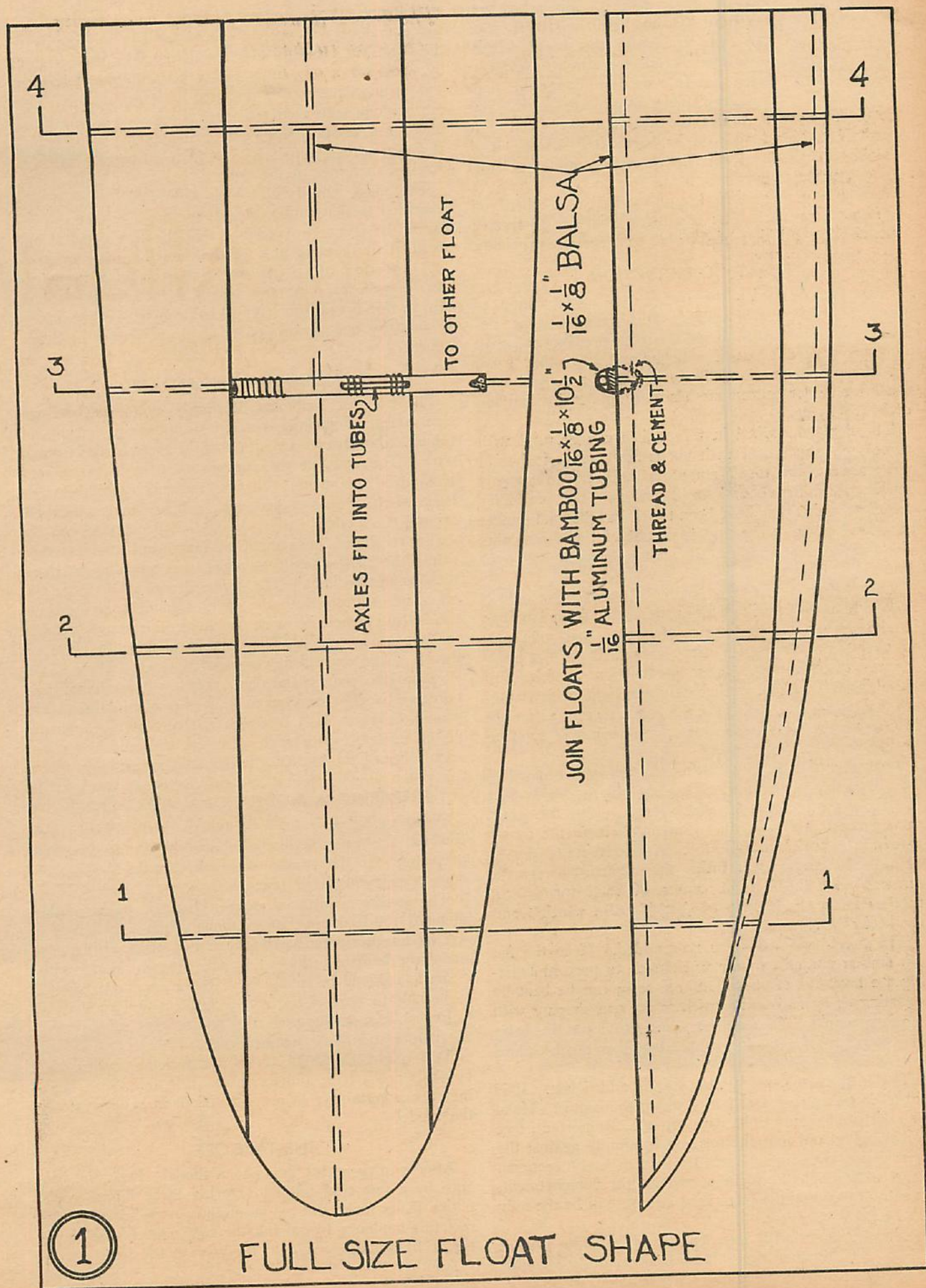
Since Morris's sensational record was established, no worth-while hydro flights have been recorded. The present list of N. A. A. records does not include outdoor R. O. W. efforts. Hydro flying should be encouraged, because it's probably the most thrilling branch of modeling. Getting a ship off the water and into the air for a long flight is a job packed with thrills and suspense. The ever-present danger of tipping over during the take-off, with resulting complications, far overshadows the excitement in land-plane flying.

The successful hydro should be stable on the water as well as in the air. Landings on water in addition to take-offs prove the model's worth. I've always considered that flying a model from a trough or small pool where it is certain to land on the ground is "sissified," compared to flying from a large lake. If your model tips over in a trough, you can recover it before it has



Top view, showing struts for attaching to plane.







had a chance to become water soaked. But when you let one go from the shore of a lake, you must keep your fingers crossed. In case of disaster the model is sure to be thoroughly saturated before you can recover it.

As for the landings, they're even more dangerous than the take-offs. Calm days on the water are a rarity, and the breeze always carries the model away. And if it hasn't been blown over on its back after landing, it is certain to drift downwind just about as fast as a land-going modeler can row a boat.

You take your model's life into your hands when you fly it on the water. The treatment it is sure to receive demands the solution of difficult construction problems.

### FLOAT CONSTRUCTION

First let's consider the design and construction of floats. The success of your model hinges on proper design. Last month the Model Workshop presented a set of paper-covered floats for beginners' and other small models. This month we'll round out the subject with floats for bigger contest models and a general discussion of hydro flying.

The floats described in this article can be used with success on any model with about 200 square inches of wing area. The displacement is sufficient to support models weighing up to 7 or 8 ounces. The particular model on which they have been tested weighed 4.3 ounces as a land plane. The added weight of the floats, plus the additional strands in the motor brought the total up to 5.8 ounces.

These floats are covered with  $\frac{3}{32}$ " sheet balsa, which is easy to waterproof and does not suffer from landings in stubby weeds or stony roads. I've used one pair of sheet-balsa floats for six years with a negligible amount of repairing. The construction technique of these floats is unique in that only two light balsa stringers are used—and both of these serve merely as an aid in construction. All the necessary strength is supplied by the sheet-balsa covering.

Begin construction by cutting the top center panel to the shape in the drawing. Next cut out the seven float formers shown from  $\frac{1}{16}$ " sheet balsa. Run the grain of the balsa up and down. Cement them to the center panel at the positions indicated. Add sections of  $\frac{1}{16} \times \frac{1}{8}$ " balsa to the center piece, fitting the balsa in between the formers. In the bottom center of each former cut notches for a single strip of  $\frac{1}{16} \times \frac{1}{8}$ " balsa which forms the keel of each float.

The sheet-balsa sides are now added. Keep the flat top section pinned to your workbench to prevent twisting the float out of shape. Sheet balsa can be bent by steaming or by moistening with saliva and shaping with the finger tips. The quickest way is to force the balsa into shape, using pins and rubber bands or pinch clamps to hold it while the cement dries.

The bottom covering of the float is added last. It is put on in two pieces and joined along the center. Make all joints and seams tight with cement. Important, too, is making certain that the formers fit snugly against the sheet balsa covering. Each float is in eight sections. Each section should form a water-tight compartment. In case of damage, the punctured section will be the only one to fill with water.

Join the floats with two lengths of bamboo  $\frac{1}{16} \times \frac{1}{8} \times 10\frac{1}{2}$ ". At the same time attach four small  $\frac{1}{2}$ " lengths of tubing on top of the ends of the bamboo, to serve as

attachment fittings for fastening the floats to the model. Cement alone will probably hold the bamboo rigidly to the float, but I like to give the joint additional strength by wrapping a few turns of thread around the bamboo and through the top of the float and the former. This can be done with a curved piece of piano wire pinch-hitting for a needle. This will probably tax your ability as a seamstress, and it is helpful to cut away small sections of the sides of the float.

The small lengths of tubing should be threaded and cemented to the bamboo float joiners. The distance between the front two pieces should be just equal to the tread of the landing gear of the model.

A covering of tissue over the balsa is a necessary step in waterproofing the floats. Use banana oil liberally in this operation. The floats can be further waterproofed by one or two coats of clear lacquer or heavy dope.

### MOUNTING THE FLOATS

The front of the floats fit rigidly on to the landing-gear axles, which are inserted through the sections of tubing. The rear float support is a piece of #14 piano wire. The ends of the rear support fit into the rear sections of tubing and the wire extends up to the fuselage, where it is fastened with rubber bands which fit around the model.

The distance between the floats and the fuselage should be just enough to allow the propeller to clear the tips of the floats. The angle at which the floats are set varies slightly with the type of model. In general, the setting which is most satisfactory is one in which the top surface of the float is parallel to the line of thrust. The rear float support can be lengthened or shortened to change the float angle. Of particular importance is the location of the step of the float. It should be 1 or  $1\frac{1}{2}$ " forward of the center of gravity of the model. With such a set-up, the model will not rock forward on its floats under full power.

### PREPARING A MODEL FOR WATER FLYING

A strong wing is needed on a hydro. After a bad landing, the wing is likely to absorb  $\frac{1}{4}$  to  $\frac{1}{2}$  pound of water. If the spars are weak, the wing will collapse when you lift it out.

The fuselage must be equally rugged. Your light-fingered touch doesn't mean much when you handle a wet model. Longerons will fold in and struts will be permanently deformed unless they are rugged to start with.

Models should be collapsible. It's a great convenience to be able to remove the wing, elevator, and rudder.

Probably superfluous is the advice that all parts of the model should be waterproofed.

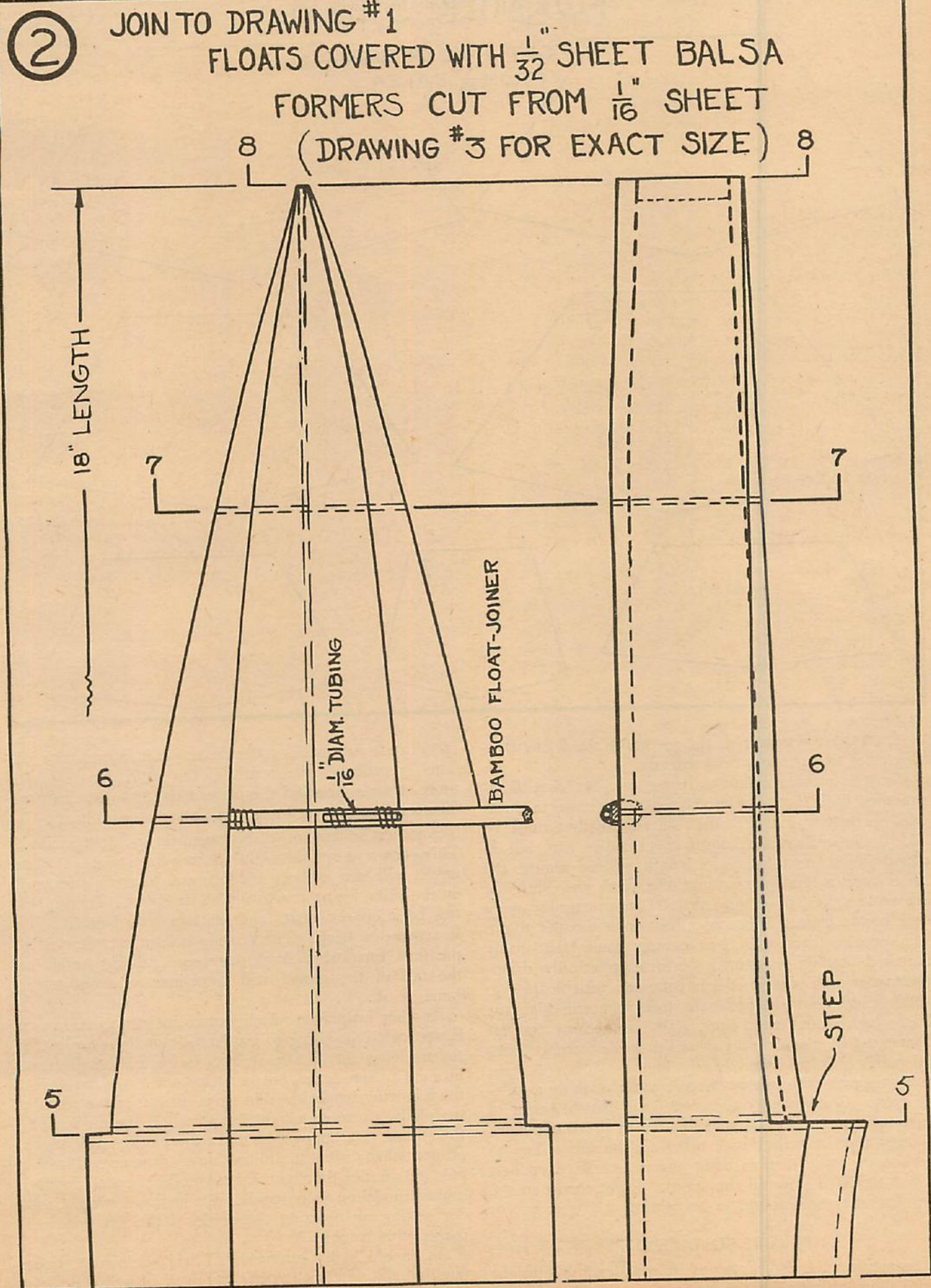
You might think all these precautions against bad landings are a trifle unnecessary. But a few bad landings are a certainty, so prepare for them before you fly the model.

### THE TAKE-OFF

After you've added floats to a model, check the balance by a few trial flights. During these flights you'll notice floats make the model slightly nose-heavy. Correct this tendency by raising the rear edge of the elevator or by adding weight to the rear of the model.

Another thing that will impress you is the extreme steadiness of a float-equipped model. This results from

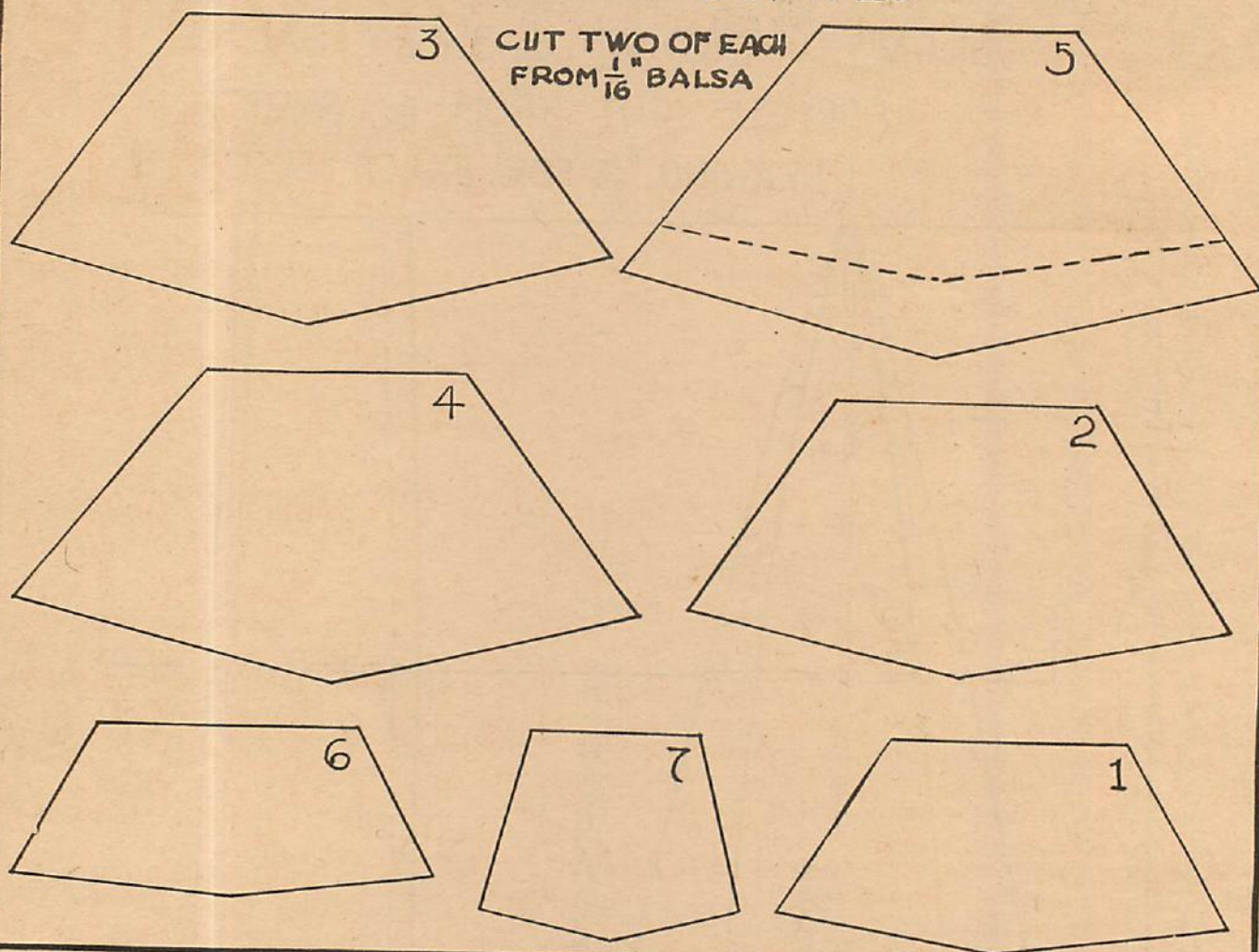






## FORMER SHAPES

CUT TWO OF EACH  
FROM  $\frac{1}{16}$ " BALSA



the increase in weight plus the resistance the floats naturally offer to any violent maneuver.

But the most pleasant surprise of your first float-equipped flight is the relatively small decrease in duration. The few extra strands of rubber that must be added will reduce the length of propeller run, but in actual flight the total flight length will be almost the same as in a land plane, since the climb and the glide are not reduced by adding floats. In practically every case, floats have a sobering effect on a model's flight. The zooms, dives, and hair-raising banks that badly adjusted models sometimes perform practically disappear when this same model is equipped with floats.

The model which circles to the right will give the least trouble on the take-off. That is because the left float must bear the torque of the propeller, and it naturally digs into the water deeper than the right. A right turn will pull this float out of the water, making a take-off easy. Consequently the model will handle better in gusty air and will usually break free of the water more quickly than a model that turns to the left. Try to develop a right turn without using excessive rudder, which tends to slow up the speed. Right thrust in the propeller has been found to be helpful.

### FAILURE TO TAKE OFF

Sometimes the model taxis in practically a straight line. The attitude on the water is good—that is, the

model rests well back on the floats, yet it fails to take off. This is probably the result of too little power. Add more strands, or wind the present motor to its capacity. The last few "power turns" will certainly pull it off.

Another source of discouragement is "porpoising." This occurs at speeds slightly lower than take-off. The model will taxi a short distance and then rock forward on its floats, losing practically all its speed. Then it settles back on the floats and starts forward again, only to repeat the trick. The remedy is to move the step of the float forward a short distance. Adding weight to the tail of the model will sometimes accomplish the same result.

Another maneuver which hydro enthusiasts insist on performing is particularly exciting to watch. It usually occurs when the model is set to turn in left circles. The right float lifts out of the water, but the left float hangs on. With the left wing banked within a few inches of the surface, the model executes a tight left turn. If the air is calm, the ending is a happy one, since the model settles down on both floats after the initial burst of power. But if a gust gets under the right wing, you'll have a thoroughly soaked model on your hands. An increase in right rudder setting or boosting the angle of the left float will correct this trouble.

As an old hydro enthusiast, I feel qualified to point out that the wind is the big bad wolf of hydro models. When he huffs and puffs, we'll all

(Turn to page 91)



THE approved-type Hammond Y is the refinement of the original Hammond "safe" light plane with which we are all familiar. Although the same general design is adhered to, the new ship differs in that its structure throughout has been re-designed.

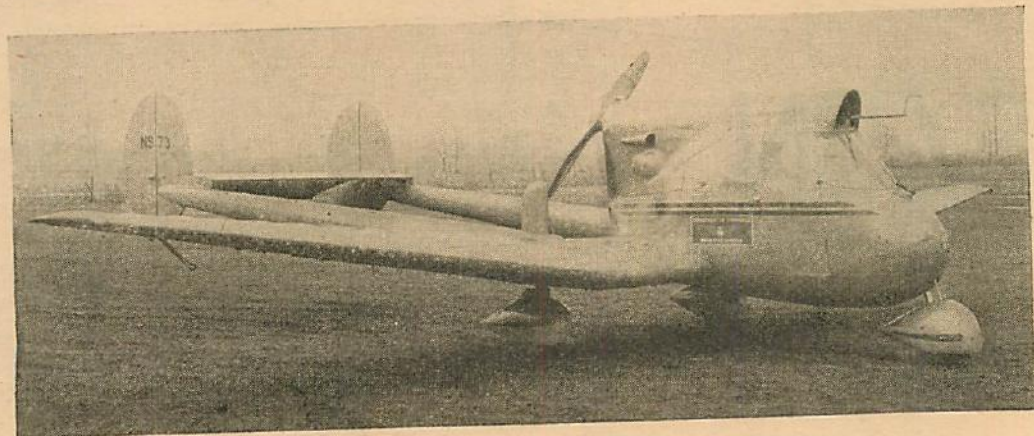
The older Hammond design was based on the use of steel tubing, wood and fabric for its structure. The latest Y is constructed of dural throughout, only the wings being covered with fabric. Consequently the general appearance has been improved, as the ship not only reveals attention to constructional details, but also presents a more pleasing form to the eye.

The wing span is 40 ft., overall length 26 ft. 11 $\frac{3}{4}$  in., height 7 ft. 7 in., and the wing area 210 sq. ft. Powered with the Menasco C-4 engine of 125 h.p., the Hammond Y has a high speed of 123 m.p.h., cruising speed at three quarters power of 112 m.p.h., and minimum speed 39 m.p.h. The front wheel is steerable to facilitate ground handling. The craft is also equipped with wheel brakes.

To begin construction of the solid model, use the fuselage block pattern given on the plans—see next page—to mark out the body profile on a block  $\frac{7}{8} \times 1\frac{1}{2}$ " to the required length. The sizes specified throughout are slightly greater than required. Shave away the excess balsa with a sharp knife. Mark out the top of the partly cut block as seen on the top view. Use a jig saw to cut out the window portion before carving the sides to shape. Round the block to the desired cross sections, using the templates given to check the work. Sand the finished fuselage block with fine paper. When sanding, do not round the edges of the flat portion that is to fit the wing cut-out. The window frames are small pieces of strip inserted and cemented in place.

## HAMMOND Y

The wings are made of  $\frac{3}{8}$ " thick stock. Mark them out as seen on the top view. Use the pattern given to mark the cut-out to receive the body. Pare away the excess balsa. Although it is tedious, the wings have to be tapered as seen on the front view. Shape the semi-carved wing blank to the required rib curve, checking your work with the two rib sections given on the plan.



Sand the completed wing with fine paper. To provide the dihedral or upward tilt of the wings, a small slit must be cut in the upper surface at the proper spot and the outer panel forced upward until the wood cracks slightly. Cement the break so that the structure will hold its shape.

Cement the fuselage block in the wing cut-out. Use

# Private Air Bus

*An answer to the government's demand for foolproof, easy-to-fly planes is the ship on the cover, presented here in a quarter-inch solid scale model.*

by William Winter

wood filler to mold the wing fillet and to fill the dihedral cracks remaining after the previous operation.

Cut the tail booms from  $\frac{3}{8} \times \frac{1}{4}$ " balsa, as seen on the top and side views. Shape them to the general section D-D given on the plan and sand smooth.

The tail surfaces are cut to shape from full  $\frac{1}{16}$ " sheet. Round the edges, sand and cement in position.

The wheel pants may be cut to shape from  $\frac{3}{8}$ " sheet scraps remaining from the wing. An optional built-up method that is preferable is illustrated on the plan.

The wheels are cut from  $\frac{1}{4}$ " sheet if wheels of the proper dimensions are not obtainable. Endeavor to obtain  $\frac{3}{8}$ " balloon-type wheels.

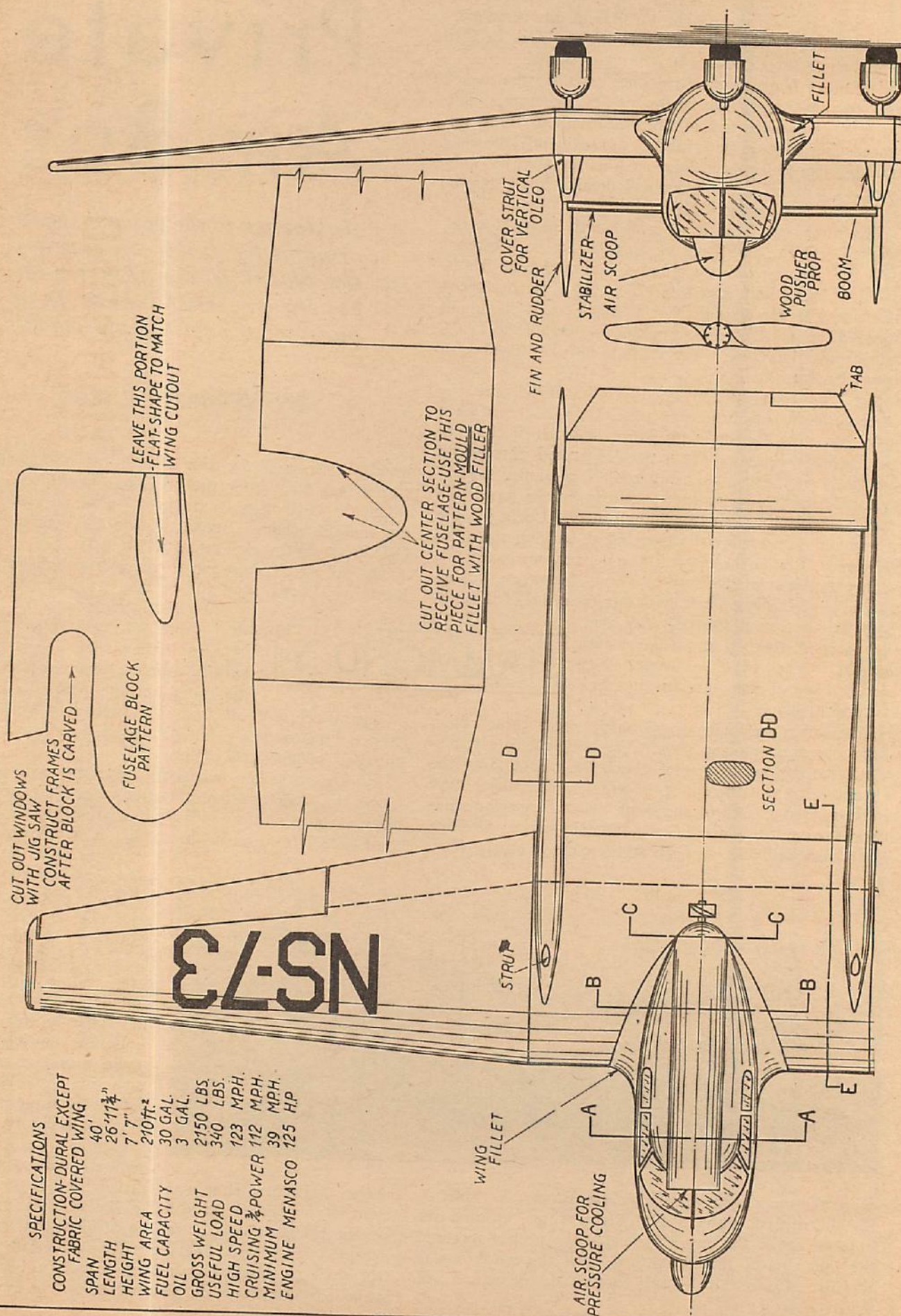
Cut the propeller blank from a scrap of  $\frac{3}{16} \times \frac{3}{32}$ ". Carve the blades with a sliver of a double-edged razor blade. Sand with a small scrap of fine paper. Mount the finished prop on a pin so that it is free to spin.

To complete the details, note that a strut extends vertically from each of the rear wheels. Shape these struts from  $\frac{1}{16}$ " sheet. The exhaust stacks are made from  $\frac{1}{16}$ " square wood, rounded and mounted on the one side only.

Before painting, give the model a coat of clear varnish or white shellac to fill the wood pores. When dry, sand lightly. Apply the paint in accordance with any color scheme you

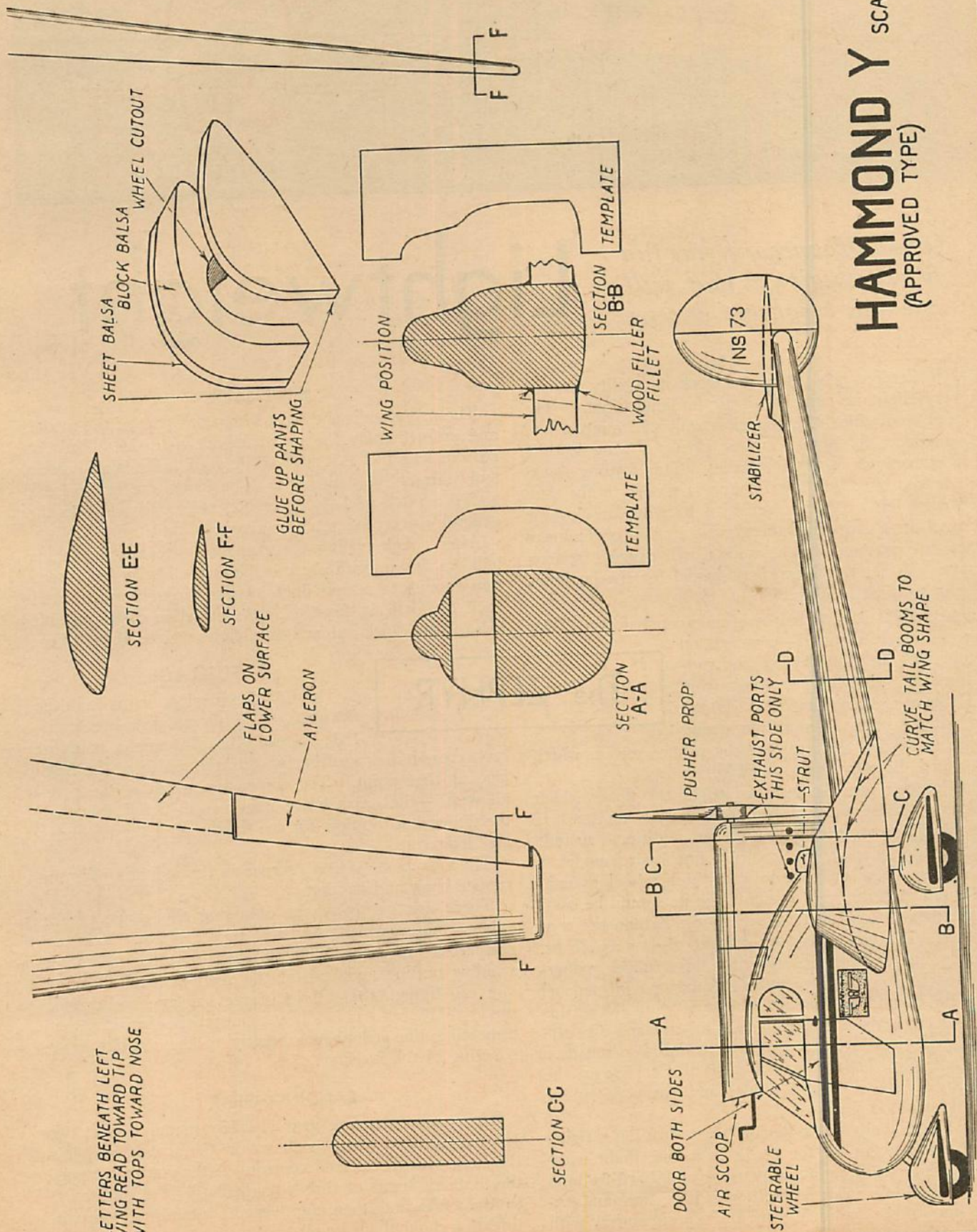
prefer. The first Hammond Y delivered to the government has a polished metal finish, but as a plane intended for the private owner, it can be furnished in any colors desired. Trim with fine black lines to locate the control surfaces, etc. The use of very thin black paper strips is recommended for this purpose. The model plans are on the following pages.



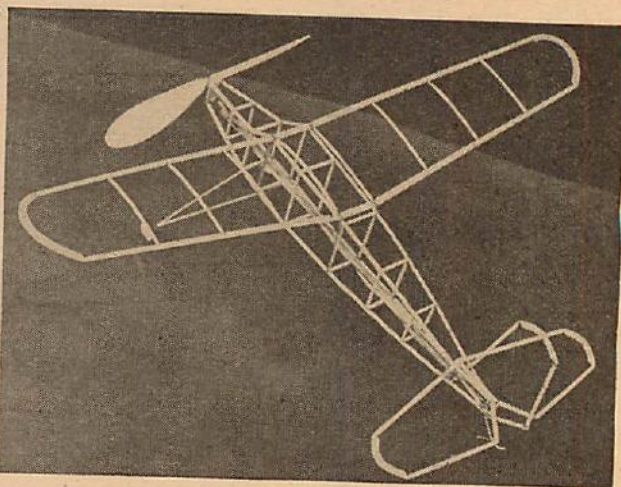
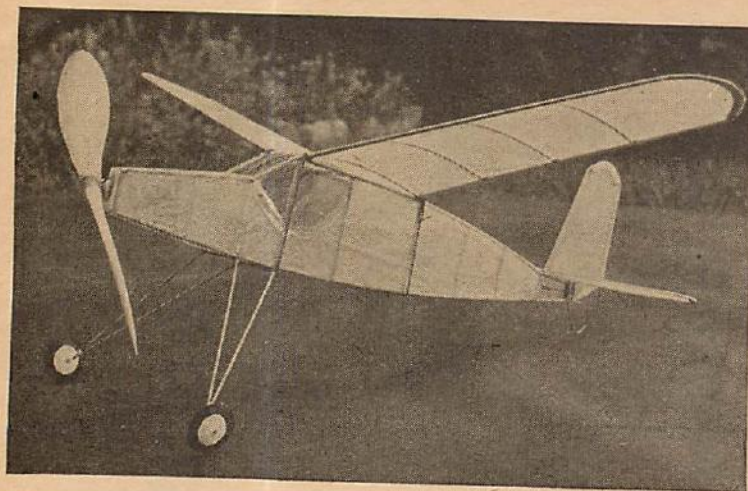




LETTERS BENEATH LEFT  
WING READ TOWARD TIP  
WITH TOPS TOWARD NOSE







*One-half ounce of flying fun  
for the beginner that will  
ride the slightest breeze.*

# Lightweight

THE Zephyr gets its name from its ability to ride very slight up-currents of air for long flights. The weight of this little model is only .52 ounces, and the wing area 82 square inches, giving a wing loading of .32 ounces per 50 square inches. This loading is too low for contests, but the Zephyr is easier to fly than heavier models. It's not sensitive to wing or elevator settings. If it dives into the ground during preliminary flights, the extremely light weight will prevent serious damage. In short, an excellent model for the beginner tackling his first fuselage job.

Light weight is obtained by simple construction. The wing is single-surfaced—covered on the top side—and the elevator and rudder likewise. The fuselage, built from 3/32" square balsa longerons, is the most rugged part. It must be strong enough to absorb the strain of the rubber motor, which is attached directly to the fuselage.

The landing gear is designed to fit the floats which were described in the October issue of AIR TRAILS. If built slightly more sturdily, with a few additional strands of rubber, the Zephyr will make a fine hydro model.

It can be flown indoors in your high-school gymnasium or auditorium. Two-minute flights should be easy. If you intend to do much indoor flying, lighten the construction. The weight can be reduced as low as .25 oz. by using lighter fuselage structure, less rubber, paper-thin propeller, and lighter tail. A quarter-ounce model can be flown outdoors in calm, dry air. A model of this weight needs only a suggestion of an upward air current to carry it away. In fact, our model is so sensitive to currents that I have seen a gust of air pick up the wing of the dis-assembled model and carry it out of sight, high in the sky.

Even if the Zephyr does decide to go away on a rising current, you'll enjoy all the thrills of a long flight without the pain of losing an expensive and hard-to-build plane. The Zephyr can be built with little time and expense, and offers an ideal way of experimenting with thermal current flying.

## The ZEPHYR

### PROPELLER

The propeller is the most important part of the model, and unfortunately the most difficult to make. For this reason, let's tackle it first while your knife is still sharp and your enthusiasm high. The block size is 7/8x1x9", giving a pitch of 12 1/2", a value which falls close to the generally accepted pitch-to-diameter ratio of 1 1/2.

After rough-cutting the propeller with a knife (some builders find a small plane helpful) the blades are sanded thin enough to permit light to pass through and to bend back or forth at least 1". A propeller cut from soft balsa with a thick hub and thin blades weighs about 15 oz.

### FUSELAGE

The full-size fuselage is given in the drawing. The top view has been omitted; instead, the dimensions noted at

each cross-brace position indicate the width of the fuselage at that point. The dimension given is the overall width—the cross brace itself is cut 3/16" less than the dimension to allow for the thickness of the two fuselage longerons.

The rear post, 1/8x1/4", serves as the mounting for the rubber hook and rudder.

There are two ways of obtaining the shape of the cabin window which is visible in the photo. You can add cross braces of 3/32x3/32" balsa to serve as the window outline and cement the cellophane to them, or you can lighten the weight of the fuselage by omitting the cross braces (as has been done in the drawing) and cementing the cellophane directly to the cut-out tissue covering of the fuselage.

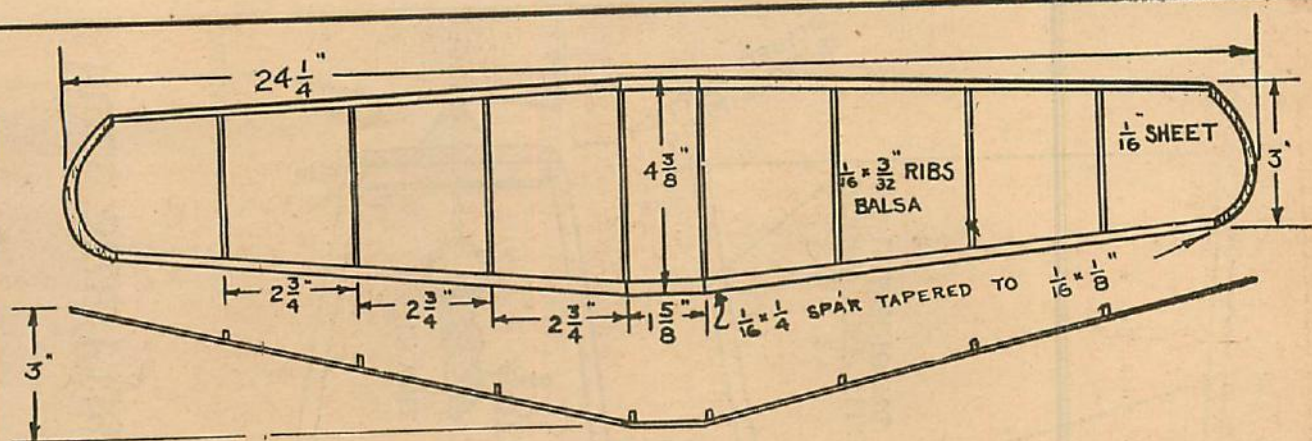
### LANDING GEAR

The bamboo landing gear is easily made. Select two 12" pieces, bend them as shown in the sketch, and join the ends with thread and cement. After you've wrapped the first few turns of thread, cement the bent wire axles to the ends and then add several additional loops of thread to hold them in place.

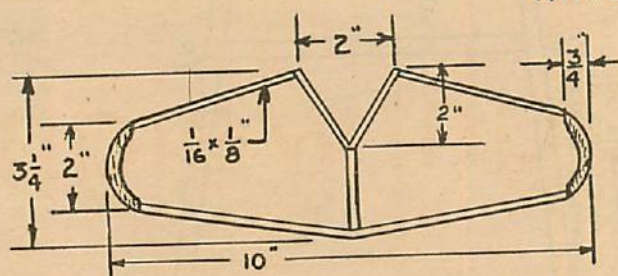
One interesting feature of the

(Turn to page 91)

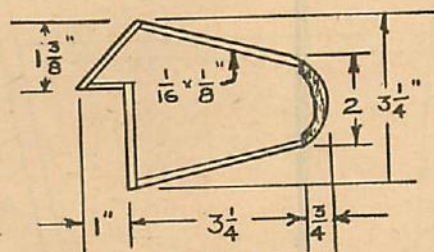




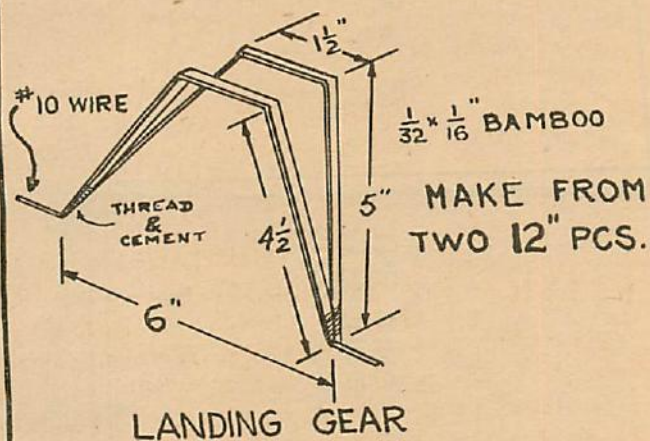
WING



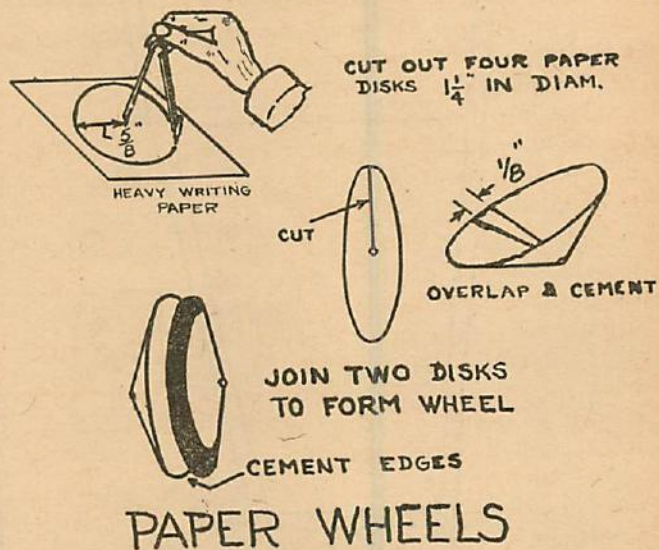
ELEVATOR



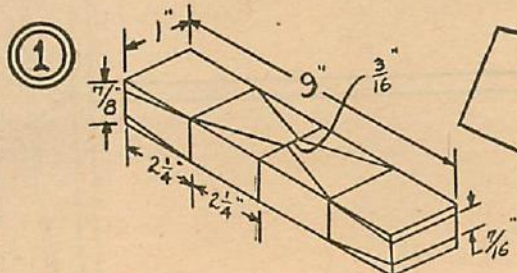
RUDDER



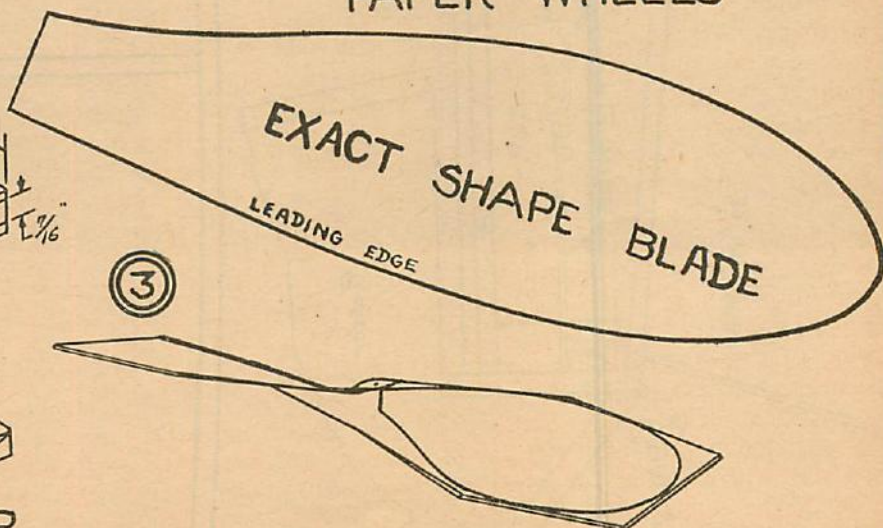
LANDING GEAR



PAPER WHEELS



PROPELLER

EXACT SHAPE BLADE  
LEADING EDGE







# The Discussion CORNER

*The model art progresses through exchange of ideas. The Discussion Corner is a monthly sounding board for your opinions. This month readers discuss the greatest difficulty in model building and in flying. For December, the subject is weight rules and changes in contest procedure. Other topics are listed below. Think about them, then write your opinion in 150 words or less and send it to The Discussion Corner. One dollar is paid for each answer printed.*

THE step in model building that gives me, and the majority of model builders, the most trouble, is the carving and balancing of the propeller. This difficulty can only be overcome by schooling oneself in patience and painstaking care. I have ruined many promising props by my haste and impatience.

One might say that the chief difficulty in securing a good flight is getting the model in a "riser," but all facetiousness aside, the prime requisites are a good climb and a fairly good glide, then, if there are any thermals, you have a good flight. The combination that makes for good climbing and soaring ability can be found by careful study of proportionment of surfaces and the choice of proper airfoils. Experience helps a lot in this.—R. L. SLOANE, Columbus, Ohio.

Covering the wings gives me the most trouble. Tissue, especially has a tendency to sag. To overcome this difficulty I glue an extra  $\frac{1}{8}$ " spar into specially cut notches in the center of the top of each rib.

The chief trouble in getting a good flight is balancing the model so it will fly straight and not zoom or dive. I pin the wings onto the fuselage for a temporary setting. When I've found the correct position I cement the wing to the fuselage.—LEO PRAVATINER, New York, N. Y.

I find in the art of model building the most trouble in doping wings without having them warp. To overcome wing warping I pin the wing down and go through the process of doping.

In contests that I have participated I have found that the chief difficulty is getting my models to take off the ground without being knocked down by the wind.

Because of my poor take-offs I have tried many ways. The best I found was to face the model a little sideways and let the propeller spin until I felt the model pull away from my hands.—WALTER CARACCILO, Forest Hills, Long Island.

I find the hardest step in making a flying model is covering it. Because it is hard to keep the paper from wrinkling. The best way to avoid this is to iron the paper before putting it on the model. Be sure to keep

the grain of the paper lengthwise with what you're covering. If this is not done when you spray the wing with water, it will shrink and warp. My chief difficulty in getting a good flight is balancing the model. Adding weights is the best way to balance a fuselage model. And for stick models a convenient way to get balance is to equip the model with a landing gear.—JACK RYAN, Overbrook, Pennsylvania.

From my point of view the main model building difficulty to the average builder is not in construction but in flying the model correctly.

I have seen builders try to fly unbalanced planes by adjusting the stabilizer or changing the incidence angle. This may change the power flight but the model is sure to glide erratically. Following are some suggestions as to the procedure in attaining a well-balanced flight:

1. Model must balance  $\frac{1}{3}$  wing chord back from leading edge when held at wing tips.
2. Glide test the model. Change the stabilizer setting until a smooth glide is obtained.
3. Fly a model with a few winds. If the model stalls under power add a few degrees of down thrust until a satisfactory climb is obtained.
4. When the model climbs smoothly and glides to a neat landing with no turns left in the motor it is adjusted correctly and may be given a left or right turn.—WILLIAM RABER, Glendale, Long Island.

COMING UP are these topics:

For January—Should the present classifications—Junior, Senior and Open—be continued? What should be the age limits for each class? Would you object to having every one compete in the same contest for the same prizes, regardless of age? Answers must reach us by November 1st.

For February—How much gas should be allowed each model for contest flying? Or do you favor discarding the present idea of maximum duration and substituting controlled flight in which the model would be judged on ability to land near a designated spot plus flying characteristics and appearance? Answers must reach us by December 1st.

## *This Month's Topic*

**What step in building a flying model gives you the most trouble? What is your chief difficulty in getting a good flight? Have you any suggestions for overcoming these obstacles?**



*Have you a question on model building or flying that bothers you? Bring us your problem and*



*we'll answer it in the interest of readers everywhere. Replies by mail require return postage.*

#### NITRATE DOPE

*Question: What is nitrate dope, and where is it obtainable? What is the proportion in which the thinner and dope should be mixed? E. G., Pittsburgh, Pa.*

*Answer:* Nitrate dope is a clear liquid about as thick as molasses. It is applied to the covering of airplanes to tauten the fabric and protect it against moisture, sunlight, oil, and gas from the engine. Nitrate cellulose, the main constituent of dope, will not dissolve in water, so it is mixed with a thinner of acetate or acetone compounds. This mixture is suitable for applying to the fabric by either brushing or spraying. It dries quickly enough to prevent "blushing"—white blotches of dope. Plasticizers, such as castor oil, are added to dope to prevent brittleness and cracking.

Practically every model supply house sells nitrate dope. For tissue-covered models it is considerably thinner than the dope sold for silk or bamboo-paper covering of gas models. Nitrate dopes cost about \$.75 per pint. The repair hangar at the airport is certain to have nitrate dope.

Dope for tissue covering should be thinned until it is just a trifle thicker than water. In this way you avoid excessive shrinking and the resulting warp in the framework of the model. For gas models the doping mixture can be thicker. However, it should always be thin enough to brush on in smooth, even coats.

#### WAKEFIELD WINNER MEASUREMENTS

*Question: What is the length of the fuselage, and the length and area of the wing of the Wakefield Winner? H. L., Cambridge, Mass.*

*Answer:* H. L. refers to the 1935 Wakefield Winner, plans for which appeared in April, 1936, issue of *Bill Barnes*. The fuselage length was 31 inches. Span was 40 inches. Wing area was 197 square inches (excluding the center section, which is directly over the fuselage).

#### FUSELAGE RECORD

*Question: What is the record for fuselage models, and by whom was it established? J. H., Glen Ellyn, Ill.*

*Answer:* We've heard of unofficial flights as long as 6 hours. However, the longest official flight with a fuselage model was made recently at Detroit by Chester Lanzo of Cleveland, O. He flew his model for 48 minutes 45 seconds.

#### ENLARGING FOR GAS POWER

*Question: Do you think it would be practicable to scale up a rubber-powered model for use with a gas motor? I am thinking of doing this with the Hum-*

*ding model, published in April, 1935, Bill Barnes, J. F. S., Wakefield, R. I.*

*Answer:* It's entirely possible to do this. You may find it troublesome if you're a beginner in the gas-model field, but a little patience and work will carry you through.

One change that would be desirable would be moving the wing position forward to take care of the additional weight of the motor. The lifting tail of the Humdinger needn't cause you any worry. We have found that a lifting tail works just as efficiently in a gas model as in a rubber-powered model. The two-piece strut-braced wing of the Humdinger should make an easy-to-handle gas model. And the high parasol-type wing should make it stable.

#### COATING PROPELLERS

*Question: Should propellers be coated with banana oil or covered with tissue, or should the wood be left in its natural state? R. B., Goldsboro, N. C.*

*Answer:* In small models up to 18" the propeller is not doped or covered unless it is necessary to complete the color scheme of the model. In this case colored dope makes a better job than colored tissue. In larger models, the propeller is always given one or more coats of banana oil or dope. The purpose is to smooth the surface of the propeller, increase the strength, and finally to protect it against moisture and warping.

If the propeller on the model is liable to meet obstacles that might break or splinter it, you can safeguard it by covering the blades with silk. Cement the silk to the tips of the blades. The combination of balsa, cement and silk is almost unbreakable. Covering the propeller with tissue will serve the same purpose, but to a much lesser degree.

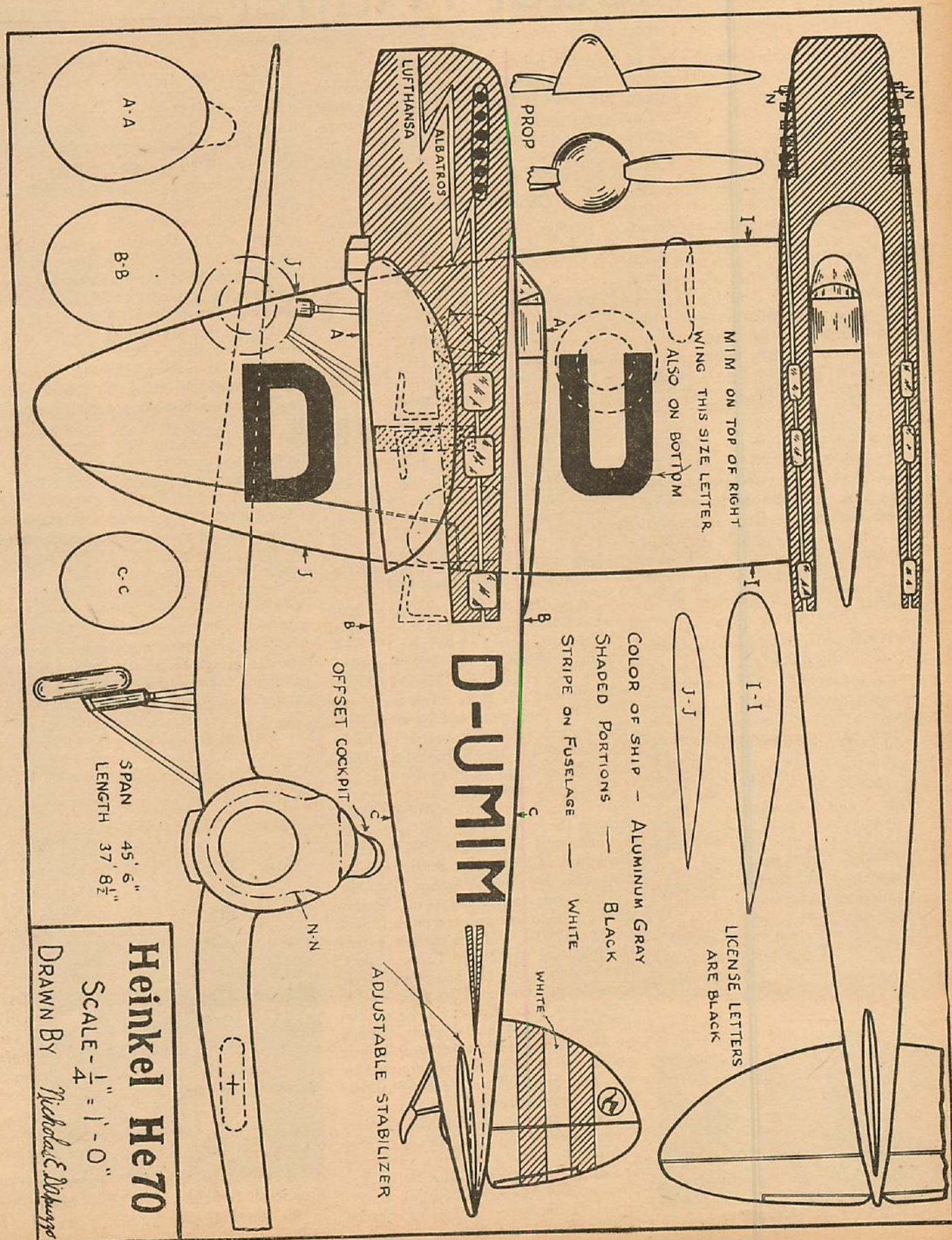
#### FOR WINDY WEATHER

*Question: What type of model is best suited for flying in windy weather? H. W. L., Galesburg, Ill.*

*Answer:* A fast-flying model with a small or medium propeller will often give a good account of itself in a breeze. A slow-flying endurance model is usually at the mercy of the wind unless additional strands are put in the motor. A heavy model will always be more stable in rough air than a lightweight ship. For good flights in windy weather, the ideal set-up therefore would be a ruggedly built, fast-flying model adjusted to fly in tight circles with a good glide after the power is gone. Models for windy-weather flying can be readily designed and built to perform well; however, their flight will suffer in calm air, since the increased weight and speed will tend to reduce the length of flight below that of the slower-flying and lighter-weight models.



# Fast Transport





*Flight records  
and contestants  
in competitions.*

# Model Matters

*Club notes and  
news of model  
organizations.*

(In contest tabulations, results are to be read as minutes (to left of colon), seconds, and fractions.)

Tulsa, Oklahoma is probably one of the most active cities in model circles. This summer they took the lion's share of prizes at the National Meet in Detroit. Boys from Tulsa won the Bloomington and Stout trophies, and placed high in almost every other event.

After the successful invasion of Detroit, the Tulsa builders went to the Texas Centennial Contest at Dallas on July 27th and won practically all the prizes. DeWitt Ross won two first places; Alvie Dague, Jr., won a first place and one second; Paul Bowlin took a first; and Barbara McMinn—the only girl entrant—won two first places. All these winners were from Tulsa.

The Model Aeronautical Engineers Club of Tulsa is largely responsible for the progress the Tulsa builders have made. Organized in 1933 by a few modelers, the club has grown in membership and interest. In 1935, W. S. Collier, airport and flying-service operator, became the club's sponsor. Present membership is 38—all active members. Friday-night meetings are in the Tulsa Y. M. C. A. Officers of the club are: Roy Wriston, president; Paul Bowlin, vice-president; Vernon Sears, secretary; and Bruce Luckett, treasurer.

## JUNIOR AVIATION LEAGUE OF BOSTON

A wind tunnel designed for model airplane testing is being built by the Experimenters' Club of the JAL. This is one of the few wind tunnels ever designed for model work. Results of experiments should prove valuable to model plane science. Veteran New England modelers—Phillips, Capo, Marchi, Tyler, and Lewis—are developing the tunnel, and actual tests will soon be under way. Results of experiments will be made public to all interested model builders.

## Junior Birdmen National Contest Boston

Competition was stiff at this contest. The three highest entrants each collect-



The result of an 800-foot plunge.

ing 125 points. Frank Kiewicz of Detroit was finally awarded first place on the basis of total duration for the three events. The following list of winners, along with the length of flights, will show how closely contested this meet really was:

### Glider (hand launched)

	Points
1. Leighton Webb, Rochester	6:02 100
2. Wm. H. Paxton, Atlanta	5:57.2 75
3. Wallace Simmers, Chicago	3:52 50

### Stick

	Points
1. Kenneth Lane, Milwaukee	11:05 100
2. Frank Barrett, Boston	9:48 75
3. Dick Sherman, San Antonio	7:27 50

### Cabin Fuselage

	Points
1. Frank Kiewicz, Detroit	11:01 100
2. Wallace Simmers, Chicago	9:35 75
3. Frank Barrett, Boston	6:23.6 50

### High Point Winners

	125 points	18:35.6
1. Frank Kiewicz	125	18:35.6
2. Wallace Simmers	125	17:33.6
3. Frank Barrett	125	17:04.6

Kiewicz won \$250 and an airline trip to the National Air Races in Los Angeles. Simmers was awarded \$100 while Barrett received \$50 for third place. In this event the best flights were added.

## THE 1936 MISSISSIPPI VALLEY MODEL AIRPLANE MEET

Competition on a par with the 1935 and 1936 National and International Model Airplane Contests was the prevailing condition in the sixth Mississippi Valley Model Airplane Meet held August 21 and 22, 1936. The meet was originated and sponsored by Stix, Baer and Fuller, was co-sponsored by Parks Air College and the Young Men's Division of the Chamber of Commerce.

The meet, regional in scope, brought boys from all parts of the Middle West. Among the cities which sent large delegations were Sheboygan, Wis.; Little Rock, Ark.; Chicago, Ill.; Burlington, Ia.; Louisville, Ky.; and Jefferson City, Mo.

There were twelve events on the program. The indoor events were held first on August 21st, and the outdoor events the following day at the Parks Airport, immediately across the Mississippi River opposite St. Louis. Two free six-day trips to the Texas Centennial Exposition in Dallas and 120 prizes, which included trophies, cups, gold, silver and bronze medals and certificates, were donated by Stix, Baer and Fuller and other St. Louis business organizations.

Lennox Murphy of St. Louis, 14-year-old member of the local club, and Roy Marquardt, Burlington, Iowa, each won one of the free trips to the Dallas Exposition, and Albert W. Courtial, Jr., received the big three-year trophy awarded by Stix, Baer and Fuller.

Flying began promptly at 10 o'clock, and as the indoor events progressed, many excellent flights were made, among them being Ralph Kummer's indoor stick, which remained in the air for 21 minutes and 18 seconds. Sidney Axelrod of Chicago had designed and built an adjustable-pitch propeller for indoor ships, and the way his ship performed in a flight of 19 minutes and 30 seconds gave him second place, and proved he had uncovered a new wrinkle in this sport of indoor model building. In the open-class competition, Carl Goldberg of Chicago sent his ship up for the record duration flight of the day—22 minutes flat. It was an effort to improve his own world record.

The indoor fuselage event was won by Albert Courtial of St. Louis with a flight of 12 minutes, 15 seconds. Although this was comparatively poor time for Courtial's ship, under the conditions it was not so bad.

On August 22, the second and last day of the meet, the outdoor entrants went to Parks Airport. Special chartered busses carried hundreds of spectators and contestants to the airport bright and early in the morning. Others came by auto and some by "thumb."

The entire airport and facilities were turned over to the model airplane fliers and flying began about 9:30 a. m., continuing steadily throughout the day.

A crowd of several thousand spectators were on the field to enjoy the antics of the little ships in the strong wind. Wallace Simmers of Chicago, after a little difficulty, got his senior fuselage



Raymond Podolsky, first-prize winner in the Internal Combustion powered event. Mississippi Valley Meet, 1936.





A general view of the indoor meet at the Arena Building, Mississippi Valley, 1936.

model off for the winning flight of the day in that division, with a trip into the blue, cloudless sky for 13 minutes, 6 seconds. Roy Marquardt of Burlington, Iowa, won first place in the senior stick type with a flight of 6 minutes and 13 seconds, but Bob Donahue of St. Louis came a very close second with a fine flight of 5 minutes and 48 seconds.

The open-class contest winners provided an upset. Two parents of contestants walked off with both first prizes! Mr. John Foerster won the top prize in the fuselage-type event, and Mrs. Martha S. Dodd took first prize in the stick-type event. Both of the winners' models were well built, and flew consistently well. Hats off to the pas and moms!

The biggest attraction of the meet was the contest for the large airplanes with gasoline-powered motors. About thirty of these were entered, and as usual was packed with thrills. Ray Podolsky of the Stix, Baer and Fuller Model Airplane Club won first, with H. A. Thomas of Little Rock, Arkansas, and Bud Weilt of Mt. Vernon, Ill., a very close second and third, respectively.

One of the most awing sights of the meet was when the gas model of John Thomas of Little Rock, Arkansas, lost its wing in mid-air high above the airport. The eight-foot ship made two tight turns and then plummeted vertically to the earth, where it crashed into hundreds of pieces, including the motor.

### Results of the 1936 Mississippi Valley Regional Model Meet, Aug. 21-22, 1936

#### Indoor Stick

Junior	
1. Lennox Murphy	7:25
2. Robert Gibbs	6:51
3. Fred Zaiser	4:40

#### Indoor Fuselage

Senior	
1. Albert Courtial, Jr.	12:15
2. Donald Dodd	11:19.5
3. Curtiss Janke (Wis.)	9:42

#### Indoor Stick

Senior	
1. Ralph Kummer	21:18
2. Sidney Axelrod (Ill.)	19:30
3. Albert Courtial	16:35

#### Indoor Stick

Open	
1. Carl Goldberg (Ill.)	20:34
2. Joseph Matules, Jr.	16:59
3. Wm. Azbell	15:32

#### Outdoor Stick

Senior	
1. Roy Marquardt (Ia.)	6:13
2. Bob Donahue (Ill.)	5:48
3. Bill Kohl	3:08

#### Outdoor Fuselage

Senior	
1. Wallace Simmers (Ill.)	13:06
2. Walter Erbach	9:30
3. William Elliot	3:28

#### Outdoor Stick

Junior	
1. Franklin Essner	2:12
2. Tom Gettys	2:08.5
3. Harry Purviance	1:35

#### Outdoor Stick

Open	
1. Mrs. Martha Dodd	2:50
2. John Foerster	2:33.4
3. Frank Nekimken (Ill.)	1:46

#### Indoor Fuselage

Open	
1. John Foerster	4:18
2. Wm. Schelhammer	3:49.5

#### Outdoor Fuselage

Open	
1. Billy Riordan	4:16
2. Robert Gullfooy	1:49
3. Stanley Dubowski	1:09

#### Amateur Sweepstakes

1. Frank Burgert	3:37
2. David Seltzer	1:53
3. Harold Zabloudit (Wis.)	1:45

#### Gasoline Event

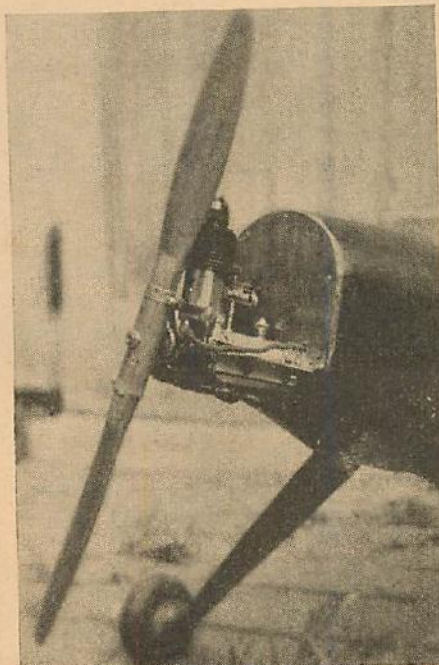
1. Ray Podolsky, St. Louis	10:16
2. H. A. Thomas (Ark.)	9:01.5
3. Bud Weilt (Ill.)	8:45

### THIRD ANNUAL OUTDOOR FLYING MEET, LEBANON, PA.

August 29, 1936

Conducted by Lebanon Exchange Club  
Sanctioned by the  
National Aeronautic Association

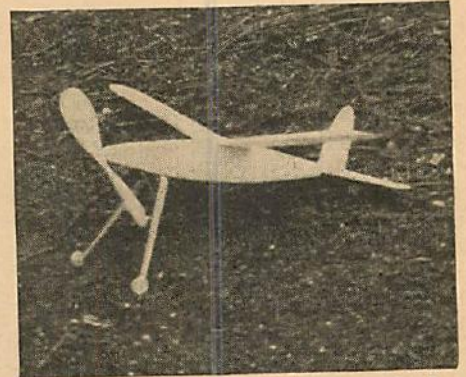
Seventy model builders from Pennsylvania, New York, New Jersey, Delaware, Virginia, Maryland, and District of Columbia made this meet the most successful ever conducted in this city. The severe rainstorm which swept over the eastern States the night before the contest probably kept many of the less hardy modelers from attending this contest. Gusty weather with few good currents kept the models near the ground,



Variable pitch propeller for gas model.

and no championship flights were turned in.

Fully fifteen hundred people turned out to watch the model flying. Events were run off smoothly, and an amplifying truck kept the spectators and contestants informed about the progress of the meet. Gas models continued their upward surge in popularity. They proved to be the favorites with the spectators and contestants alike, since fully forty gas models were entered in that event.



Capo's fuselage model set a Junior Birdman record in the New England eliminations.

### Tabulation of Winners of 3rd Annual Lebanon Outdoor Meet

#### Glider (tow-line launched)

1. Stephen Kowalik, Wilmington, Del.	1:35.6
2. James Koller, Reading, Pa.	1:57.5
3. Walter Deshler, Phillipsburg, N. J.	:51

#### Glider (hand launched)

1. Louis Van Rossum, Baltimore, Md.	:25
2. Thracy Petrides, New York City	:24
3. Alec Landis, Lebanon, Pa.	:22.5

#### Stick (hand launched)

1. John Becht, Philadelphia, Pa.	5:11
2. Erwin Leshner, Philadelphia, Pa.	4:34
3. Sol Schwartz, Philadelphia, Pa.	2:50

#### Fuselage (R. O. G.)

1. Sol Schwartz, Philadelphia, Pa.	4:15
2. Erwin Leshner, Philadelphia, Pa.	3:37
3. Joseph Urban, Baltimore, Md.	2:34

#### Free for All

1. John Becht, Philadelphia, Pa.	7:11
2. Walter Dickinson, Newark, N. J.	2:27
3. Irvin Shiffer, Elizabethtown, Pa.	2:15

#### Gas Model (1/16 ounce per pound)

1. Jennings Tinsley, Washington, D. C.	10:8
2. Walter Dickinson, Newark, N. J.	5:1.4
3. Fred Price, Newark, N. J.	4:29

### CHICAGO PARK DISTRICT CRAFTS SECTION

#### Results of All-Chicago Model Airplane Contest

Directed by Chicago Park District  
Sponsored by American Legion  
Post 775

The American Legion and the Chicago Park District collaborated in running an All-Chicago Model Airplane Contest. The Outdoor Fuselage (R. O. G.) was held August 8th, at the Chicago Meadows Golf Course, 5900 S. Cicero Avenue. The Exhibition Scale Model contest closed August 12th, at 3:30 p. m., and the Indoor Duration Contest was held August 15 at 124th (Turn to page 90)



# MURDER OVER HOLLYWOOD

(Continued from page 16)

minutes later. Small looked around in amazement as he entered the hidden bombproof room that contained all of Bill's secrets.

"The police after you?" Small asked with a grin. "I'm glad to see you again, Bill." They shook hands, and Small dropped into a large leather chair while his eyes traveled around the room.

"I'm glad to see you, Len," Bill said. "I thought you were in Hollywood?"

"I am, figuratively," Small said. "The president of MRO wanted some important papers in New York this afternoon, and he didn't want to trust them to the mail. When anything like that happens I'm the errand boy. Henry Holt told me yesterday you were coming out to give him a hand. I thought I'd drop in and say hello and welcome you to Hollywood—without the roses and the brass band."

"What's the set-up out there, Len?" Bill asked. "Holt sounded pretty desperate when he talked to me."

"He is desperate," Small said. "He's in a jam. His director has killed three men, and no flier will touch the picture with a ten-foot pole. I'm working with him, and I have four men under me. But we fly our own ships. We're sure of 'em."

"Any idea how those three men were killed?" Bill asked.

"Structural faults or carelessness," Small answered. "If you take my advice, you won't go near the place. There is something peculiar about the whole thing."

"Holt told me he had strengthened and rebuilt his Spads and S. E. 5s," Bill said. "I'm going to hop down to the Smithsonian in Washington in the morning and look over some of the old models they have there."

Bill picked up one of the telephones on his desk as its bell buzzed, and spoke into the mouthpiece.

"Sure, come on down," he said, and hung up the receiver. "That was Shorty Hassfurther. Weren't you with him for a time during the War?"

"Hell, yes," Small grinned. "I knew him when he was a fair-haired boy with an ideal."

"I'm going to take him to Washington with me in the morning. He knows more about Spads and S. E. 5s than I do."

"He knows more about a lot of things than most people do," Small said.

Bill looked at Small quickly to see if his remark was supposed to be a sarcastic one. Small's face was expressionless. But a moment later, when "Shorty," his squat chief of staff, shook Small's hand he could tell by Shorty's

expression that there was no love lost between the two.

"Hi-yuh, Small," Shorty said, and busied himself studying a blue print tacked to a drafting board.

"Gaa-see-gen," Small grunted. But it was very evident that he wasn't glad to see Shorty again. Bill watched the silent feud between them without indicating he was aware of it.

"Just a couple of old war horses," he said. "You two are lucky you're here."

"Yeah," Shorty said with a voice that was like finger nails scratching on slate. "I'm lucky, eh, Small?"

"You always were shot full of luck," Small returned coolly, and got to his feet. "I'd think it over a long time before I mixed in that job out West, Bill," he said. "Must toddle along. Have an amphibian. Going to land her up the river. I'll see you both if you come to Hollywood."

He shook hands with Bill and then turned to Shorty. Shorty took his extended hand, but there was an expression in the eyes of both of them that sent a shiver up Bill's spine. Small's icelike eyes were slightly humorous. Shorty's were deadly serious and intent.

After a guard had conducted Small up to the main floor of the administration building, Bill turned to Shorty and whistled.

"You two seem to have a deep affection for one another," he said, grinning.

"I like him like I like water moccasins," Shorty said. "He's a rat."

"What did he ever do to you?" Bill asked. "Weren't you in the same British squadron for a time during the War?"

"We were," Shorty said grimly. "I never liked him. Why did he stop in here?"

"To warn me against taking a job in Hollywood," Bill said. "I think it was rather decent of him to take the trouble."

Shorty grunted.

"Scotty told you I wanted you to hop down to Washington with me in the morning?" Bill asked.

"Yeah," Shorty said. "I'd like to see some of the old War crates."

"We'll be taking off at about seven o'clock," Bill said. "Take some clothes with you. We may go from there to Hollywood."

"What does Small have to do with our proposition in Hollywood, Bill?" Shorty asked.

"He's in charge of four or five men who fly for MRO pictures," Bill said. "They've loaned him to Henry Holt to make the picture we're going to work in."

Shorty looked at Bill for a moment,

started to speak, then stopped. "O. K.," he finally said. "I'll be on the apron with my spare pair of pants at seven."

"You'd better bring a spare shirt, too," Bill grinned.

"I'd be afraid to," Shorty said. "I'd be afraid that Small might steal it."

## IV—INSPECTION TOUR

AT five minutes before seven the next morning Bill stood on the apron with Scotty MacCloskey. He was giving Scotty final instructions, not knowing when he would see Barnes Field again.

"Have Red and Cy stand by for orders," he said. "I may send for them at any time. Bev Bates is working on that aerial survey down in Tennessee. Leave him alone. Sandy is going to ride with me to-day. We won't need the Eaglet. I may want him to relieve me at the controls across the continent. Here he comes now."

Bill's face became a thundercloud as he saw that Sandy's boon companion, Alphonso, rode on his shoulder and chattered into his ear. The kid's face was scrubbed so that the freckles on his nose stood out like air beacons at night. The grin disappeared from it as Bill belowered at him.

"You leave that baboon here!" Bill shouted at him. "What do you think this is, a traveling zoo? Sometimes I think you don't have any sense at all."

"Listen, Bill," Sandy said, with no little dignity, "Alphonso is no baboon. He's—"

"I don't care what he is," Bill shouted. "Put him where he belongs and leave him there."

"He'll be lonesome, Bill," Sandy said.

Bill groaned and opened his hands in supplication to the grinning MacCloskey. He was spluttering without being able to say anything as the squat, powerful form of Shorty Hassfurther appeared on the steps of the administration building. His broad, humorous face was twisted into a grin as he came toward the little group.

"Take the monkey and leave Sandy here," he said. "They look so much alike now that no one will know the difference."

"Listen, kid!" Bill roared at Sandy as he started to answer Shorty. "Put that monkey away and get back out here. We shove in two minutes. If you're not back here you don't go. Get it?"

Sandy got it. He knew that when Bill spoke that way there was no use in trying to change his mind. He started on a run for the pilots' quarters behind the administration building.

They were all watching his flying legs take the corner of that building when



# The 97-Pound Weakling...

who became "The World's  
Most Perfectly  
Developed  
Man"

**"I'll Prove to You in 7 Days that  
YOU, too, can be this NEW MAN!"**

—CHARLES ATLAS

**W**HEN I say I can make you over into a man of giant-power and energy, I know what I'm talking about. I've seen my new system of body development, *Dynamic-Tension*, transform hundreds of weaker, punier men than you into Atlas Champions.

Take myself, for instance! I used to weigh only 97 pounds. I was a sickly scare-crow. Then I discovered *Dynamic-Tension*. It gave me a body that twice won me the title "The World's Most Perfectly Developed Man." It'll work just as big a change in you, too! I'm so sure of it that I make you this amazing offer: At my own risk I'll give you PROOF in even the first 7 days that I can make you over into this NEW MAN. I'll begin training you on approval. If you don't notice a marvelous change in yourself within a week you don't owe me a cent.

No "ifs," "ands," or "maybes." Just tell me where you want handsome, steel-like muscles. Are you fat and flabby? Or skinny and gawky? Are you short-winded, pepleps? Do you hold back and let others walk off with the prettiest girls, best jobs, etc? Give me just 7 days! I'll PROVE to you that I can make you a healthy, confident, powerful HE-MAN.

*Dynamic-Tension* is an entirely NATURAL method. No mechanical gadgets to strain your heart and other vital organs. No pills, special foods or other unnatural, artificial contraptions. Only a few minutes of your spare time daily is enough to show amazing results—and it's actually fun! *Dynamic-Tension* does the work.

## NOTE:

No other Physical Instructor in the world has ever DARED make such an Offer!

## THIS STERLING SILVER LOVING CUP BEING GIVEN AWAY BY

This valuable cup, made of solid sterling silver, stands about 14 inches high on a black mahogany base.

I will award it to my pupil who makes the most improvement in his development within the next three months. Therefore, no matter what your measurements may be now, you have an equal chance to win this cup for permanent possession—and with YOUR name engraved on it!

Get my free book by mailing coupon below!

*Charles Atlas*

## Send for FREE BOOK

Mail the coupon right now for full details and I'll send you my illustrated book, "Everlasting Health and Strength." Tells all about my "Dynamic-Tension" method. Shows actual photos of men I've made into Atlas Champions. Supplies the facts you need to know about your condition. It's a valuable book! And it's FREE. Send for your copy today. Mail the coupon to me personally. **CHARLES ATLAS, Dept. 153L, 115 East 23rd Street, New York, N. Y.**



## CHARLES ATLAS

Dept. 153L, 115 East 23rd Street, New York, N. Y.

I want the proof that your system of "Dynamic-Tension" will make a New Man of me—give me a healthy, husky body and big muscular development. Send me your free book, "Everlasting Health and Strength." This request places me under no obligation.

Name ..... (Please print or write plainly)

Address .....

City ..... State .....

© 1936 C. A. Ltd.



the drone of a powerful airplane engine penetrated their consciousness. They turned with uplifted hands to shade their eyes from the glare of the morning sun.

"That baby has plenty of horses," Shorty Hassfurth said. "Can you see him?"

"Just faintly," Bill said. "He's almost in the sun." He whistled as the drone of the motor above them became a high-pitched scream. "He's diving. Maybe he's testing her for one of the other fields."

"This is a hell of a place to power-dive a ship," Shorty growled. Then his voice rose in excitement. "He's diving her straight at us, Bill!"

"Look out!" Bill screamed, and grabbing at Scotty MacCloskey's arm, began to drag him down the apron. Shorty Hassfurth's face was white as he moved along beside them.

"He'll never pull out of that dive!" Shorty groaned, his voice tense.

"He's easing out now," Bill said, and his voice trembled. "The man must be insane."

Then their eyes nearly popped from their heads as they saw the rugged little biplane nose down again only a thousand feet from the ground. They saw it nose down—and when it was only a hundred feet above the Silver Lancer, the greatest plane Bill had ever built, fire spouted from two nickel contrivances on each side of the fuselage.

At first the speed of the plane tore the fire from the nozzles and drove it backward, then it leaped fifty feet ahead as the biplane nosed down just above the Lancer and engulfed it in flame.

"Liquid fire!" Bill said, with a bellow of rage that could be heard above the roar of that powerful motor. "He's trying to destroy the Lancer!"

The biplane zoomed upward, and it was only too apparent that it was gaining altitude before it dived for another assault on the Lancer. For a fraction of a second Bill gazed at the biplane with stunned eyes. Then he went into action.

He covered the distance to the Lancer in long, powerful strides while he belated for Shorty to get into the rear cockpit of his Stormer and swing his machine gun into action. He dived into the rear cockpit of the Lancer and broke out the .30-caliber machine gun on its flexible track. He sighted through the telescopic sight as the biplane dived with its liquid-fire jets spouting flame.

Bill saw the tail of the biplane bounce upward as his bullets tore into it. He heard Shorty's gun chatter as the pilot of the biplane eased the nose of his ship up to skid it to the left, out of range. He thought he heard the powerful motor in the little ship skip and prayed that he had put a bullet in its engine block.

Then it zoomed upward, circled once

high overhead and stuck its nose into the sun to the east. Bill heard the roar of Shorty's Snorter as he fed juice into its engine. He saw the Snorter start down a runway, gather momentum and whip into the air. But he knew it was a futile gesture. The biplane was a mere speck in the east when Shorty had only a thousand feet under him. He reached for the radio switch in the Lancer and chanted Shorty's call letters into the microphone.

"It's no use, fella," he said, when Shorty answered. "He has too much of a start and too much speed. Let him go. We've got a job in front of us."

"Is the Lancer O. K., Bill?" Shorty was breathless.

"Just scorched," Bill answered. "Who the devil is behind that move?"

Shorty growled something unintelligible into his microphone.

"You'd better stay up there if you're all set?" Bill said. "I'll join you in a minute. I told Holt I'd be in California to-night. Red and Cy can take care of things here. There is no use in our delaying our start for Washington. We'll know sooner or later who was behind that attack. They always show their hand eventually."

BILL, Shorty and young Sandy climbed the steps of that huge, gloomy edifice that is the Smithsonian Institute at about nine o'clock. Once through the door they stopped and gazed above them. In their eyes was an expression of respect and reverence for the ship suspended above their heads.

On its side was painted *Spirit of St. Louis*. It was the sturdy little ship Colonel Charles A. Lindbergh had flown from New York to Paris in thirty-three and one half hours in a day when transatlantic flying was practically unknown.

Farther down the hallways of the musty old building they came upon models of the gliders Leonardo da Vinci had designed in the 15th century. A thing with huge wings that were to be flapped by the efforts of the pilot to propel it through the air. Then came the "Flugmaschine" of Jacob Degen, a contraption with wings that looked like two huge umbrellas. And the helicopter Vittorio Sarti designed and built in 1825, but never flew.

On up through the years to the "aerodrome" of Professor Pierpont Langley of the Smithsonian Institute, which he could never launch into the air, and which caused him to die of a broken heart.

The queer monoplane in which Hubert Latham nearly succeeded in flying across the English Channel, and the monoplane Bleriot did fly across it. There was an early Curtiss biplane. Colonel Cody's weird-looking biplane. And an early ship of Henri Farman's.

They were flimsy affairs, built of can-

vas, bamboo and wire. Then, as if some magic hand had waved a wand over them, there were planes that were the result of the War that swept across Europe. Planes that became an essential part of war.

They gazed on bullet-peppered S. E. 5s, Spads, Fokkers, ships that seemed clumsy and unwieldy now, but capable of terrific speed and maneuverability for that day and age.

Shorty gazed with eyes that were not a little misty on the War-time Spad of a famous ace.

"They were great little ships in those days, Bill," he said. "The only thing that could match them was the German Fokker and the S. E. 5."

"Gosh," Sandy said. "I'd hate to have to fight in one of them."

"You better study this baby, kid," Shorty said. "We may have to use them out in Hollywood."

"Hollywood!" Sandy said, looking at Shorty suspiciously. "Is that where we're really headed for, Bill?"

Bill gave Shorty a look of disgust. Then he laughed as he saw Sandy's flushed face and sparkling eyes.

"I didn't tell you that part of it, kid," he said. "I didn't want you to go entirely nuts before we got there. We may do some work in a movie out there. You remember Henry Holt? He's making a war-time air picture; he's in trouble. We're going to give him a hand."

Sandy tried to speak, and couldn't. He stared at Bill with his mouth half open, his eyes wide. "Me in the movies," he finally whispered. He straightened his necktie and pushed back an unruly lock of hair. "My gosh, Bill. Why'n't you tell me? I'd have—"

"Had your face lifted," Shorty said with a roar of laughter.

Bill saw the amusement on Shorty's face suddenly vanish, to be replaced by a vicious scowl as he heard a voice behind him say, "I decided to take a look at some of these old crates after you mentioned it yesterday, Bill."

Bill turned around slowly. He recognized the voice of Lennard Small, and for some reason it annoyed him. He wanted to talk over certain technicalities of ships with Shorty.

"Hello, Small," Bill said. Then he smiled to counteract the coolness in his voice.

"I'm going to find that old NC-4 that made the first hop across the Atlantic," Shorty said as he moved away. "She's in here some place."

"Shorty doesn't seem to care for my companionship," Small said laughingly. Bill waited for him to go on. "We had a little trouble about eighteen years ago, and he hasn't forgotten it," he finished.

"Have you?" Bill asked.

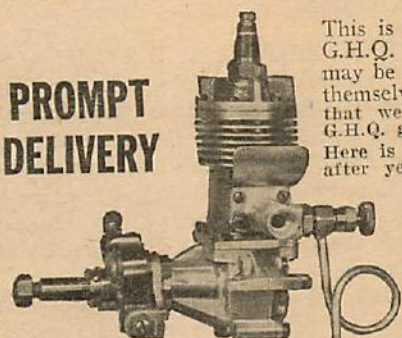
"No," Small said quietly. "But I can always forgive, even if I can't forget."



# G. H. Q. GAS MOTOR KITS

## LAST CHANCE....offered up to Nov. 15th only!

**PROMPT  
DELIVERY**



This is actually one of the most startling announcements ever made. Only five months ago, G.H.Q. blazed new trails in model airplane history with the news that a super-power engine may be had at only \$8.50 for a limited time only. Thousands of delighted men and boys availed themselves of this unusual opportunity during this period of time. We have decided therefore that we are now at liberty to withdraw this temporary offer and discontinue the delivery of all G.H.Q. gas kits after this month—selling finished motors only thereafter.

Here is your last chance to obtain the G.H.Q. Motor Kit, an engineering triumph—accomplished only after years of scientific aero-dynamic research. Thousands of letters have poured in from all parts of the country praising and recommending this mechanical achievement and the thrill of a lifetime will be yours with this motor kit—one of the most powerful ever constructed. Has broken records for amazing performance—flies model planes up to 10 ft. wingspread. Also used for boats and stationary use. Easy to start and simple as ABC to assemble—average assembly time is only 45 minutes. So easy only a screw driver is needed. Everything is in the kit including plug, coil, condenser, tank, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, etc. Every part is fully machined and finished. No oil, gas, batteries or propeller included. Postpaid for only.....

**\$8.50**

## Ready-To-Run G. H. Q. "Gas" Motor

The famous motor completely assembled on stand with one finished fly wheel mounted on motor given free. (This offer not for dealers). Tested and run before shipment—Performance guaranteed—1/5 horsepower at 3000 to 7000 R.P.M.—No oil, gas or batteries included. Postpaid for only

**\$12.50**

### G.H.Q. SPORTSTER KIT

The G.H.Q. Sportster kit specially designed for G.H.Q. Gasoline motor but may be used for any other motor of like weight and power. Built according to scientific aerodynamic principles—Has made hundreds of successful flights without crackup—Marvelous glider . . . . And what a climber! 4-hour flights are common! A complete kit of all parts including plan, all wood, wire wheels, metal and other parts. Postpaid for only \$5.00.



### ORDER TODAY

or send 3c for illustrated catalog of gasoline motors, gasoline planes, gasoline accessories and parts.

**We have a complete line of kits from  
10c to \$1.00**

**G. H. Q. MODEL AIRPLANE CO.,**

854 East 149th Street, Dept. T, New York, N. Y.

He shrugged his shoulders and pointed at the Spad beside which they were standing. "Ever fly one of these crates, Bill?"

"No," Bill said shortly. "I'm going to move along and find Shorty. I'll see you later, Small."

"O. K., Bill," Small said. "I have only a few minutes. I want to look over that Fokker down the line. My men and I are the enemy in this picture of Holt's, you know. We're flying Fokkers."

Bill nodded his head and moved away. Sandy climbed out of the cockpit of the Spad, where he had no business to be, and joined him. They moved along slowly, studying the magnificent display of planes. Bill glanced back once or twice, but could see nothing of Small. Nor did they locate Shorty. Bill wished he dared shout out loud for him in this great barn of a place. It might take an hour to find him. He wanted to talk over the idiosyncrasies of the Spad and the S. E. 5. That was why they had come here.

Bill went into the hallway to locate a guard or a guide. There was none in sight. So he plunged back into the great hall of planes again, with Sandy at his heels asking questions.

Another room caught his eye through

an arched doorway. He saw that there were planes in there, also. He hurried toward it. The whole place was like some huge tomb, with the bullet-riddled airplanes of the War sitting like mute watchdogs guarding the last resting place of their dead masters.

Bill saw an enormous flying boat with NC-4 painted on its side. The sun made grotesque patterns on the floor as it streamed through the dusty windows. He circled the ungainly tri-motored ship that had made the first crossing of the Atlantic from Newfoundland by way of the Azores.

Shorty was nowhere in sight. He cursed softly and called to Sandy to ask if he had seen Shorty. Sandy called back that he hadn't, and came over to join Bill. He walked around the big ship and clambered up the side to peer into the cockpit.

Suddenly Sandy's blood froze in his body and the hair at the base of his scalp seemed to rise. He heard what sounded like a muffled groan coming from deep back in the recesses of the cabin. He listened while he gripped the sides of the flying boat until his knuckles showed white. Again that sucking sound came to his ears, followed by a stifling gasp for breath.

"Bill!" he called. "Bill! There is

some one back in this cabin. I can hear groans!"

He pulled himself up over the side of the hull, to be followed immediately by Bill. Bill pushed him to one side and made his way back through the antiquated cabin until the noise was directly under his feet. The pitiful moaning was louder as he struck a match. He bent close to the dark object on the deck. His eyes grew wide with horror as he saw that it was Shorty!

He saw a lump the size of a hen's egg on the side of Shorty's head, and the blood that was beginning to dry.

"It's Shorty," he whispered to Sandy. "Get over the side. We'll have to slide him over the hull."

When they had Shorty stretched out on the dusty floor beside the ship, Bill tore at the fine wire that cut deep into Shorty's wrists and ankles. He was trussed with his arms behind his back, and his ankles drawn back so that they almost reached his wrists. His mouth was taped so that he could hardly breathe through his nose.

A sound that was half a sigh and half a moan escaped Shorty as Bill released his wrists and ankles. Then Bill went to work on the tape covering his face, removing it as gently as he could. While



Bill didn't bother answering him. His fist traveled not more than ten inches—



he was doing that Shorty's eyes opened, then closed again.

"What dirty—" Sandy began, but Bill silenced him.

"Find some water," he said. "Bring as much as you can."

Sandy raced out into the hallway, dodging propellers and tail assemblies like an open-field runner. He filled three paper cups with water and raced back. Shorty drank two of them after Bill had thrown one in his face.

The water seemed to bring back part of his strength. He insisted on struggling to his knees, and they helped him to his feet. For a moment he swayed, then steadied himself.

"What happened to you, fella?" Bill asked.

"You tell me," Shorty groaned. "I was looking at the NC-4. That's the last thing I remember. I remember I had my hat in my hand. Some one slugged me on the head. Where were you?"

"After you left me I talked to Small for a few minutes," Bill said. He stopped talking as he saw the gleam of hatred that came into Shorty's eyes.

"Where did Small go?" Shorty asked.

"He went back toward the entrance," Bill said. "We kept moving on toward this room. We didn't see him again. There was no way he could have got back here without us seeing him."

"That guy's a snake, Bill," Shorty said. "Let's get out of here. I need some air. My head feels as though some one was squeezing it in a vise."

Bill put a hand across Shorty's back to steady him, and Sandy did the same thing on the other side. They moved slowly toward the corridor that led to the front door.

"You might have died of hunger and thirst, and in agony, if we hadn't been looking for you," Sandy said. "No one would have heard you in there."

"Do you think Small had anything to do with this, Shorty?" Bill asked.

"I wouldn't know," Shorty said. "He's capable of anything. But—" He shrugged his shoulders and became silent.

While Shorty rested on a bench in the front foyer, Bill went to see the director of the Institute. He introduced himself and told him what had occurred. The director came to his feet; his face was white as Bill unfolded his story.

"There have been three other attacks inside the Institute within the past year," he said. "But none within the past three months. We have had a police detail here constantly. I wish you would let me report it to them."

"I'm sorry," Bill answered. "I don't want any publicity for myself or my men. I'm going to run Hassfurth to a hospital and have quick X rays taken to be sure there is no fracture."

Bill told Shorty what the director had told him. They described Small to the man at the door. The doorman said that a man answering Small's description had left more than an hour before. Bill checked the time with the watch on his wrist.

"It couldn't have been Small," he said slowly. "He was out of here when you were attacked."

"It probably wasn't," Shorty said. "I'd just naturally suspect that bird, if he happened to be around, of anything from petty larceny to murder."

They took a taxicab to a hospital, where X rays were taken of Shorty's head. They were developed immediately and showed no fracture.

"Only a slight concussion," the doctor said. "Just take it easy for a couple of days."

"Was there anything at all inside his skull?" Sandy asked innocently.

Shorty grinned at him while Bill glowered.

"We'll get some luncheon and get back

to Bolling Field," Bill said. "Shorty will ride with me, kid, and you'll fly his Snorter. I want to be in Hollywood by midnight."

## V—FOOD!

BILL, SHORTY AND SANDY carefully checked the Silver Lancer and Shorty's Snorter before they ordered them trundled out to the apron at Bolling Field. The ships had been under lock and key while they had been gone, but they weren't taking any chances after the things that had occurred that morning.

"It's the same old story," Bill said grimly. "Some one gunning for us before we know why."

At one o'clock he gunned the engines in the Lancer until the whole world was filled with their roar. He watched young Sandy take the Snorter down the runway with a workmanlike take-off that was typical of him.

Then Bill released his brakes, and the scorched, silver ship rolled down the field. He lifted it off the ground with the smoothness and grace of a duck taking the air. As he spiraled upward, the landing-gear light on the instrument panel gleamed. The Silver Lancer became a streak of gray light in the mid-day sun.

At five thousand feet Bill leveled off and threw the switch on his radio.

"Bill speaking, kid," he said when Sandy answered his call. "I'm going to open the Lancer up and try to make Hollywood by eight o'clock, their time. I'll make contact with Tony and have him wire Holt to have the landing lights on at the MRO field. You'll be able to find it all right. Keep in touch with me."

"O. K., Bill," Sandy answered. "I ought to be in by nine or ten, Pacific time. How is Shorty feeling?"

"Better than you'll ever feel at my age," Shorty cut in.

"O. K., gran'pa," Sandy said. "It's too bad you have such an ugly pan. They'll never be able to use you in close-ups out in Hollywood."

"Listen, beautiful," Shorty answered, "I'll probably have to beat the gals off my Snorter with a rubber hose to get away from them."

"Yeah," Sandy sneered, "you and Frankenstein."

He threw his radio switch and stuck the nose of the Snorter upstairs. While the joy of being alive and in the air sang through his veins, he joined his motor in singing, "California, Here I Come." It wasn't very good singing, but he made almost as much noise as his motor.

Ten minutes later Sandy threw his radio switch again and chanted, "Calling B. B. . . . Calling B. B. . . . Calling B. B."



"Bill answering," came to his ears.

"I forgot to ask you what route you're taking, Bill," Sandy said.

"South," Bill answered. "Emergency fields. Regular air-line route. Pittsburgh, Columbus, Terre Haute, St. Louis, Kansas City, Wichita, Amarillo, Albuquerque, Winslow, Los Angeles. There are some maps in Shorty's rack, aren't there?"

"Sure," Sandy said. "Plenty. I can fly it with my eyes shut."

"Well, keep 'em open," Bill snapped. "Watch your fuel. Signing off!"

The sun was just taking its evening dip behind the mountains to the west when Sandy took his bearings and reported to Bill that he was just passing over the town of Winslow, Arizona.

"O. K.," Bill said. "I'm going to sit down on the MRO field in a few minutes. We'll wait there for you on the lot. Open her up."

"O. K.," Sandy said, and opened his throttle wide. The deep growl of the Diesel in the nose of the Snorter became a thunderous roar as he stuck the nose of the ship on Los Angeles and settled back in his bucket seat.

Perhaps it was the roar of the three thousand horses in the nose; perhaps it was the fact that he had set his gyropilot and automatic stabilizers to work and was half asleep that Sandy didn't hear the drone of the engine a thousand feet above and behind him.

He was not aware of the rugged little biplane until it came swooping down on his tail with its two machine guns vomiting lead and death into his tail. He felt the Snorter quiver like a thing mortally wounded under the terrific impact of that hail of lead. For one startled instant he sat immobile, frozen to the stick.

Then he yanked the stick back into his stomach and zoomed the Snorter up and over on its back as the single bay, buff-colored biplane dived beneath him.

At the top of his loop he half rolled the Snorter to a level position and gazed over the side as the biplane pulled out of its dive and came around in a wide, sweeping bank.

"My gosh," Sandy said aloud, "I wish Bill was here!" His face was suddenly flushed, and his blood was racing through his body like fire. He opened his throttles wide and zoomed upward in an abrupt climbing turn until she almost stalled. Then he brought the nose down and was back on his original course. He debated with himself for a moment whether he had better open the Snorter up and run for Los Angeles or answer the challenge of the biplane.

While he was leveling the Snorter off, the buff biplane decided the question for him. It zoomed up beneath him with its twin guns spewing burst after burst of fire. The lead chewed through the leading edge of his left wing. He

threw the Snorter out of the line of fire as anger half choked him.

The biplane roared upward and dived back to the attack. Sandy pulled his stick back and raced to meet the diving plane. The two planes roared at one another with terrific speed. Sandy's fingers tightened on his gun trips. His guns chattered their song of death. His bullets drove through the biplane's fuselage before the pilot skidded his ship out of range.

Sandy was talking to himself now through clenched teeth. All fear had left him after that first surprise attack. He had settled down to the business of handling his Snorter like a veteran.

"So you'll pick on a guy minding his own business, will you?" he asked any one who could hear. "You'll come up and try to shoot a guy in the back like a dirty thief. I'll show you," he raved. "I'll teach you not to hold lighted fire-crackers in your hand, you sap. You just——"

The two ships streaked and tumbled all over the sky, filling the air with red-hot lead. They fired burst after burst at one another—without telling effect.

"That baby knows his business," Sandy grated. "The dirty murderer! It was only luck that he didn't get me before I knew what hit me. I'll carve my initials on his back in a minute. I'll——"

Sandy's fingers clamped down on his gun trips as the buff biplane came under his sights. But before his bullets reached the other plane it had slipped away. Sandy made noises in his throat and almost lost control of himself. Then his lips became a hard, set line of determination. His face dripped with perspiration. He used all his powers of concentration as he studied the other pilot's tactics.

"My gosh!" Sandy said aloud. "He's a fighting fool. Maybe he's going to be too much for me." He sideslipped the Snorter out of range as the buff biplane came at him head on with guns yammering.

Sandy came up in a chandelle and dived on the buff ship. But when he clamped down on his firing trips the plane disappeared from under his sights as though some unseen hand had flicked it out of danger.

Sandy shook his head with a gesture of disgust. He realized that he was bearing down too hard. He realized that in his intensity he was doing the very thing he had been taught by Bill not to do. He was "freezing on his controls." He was trying too hard.

The next time the buff ship flashed across his sights he kicked his rudder ever so little as his fingers gripped hard on his gun trips. The nose of his Snorter followed the course of the biplane for a split fraction of a second.

Sandy's bullets wove a pattern from the engine housing to the tail assembly.

## Berkeley . . . MASTER MODELS 20" WINGSPAN

The finest low priced models on the market. Complete in every respect. Many new ideas in model construction such as simplified filleting, wire reinforced landing gears, free wheeling propellers and movable controls. Kits include full size tube of cement, "superfine-line" printed balsa parts, full size layout plans, and everything to complete the models as illustrated.

All super-flyers, capable of flying 100 feet and longer.



**Bendix Trophy Winner  
BEECHCRAFT A17-R**

The first model of this new fast cabin job. Cruises at 205 m.p.h. Has large removable motor plate and tail plug, and controllable-pitch style propeller. Red and white with black details.

**50¢  
pp.**



**SEVERSKY FIGHTER**

New U. S. Army 220 m.p.h. cross country trainer and pursuit. Has double venturi cowl, large removable motor plate and controllable-pitch style propeller. New Army blue and yellow, with black details and full-color insignia.

**50¢  
pp.**



**CHESTER RACER**

World's fastest light plane. Has free wheeling device inside propeller's spinner. Green and yellow with details in black and white.

**50¢  
pp.**



**CURTISS FIGHTER F13C-1**

New 280 m.p.h. navy fighter. Model has real shock absorbing landing gear, removable motor plate and controllable-pitch style propeller. Red, yellow and silver, with black details and full-color insignia.

**50¢  
pp.**



**The BUCCANEER 7 ft. 4 in. wing span**

Official World's Open Record Breaker  
63 minutes official—47½ hours unofficial  
Three Places in the National Contest  
Complete Materials including Brown Jr. Motor,  
M. & M. Air Wheels to build the Buccaneer \$29.50  
Complete materials without motor \$9.50  
Plans only..... .50

Send for our complete catalog. Include stamp for postage.  
Berkeley Kits can be obtained from your local dealer  
or direct. All kits postpaid in U. S. A. Master  
Models 10c extra in Canada.

**BERKELEY MODEL SUPPLIES**  
53-T Berkeley Place Brooklyn, N. Y.



The buff ship skidded off dangerously on one wing and yawed wildly. Sandy whipped the Snorter around and returned to the attack. His breath was coming in short gasps now, and his body was saturated with perspiration. He poured round after round at the other ship as it tried to dive out of danger.

Sandy pushed the stick of the Snorter forward with all his strength as he tried to follow it. Then he eased it back as the other ship came up and over in a flashing Immelmann turn. Now he was above Sandy and diving on him with his guns flaming. Only a thousand feet from the ground, and diving at a terrific speed, Sandy pushed the stick even farther forward, until the ship went into an outside loop. He felt weak and giddy as he hung head down at the bottom of the loop. He gulped and tried to shout as the pressure became terrific. Then he was up and climbing upward without having "blacked out."

Sandy's stomach felt as though it had come to rest in his throat as he probed the air around him for the buff biplane. He knew where it was without seeing it a moment later as he felt bullets tearing up through the belly of his Snorter. He barrel-rolled to get out of range as the buff ship zoomed past him. Then he was under its belly, with his machine guns chattering. He could see his tracers pumping into it before it sideslipped out of range again.

The two planes raced upward again, each trying to gain the advantage of altitude. At four thousand feet Sandy whipped around to return to the attack. His hands were trembling on the stick now, he was so tired. His body felt weak, as though it had been racked with fever.

As he whipped around he probed the air in front of him. His mouth dropped open, and he could not believe his eyes. He saw the buff biplane racing toward the earth in a terrific dive. At about a thousand feet he saw the nose come up, but the plane didn't change its direction. It was headed north at a terrific speed.

It had peeled off and was running away. Sandy brought the Snorter around and stuck it on its course again. For an instant he thought of pursuing the biplane. But he discarded the idea as quickly. He had seen all of that biplane he wanted to see, he told himself.

He tried to get Bill on the radio, without any success. Five minutes after he laid the nose of the Snorter on Los Angeles it was dark. The twinkling lights of towns under his wings were like the constellations overhead. He settled back in his seat and tried to relax. He tried to figure out who had been piloting the plane that had tried to shoot him down.

"She looked like a Grumman fighter," he said aloud. "And boy, did that pilot know his stuff! He was a flying fool.

Good night, but I feel funny. Something is wrong with my insides. They don't feel right. Maybe I have appendicitis, or ulcers."

Suddenly he sat upright in his seat, an expression of alarm on his face.

"Good night, is right!" he said. "That's what it is. I haven't had anything to eat since twelve o'clock. What's wrong with me is I'm just plain starving to death."

He pushed the throttles of the Snorter open wide as a vision of well-done steak, French fried potatoes, several glasses of milk, ice cream and lemon meringue pie—a whole one—floated before his eyes.

"That," he said, "is why I couldn't get that bird under my gun sights. I was weak from lack of food!"

## VI—SANDY, THE GALLANT

A LITTLE MORE than an hour later Sandy picked up the lights of Pasadena, then Los Angeles. He corrected his course by kicking his rudder slightly, then threw his radio switch.

"Calling B. B. . . . Calling B. B.," he chanted.

"Shorty answering, kid," a voice came back to him. "Bill's inside talking to Mr. Holt. The landing lights and flood lights are on. One beacon is flashing MRO in Morse. Do you see us?"

Sandy leaned over the side of the Snorter and searched the air beneath him.

"O. K., Shorty," he said into his microphone. "What does the wind sock read?"

"Northeast," Shorty answered. "You have a good run on the field. We have some supper waiting for you. Take it easy, kid."

"What's the supper?" Sandy asked.

"Steak."

"I'll be with you in a sec," Sandy answered, his mouth watering.

Three minutes later he was sliding over the side of the Snorter. Two or three grease monkeys ran up to take the ship into the hangar.

"In the same hangar as the Lancer," Shorty directed. "And don't forget to lock it up again."

"Where's this food?" Sandy asked.

"I'm nearly starved."

"It's over in the bungalow Miss Holt uses for a dressing room." Shorty grinned. "Bill's there with Henry Holt, Miss Holt, and one of the directors."

"Let's get a look at the food," Sandy said. "The rest of it can wait."

With the thought of food just ahead, Sandy had forgotten all about the attack made on him. And the attack was to go further out of his mind when he got inside the bungalow.

Bill stood up, clapped him on the back and introduced him to Helen Holt, Henry Holt, and Joe Leeds.

Sandy was aware that he shook hands with a kindly-faced man named Holt,

and another man named Leeds. But he didn't see them. All he saw was Helen Holt. He shook hands with her first and wasn't aware of the two men.

"What kind of a trip did you have, kid?" Bill asked him.

Sandy didn't answer. He was staring at the door where Helen Holt had disappeared. Bill poked him in the ribs and repeated his question.

"What was that, Bill?" Sandy asked. "My ears are still dead from the engine. I couldn't hear you."

"I asked you," Bill repeated, "what kind of trip you had."

"Oh!" Sandy said. "Yes! Sure! What time did you get here?"

Bill gazed at him for a half second with a puzzled expression on his face. Then he decided the kid had been deafened by his engine.

"About eight o'clock, Pacific time," Bill shouted.

Helen Holt came back into the room with a tray of food which she placed on a gate-leg table. She removed the dishes from the hot-water containers that had been keeping the food warm and placed them on the table.

Sandy, watching her, saw that there was a steak, French fried potatoes, and a vegetable that was fixed *au gratin*. Under a covered receptacle there were thin pieces of toast.

"There!" she said, smiling into Sandy's eyes. "I'm going to call you Sandy, if you don't mind. Mr. Barnes has been telling us about you while we were waiting for you. Do you mind if I call you Sandy?"

"Good gosh!" Sandy said as he sat down weakly in his chair. "You can call me anything you want to!"

She smiled at him again, and then moved over to join the general conversation. Sandy cut a piece of steak, but only got it halfway to his mouth. He was holding it there, staring at Helen Holt, when Shorty caught his attention by moving his hand back and forth quickly beside his leg. Sandy lifted his eyes and saw Shorty grinning at him. He shoved the piece of steak into his mouth and followed it with two or three potatoes and a forkful of cauliflower.

He tried to keep his eyes away from Helen Holt, but she drew his gaze like a magnet attracts a pin. He thought about the things Bill had told him. That Henry Holt was in trouble. That would mean his daughter was in trouble.

He wondered whether that rat who had tried to shoot him down that day had anything to do with it. Certainly! He must. He was sorry he hadn't shot the bird's buttons off. Why hadn't he gone after him and given him what he deserved!

Any one, Sandy resolved, who made trouble for a fine old man like Mr. Holt and his daughter was certainly pretty low. He was glad Bill had brought him



"She's all right," he conceded in the



middle of his yawn. "But she's like all these Hollywood babies. She's just another dame."

"Dame!" Sandy hissed, his face suddenly red, his fists clenched. "She's no dame, Shorty!"

"What is she, a mermaid?" Shorty asked as he threw himself down on his bed. "Good night, kid. Sweet dreams."

## VII—CHAIRS—AND NAMES

HENRY HOLT drove Bill, Shorty and Sandy to the MRO lot early the next morning, an hour before the work of the day was to begin. Sandy's eyes nearly popped from his head after they were inside the gates and he saw some of the permanent sets.

He saw a French set that included a street in a small town, a barn yard, and a fully equipped peasant's house. Next to it was a replica of Coney Island, board walk and all the things that went with it. Then a Colonial home with sweeping grounds and lawn in front, a driveway that curved through a lane of real trees from the front gate to the house. Another mansion that was 16th century Italian, with gates and driveway. A New York East Side street so arranged that it could be shot from eight or ten different angles. And a panorama with a treadmill that could be used for all kinds of chases.

"Have they already used these scenes?" Sandy asked Henry Holt.

"Yes," Holt laughed. "And they're hoping to use them again. Or rent them to some other studio who can use them. There are twenty or thirty sets spread over the lot. Everything from Venetian sets with canals and houses to a Japanese water front."

When Holt drew up beside the hangars, Bill leaned forward from the back seat of the open car and said: "Where did they put those ships that crashed?"

"They're right back of the hangars," Holt said. "What is left of them. They dug 'em out of the ground and lugged 'em back there."

"Which hangar?" Bill asked.

"Right behind this one," Holt said, pointing.

Bill climbed out of the car and motioned to Shorty. They went around to the back of the hangar. They shuddered when they saw what remained of the bomber and two pursuit ships that had crashed. They were twisted and burned beyond recognition.

"You'll never learn anything looking at them," Shorty said.

"Maybe I can find the control wires," Bill said. "That's what I want to look at."

After fifteen minutes of pushing and hauling at the twisted pieces he stood up and dusted off his hands.

"I could only find one that wasn't broken," he said. "It seemed to be

O. K. The turnbuckles were tight and cattered."

"Do you have any suspicions about those crashes?" Shorty asked.

"No," Bill said, slowly. "It just seems peculiar to me that three men who knew their business should crash in a similar way. If we do some work for Holt, be sure you go over your ship thoroughly just before you take her into the air. Check everything. Those Spads and S. E. 5s are old crates, even though they have new motors and have been reinforced."

"I'm always careful about Mrs. Hass-further's little boy," Shorty said, dryly. "I attribute my present old age to caution, not to dill pickles or staying away from chewing tobacco."

"I'm anxious to see this director, the great Di Maggio," Bill said. "Small hinted that everything wasn't as it should be."

"He ought to know," Shorty said. "Here he comes now."

Bill looked up to see the angular, lined face of Major Lennard Small coming toward them from around a corner of the hangar. He wore a flying helmet pushed back on his head, a flannel shirt open at the neck, boots and breeches. He waved a hand and smiled pleasantly before he reached them.

"Welcome to our little playground," he said, shaking hands with Bill. "What do you think of fairyland?" he asked Shorty as he extended his hand.

"I like the place all right," Shorty answered as he reluctantly shook Small's hand, "but I don't have much enthusiasm about the people."

Small laughed, his cold, gray eyes glittering strangely. "You'll like us after you know us better," he said.

Shorty smirked and started to walk away.

"Wait a minute, Shorty," Small said. "I want you to hear what I'm going to tell Bill."

Shorty stopped without speaking.

"I'm just giving you a friendly tip," Small said, earnestly. "Be careful. Be sure to check any ship you take into the air. I told you that on Long Island, Bill. But I want to emphasize it. Those three boys who crashed were experts in this line of work. Of course, doing this kind of work you're bound to pick a blank some day and not be around the next. We all know that."

"But there was something peculiar about those three crashes. This man, Di Maggio, the director, will do anything to get a good shot. A life means nothing to him. He'd watch a whole regiment of men die, and grin while he watched it, if his cameras were grinding."

"He has been slowing up things on this picture. He may be doing it so that MRO can get Holt's picture for a penny. I don't know. But watch your step. Don't take anything for

granted. I just wanted to warn you."

"That's very decent of you, Small," Bill said.

"I know you'd do as much for me. Eh, Shorty?" Small grinned.

"I don't know whether I would or not," Shorty said, grimly. "But thanks for the tip."

A large, shiny limousine came down the lot, its horn blaring continuously. It stopped near the front of the hangar and the chauffeur leaped from his seat to open the door. From it stepped a dark-complexioned man with a flaring mustache waxed at the ends. He stepped from his car much as Louis XVI must have stepped from his carriage. Half the people on the set stopped to bow or speak to him. But he spoke to no one. He walked with no little majesty toward the platforms that lined the set. Joe Leeds and his phalanx of assistants followed him.

When they arrived near the platform, a prop boy ran forward shouting, "Mr. Di Maggio's chair! Mr. Di Maggio's chair! Where is Mr. Di Maggio's chair?" He rushed back and forth along a line of chairs between two of the camera platforms.

"This is going to be good," Lennard Small said, his face breaking into as much of a grin as was possible. "Isn't that young Sanders sitting in that large chair in the center?"

Bill nodded his head. "Sure," he said. "What's it all about?"

"The director's chair is sacred property," Small explained. "No one is allowed to sit in it, under any circumstances, except the director."

They saw the prop boy pounce on Sandy from the rear and dump him out of the chair so hard that Sandy fell forward on his face.

They couldn't hear what Sandy had to say to the prop boy—who was a two-hundred-pound man—when he got up off his hands and knees. Nor did they hear the prop boy's answer as Di Maggio sat down in the chair.

But they did see Sandy when he took three fast steps and bounced his right fist off the left side of the prop boy's chin, and his left off the end of his nose.

They saw the prop boy fold up like an accordion and topple over backward as Di Maggio turned around in his seat, waved his arms and roared at Sandy.

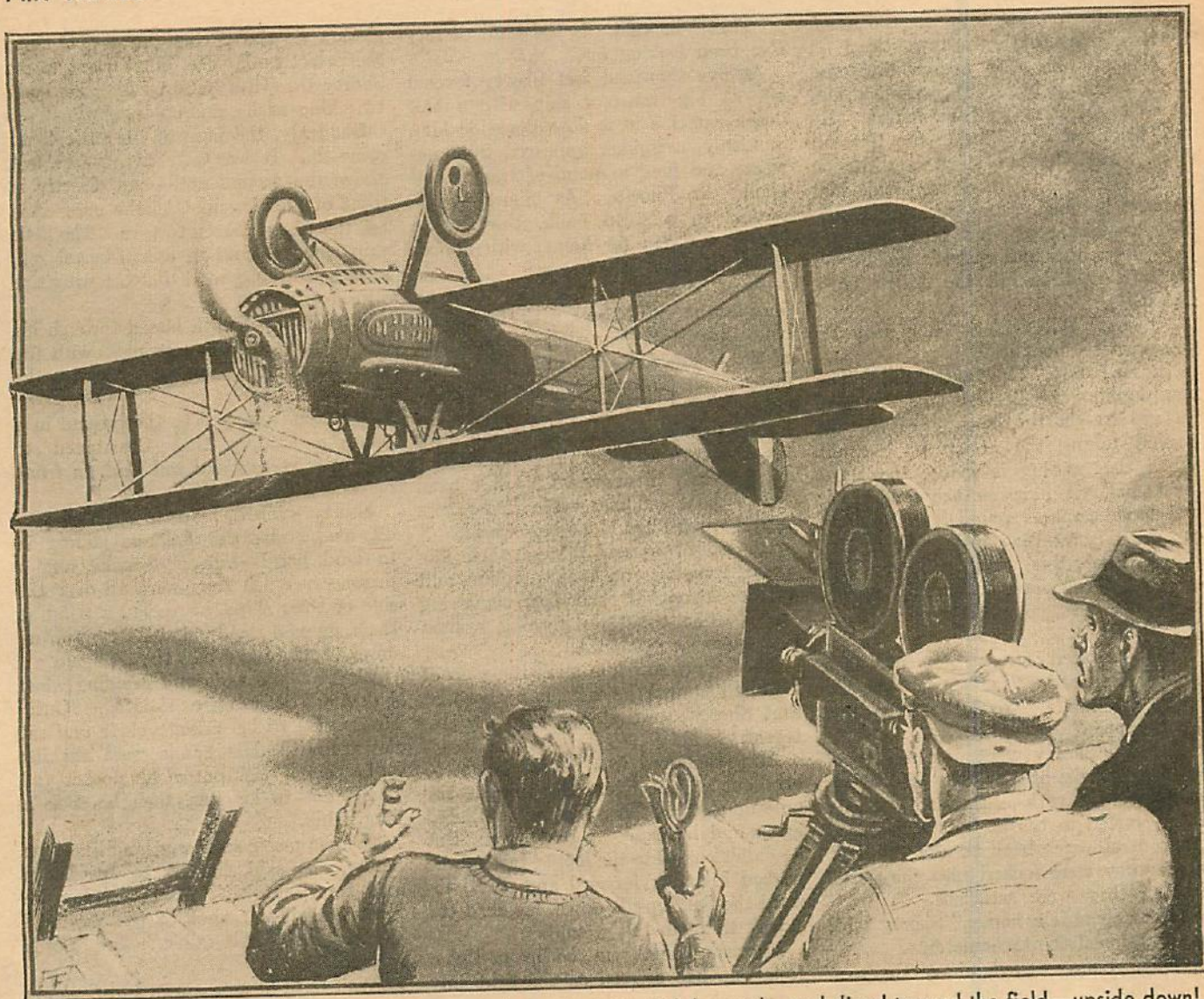
"Hey, kid," Bill shouted at the top of his voice. "Come here!"

Sandy's face was crimson and his eyes sparkled with anger as he reluctantly answered Bill's command.

"Hey," he said, angrily, "who's that cream puff with the waxed mustache? He called me a peasant!"

"Next to Henry Holt," Bill said, "he's the big shot around here. He's the director, Di Maggio. If he doesn't like you, you won't have a chance. I don't blame you much for hitting that prop





But Shorty didn't complete the loop! Instead, he pushed his stick forward—and dived toward the field—upside down!

boy, but don't do it again. Keep out of chairs that have names on them. They're sacred property around here."

"I was just sitting in it," Sandy said. "There wasn't any one in it when I sat down."

"Bill's right, Sandy," Lennard Small said. "Don't ever sit in the director's chair, any chair that has a name on it, even if it's the middle of the night and the person who owns it is fifty miles away. That's one of the things that make these people out here feel important."

"All right," Sandy said. "I'll get a chair of my own."

### VIII—CURIOSITY

HENRY HOLT came over to join Bill, Shorty and Sandy as Major Small left them. He smiled at Sandy and said, "You want to be careful about sitting in private chairs, youngster."

"So I hear," Sandy said, grimly. "I'll fix that."

"I want you to come over and meet Di Maggio, now, Bill," Holt said. "All three of you. Don't pay any attention

to his attitude. He doesn't know that anything exists except talking pictures. He thinks of moving pictures all day and dreams about them at night. I would be willing to lay odds that he couldn't tell you the name of the President of the United States. He's entirely wrapped up in himself and his work. But he gets results. He's the greatest director in Hollywood."

"O. K.," Bill answered. They followed Holt toward the throne of the great Georgio Di Maggio.

Di Maggio was engaged in serious conversation with Joe Leeds, his assistant, and a script clerk, when Holt approached him. He looked up with annoyance when Holt spoke his name.

"Mr. Di Maggio," Holt said, "I want to introduce Mr. Barnes, Bill Barnes; Mr. Hassfurth, and Mr. Sanders, better known as Sandy. They are the men I told you about. They will handle the rest of the stunt work we require."

Di Maggio nodded peremptorily and then scowled. "Only three of them?" he asked. "What are we going to do when we have to send a patrol of five machines against Small's Fokkers?"

"I have two more men I can have out here by to-night," Bill said. "I wasn't sure that you would need them."

"Get them!" Di Maggio ordered. He glanced at the script before him and said, "I need a man who can really handle a Spad this morning. I have a difficult shot to make. It must be realistic. The man who makes it will be doubling for Lewellyn Lindley, our star."

He gazed at them as if doubling for Lewellyn Lindley was something more than an honor and a privilege.

"What is the shot?" Bill asked.

Di Maggio stood up and made motions like a Shakespearean actor of the old school.

"Lindley, or the man who doubles for him," he said, "is flying along five thousand feet in the air. He is on a lone patrol. Suddenly a lone German Fokker appears and fires a burst of shot at him. Lindley goes after the Fokker, which manages to keep out of range of his bullets. He lures Lindley back across the German lines. Then, out of the clouds, pounce four more Fokkers. Lindley fights them, desperately, shoot-



ing one down. But they are too much for him. He decides to outwit them.

"He puts his ship into a dive and then a falling leaf. They follow him down to be sure he isn't faking. He sets his Spad down inside the German lines. The German ships land beside him. When they are down beside him he guns his engine and takes off before they are aware of what he is going to do. He escapes and makes a landing on his own field behind the Allied lines. Get it?"

"O. K.," Bill said. "How soon do you want to shoot it?"

"Immediately," Di Maggio said. "The man doubling for Lindley must be careful not to get in the way of the air camera taking the action in the air. When the landing is made, the Spad must make it here on the field. We will have cameras panned so that we can get it from every angle. All right?"

"I'll take this one," Shorty said, quietly. "You haven't had an opportunity to get your hand in with a Spad."

Bill hesitated for a moment, then nodded his head. "Let's look over the Spad," he said. "We'll be ready in a few minutes."

Bill and Shorty went over the Spad Joe Leeds designated for the job. They went over it with a fine-tooth comb. They started in the cockpit and traced the control wires back to the tail unit where they were locked into the posts. Finally, they were satisfied.

"The engine is a honey," Shorty said, as he watched the tachometer.

"Hey," Sandy asked, above the roar of the motor. "Why doesn't this cream puff, Lewellyn Lindley, do his own stuff?"

"He's too valuable, even if he can fly," Bill said. "They can't take a chance on killing a bird they've spent hundreds of thousands on."

"The only time they let him fly," Shorty said, "is when the plane is sitting on the studio floor. In the picture you'll see him leading his patrol in battle with clenched teeth and a red-stained bandage around his head. The bandage is to keep the studio dust out of his hair."

Joe Leeds came hurrying over to them and shouted that Di Maggio wanted them to take the air at once. "The clouds over there are just right. You'll encounter the single plane at about five thousand above the field. He'll lure you back to those clouds and the other ships will pounce on you."

Shorty nodded, flipped a hand at Bill and Sandy and gave the little Spad the gun. It raced down the field at terrific speed; the tail came up, and Shorty kicked it into the air. At two thousand feet he went through a series of acrobatics that brought the stomachs of the people on the ground up into their throats. Di Maggio roared with approval.

"That," he said, "is the kind of flier I've been looking for."

At five thousand feet Shorty leveled off. A big transport ship with a half dozen cameras in it flew alongside him. Suddenly, a Fokker appeared from nowhere and fired a round of tracers and blanks at Shorty. As Shorty came around in a steep bank, the Fokker turned and ran for home, with Shorty on his tail, but out of range.

Deep behind the imaginary German lines four more Fokkers, with the sinister black crosses on their wings, dropped out of the clouds like vultures. They were faster than Shorty's Spad, and five to one.

Fighting desperately, turning to meet one and then another, firing burst after burst, Shorty maneuvered his ship back toward the Allied lines, while the Fokkers darted around him like angry wasps.

He dodged his ship through them like a man gone berserk, looping, rolling and twisting to avoid their fire, conveying the idea he could do nothing against their superior machines.

Then, they saw him stick the nose of his Spad toward the earth in a dive that sent Shorty's own stomach up into his throat.

At a thousand feet Shorty began to ease out of his dive. He brought the nose up slowly. Then his engine blasted again and he came up and over. But he didn't complete the loop. Instead, he pushed his stick forward and dived toward the field upside down, his head the closest thing to the ground.

A scream came from the lips of Helen Holt who had arrived on the field only a moment before. A roar of approval from Di Maggio as he roared at his cameras to keep grinding.

Bill Barnes' face was a mask of horror as he saw Shorty headed for certain death. Henry Holt was cursing in unison with Joe Leeds.

"Get fire extinguishers!" Bill roared at the grease monkeys who were watching, with faces that were strained and white.

They saw Shorty take the Spad to the end of the field and climb slightly, then bank around, still in an inverted position. He came tearing back from the other end of the field at a hundred and fifty miles an hour, his head still the closest thing to the ground.

When he was halfway down the field, with the cameras grinding away on each side of him, his motor cut down until it was just turning over.

The anguish on the face of Bill Barnes was a terrible thing to see. He stood like a man petrified as he screamed for fire extinguishers again. He knew that after Shorty crashed the fire extinguishers would do no good. He would be pounded to a pulp from the crash. Bill wanted to turn his head so that he wouldn't see the ripping, tearing ex-

plosion as the engine drove back into the petrol tank. He didn't want to see Shorty thrown a hundred feet, his body twitching as he ran up to him.

Suddenly, the nose of the little Spad came up. It was only twenty-five feet above the ground now—and directly in front of Di Maggio. As the nose came up, the wings started to turn. The little ship came around in a half-barrel roll, so close to the ground that the wing tips stirred the dust.

Bill Barnes' breath hissed through his lips as he saw Shorty struggle with the opposite aileron, then haul back on the stick.

The Spad plopped to the ground in a pancake landing that threatened to wreck its wheels and tail skid, in front of the cameras!

Shorty grinned, his face covered with oil, as he saw the Fokkers gliding in to land beside him and make him a prisoner. When they were all over the side of their ships, he waved a hand at them, gunned the Spad and went tearing down the field and into the air again.

The cameras were still grinding when suddenly Di Maggio shouted, "Cut!" He crossed to his private chair and sat down in it. His hands were shaking as he took a flask out of his pocket and touched it to his lips, then he took a long drink.

"I have never seen anything like that before," he said, huskily to Joe Leeds and Henry Holt. "That will be the most magnificent shot of the picture."

"And he's still alive," Joe Leeds sneered.

"Wait until he gets warmed up," young Sandy put in. "Heck! you haven't seen anything yet!"

Shorty fishtailed the little Spad in at the lower end of the field and taxied it back to its position at the end of the line. Bill pulled away from the people around Di Maggio and went to meet him. Shorty was climbing over the side, his face a smear of oil when Bill stopped beside the plane.

"What the devil are you trying to do?" Bill asked him.

Shorty's broad face broke into a grin. "I didn't like the way Di Maggio spoke to us," he said. "I thought I'd give him his money's worth." Then his face sobered. "Look here, Bill," he said, pointing to three tiny holes in the space between the cockpit and engine of the Spad.

Bill looked at them. His eyes were wide and a low whistle escaped him as he turned to look at Shorty.

"Real bullets!" he said.

"Real bullets!" Shorty echoed.

"Could you tell which one fired 'em?" Bill asked.

"No," Shorty answered. "But I have an idea. I'm going down to look over those Fokkers now. They're coming in."

"I'll go with you," Bill said, grimly.



## AIR TRAILS

"No," Shorty answered. "They aren't so apt to pay any attention to one of us. If both of us go snooping around they may raise a row."

"O. K.," Bill said, as Shorty moved away. He bent over to study the bullet holes in the Spad again.

Shorty sauntered down to the far end of the line where the MRO pilots were lining up their ships. He waited until Lennard Small had left the immediate proximity of the planes, then climbed up on the step of the first one. He threw open the breech of the machine gun mounted in the cockpit and saw that it held a blank cartridge. He closed the breech and was about to climb down when he heard a voice shout at him from the third ship.

"What the hell are you doing in there?" the voice wanted to know.

Shorty slid to the ground without answering. As he rounded the tail of the ship, three men in overalls and with hard-bitten faces came toward him. He knew they were either pilots or mechanics in Small's outfit.

"What's the idea?" one of them asked, shouldering Shorty.

"I just wanted to look over your ships," Shorty said, quietly. "I haven't seen any War-time Fokkers in a long time."

"It'll be another long time if these are the only ones you have a chance to see," a man with a flat nose said.

"I'm not going to hurt them," Shorty said, as he climbed up on the step of the second ship and threw the breech of its machine gun.

There was a roar behind him that was not unlike the snort of an angry bull. He felt a hand encircle his ankle. He clung to the machine gun, and kicked out with his free foot. A howl of rage sounded below him. Both of his legs were encircled with bands of steel. He tried to kick loose. He felt his grip slipping on the machine gun. He hit the ground with his right shoulder and kicked his feet loose as a man made a dive for him.

He dodged the blows that were thrown at him and managed to stagger to his feet. A terrific blow caught him behind the ear, another on his right eye. He ducked and shot an uppercut into the stomach of the man in front of him. The man groaned and couldn't straighten up as Shorty ducked under a fist and brought his right up on the side of another jaw.

He ducked and weaved, taking a half dozen blows to land one. He saw the man he had hit in the stomach coming back into the fight. His head spun as he was hit behind the ear again.

Then Shorty knew he was on the ground. He saw a foot traveling toward his head, and started to cover up his face. But before it landed he saw another boot meet the ankle of the man

who was trying to kick him. He heard a voice bellowing above him. He looked up and saw Major Lennard Small driving his own men back with his fists.

"What the hell do you cutthroats think you're doing?" Small bellowed at them.

"You told us not to let any one near our ships," the man who had first attacked Shorty cried.

"But he's a flier, you fool!" Small stormed. "I ought to dock you all a week's pay." He turned and went back to help Shorty to his feet.

"Are you all right, old man?" he asked. "They didn't mean anything. They were just carrying out my orders."

"No," Shorty said, feeling of his jaw and touching his eye tenderly. "I know it was all in fun. They were about to kick my brains out. A nice bunch of mugs you have there."

"They're all right," Small said. "Just a little hard-boiled. They didn't understand. Were you looking over my ships?"

"Yes," Shorty said, grimly, remembering what he had been looking for. "Small, you or one of your cute little playboys there had some real bullets in his gun a little bit ago. Three of them missed me by only a few inches."

Shorty watched Small's eyes spread wide in incredulous amazement. A half dozen paradoxical thoughts flashed through Shorty's mind. Had he been wrong about Lennard Small? Was he being small and picayune to hold a thing against him that had occurred so long ago?

"You must be mistaken, Shorty," Small said, evenly. "You know we would be signing our own death warrant if you had been shot down in the air. My men may be tough, but they aren't murderers."

"Could this man Di Maggio have planted those bullets in one of your guns?" Shorty asked, suddenly.

"I don't think so," Small answered, slowly. "I've had my ships too closely watched. Perhaps you've noticed?"

"Yes," Shorty said, dryly, "I've noticed."

"I don't think any one could get near them," Small went on.

Shorty impulsively stuck out his hand. "I'm sorry, Len," he said. "I guess I'm getting old. I've held my grudge too long. It's a long time since the War."

"Your nerves seem to be holding out all right," Small said. "That was a marvelous bit of flying you did out there. You even got a rise out of Di Maggio and his skin is thicker than an elephant's."

They shook hands and grinned at one another as they had done nineteen years before when they first met at St. Quentin, in France.

Bill looked at Shorty's slowly closing right eye in amazement a few minutes later. "You look as though you'd spoken out of turn," he said.

## LOOK AT THESE BARGAINS

You can't beat these prices  
You can't beat Imperial Service

## COMPARE - - CONVINCE YOURSELF

**FREE** With all orders for \$1.00 or over  
Your Choice of  
2 OZ. CLEAR CEMENT AND 100-  
1/16x1/16x18 Balsa or 1 Skein  
#45, 1/16 Sq. OR 1/8 Flat Rubber  
If rubber is desired, add 10¢ handling charge

18" Balsa 1/16x1/16 100, 5c 1/16x1/16 40 5c 1/16x1/16 20, 5c 1/16x1/16 16 for 5c 1/16x1/16 5 for 5c 3/32x3/32 32, 5c 3/32x3/32 16 for 5c 3/32x3/32 10 for 5c 3/32x3/32 10 for 5c 3/16x3/16 8, 5c 3/16x3/16 6 for 5c 3/16x3/16 3 for 5c 3/16x3/16 2 for 5c 1/8x3/8 6 for 10c 1/32x3/8 8 for 10c 1/16x3/8 8 for 10c 3/32x3/8 7 for 10c 3/8x3/8 6 for 10c 3/16x3/8 3 for 10c 3/8x3/8 2 for 10c 3" sheets or 36" lengths double above prices; add 10¢ packing charge for 36" lengths.	INSIGNIA 24 and stripes 5c WASHERS 1 doz. 1/2 or 1 1c THRUST BEARINGS Small, .002, 8c Large, .002, 12c PROPELLER BLOCKS 1/2x1/2x5 8-5c 1/2x1/2x6 6-5c 1/2x1/2x7 4-5c 1/2x1/2x8 3-5c 1/2x1/2x10 2-5c 1/2x1/2x12 2-5c 1 x1/2x12 2-5c 1 x1/2x15 6-5c	WING AND TAIL LIGHTS 1 1/2" 10c; 1 1/2" 15c; 2 1/2" 20c. RUBBER .04" dia. 20 ft. 5c 1/16 sq. 20 ft. 5c 1/4 flat .18 ft. 5c Skein .50c DUMMY RAD. ENGINE 1 1/2" dia. 10c; 2" d. 1 1/2" 3" d. 20c. ENGINE AND COWL ATTACHED 1 1/2" dia. 20c 1 1/2" 3" d. 20c. 3" dia. 35c CELLULOID PANTS, per pair 1 1/2" to 1 1/2" .18c 1 1/2" to 1 1/2" .35c METAL PROPELLERS 2 blades 3 blades 1 1/2" .5c .08 2 1/2" .10c .10 3 1/2" .15c .20 4 1/2" .20c .25 ALUM. TUBING 1/16 or 1/8, ft. 7c 3/16 or 1/4, ft. 10c ALUM. COWLINGS 1 1/2" 15c 2" 18c 3" 25c Specify whether anti-drag, closed, or open. BOMBS 1 1/2" .1c 1 1/2" .7c 3" .12c GUNS WITH RING MOUNT 1 1/2" 10c 1 1/2" 15c PURSUIT MACH. GUNS 1/2", 1 1/2" or 1 1/2" each 5c CAMEL'S HAIR BRUSHES Small 3c; Lge. 5c BUSHINGS 1/16 .4 for 1c WOOD, WATER SPRAYER 1 1/2" or 1" pkg. 5c MODEL PINS SANDPAPER Doz. sheets .5c PROP. SHAFTS, doz. .5c 1/32 1/16-1/8 2 for 1c NOSE PLUGS 1/2" doz. 8c
18" PLANKS 1x1 1/2 1c; 1x2 10c 1x3 15c; 2x2 18c 2x3 22c; 2x6 35c 3x3 40c; 3x6 75c TISSUE, AA All col., doz. 18c Silver, ea. 10c Superfine, wh. 5c WHEELS, per pr. Brch. 1/4 .01 .02 1/2 .02 .03 .05 1 .03 .04 .07 1 1/2 .04 .08 .10 1 3/4 .07 .08 .10 1 7/8 .07 .08 .10 1 3/4 .15 .30 PINEWHS., pr. Both sides alike 1/4 .4c; 1" .6c 1 1/2 .8c; 1 1/2 .12c NOSE BLOCKS 1x3x1 .1c 2x2x1 .2c 2x3x1 .3c 3x3x1 .5c 3x3x2 .8c 3x3x3 .10c	THINNER Same as clear dope COLORED DOPE 1 oz. 5c; 2 oz. 9c; 4 oz. 17c; 1/2 pt. 35c; pt. 55c CLEARANCE 1 oz. 5c; 2 oz. 9c 4 oz. 17c; 1/2 pt. 30c; pt. 50c MACHINE-CUT BALSA PROPS 1/2" 5c; 3/4" 5c; 7/8" 6c; 1" 7c; 1 1/8" 8c; 1 1/2" 10c. BAMBOO 1/16 sq. x12 38-5c 1/16 sq. x15 dz. 10c DOWELS 1/16 sq. .002, 5c 1/8 x18 .2 for 3c WIRE 6-8-10-12-14 .....2 ft. 1c WOOD VENEER PAPER 20x30 .1 for 10c CELLULOID 6x8 .....5c 12x16 .....18c	FREE POSTAGE ON ALL ORDERS IN UNITED STATES FOR 75c OR OVER, EXCEPT WEST OF MISS. ADD 10c; CANADA, U.S. POSSESSIONS, AND FOREIGN, ADD 15c. UNDER 75c. ADD 10c. No C.O.D.'s. No Stamps. Add 10¢ handling charge for free rubber.

20 IN. FLYING PLANS 10c—3 for 25c  
Sparrow Hawk, Boeing Trans. 247, Spad Chass., Vought  
Corsair, Curtiss Swift L. W., Waco Cabin Biplane,  
Douglas Dolphin, Boeing P12F, Fokker D-VII, S.E.S.  
Goshawk, Gee Bee, Boeing 26A, Monocoupe, Northrop  
Gamma, Fairchild 24 Cabin.

SELECT ANY 2 OF THE ABOVE PLANES  
in 2-in-one FLYING KIT

with carved prop, complete. Postpaid in U.S.A. **75c**  
(Free offer will not be included with 2-in-1 kits  
unless order amounts to \$1.50 or over.)

**36" CORBEN SUPER-AE FOKKER D-VII 75c**  
Complete. Add 20c postage.

**KITS CURTISS GOSHAWK \$1.00**  
Add 25c postage

No free offer with 36" kits  
SEND FOR FREE CATALOG

Send for Wholesale Price List

**IMPERIAL MODEL AERO SUPPLY**  
416 E McDONALD AVENUE, BROOKLYN, N.Y.

COLT 45 CAL.  
AUTOMATIC \$1.00

Colt 45 Automatic pistol model kit \$1.00  
Thompson Sub Machine Gun kit \$1.00

## FREE OFFER

1 Colt 25 automatic  
pistol model kit  
FREE with order for  
\$2.00 or more.

Beautiful kit complete,  
best basswood, all parts  
cut to shape. Require  
only short time to finish.  
Sent postpaid in U.S.A.  
No stamps, please.  
Send for free illustrated  
pamphlet.

GUN MODEL CO., Dept. W 11, 2908 N. Nordica Ave., Chicago



"Curiosity did that." Shorty grinned. "You know, Bill, I think I've been wrong about Small. I was suspicious of him because— But let that ride—I think I was wrong. I went down to look over those Fokkers and threw the breech on a couple of machine guns. His gorillas were about to kick my brains out when he came along and bounced a couple of them on their ears. He probably kept them from killing me."

"That's what I've thought all the time," Bill said. "That attack on you at the Smithsonian looked bad because Small happened to be there and you didn't act any too friendly toward one another. Then the attack on Sandy when he was flying your ship. But it isn't as simple as that. There is something else. Something—" Bill stopped speaking and shrugged his shoulders. "I haven't been able to put my finger on it yet. I'm going to ask Holt if we can't see some rushes of those pictures they took of you to-day. Perhaps we can tell by the smoke from the guns of the Fokkers which one was using real bullets."

#### IX—MR. SANDERS

HENRY HOLT, Bill and Shorty sat in the tiny theater on the MRO lot that night and saw the rushes of the raw shots that had been made in the air that day.

Even Shorty got a thrill out of that shot where he brought his little Spad down in front of the cameras in an inverted position, with a nearly dead stick, and barrel-rolled it for a pancake landing.

Perspiration ran off Bill's face while he watched it. "I thought you would surely crash," he said to Shorty.

They had the operator run off the combat between the lone Spad and Len Small's Fokkers four times. Having told Henry Holt nothing about the bullet holes they had found in Shorty's plane, they could say nothing about it while they watched it. But when Henry Holt had left them they compared what they had seen.

"Did you see anything?" Bill asked Shorty.

"Nothing," Shorty said, in disgust. "The first time they ran it I thought I saw dark smoke coming from a Fokker off on my starboard side. It was only a burst. Maybe a half dozen shots. I couldn't tell which plane it was or who was piloting it, except that it wasn't Small's. His ship had a squadron commander's insignie on it.

"Then the next two times I couldn't spot it at all. The last time they ran it I thought I saw it again. But I wasn't sure. It was so short a burst of fire I couldn't tell."

"Dark smoke wouldn't prove it conclusively," Bill said.

"Yeah, I know," Shorty said. "Maybe those holes were in the Spad before I

took her into the air. But, I'm sure I felt them strike her. You know the way they feel."

"I know," Bill said with conviction. "Do you suppose this bird Di Maggio is trying to wreck things so that MRO can get hold of the picture? You know Holt has to finish within a certain time, then turn the sets back to MRO. He told us that and Small hinted that something was wrong."

"I don't know," Shorty answered. "This picture business is too goofy for me. Every one of these interruptions eats into Holt's time."

When Bill and Shorty had asked Sandy if he wanted to go with them that evening to see the rushes of the shots that had been taken that afternoon he told them he didn't care to go.

Cy brought the Spad around in an abrupt turn and leaped clear—just as the flames hit the gas tank!



"I have a little headache," he explained. "It's nothing bad, but the pictures might make it worse."

"What's the matter with you, kid?" Bill asked earnestly. "Last night you didn't eat any dinner and to-night you don't want to see movies of Shorty in action. It's the first time I ever heard you refuse an invitation to the movies."

"It's his eyes, Bill," Shorty said, grinning. "Notice the way he has been going around squinting to-day? He ought to go to an eye doctor. He'd look fine in a pair of those big, bone-rimmed glasses."

Sandy threw a murderous look at Shorty and went up to the room he was occupying with Shorty in the Holt home. When he heard Bill, Shorty and Henry Holt depart, he hurried downstairs and



turned on a radio. A couple of minutes later Helen Holt stuck her beautiful head around a corner and gazed at him in surprise.

"Why," she said, "I thought you had gone to see the rushes."

"No," Sandy said, assuming the air of a man who couldn't be bothered with trifles. "I don't care for rushes. I'd rather wait until the raw shots have been edited and cut and put in sequence. If I see the rushes it spoils the picture for me later."

"Oh," she said. "You sound like an old hand in the movie business."

"I wouldn't say that," Sandy said, laughing carelessly. "But I get around quite a bit, you know."

"I wish you'd tell me about some of your experiences with Mr. Barnes," she said, sitting down beside him.

Sandy edged away a half inch and glanced at her out of the corners of his eyes. "Gosh," he thought, "I wish some one would come in here and try to insult her or something. What I wouldn't do!"

Then he tried to look nonchalant. "Well," he said, "there was that time out in Madagascar that was quite amusing."

"What's Madagascar?" Helen Holt asked. "A city or a country?"

"It's an island off the east coast of Africa," Sandy said. "We were helping the French government with a threatened uprising. I had been left to guard our transports and bombing plane from the aborigines and—"

"What in the world are aborigines?" Miss Holt asked.

"Why," Sandy said, looking at her in surprise, "they are the natives of a wild country, the original natives."

"Oh, I see," she said. "Like the Indians were here?"

"Yeah," Sandy said, "that's the idea. Well, after a while some of the natives did come stealing out of the brush and sneak toward the plane. I didn't want to fire at them because then there would be no telling what might happen. So I waited until they had crept under the

big plane and I got a dummy I use with my ventriloquism. I was afraid they would set the plane on fire and I thought I could frighten them away by making the dummy talk to them with me out of sight."

"Weren't you terribly afraid?"

"Naaa!" Sandy said, dismissing the idea with a wave of his hand. "Just then Bill and a couple of others appeared and captured the natives. When an interpreter asked them what they were after they said they wanted to get one of the eggs of the big bird that flew so they could ride on it after it hatched!" Sandy turned to look at Helen Holt as he completed his story and found that she was frowning instead of laughing. He waited for a moment, but she retained her puzzled frown.

"You see," Sandy explained, "they thought the bomber was a big bird that would lay eggs. They wanted to get one of the eggs and hatch it so they could fly on it when it grew up."

"Oh!" Helen Holt laughed. "What a weird idea."

Sandy gazed at Helen Holt with a curious expression on his face. He wondered if he had told the story badly. He racked his memory for an episode that would be easier for her to understand. He thought of one and started to tell it when a voice that he knew only too well came from the open porch.

"Tell her about the time you swallowed the crocodile and it ate all your supper and died," the voice said.

Sandy started violently, then jumped to his feet as the grinning, carrot-topped "Red" Gleason and leathery-faced Cy Hawkins stepped into the room—without an invitation.

"This," said Red, "must be the place we're looking for. Bill Barnes must be close by or you wouldn't allow that brat around."

"Listen, you—" Sandy's face was crimson.

"Don't stand there making noises," Red interrupted. "Introduce us—introduce us. Didn't we come three thousand miles just to meet Miss Holt?" He

looked at Sandy and saw the kid was half choking.

"Never mind," he said. "Miss Holt, my name is Gleason. This is that gallant knight, Mr. Hawkins. Bill—Mr. Barnes—instructed us to come to your home after we made a landing. We have made our landing and have rented a car. If you would like to take a ride to—"

"Denver," Cy said, his bronze face immobile.

"Or Chicago," Red said, with a bow. "Or Quebec," Cy added.

"We're at your service," Red finished. "We might go over to the Grove and dance," she said. "Just wait a moment until I get a wrap."

"You two lousy kiwis," Sandy hissed at them when she was gone.

"What's the matter, kid?" Red said. "You're coming along, aren't you?"

"I have a headache," Sandy said, with dignity. "I'm going to get some air and then go to bed." He disappeared through a window that led to a side porch.

When Helen Holt reappeared, her face was flushed and her eyes were sparkling. She threw a smile at each of them and said, "Where is Sandy?"

"He has a headache. He's going to bed," Red said. "You know, you're even more beautiful than your pictures."

"Flatterer," she said.

"Snake!" Sandy hissed from the dark.

GEORGIO DI MAGGIO, the director, arrived on the MRO lot the next morning in the same large, shiny limousine. It stopped near the front of one of the hangars and the chauffeur leaped from his seat to open the door of the car as he had done on the previous morning.

Red Gleason and Cy Hawkins looked at Bill and Shorty with questioning eyes as Di Maggio walked toward one of the camera platforms with Joe Leeds and his phalanx of assistants following him.

The same prop boy shouted, "Mr. Di Maggio's chair! Mr. Di Maggio's chair!" This morning there was no one in it and Mr. Di Maggio fell into it as though



Never Before Such A Sensational Subscription Offer:— ALL FOR  
**12** Issues—1 YEAR of **MODEL AIRPLANE NEWS** plus **24** Issues—2 YEARS of **OPEN ROAD FOR BOYS** \$**2**



BOYS! You won't be able to match this offer anywhere, anytime. Here are 2 outstanding magazines—both of which are well worth twice their regular newsstand prices per copy. **MODEL AIRPLANE NEWS** is 20c per copy; **OPEN ROAD FOR BOYS** is 10c per copy. This combination offer brings you 36 magazines at a total value of \$4.80. Think of it! This offer saves you \$2.80 on the transaction. Don't pass it up! Fill in the coupon now. You'll be mighty glad you did it.

**MODEL AIRPLANE NEWS** 88-2  
 551 Fifth Avenue, N. Y. C.

I want the next 12 issues of Model Airplane News and the next 24 issues of Open Road For Boys, beginning with current issues. \$2.00 enclosed, covers payment of all 36 issues.

Name .....

Address .....

City ..... State .....



he had been standing in a bread line all night.

"Whew!" Red said. "Who is he—the king of all the Californias?"

"He's the director," Shorty said. "They all act like that. It must be something they ate when they were young."

Shortly after Di Maggio was in his chair and his assistants had gathered around to "yes" him, another large, shiny limousine came across the lot with its horn blaring. It stopped just behind Di Maggio's car and the chauffeur leaped to open the door.

Annoyed by the noise of the horn, Di Maggio turned around to protest as a skinny figure in white overalls and white helmet stepped to the ground.

At the same time, a footman climbed off the front seat and began to shout, "Mr. Sanders' chair! Mr. Sanders' chair! Mr. Sanders' chair!"

Then he blew a half dozen notes on a bugle he held in his hand, and fell in behind the unsmiling Sandy as he went

toward a great throne of a chair whose broad, walnut back rose eight feet into the air. It was in line with one of the camera platforms, and on the top had a large sign that read: MR. SANDERS.

Georgio Di Maggio watched the whole proceeding with eyes that were inflamed with rage. The faces of his assistants and the cameramen on the platforms were a mixture of emotions. Some of them were horror-stricken. Others struggled manfully to keep from going into convulsions of laughter.

"Holt! Holt!" Di Maggio roared. "Get me Holt!" he shouted at Joe Leeds. Leeds was only too glad to look for Henry Holt, because he knew he couldn't control his laughter any longer.

But Henry Holt couldn't be found. He was hiding in a hangar—laughing.

Di Maggio continued to stare in Sandy's direction, started to get up twice, and finally decided the best thing to do was to ignore him.

When things had quieted down Bill strolled over beside Sandy. He didn't

dare look at the kid as he spoke. Instead, he looked across the field as he asked, "What's the big idea? Do you have to go out of your way to make people hate you?"

"What's the matter, Bill?" Sandy asked innocently.

"You know what's the matter," Bill growled. "That chair and car and the trumpet-blowing footman!"

"Can't I use my money the way I want to?" Sandy asked. "That show cost me almost fifty bucks."

"Was it worth it?" Bill asked.

"It would have been worth a hundred," Sandy grinned. "The big stuffed shirt!"

"All right," Bill said. "Lift yourself out of that throne and come on over here. Holt says Di Maggio wants to give us our instructions for this morning's shots."

#### X—DOG FIGHT

"YOU WERE trying to make me look ridiculous, eh?" Georgio Di Maggio said



Helen Holt didn't bail out of the ship. She fell out—head foremost!



to young Sandy when Bill and his men were gathered around him.

"No, sir!" Sandy said, stoutly. "I couldn't make you look ridiculous."

"You hear him?" Di Maggio screamed at Henry Holt, at the same time waving his hands.

"All right, Di Maggio," Holt said. "Let's get on with our work."

"Very well," Di Maggio said. He snatched at the script on his chair and turned the pages as though he intended to tear it apart.

"You, Small, will be leading your patrol of five men. You will be mere specks in the sky, high above Barnes and his men as they fly toward you. At a given signal you will dive on Barnes' patrol. After that first dive you will peel off and go into a dog fight. The dog fight must be accurate in every detail. Two of Small's planes must be shot down, one of Barnes', during the engagement. Finally you all run out of ammunition, salute one another in the air to show respect for a brave enemy and turn your planes back toward your own lines.

"You must work out your plan of battle before you take to the air—which man is to be shot down and by whom. Small, your two planes must seem to go down in flames. You have the smoke screen and flame throwers attached to the ships that are to be destroyed?"

"All set," Small said.

"All right," Di Maggio growled, frowning in Sandy's direction. "Get your combat tactics worked out. The camera plane will go into the air in a few minutes. I want you to make this a real dog fight."

Lennard Small and his hard-bitten bunch of fliers followed Bill and his men over to the apron where the five Fokkers and five Spads were on the line.

"We'll be flying out of the sun, Bill," Lennard Small said. "I suppose you'll be coming toward us, from down below, in a stepped-up formation. You won't see us as we go over you. We'll spot you, wheel around and dive in a surprise attack. Naturally, we'll focus our fire on you in the lead. Shorty and Red will be on the tips of your V?"

"That's right," Bill said, "with Cy and Sandy in the No. 2 and 3 positions."

"Red and Shorty will turn sharply through one hundred and eighty degrees when they hear our first shot. They will probably be able to get in one burst as we dive on you. You turn with Cy and Sandy on our second dive and try to get in a head-on burst. Red and Shorty will dive on us to get in an effective fire as we reach the bottom of our dive. O. K.?"

"O. K.," Bill said. "Then we go into a regular dog fight trying to gain altitude."

"You single out our No. 2 man and

shoot him down during the fight," Small said. "Shorty, you get our No. 3 man."

"I'll shoot down the one ship you are supposed to lose," Small went on. "Which one of you shall it be?"

"That'll be mine," Cy Hawkins said. "Make it early in the fight—on the first dive, if you want to. I don't like these old War planes. They're too much like the horse-and-buggy days you hear the politicians talking about."

Bill and Shorty went over the five Spads with Red Gleason and Cy Hawkins helping them. They traced the control cables from one end to the other and made sure that the turnbuckles were tight and cotted. All of the motors caught, except Sandy's, on the first spin of the propeller. Sandy's caught after it had been spun three times, but it did not have the full-throated roar of the other four.

"It sounds a little anæmic," Sandy said to Bill.

"You take my ship, kid," Bill said. "I don't like the sound of that motor. It's probably O. K., but I don't want to take any chances."

"Your neck will break as easily as mine," Sandy answered.

"All right," Bill said, sharply. "Obey your orders."

"Yes, sir!" Sandy answered, his face crimson.

"Oh, Mr. Barnes! Oh, Mr. Barnes!" a prop boy called as they were about to climb into their ships. "Mr. Di Maggio wishes to speak to you and your men before you take off."

Bill and his men followed the prop boy back to Di Maggio's throne between the camera platforms.

"You wanted to see us?" Bill asked.

Di Maggio turned from his conversation with Joe Leeds; a frown was on his face. He nodded to Bill and finished his conversation with Leeds. Then he turned back to Bill while Sandy glared at him.

"I just wanted to tell you, Barnes, that I was well satisfied with the work your man, Hassfurter, did yesterday. If you put the same spirit and zest into your work to-day, I will see that you do not lack work in Hollywood. This is your big opportunity."

Bill could hardly suppress the laugh that leaped to his lips. He saw that Shorty, Red and Cy were grinning. He knew there was no use in telling Di Maggio that there wasn't enough money in Hollywood to lure him there again unless it was to help an old friend such as Henry Holt.

"We'll do our best for you, Di Maggio," Bill said, trying to wipe the grin off his face.

"Your best is not enough," Di Maggio said. "You must excel yourselves. Working in a picture of Georgio Di Maggio's will insure your future. You——"

"Why, you big fathead!" Sandy burst forth. "You conceited ape! You——"

"Shut up, kid!" Bill said, but he couldn't suppress his grin now.

"Does this boy realize to whom he is talking?" Di Maggio asked, with dignity.

"Do you know to whom you are talking?" Sandy raged at him.

"Come on, kid," Bill said and grabbed Sandy by the collar of his overall. "If there's anything wrong with our flying, you tell us," he said to Di Maggio. He rushed Sandy across the lot toward the five idling Spads.

"Can't you ever keep your trap shut?" Bill asked him.

"I'll take that guy and drop him out without a chute," Sandy raved.

"Get into your ship—I mean mine," Bill ordered. "We have a job ahead of us."

Bill led his men off the field in their Spads with a verve and flourish that would have done credit to a Guynemer or a Fonck. At five thousand feet they formed a stepped-up V and circled west until Small and his patrol had ten thousand feet under them, off to the east.

At a signal from the big transport plane carrying the cameras, Bill brought his patrol around in a sweeping turn and stuck his nose on a previously determined compass course toward the east. Far overhead, Small's patrol looked like five specks in the bright sun as they passed above Bill and his men.

Bill rocked his ship to get the attention of his men, then flipped his ailerons to tell them to close up their formation. A moment later, as he saw Small bring his little patrol around, he dipped his right wing to tell his men to make a right turn, and then fishtailed his rudder to make them understand that it was to be a one-hundred-and-eighty-degree turn. The only way he had of signaling to his men was by the old-fashioned tail-wag method.

The five Spads purred through the air, keeping a keen lookout ahead and above them for the enemy as they approached "German" territory. The big transport plane carrying the cameras was below and in front of Bill's patrol as Small and his men dived their Fokkers out of a wisp of cloud.

At four hundred yards, before they were within range, Small opened fire on Bill. Bill, looking back over his shoulder, saw Shorty and Red wiggling their ailerons to tell the rest of the patrol that they had sighted the enemy. Then they cut around in a tight turn, to get in one short burst of fire at Small and the two Fokkers diving with him before they attacked the last two Fokkers head-on. They sped toward one another at terrific speed, their guns flaming, only to roll and sideslip at the last moment to avoid collisions.

Bill and his men broke their formation to zoom and dive and whip around in



flashing chandelles to avoid the attack of the faster Fokkers.

They put on a show that brought the hearts of the onlookers on the ground up into their throats. It was faithful in every detail to the dog fights of twenty years ago.

Bill came up in a loop and rolled his Spad level at the top to complete an Immelmann turn as the No. 2 Fokker in Small's patrol chandelled back toward him. They were headed at one another with all the speed the little ships could produce. As the No. 2 Fokker started to sideslip out of Bill's imaginary line of fire, Bill corrected his aim and fired two sharp bursts. Bill saw the other pilot's arms shoot up above his head; Bill saw him slump down in his cockpit as he went by him. The Fokker yawed wildly and fell off on one wing. The nose went down as a billowing cloud of black smoke and flame seemed to shoot back from the engine housing.

To carry out the methods of War-time fighting, Bill followed the seemingly blazing ship toward the earth to make sure that it was falling out of control.

Zooming upward a moment later, he saw that the battle had drifted off to the left. He went back into that mass of snarling, raging ships with the speed and fury of a tornado. Fokkers rolled and dived and zoomed to get out of his path of mad fury as he swerved neither to right or left.

As three of the Fokkers whirled to pounce on him, he flipped his Spad over like a hawk and shot across their rear.

He grinned to himself as he got one of the German planes under his sights and poured blank cartridges into the cockpit. If this didn't suit Di Maggio he would be hard to please, Bill thought. And if Lewellyn Lindley, the ace of aces, who was supposed to be flying Bill's ship, wasn't pleased, he didn't know when he was being made a hero.

Suddenly, the smile froze on Bill's lips. There was a new note in the *tack-tack-tack* of one of the machine guns around him. He swept the air to see if he could detect which plane was carrying the gun.

Then he groaned. Black smoke was coming out of the engine housing of Cy Hawkins' plane! It had been arranged that Cy was to be shot down in the fight. But Bill knew there was no smoke device on the Spads such as the Fokkers carried.

He saw lubricating oil spurt out of Cy's engine, followed a second later by orange flame. His heart climbed into his mouth and nearly choked him as he knew that Cy's ship had been struck by real bullets. Shorty hadn't been wrong the day before. Some one of the enemy planes was firing real lead. He saw that Cy's face was white as he brought his

ship up in a zoom while the flames licked back toward the cockpit.

Then, as Bill raced up beside him, he knew Cy had cut his switch. He saw Cy grin and flip a hand at him as he let the nose of the Spad drop. He saw that the flames were coming out of the right side of the engine only and he knew what Cy was going to do as the Spad started to spin to the right.

For a moment the flames increased. Bill held his breath as the spin increased. Then the terrific rush of air smothered the flames. They no longer licked backward in a long ribbon of orange.

Bill dived his ship down beside Cy and knew that he was fighting his controls as he had never fought them before. He watched Cy's rudder, and knew that he was warping, but without the use of his engine he was practically helpless.

He saw Cy stand up in the cockpit as though he was going to dive over the side without a parachute. He saw him bracing himself with his hands on each side of the cockpit while he pushed downward with his feet.

Then the nose of the Spad eased upward and leveled off. Cy fought his controls again with the desperation of a man who has found a straw at sea. He put it into a long glide that would bring it down on the MRO field. Bill saw him strike with a thump and saw flames shooting out of the engine again. He knew it would only be a moment until they licked back to the gas tank.

He saw Cy bring the Spad around in an abrupt turn and leap clear as the little ship nosed over. Cy was a hundred feet away from the ship when he collapsed, and the Spad went up in one great burst of flame as the gas tank exploded.

Bill watched Cy stagger to his feet as people rushed to his assistance, and then zoomed his ship back into the fight. He saw what he supposed was the No. 3 man in Small's patrol, fluttering his ship toward the earth in a falling leaf while artificial smoke and flame licked out behind it.

Perspiration ran down from under his helmet and seeped in between his eyes and his goggles, blinding him. He searched the little group of snarling fighters for Lennard Small as he realized that he had expended all of his ammunition.

He couldn't locate Small, but suddenly his blood froze in his veins again. He saw Sandy's Spad come staggering out of the slashing fight, saw the nose drop. He watched the flippers on the Spad and saw Sandy's body going forward and backward. He knew that Sandy was trying to lift the nose, but his flippers were not moving. He heard Sandy's motor roar as the kid opened his throttle wide, saw the nose come up slightly to level off.

This, Bill knew, was the thing Henry

Holt had told him about and the thing Len Small had warned him against. Sandy's flipper wires had become useless in the air. The same thing had killed three other men. He saw the plane sideslip and knew that the cables to the ailerons were gone, too.

"He only has engine and rudder control," Bill groaned as he watched Sandy fighting the little ship with a desperation born of necessity. He became aware that he was shouting useless instructions to Sandy as he dived down beside him. Then he saw the kid's hand come up over his head to signal to Bill, and he saw that Sandy's thumbs were pointed downward. Bill groaned as Sandy let the nose of the ship fall again and held it in a glide.

He kept his eyes on his altimeter until they were down to a thousand feet. He heard Sandy's motor roar again and saw the nose come up. They had gone far beyond the MRO field now and there were no more fields ahead of them—only hills and houses.

Bill tried to scream at Sandy as he saw him right-rudder and try to bring the Spad around into the wind. Without the use of his ailerons, he was attempting the impossible.

But bring it around he did, until the nose was flying into the slight wind. Again Sandy let the nose drop as he cut his motor and began a long glide.

Suddenly, Bill realized what Sandy was doing. He was riding the air in the same fashion he had ridden it with his crazy canvas wings back on Barnes Field a few days before!

Sandy was flying, not with his rudder and stick, but with his body. He was a living part of the canvas, steel and wire that held him in the air. He was swaying his ship with the movements of his body, dipping and beading and rolling and making the ship respond.

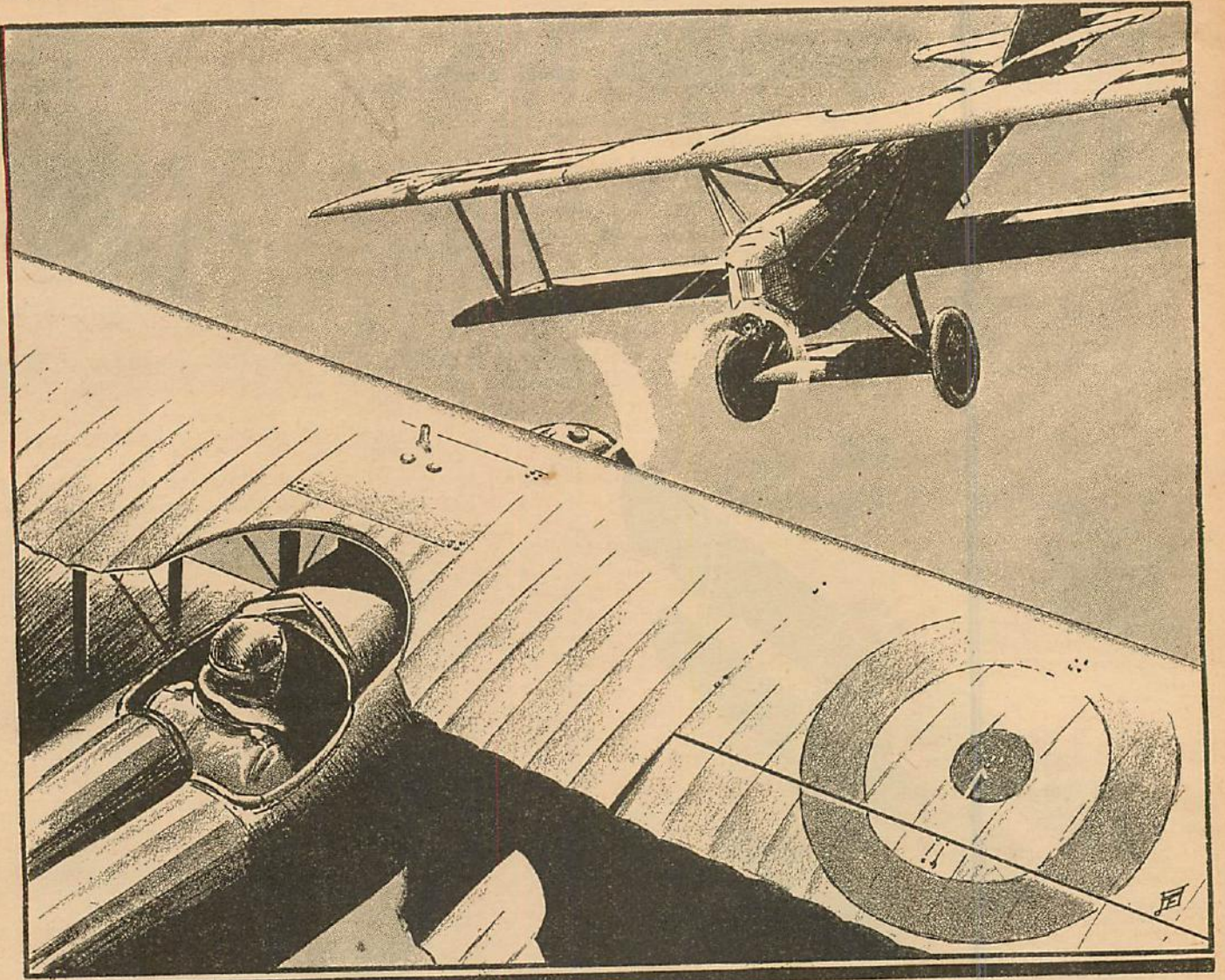
Again Sandy brought the little plane around in a complete circle. When he had completed it he was only a hundred feet above the ground over the MRO field. He eased his throttle again and again; the nose dropped until it was only twenty-five feet above the ground.

He cut his motor on and off until he was only ten feet above the ground. Then he cut his switch. The roar of his motor died. The little plane skimmed the ground at what seemed a terrific speed.

Bill fishtailed down beside him, knowing that the Spad would nose over at that speed. He saw the tail come up and over and heard the crash as he slued his own Spad around and dived over the side. He was reasonably certain that Sandy had cut his switch. But he wasn't sure.

Bill's breath was hissing through his nostrils as he drove his powerful legs toward the overturned plane. A half dozen mechanics and prop boys reached





They put on a show that brought the hearts of the onlookers into their throats. It was faithful in every detail to the dog fights of twenty years ago.

the plane at the same time he arrived.

"Lift it over," he gasped.

Sandy's limp form was crumpled up in the cockpit as they rolled the ship over. His face was a bloody mask of horror.

"That," Bill whispered to himself, "was the ship I was supposed to fly."

## XI—ACID AND A KNIFE

BILL HEARD an ambulance clanging across the field as he tried to stop the flow of blood from Sandy's head and face. He felt sick when he thought that Sandy's skull might be fractured and he might be injured internally.

Then he was aware of Di Maggio screaming beside him. He looked up and saw that Di Maggio looked like a mad man. His eyes were wild and his face was purple.

"Get back before the ambulance arrives," he screamed. "Get back so I can get a shot of Sanders unconscious beside his plane. It is a magnificent opportunity!"

Bill didn't answer him. He couldn't have spoken if he had wanted to. As the ambulance came to a clanging halt, Bill shot upright beside Di Maggio. His fist traveled not more than ten inches. It landed flush on the side of Di Maggio's jaw. Di Maggio's head snapped back as though he had been struck by a rubber battering-ram. His knees crumpled and he fell forward on his face.

Bill didn't bother about him after that. He knew he wouldn't be conscious for at least five minutes. He shouted at the doctor, who leaped off the ambulance, and they lifted Sandy onto a stretcher. "We'll rush him to the hospital on the lot," the doctor said.

Bill nodded and swung on the back step beside a uniformed interne or attendant.

Sandy whimpered and tried to draw away from the sting of the antiseptic with which they flushed his wounds. Then he opened his eyes and gazed around him like a man in a trance.

"How're you coming, kid?" Bill said,

gruffly. He didn't dare trust himself to speak any other way.

Sandy's eyes began to clear and he tried to grin at Bill. Then a twinge of pain twisted his face.

"What happened to me, Bill?" he asked.

"Your Spad nosed over when you landed," Bill said. "Can you remember? What was wrong with your controls?"

Sandy studied the problem for a moment with clouded eyes. Then his face lighted and he tried to sit up. The doctor, a nurse and Bill all pushed him back.

"My controls went haywire, Bill," he said. "That old crate was falling apart." He tried to grin again. "I never would have made it, Bill, if it hadn't been for those wings I've been fooling around with for the last month. I rocked and rolled that Spad down with my own body. All I had was a rudder, and the engine. I guess you won't laugh at my ideas again."

"I guess I won't, kid," Bill said,



grimly. "When did you notice your controls had gone bad?"

"I was coming around in a wing-over," Sandy said. "First my flippers went, then my ailerons. I was trying to pull out of my glide when you saw me. I remember now. I—"

"He had better stay quiet," the doctor said. "As soon as he is feeling all right we'll take some X rays."

Bill nodded and took Sandy's hand. "That was neat work, kid. I'll be back in a bit. I have a number of things I want to check."

Bill walked back the short distance from the MRO hospital to the set where

fly. But he had exchanged planes with Sandy. And Sandy had been the victim. But why would Di Maggio have picked on Bill to crash when he was supposed to be doubling for the star of the picture, Lewellyn Lindley?

Bill cursed and began to run toward the hangars as he saw that Shorty, Red and Cy Hawkins were fighting desperately with four of Small's pilots and a half dozen mechanics.

BILL didn't ask any questions when he arrived at the spot where his own men were trying to hold up their end against ten men. He knew that ques-

"What's it about?" Bill snapped.

"I wanted to look over their machine guns," Cy Hawkins drawled. "They objected."

"Where is Small?" Bill asked.

"They say he left the field in his own plane right after he landed," Red Gleason said.

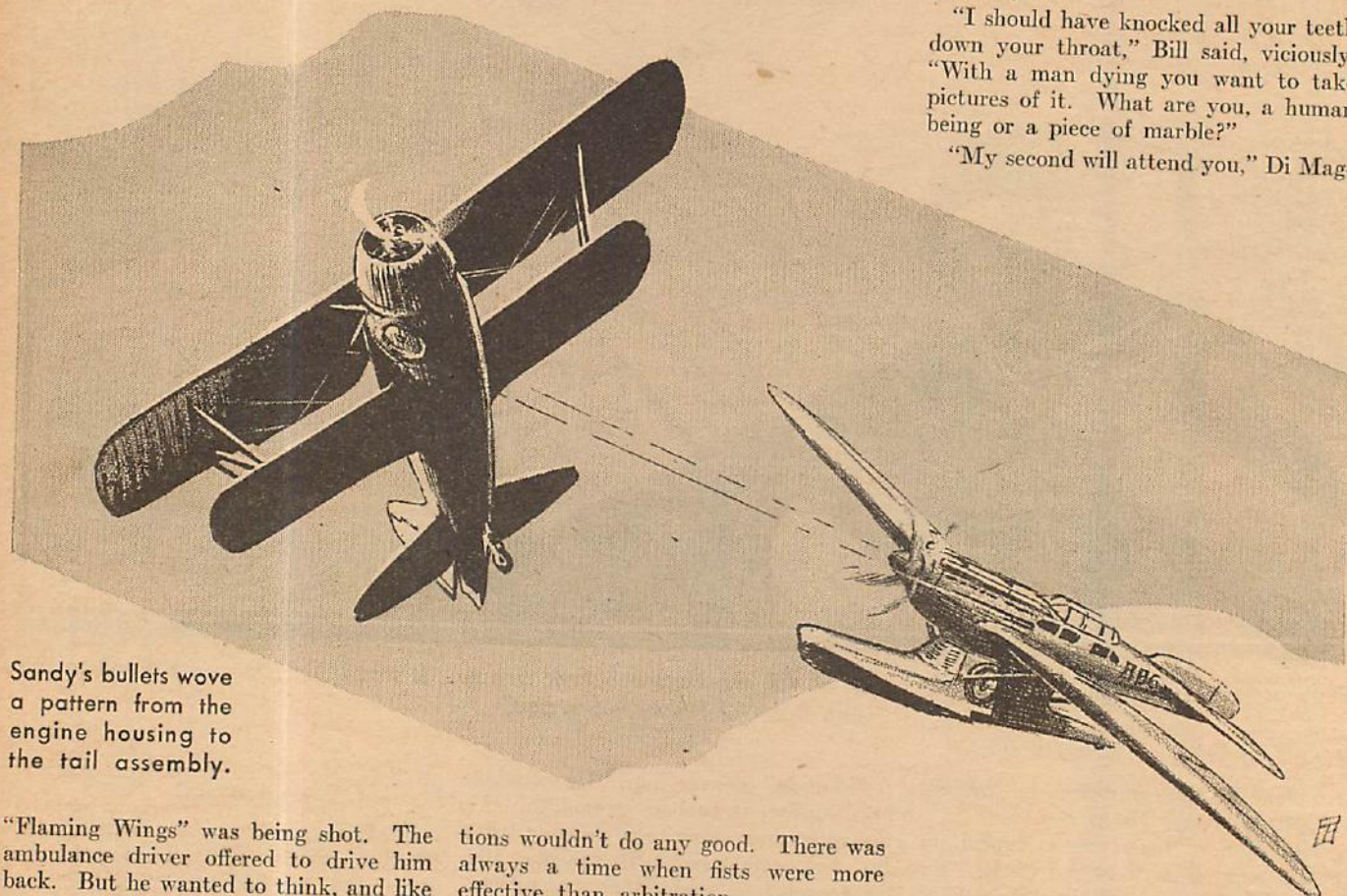
Bill saw Di Maggio coming toward him with his crew of men and said, "Look over those guns now. Hurry up!"

Bill was silent as Di Maggio came to a stop a bare foot away from him.

"You have grossly insulted me," Di Maggio said, drawing himself up to his full height.

"I should have knocked all your teeth down your throat," Bill said, viciously. "With a man dying you want to take pictures of it. What are you, a human being or a piece of marble?"

"My second will attend you," Di Mag-



Sandy's bullets wove a pattern from the engine housing to the tail assembly.

"Flaming Wings" was being shot. The ambulance driver offered to drive him back. But he wanted to think, and like all fighters he could think best when he was on his feet.

There was only one solution to the thing, he argued.

Di Maggio! The man was mad. He had one of Small's pilots in his employ, or under his thumb. He had paid the pilot to put real bullets in his machine gun so that he could get effective shots as the plane crashed. The pilot had drilled Cy's engine so that it would crash afire.

But what had he done to Sandy's plane? And the planes of those other three men who had crashed?

Then Bill remembered that Di Maggio had called them over for a last conference just before they took the air that morning. That little talk had been a stall. While they were there Di Maggio had sent some one to tamper with the plane he thought Bill was going to

tions wouldn't do any good. There was always a time when fists were more effective than arbitration.

Because they didn't see him coming into the battle, he had three men on their faces before they knew he had arrived. He caught two of them behind the ear and a third just at that soft spot in the midsection where the ribs divide.

He saw Shorty go to his knees and knocked the man who was about to kick Shorty at least ten feet. The man staggered backward for five or six steps and then went over on his back to gaze at the sky with open eyes.

Cy Hawkins doubled up a man with a punch in the stomach, then nearly tore his head off with an uppercut. Red Gleason drove his heavy right fist into another man's face four times in succession. The fourth time the man broke and ran. The four remaining men looked around them for assistance, then followed the running man toward the hangars.

gio said. "My honor must be vindicated."

"Nuts!" Shorty Hassfurth said, and pushed Di Maggio out of the way. He put an arm around Bill's head and whispered in his ear.

Bill gave the astonished Di Maggio another push that set him down on the seat of his pants as he and Shorty started toward the Spad Sandy had been flying. They raced between the camera platforms and Shorty dived into the blood-smeared cockpit of the crumpled Spad.

In two minutes Bill heard a grunt, then Shorty came out with two little nickel balls in his hand.

"Acid and a knife!" Shorty said as he handed the things to Bill. "They were fastened to his flipper and aileron cables. There was acid in a little tube that softened up the wires. Then the



## AIR TRAILS

knife, turning in one direction and set so it couldn't turn back. Every time the controls were used the knife cut a little deeper into the burned cables. Finally, they parted."

"And you think—" Bill began.

"I'm positive, Bill," Shorty said. "Listen, I didn't want to tell you this before. It seemed so long ago and I thought Small might have changed. I finally became convinced he was all right."

"We never got on when we were in France together. He hated me. I managed to get two victories to his one. We fought one day and I half knocked his head off. I didn't like him any better than he liked me. I knew he would kill me if he had the opportunity."

"One day we were on patrol together. Early morning. I didn't go over my ship before I took her up. I trusted my mechanic. We ran into three Fokkers. We took them on. I shot one down, then my controls went haywire. My flippers wouldn't work. I thought they had been shot away. I signaled to Small. I saw him laughing at me. He peeled off from the fight and beat it for our own lines. I was left with two Fokkers to deal with and my flippers gone. Why they didn't get me I don't know. I managed to evade their fire, but I couldn't fight back. I knew it was a matter of time. And I knew that Small had left me to be murdered."

"Then a patrol of British S. E. 5s came to my rescue. They chased the Fokkers home and I managed to bring in my ship. When I landed, I found my flipper wires had not been shot away. They had been smeared with acid. The acid had eaten them in half. Small said he had run out of ammunition and thought I was following him when he peeled off."

"I knew he was lying and I knew he had smeared that acid on my flipper wires. But I couldn't prove it. I managed to get a transfer a short time after that because I knew I would kill him if I stayed on in the same squadron."

"Killing a man in those days was just part of a day's work," Shorty finished, bitterly.

"And you found a half dozen real bullets in a pocket of his Fokker just now?" Bill said, slowly. "But why?"

"It was Small who attacked us on Barnes Field," Shorty said. "He had a reason for not wanting me to come to Hollywood. He was afraid I would talk. He tried to get me again in the Smithsonian. And then he waited for me over Winslow, Arizona. He wanted to shut me up. Instead he almost got Sandy."

"I had decided it was Di Maggio," Bill said. "He would have a reason. That is, the better the crashes, the better his picture. It didn't seem possible that any one could be so inhuman. But it was the only way I could figure it."

"Why would Small murder three of

Holt's fliers and then try to murder me? That was the plane I was supposed to fly—the one that cracked up when Sandy landed. Small must be getting pay from Di Maggio or MRO pictures. They want this picture Holt is making."

"No!" Shorty said, emphatically. "Small has another reason for the things he has done. Di Maggio may be a part of his scheme. The pieces don't fit."

"We've got to get Small," Bill said. "He's a dangerous maniac. Have you ever seen his own ship? The one he left in."

They both whirled as the voice of Henry Holt bellowed at them from across the field. He was running toward them, his hair tousled.

"Bill!" he gasped. "What's this I hear about Small using real bullets? Where has he gone? You've got to stop him. In some way he persuaded Helen to go with him. He has been trying to force himself on her for weeks. You've got to find him, Bill!"

"I'll find him all right," Bill said, grimly. "I have a couple of questions I want to ask him. He tried to kill me and he tried to kill Cy Hawkins after murdering the three men who died before we came out here."

"I'm afraid of what may happen, Bill," Henry Holt whispered.

"We'll get him," Bill repeated. "I want you to go over to the hospital and see that Sandy gets everything he needs."

## XII—JUST ANOTHER DAME

BILL SPUN on his heels and began running toward the hangar where the Silver Lancer and his three Snorters were under lock and key. Shorty fell in behind him without a word.

"Roll out the Lancer and one of those Snorters!" Bill shouted at a bunch of gossiping grease monkeys. In three minutes the two ships were out on the apron and Bill was tuning in the master control on his radiophone. While the twin Diesels of the big ship warmed up, he made contact with a half dozen fields to the north and as many to the east and northeast. He described the plane Small was flying as the grease monkeys had described it to him, and gave its license number. One after another the fields reported they had not seen it. Then his body tensed as Oakland reported that Small had made a landing there to refuel.

The manager of the airport also told Bill that Small had asked for maps and weather conditions to Winnipeg, Canada.

"He sounded as though he intended to hop from here to Salt Lake City, then north to Great Falls, Montana, along the regular air routes, then cut northwest to Winnipeg."

"Was there a woman with him?" Bill asked.



**FREE** MAIL COUPON  
for Big Train Book  
IN FULL COLORS

Page after page shows new streamline trains, new and advanced features such as the realistic air whistle, model high speed track, remote control reverse, six wheel drive steam-type locomotives, etc. All of America's famous streamliners have been reproduced by American Flyer—they are models you will be proud to own. Select your fun-making automatic signals, stations, bridges, etc. Dads, too, make railroading a hobby.

American Flyer Mfg. Co. SEND FREE TRAIN BOOK  
2246 S. Halsted St., Chicago, Ill.

Name .....

Address .....

**American Flyer Trains**

SMASH! BALSA SUPPLIES  
CUT TO THE BONE

These prices apply only to orders for \$2.50 or over.

**FREE** YOUR CHOICE OF DOZEN BOTTLES  
CLEAR CEMENT OR CLEAR DOPE (RE-  
TAIL VALUE 70c), OR 225 FEET 1/8" FLAT  
RUBBER. If rubber is desired, add 10c  
handling charge.

On orders of \$10.00 or over, 1/2 gallon cement

**FREE**

We do not limit quantities of any item

18" BALSA Per 200	PROP. BLOCKS PER DOZ.	WASHERS PER 100
1/32x1/16 ... 9c	1/8x3/16 ... 5c	3/4 or 1/2 O.D. ... 5c
1/16x1/16 ... 10c	1/8x3/8 ... 5c	MACHINE CUT PROPS, per doz.
1/16x3/32 ... 10c	1/8x1/2 ... 14c	5" ... 20c 6" ... 21c
1/16x1/8 ... 10c	1/8x1/2 ... 17c	7" ... 30c 8" ... 35c
1/16x3/16 ... 24c	1/8x1/2 ... 29c	10" ... 45c 12" ... 60c
1/16x1/4 ... 26c	1/8x1/2 ... 34c	WHEELS, doz.
1/16x1/2 ... 60c	1/8x1/2 ... 38c	Birch Bal. Cel.
3/32x3/32 ... 24c	1/8x1/2 ... 52c	1" ... .05 .09 .12
1/8x1/8 ... 29c	BEST BAMBOO	1 1/2" ... .06 .11 .24
1/8x3/16 ... 48c	1/16x1/16x12 8c	2" ... .08 .14 .25
1/8x1/4 ... 52c	1/16x1/16x12 8c	3" ... .10 .19 .35
3/16x3/16 ... 65c	gross 15c	4" ... .15 .35 .60
1/4x1/4 ... 80c	CLEAR DOPE	5" ... .75 1.50
1/2x1/2 ... 2.15	1 oz. ... doz. 40c	WIRE, 100 FT.
1x1 ... 2 for 6c	2 oz. ... doz. 60c	No. 6 ... 25c
1x2 ... 2 for 8c	1/2 pt. 25c 1 pt. 35c	No. 8 ... 25c
2x2 ... 2 for 23c	1 qt. 65c 1/2 gal. 95c	No. 10 ... 25c
1x1 1/2 ... 2 for 11c	1 gal. each, \$1.50	No. 12 ... 30c
1x2 ... 2 for 13c	COLOR'D DOPE	No. 14 ... 35c
2x3 ... 2 for 32c	All colors.	PROP. SHAFTS
1/64x2 20 for 16c	1 oz. bot. dz. 50c	1 gross \$45
1/32x2 20 for 14c	2 oz. bot. dz. 75c	PROP. DOCKS.
1/16x2 20 for 17c	1/2 pt. 27c 1 pt. 45c	1x2x1 ... 6c
3/32x2 20 for 22c	1 qt. ... 70c	2x2x1 ... 20c
1/8x2 20 for 20c	1/2 gal. ... \$1.25	3x3x1 ... 30c
3/16x2 20 for 31c	BUSHINGS	3x3x2 ... 35c
1/4x2 20 for 40c	1/16 I.D. 100 15c	RUBBER
3" sheets or 36"	CLEARC'M'NT	BEST QUALITY
lengths, double	1 oz. bot. dz. 45c	225 ft. skeins
above prices and	2 oz. bot. dz. 65c	.045 sq. ... 25c
add 10c packing	1/2 pt. 25c 1 pt. 40c	1/16 sq. ... 20c
charge for 36"	1 qt. ... 60c	1/8 flat ... 35c
lengths.	1/2 gal. ... \$1.00	1/2" NOSE
	1 gal. ... 1.75	PLUGS
	5 gal. ... 6.50	1 doz. 5c 100 35c

Remit with order. Because of these low prices, we do not pay shipping charges. No C.O.D.'s. No stamps.

Send for complete price list.

**RELIABLE DEALERS SUPPLY**  
416E Gravesend Ave., - BROOKLYN, N. Y.



"Yes," the manager said, slowly. "He seemed to have some difficulty in persuading her to go on with him. Is there anything we can do? Is something wrong?"

"One of my men will be in there in a couple of hours," Bill said. "See if you can remember anything else to tell him when he arrives. Thanks. I'm signing off."

Bill motioned to Shorty, Red and Cy Hawkins from his place in the forward cockpit of the Lancer.

"Cy," he said, "I want you to stay here and keep an eye on Sandy's condition. I'll check back and get a report every hour on the hour. Stand by your Snorter at that time. Red, I want you to hop up to Oakland. See if you can find out anything more from the manager there. Shorty, you cut across to Salt Lake City and up to Great Falls. The idea is to keep Small from getting over the Canadian line. I'm going to cut almost due northeast and try to intercept him at the northern corner of North Dakota and Montana. If he's going to Winnipeg, that is where he'll go over the line. Keep in contact with me and watch it over the Rockies, Shorty."

Bill threw his brakes and taxied out into the wind. He opened his throttles and took the big ship down the field like a flash of silver light.

At five thousand feet he swung out his map rack and laid a course over the Sierra Nevadas and the Rocky Mountains. He stuck his nose on a point between the places where the Milk and Yellowstone rivers ran into the Missouri River. He figured that with plenty of altitude he could sight Small at about that point.

It was well along in the afternoon when Bill circled above the flatlands of northwestern North Dakota and northeastern Montana. He located the junction of the Missouri and Yellowstone rivers below him and made up his mind to form the base of a triangle between them.

He was certain that if Small was headed for Winnipeg he would be able to cut him off at that point. He cruised back and forth between the two rivers, scanning the air all about him with powerful binoculars.

The red light that suddenly flashed on his radio panel startled him. He threw the switch and spoke into the microphone.

"Shorty speaking, Bill," came to his ears. "I'm at Great Falls. Small checked out of here an hour ago. You were right. He is heading for Winnipeg. Where are you?"

Bill gave him his position.

"Just a moment," Shorty said. "He ought to be in that vicinity within a half hour. He has a fast ship. She'll do close to three hundred when she's

pushed. Helen Holt is still with him. But according to the report from Salt Lake City and Great Falls, he is having trouble with her. Do you want me to come there?"

"No," Bill said. "Not unless I send for you. I can take care of Small. If necessary, I'll follow him to Winnipeg. I mean, if I can't force him down before he goes over the border. You can't help. I'll make out. Wait there. I'll get in touch with you."

"O. K.," Shorty said.

"Wait!" Bill shouted into the mike. "I think I see him now. He's ten thousand feet below me, and going like mad. I'm signing off, Shorty."

"Luck, fella," Shorty shouted as Bill threw his radio key.

Bill jammed the control column forward and pushed his throttles nearly open. The Lancer went screaming down in a seven-thousand-foot dive like a silver bullet. At thirteen thousand feet Bill eased back on his stick and brought the nose up. Then he stuck it down again and held it down, pointed at the nose of the oncoming biplane.

When he was only fifty feet above the buff-colored ship he leveled off and gazed over the side. He couldn't tell whether the man piloting the ship was Lennard Small because of his helmet and goggles. But he could tell that the person in the after cockpit was Helen Holt, and he saw what he wanted to see. He saw that she was wearing a parachute.

He came up and around in a flashing chandelle, raced in at Small from the starboard side. When he was only a hundred feet away he clamped down on his gun trips and his .37mm. cannon and fired a warning across the nose of the fast-traveling biplane.

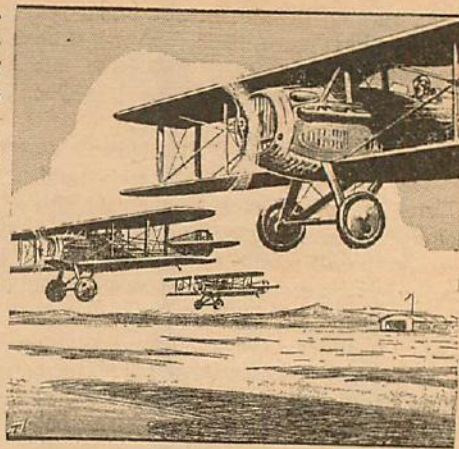
There was no doubt in Bill's mind that Small heard and saw the smoke of his tracers as he leveled off and paced himself alongside the speeding plane.

Bill was watching Small as a cat watches a mouse, but he didn't expect him to do the thing he did. As Bill dropped a little behind the buff biplane, Small stuck the nose of his ship up in a gradual climbing turn until it almost stalled. When the nose fell, his two guns were pointed dead on the Silver Lancer. Before Bill could slip out of range the two guns stuttered.

Bill could feel the bullets drilling through the metal skin of the Lancer; he felt her quiver under the contact. Then Small's ship cut around to the right to complete an approximate one-hundred-and-eighty-degree turn, and he was speeding away in the other direction.

"So he wants to fight, does he?" Bill gritted between his teeth as he chandelled the Lancer up and around again. Then the thought of Helen Holt in the rear cockpit of the biplane checked him.

He remembered that he might have ordered Shorty to come and join him



With a verve and a flourish, Bill led his men off the field in their Spads.

with all the speed he had. With Shorty there they could get Small between a cross fire and force him lower and lower until he had to set his ship down on the ground.

He flew only twenty-five feet above the speeding biplane and leaned over the side. He saw Helen Holt looking up at him, and he ripped off his goggles and made motions at her that meant she should go over the side. But he saw that she was petrified. He stuck the nose of the Lancer down and fired a burst of .50-caliber bullets just over Small's head.

He saw the nose of Small's ship drop and saw him take it down in an outside loop. At the bottom, Small rolled the plane to a level position and sped off to the northeast again.

As Bill brought the Lancer up and around in a dazzling Immelmann he knew there was only one thing for him to do. He must drive a half dozen of his powerful .50-caliber machine-gun bullets into the engine block of Small's plane. The chances were that it would catch fire. But Small would be conscious and should be able to land the plane. And if Helen Holt didn't lose her head entirely, she would be able to bail out and land without being hurt.

For fifteen minutes Bill and Lennard Small went through acrobatics and maneuvers that would have done credit to any man who ever fastened his hand around the control column of an airplane.

Small was handling his ship with the cool skill of a seasoned fighter, and with the dash and courage of a man who is reckless of his life. It took every bit of Bill's skill to keep out of range of his bullets and at the same time try to get Small's engine housing under his sights.

Perspiration streamed off Bill's face as he took the Lancer through every evolution known to him.

Then his chance came. He was directly underneath Small. He stuck the nose of the Lancer up and blasted the biplane's engine with the full force of his



twin guns. He saw oil spurt out of the engine block, to be followed a few moments later by flame. He stuck the nose of the Lancer down to avoid the biplane as its nose dropped. He circled back and made motions at Helen Holt again. He tried to tell her to go over the side by taking the ring of his own parachute in his forefinger and making motions with it. But Helen Holt was still too frightened to recognize Bill's pantomime.

He saw Small glance over the side of his ship as smoke and flame curved up the side of the fuselage. Then he saw him turn and shout at Helen Holt. He saw the girl rise slowly to her feet. He saw Small shout at her again and saw her fasten a forefinger in the ring of her parachute. She was climbing up on the bucket seat in the rear when Small brought the buff biplane up and over in a screaming loop.

Helen Holt didn't bail out of the biplane. She fell out, head foremost, as Small was at the top of his loop. Her body turned over and over. Bill held his breath. She shot toward the earth for a thousand feet before there was any sign of her parachute opening. Bill wondered if she had been frightened into insensibility. Then he saw her pilot chute whip out behind her, followed by the wide folds of her main chute.

He marked the place where she would probably fall and turned his attention back to Small. He saw that Small was going to make a landing in the scrub below. He had cut his engine and was descending in a long glide. Bill got on his tail and followed him.

Bill zoomed upward as Small set his wheels on the ground. He saw that Small was going to strike a great clump of scrub just in front of him. And strike it he did—head-on, with a crash that brought the tail of the ship up and slapped it down on its back. Bill jockeyed the Lancer in fifty feet away, killed his engine and rushed toward the burning plane. Small was trying to climb out from underneath it as he arrived. Bill saw that one of his arms was broken and blood was streaming out of his

mouth. His face resembled the color of paper.

"All right, Barnes. You win," Small said as Bill dragged him to safety. At the same time he tried to snake a gun out of his pocket with his one good hand.

Bill kicked it out of his hand. "You won't be safe until you're dead," he roared at Small.

"That'll be in a few minutes," Small said with a grimace of pain. He managed to twist his crushed body on the ground and put his hand in a side pocket while Bill watched him like a hawk. When he brought it out he held a small nickel ball in his hand.

"There's the little thing that did the trick, Bill," Small said. "I'd have made a million dollars on it in a few days if you had stayed out of Hollywood."

"We found one in Sandy's ship," Bill snarled. "What was the idea, Small? Why the wholesale murders?"

Bill's face became a mask of horror as Small unfolded his story. He had killed a half dozen men to perfect and demonstrate his device, he said. A motion-picture lot was the safest place to do it.

"I was about to sell this thing to a foreign power for a cool million, Bill," Small finished. "Now it's too late. You

turn it over to our government if they can use it." Small's words were coming in short gasps now. Bill asked him if there was any way he could help him.

"Always the gallant young fellow, eh, Barnes?" Small choked. "Give Shorty my love. If he had stayed out of this I'd have made the grade. Keep your nose out of the ground, fella," he finished in a whisper. His head fell forward in the dirt.

After Bill had covered him he took the Lancer off the ground and began to search for Helen Holt. He found her scratched and bedraggled five miles away. She was incoherent from nervous shock and fear.

He made contact with Shorty and told him to do what must be done about Small. Then he stuck the nose of the Lancer on Hollywood.

BILL, Shorty, Red Gleason and Cy sat on the edge of Sandy's bed the next morning. Sandy was sitting up in bed. Except for the yards of bandages in which his face was swathed he was all right.

They were discussing the picture Di Maggio had finished the day before, and also Di Maggio.

"Di Maggio is all right," Bill said. "He's just temperamental."

"Another word for being nuts," Shorty said.

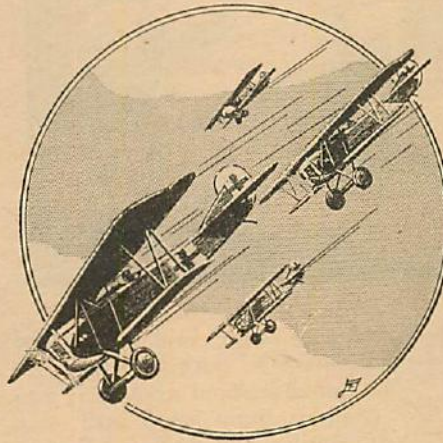
"That's the idea. If he doesn't act half crazy he doesn't think he is getting results."

"But what about Miss Holt?" Sandy asked. "Why did she go with Small? She must have felt pretty bad when she knew he was dead."

"She did," Shorty said dryly. "She felt bad when Small murdered young Wolcott, too. She said it was a shame Small should die so young. Imagine the way she would have felt if you had died," he said to Sandy.

"Yeah," Sandy said in all his wisdom, "for maybe a couple of days. She's like all these Hollywood babies. She's just another dame!"

He glared as Shorty rocked with laughter.



Deep behind the imaginary German lines, four Fokkers dropped out of the clouds—like vultures.

**Statement of the Ownership, Management, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Bill Barnes Air Trails, published monthly, at New York, N. Y., for October 1, 1936.**

State of New York, County of New York (ss.)

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared George C. Smith, Jr., who, having been duly sworn according to law, deposes and says that he is President of Street & Smith Publications, Inc., publishers of Bill Barnes Air Trails, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and

business managers are: Publishers, Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y.; editor, F. Orlin Tremaine, 79 Seventh Avenue, New York, N. Y.; managing editors, Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y.; business managers, Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y.

2. That the owners are: Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y., a corporation owned through stock holdings by the Estate of Ormond G. Smith, 89 Seventh Avenue, New York, N. Y.; the Estate of George C. Smith, 89 Seventh Avenue, New York, N. Y.; Cora A. Gould, 89 Seventh Avenue, New York, N. Y.; Ormond V. Gould, 89 Seventh Avenue, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only

the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

GEORGE C. SMITH, Jr., President,  
Of Street & Smith Publications, Inc.,  
publishers.

Sworn to and subscribed before me this 30th day of September, 1936. De Witt C. Van Valkenburgh, Notary Public No. 16, New York County. (My commission expires March 30, 1938.)



# GRANDPA BURNS

(Continued from page 26)

incredulity. Suddenly he reached for the door and started to rush out into the cabin. But Grandpa Burns was too fast for him. The hand that fastened on Ellis' arm was a band of steel.

"Just a minute, lad," he said. "You mustn't excite the passengers. I told them your uncle had a stroke. But I didn't tell them he was dead. You mustn't act panic-stricken. Sober up and act like a man who is worried over the condition of his uncle's health. It's a ticklish situation and needs careful handling. You've got to help us. The passengers must not become alarmed. We will be ending our leg at Louisville in a few minutes. I must get the field manager on the radiophone and report your uncle's death so they will be ready when we land. Can I depend on you?"

"Yes," Ellis said, "you can depend on me. The liquor I've had and the shock

throw out the window. Jimmie made a report to Louisville.

A few minutes after he had finished a voice called back into his earphones: "Station WBBA-WBBA. Calling Trip No. 5. Calling Trip No. 5. All arrangements have been made here. Medical examiner and coroner will be on field on arrival. All clear. All clear. Wind E. N. E.—unlimited. Go ahead! Go ahead!"

A few minutes later, with the air-drome at Louisville in sight, Marilyn Banner again opened the door into the pilot's office. As Grandpa Burns looked at her he saw that she was more than a little worried now.

"That young Ellis is acting like a crazy man," she said. "He's mumbling to himself, and his face is twitching."

"He's probably going to start chasing the Brooklyn boys through the key-

THE DEAD BODY of Walter Ellis was stretched out on a table with a sheet over it when Pilot Burns, Co-pilot Albert and Stewardess Banner were ushered into the room. A stenographer was taking notes while the field manager expostulated at some length to the coroner and the medical examiner, Doctor Watkins.

"Naturally," the field manager was saying, "we want as little publicity on this thing as possible. It would help particularly, Doctor Watkins, if you would mention in your report that the man was suffering with a weak heart when he came aboard the plane. What I mean is, let the public know that traveling by air had nothing to do with the heart attack that caused his death."

The medical examiner nodded, and after the field manager had introduced the two pilots and the stewardess to him and the coroner, the coroner explained that the death of Ellis had been due to a heart attack, and he only wanted to ask them a few routine questions.

"First," Grandpa Burns interrupted, "I'd like to ask you a question or two."

The coroner looked surprised, then nodded his head. "Shoot," he said.

"Did you notice any punctures on the skin of the dead man?" Burns asked him.

"Punctures?" Doctor Watkins asked.

"Punctures that might have been made by the bite of a small animal?" Burns asked.

"Yes," Doctor Watkins said slowly. He got to his feet and threw back the thing covering the dead man, exposing his legs as far as his knees.

Grandpa Burns bent over, scrutinized them carefully and nodded his head.

"Can I see the socks and trousers of Mr. Ellis?" he asked.

They brought them to him, and he again nodded his head when he sniffed of the garters attached to the socks.

"Gentlemen," he said, "this man did not die of a heart attack. He was poisoned! It is one of the most fantastic murders I ever heard of. Where is young Ellis, his nephew?"

"He is being detained with the rest of the passengers," the field manager managed to say after he had recovered from his astonishment.

"What do you know about this?" the coroner growled.

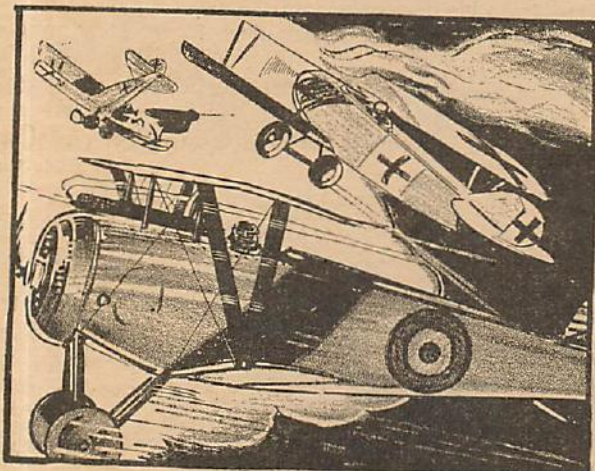
"I've just put a few things together," Grandpa Burns said. "I'd like to have young Ellis here while I tell you about it. I'll reconstruct the murder for you."

"You're insane," Doctor Watkins said.

"I've been called worse than that," Grandpa Burns said.

Jimmie Albert and Marilyn Banner

Grandpa Burns' pupils returned with few bullet holes.



has dazed me. I'll go back to my seat and be quiet."

"That's a good lad," Burns said, patting Ellis on the shoulder. He watched Ellis while he went back to his seat. Then he lifted the cover of the receptacle receiver and took out the package Ellis had been trying to put through the window. He unrolled it and gazed at the contents for three or four minutes. Then he rolled it up again and stuck it into his pocket. He shook his head in bewilderment and went down the runway and into the bridge.

"He's dead, all right," Grandpa Burns said to Jimmie Albert. "Dead as a mackerel. His liquor caught up to him."

"I suppose that'll mean we'll all be held while the coroner and medical examiner fuss around," Jimmie said in disgust. He was thinking about the afternoon and evening he had anticipated with Marilyn.

Grandpa Burns didn't answer. He had taken back the controls, but he was deep in thought. He was thinking about that package young Ellis had tried to

holes," Jimmie Albert said. "He's had so much liquor he can't take it."

"Can you understand what he is saying?" Grandpa Burns asked her.

"No," Marilyn said slowly. "That is, it doesn't make sense. He says over and over, 'The clock struck one and down he run.' I asked him what he meant and he grinned at me like an imbecile. I'm afraid of him."

Grandpa Burns asked her to repeat the thing he had been saying over and over.

"The clock struck one and down he run," she said again.

"He has it a little mixed up," Grandpa Burns said, and he was almost smiling.

"Has what mixed up?" Jimmie Albert wanted to know.

"I'm not sure yet," Grandpa said, his leathery face like a mask. "I'm going to take her in now."

The wheels of the big transport kissed the ground a few moments later, and a tractor hauled it up in front of the canopied runway.



were gazing at him with their mouths hanging open.

An airport special officer ushered young Ellis into the room a few moments later. His face was white, and his eyes were bloodshot and swollen.

"Will you please sit down, Mr. Ellis," Burns said.

"First," Grandpa Burns went on, "Miss Banner came to me and told me the two Ellises, uncle and nephew, had come aboard drunk. She asked me to look them over. I did, and advised the young man not to drink or he might get sick. He told me his uncle across the aisle had been drinking since he was five years old, and would probably live to be a hundred. He also added that he was his only heir.

"A little while later Miss Banner came in and told me the old man looked horribly sick. She said she thought he was dead. I went out and took his pulse and felt of his heart, and knew that he was dead. That was about a quarter after one in the afternoon. Remember that.

"I told the passengers what had happened, and then went back into the lavatory to find young Ellis. When I went in he was trying to push a small package out the window. I told him to hold it and threw the package in a receptacle. After he had gone I fished it out."

"What was in the package?" Doctor Watkins asked.

"I'll come to that in a moment," Grandpa Burns said. "Unless Mr. Ellis wishes to tell you what was in the package."

They all turned to gaze at Sidney Ellis and saw that he was gazing at Burns.

"I went back to my office and took over the controls while Mr. Albert reported what had happened. A few moments later Miss Banner came in again and said she thought young Ellis had gone crazy. She said he was mumbling to himself. I asked her what he said, and she told me he kept repeating, 'The clock struck one and down he run.' I had a glimmering then. All the pieces began to fit together. Because of my hobby, I knew what young Ellis was mumbling about.

"The whole thing was fantastic, but it fitted with the workings of a delirious mind, one that was suffering from excessive use of alcohol."

"Listen, Burns," the field manager said sternly, "what the hell are you talking about?"

"Never be in a hurry, man," Grandpa Burns said. "Perhaps young Ellis will tell you how it all happened."

But young Ellis was beyond telling them anything. He was sitting with his head in his hands, rocking back and forth.

"When I first looked at the elder Ellis," Burns went on, "he was half asleep. I noticed that he was loudly

dressed for a man of his age. Among other things, I remembered that he was wearing light-blue socks with red clocks on them."

He reached into a side coat pocket and pulled out a small package. Carefully he unrolled it. He smoothed out the paper on the table. On it was a small gray mouse, dead, with a collar around its neck and a tiny leash attached to the collar.

"What in the name of—" the coroner began.

"Hush a minute, man," Grandpa Burns said. "There," he said, "is the thing that killed Mr. Walter Ellis!"

They all stared at him as though they thought he had gone mad.

"That," he said, "is the package young Ellis was trying to push through the window. It was only luck and the fact that Miss Banner was keeping her eyes open that gave me the opportunity to keep him from dropping it into oblivion."

"Come on, Burns, talk sense!" the field manager said.

"I'm talking sense, man," Grandpa Burns said. "Let me recite you a little poem, a nursery rhyme. No, I'll sing it. It's really a little song for children—an old one."

Any one could have told that Grandpa Burns was having a swell time. He cleared his throat and sang:

"Hickory, dickory, dock,  
The mouse ran up the clock;  
The clock struck one;  
The mouse ran down,  
Hickory, dickory, dock."

A moan escaped young Ellis as he finished. Ellis leaped to his feet.

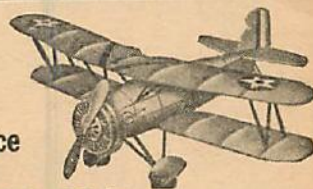
"Let me out of here!" he screamed. "Let me out of here!"

The special officer who had brought him in put a hand on his shoulder and pushed him back into his chair.

"What in hell are you talking about?" Doctor Watkins asked, with no little emphasis.

"I told you it was fantastic, doctor," Burns said. "But he thought he could get away with it. As I said, he would have if Miss Banner hadn't been paying attention to business.

"If you hold an autopsy you will find that Mr. Walter Ellis was poisoned. The poison was on the teeth of that mouse. Young Ellis conceived the idea from that



## Your choice of these Popular 15 to 20 in. Flying Model Kits

CURTISS HELL DIVER  
BOEING P-12-B  
VOUGHT CORSAIR 03U-4  
WACO TAPER No. 220  
WEDELL WILLIAMS  
DE WOITINE D-33  
JUNKERS D-1  
28 IN. UMBRELLA TYPE

**35c**

EACH  
any 3 Kits  
for \$1.00  
Postpaid.  
(Foreign-Canadian Orders—add 10c on each Kit.)

These Kits were made to sell for 50c each and offer marvelous value at our new low price. Each Kit complete with fully finished "IMP" Paulownia Wood Propeller, 2-inch Aluminum Drag Ring where required, 2-inch Celluloid Dummy Motor, finished front and rear hooks, finished wheels, tissue, cement, insignias, all bulkheads and ribs clearly printed on high grade balsa, clear accurate plans and instructions. Models are designed to scale and everything finest quality. Select yours now and send your order at this special low price!

**Send 3 cents**

for our Latest Propeller Guide with lowest prices on genuine "IMP" Paulownia Wood Propellers, Propeller Fittings, Celluloid Dummy Motors, Balloon-tire Disc Wheels and other "IMP" Specialties, including the famous TORNADO Motors. It pays to be on our mailing list.

## INTERNATIONAL MODELS CO.

1773-1775 Broadway, General Motors Bldg., New York  
British Agents for all "IMP" Products  
MODEL AIRPLANE STORES  
42 Derby Road, Prestwich, Lancs.

## CLASSIFIED DIRECTORY

An opportunity to contact a large field on a small lineage. Rate 10c per word (Minimum 20 words). Cash with order. Address:

**AIR TRAILS CLASSIFIED ADVERTISING**  
79 Seventh Avenue, New York City

### Model Airplanes

DEALERS! Clubs! Jobbers! Get our sensational wholesale list on kits and supplies. American Enterprises, 5116-13th Avenue, Bklyn, N. Y.

DEALERS, Manufacturers: Japanese Tissue, 32 colors. Also Bamboo tissue, Paul-O-Wina Propellers, Celluloid Motors. Write on business letterhead for prices and quantity discounts. Whitfield Paper Works, Importers, 12-14 Vestry St., New York City.

73" CURTISS Robin Kit. Rubber powered, \$1.75 postpaid. Gas powered \$2.00 postpaid. Full size plans, dope, special cement, etc. Dealers write. Complete line of gas model supplies. Woburn Model Airplane Shop, 236 Main, Woburn, Mass.

### For Sale

NEW Aeroplanes, \$98.00; Motors, \$19.98; Propellers, \$2.98. Send 25c for data, information. Hibbs, Fort Worth, Texas.

### Instruction

MEN—Women. Get Government Jobs. Start \$105-\$175 month. Prepare now for next announced examinations. Common education sufficient. Full particulars—list positions. Free. Write today. Hurry. Franklin Institute, Dept. R19, Rochester, N. Y.

## It flies through the air— THE HELL DIVER

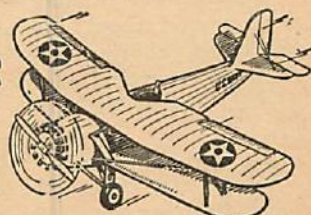
You can make it best by using Duco Cement—strong, quick-drying adhesive. Light in weight and easy to use. Send red disc from 25c tube for working plans. Du Pont, Dept. C-6, Wilmington, Del. Also choice of plans for Winnie Mae, Laird 400, Akron Fighter.

**TRANSPARENT • WATERPROOF**



**DUCO Household CEMENT**

**FREE**  
Blueprints  
of this  
Famous  
Navy Plane





old nursery rhyme I sang to you. If he had got rid of the mouse there would have been no evidence against him. You wouldn't even have held an autopsy to find the poison.

"When young Ellis thought no one was looking—in fact, when no one *was* looking, he put the mouse on his uncle's foot. His uncle was asleep. The mouse went up the old man's leg, inside his trousers, drawn by the smell of the chemical you will find on his garter. The old man woke up and grabbed at his leg. The mouse bit him. He died almost instantly.

"Young Ellis pulled the mouse back and wrapped it in a piece of paper. He put the poison on the teeth of the mouse just before he released it. It had no chance to get into the blood stream of the mouse until it crushed the little wedge he had inserted in its mouth when it bit the old man.

"Naturally, young Ellis was after his

uncle's money. He followed the nursery rhyme literally, because the actual murder occurred at about one o'clock, when the mouse ran down the clock of the old man's sock."

"Do you expect any one to believe a fantastic tale like that?" the field manager asked him.

Young Sidney Ellis answered that question. He got to his feet again. His face was the color of a death mask.

"It's true," he said. "That's the way it happened. Take me away from here. Take me any place. Take me—" He didn't finish, because he slumped to the floor unconscious.

The coroner was looking at Grandpa Burns with an expression that is beyond description. It was a combination of amazement, admiration, and something else.

"What," the coroner said to him, "if you don't mind telling me, is your avocation, or hobby, Mr. Burns?"

Grandpa Burns looked at him quickly, and his face became the color of the sky at sunset. Then one of his rare smiles flashed across his face.

"I suppose there is no use in trying to hide it with this thing coming up," he said. "I write nursery rhymes for children."

"My gosh!" Marilyn Banner said after a moment of silence. "You're Stephen Burns, the one who wrote 'I Remember.' Nursery rhymes! Why, they're as much for grown-ups as they are for children. I've read it through a half dozen times."

"Never mind about that," said Grandpa Burns, poet, bachelor and pilot. "I heard after we landed that *your* Jimmie is going to get that new leg Atlantic is opening—with the condition that he take you along as stewardess."

"Nursery rhymes!" the field manager said. "What will happen around here next?"

## ORDERS TO PENSACOLA

(Continued from page 20)

it is necessary that he taxi into it with precision and dexterity in order to avoid a collision. Sometimes the wind conditions will indicate that sailing the plane in is a safer method of approach; in anticipation of this, the student must not only know how, but when, to employ such a method.

If, upon the termination of this flight, the check pilot signals a "thumbs up" to the timekeeper's tower atop the squadron hangar, the student will begin the third and last leg of the primary seaplane course. He will be taught how to slip off excess altitude, fish-tail to kill speed, make power-stall and precision landings, execute flipper turns, figure eights and wing-overs. Mastery of this third and final stage, with its attendant final check, makes the student a graduate of primary seaplane training.

He is now ready to tackle primary land planes at Squadron Two; but before he departs, let him pause to survey what has taken place during the two months he has been at Pensacola. Morning muster reveals that the class has had its ranks depleted by approximately one file out of every seven. Our survivor, having completed Squadron One, with its fifty hours of primary seaplane work, is approximately one sixth of the way through his flight training and a third through ground school. He has acquired some flying ability, a proportionate amount of theoretical knowledge, and a wholesome respect for checks and check pilots.

He is now about to enter the second and by far the most difficult stage of his flight training.

Corey Field, shared equally by Squadrons Two and Five, is located approximately five miles distant from the sta-

tion proper. Corey and a half dozen small adjoining fields comprise the busiest training area of the naval air station. At Squadron Two there are usually 50 percent more students than at any of the other squadrons because of the increased number of flying hours in this stage.

As at Squadron One, there is a period of dual instruction followed by a solo check. After solo the student is introduced to a feature of the training that proves a pitfall to more students than anything else in the course—"shooting the circle."

Briefly, it consists of landing in a one-hundred-foot circle after having glided without power from an altitude of 1,200 feet, directly over the circle, making one 360-degree spiral en route; also from an altitude of 800 feet making a half spiral or 180-degree turn in descent.

The next fifteen hours of the student's flying time is occupied solely with this, and with emergency landings in small fields; the check flight which follows usually indicates that the time allotted to this practice was none too generous. Many of the class will no doubt have trouble here; some will be granted extra instruction time and another check, while others will say good-bye to aviation training.

There is a definite reason why this check is so exacting. It is the first rigid test of the student's sense of precision; therefore it is a gauge measuring his chances for long life, should he become an aviator.

With this check behind the student, training at Squadron Two takes on a new character. The tedious hours spent in perfecting landings, take-offs, proper glides and precision shots give way to an

intensely interesting stage—stunts, formation, and cross-country flights. Approximately thirty hours of this sees the student ready for the most important check of his training days—his final at Squadron Two. Let us go along with him.

In the rear cockpit of a yellow land-plane, not unlike the NY in which he took his first ride, the student, now almost an accomplished flier, taxis away from the line. Deliberately he moves down the cement runway to the take-off position. Nothing must mar the perfection of his work, for he has had almost a hundred and fifty hours in the air, and is seeking to prove to the man in the front cockpit that he is fit to be graduated from preliminary flight training. He must taxi at the proper speed and enter the operating area in the right position; he must not commit even a minor infraction of the course rules.

He pushes the throttle forward. The ship is in the air. They cross the edge of the field scarcely above the treetops.

There! It's happened—the check pilot has cut the throttle! Down goes the nose for a simulated landing in the trees. The student is too much of a veteran to be tricked into turning back toward the field—test number one in his favor.

The throttle is pushed forward again. They begin circling the field. Carefully the student remains within gliding distance of it until he has attained the thousand feet of altitude required by the regulations.

At a signal from the check pilot he turns away from Corey Field to begin the contest. Always on the alert for the next cut throttle, the student catalogues the locations of the fields beneath that afford the best landing conditions. Time



after time when the "gun" has been cut he glides down and sideslips into one of them for a simulated emergency landing. Failure to reach a field of some kind is inexcusable, for this is his final check at Corey.

They pass out of the small-field section and climb toward the stunt area.

"Do a loop!" comes a command through the gosport. The ship roars through a vertical circle. "Now, an Immelmann! . . . A left roll! . . . Some wingovers!"

In the middle of a stunt the throttle is cut again. Righting the plane, the student looks for a safe spot in which to land.

More emergency field work, some pylons turns, a half dozen shots at the precision circle, and they start for home. To the student this is the tantalizing part of the ride—has he passed?

"O. K.," is the blessed word from the front cockpit.

The student's preliminary flight training is over. He has been taught the principles of flying; the remainder of the course consists now in applying what he has learned both in flight training and ground school to the operation of service-type aircraft.

He begins this at Squadron Three, where he is given formation, cross-country navigational hops, practical radio flights, free gunnery, and blind-flying practice in the two-seated gray land-planes known to the navy as O2U's, or Corsairs. Approximately seventy hours is spent in these planes, fitting the student for the type of work he may be required to perform when graduated.

From Squadron Three he returns to seaplane training, but in ships that are of much greater proportions than those in which he was first introduced to flying. Far from being the flexible, slow-landing craft of his early training, the student finds the "big boats" of Squadron Four require for their handling every bit of the skill that he may have acquired during his course.

He is initiated into big-craft flying in T4M's, or Martin torpedo planes. These ships, while not precisely of the big-boat class, are much larger than anything he has flown up to this time, and serve thus as stepping stones to the bigger ones.

From the torpedo planes, he goes into twin-motored Martin patrol ships, monoplanes and biplanes, having gross weights exceeding six tons.

After perfecting his handling of these ships, the student puts them to the practical uses for which they were designed—torpedo drops, aerial bombing, long-range navigational hops, and radio flights.

Fifty hours of big boats sees the student ready for the most strenuous and thrilling stage of his course—Squadron Five, the fighter squadron.

Here he learns the handling of the

## The Most Complete Solid Wood Scale Kits on the Market

Each Hawk Kit contains all wood parts, as fuselage, wings, stabilizer, and rudder, CUT TO OUTLINE SHAPE. Die cast machine guns, propellers and wheels are furnished in each kit. Kits requiring radial motors have die cast motors included. All sets have formed metal seats, good paint, glue, insignia and real scale plans. PROOF of this can be seen in this picture.



We offer you the following scale model kits (Non-flying)  
**EACH KIT INDIVIDUALLY PRICED**

### 40 Cents Each

DOUGLAS O-38  
VOUGHT V-65  
DE HAVILLAND 4  
P.E. 2-B (1915)  
BRISTOL FIGHTER P.2.B.  
B.J. OJ2 SEAPLANE  
AUTOGIRO  
LOCKHEED VEGA  
CURTISS F11C-2 (GOSHAWK)

### 35 Cents Each

BOEING P-26 A  
BOEING P.4.B.4  
CONSOLIDATED P-30  
BOEING P-12-F  
SUPERMARINE  
B.J. P-16

### 30 Cents Each

HAWKER SINGLE-SEATER  
HAWKER FURY  
FOKKER TRIPLANE  
SOPWITH PUP  
HAWK P-6-E  
FOKKER D-7  
MONOCOUE  
ALBATROSS  
NIEUPORT 28  
ANSALDO S.V.A.  
NIEUPORT 17  
CURTISS SWIFT  
DE HAVILLAND 5  
PEALZ D-12  
HAWK P-5  
SHIPBOARD FIGHTER

### 25 Cents Each

WESTLAND WAGTAIL  
NAVY RACER  
S.E.5  
PEALZ D-3  
SOPWITH CAMEL  
CURTISS RACER  
HALBERSTADT  
FOKKER D-8  
SPAD 13  
HOWARD MIKE  
THOMAS MORSE 89

**NOTE:** Add 15% for postage on total order. No order for less than 50 cents accepted. Send remittance with MONEY ORDER only.  
**DEALERS:** Handle the Hawk Line for substantial sales.

## HAWK MODEL AEROPLANE CO.

4946 IRVING PARK BLVD.

DEPT. S.5.

CHICAGO, ILLINOIS

sturdy, high-powered little single-seaters—flexible, maneuverable, speedy—learns not only to handle his ship by himself, but also to operate it as a component part of the squadron.

First, of course, he must become thoroughly skilled in handling the fighter, and to this end he is given approximately ten hours of solo work and ten hours of stunt flying before he begins operation with the other planes of the squadron. After this period is passed, however, he seldom leaves the ground except as a member of a section or larger formation.

Every hour of Squadron Five is thrilling. There is fixed gunnery in which he dives like lightning from his point of vantage, pours murderous lead into his target-enemy, then ducks away to safety. There is bombing in which his earthward dive is so furious that he must yell all during the descent, in order to protect his ears. In dog-fighting he charges full speed toward the appointed dueling ground; his opponent, with eye cocked skyward, is rushing in from the opposite direction a thousand feet below him; the two planes pass, one above the other; the higher one rolls, then dives to the attack; the lower one zooms to avoid it; together they struggle for altitude, following each other in a slow, climbing turn, each endeavoring to gain the victor's position on his adversary's tail.

There are night cross-country flights, mass parades, carrier landing practices—one fascinating event—following so closely upon the other that the student is almost astounded to find, one day, that his course at Pensacola is completed. Almost regretfully he listens to the words that for a solid year he has prayed to hear:

"And now, gentlemen, you have earned the right to wear the gold wings of naval aviation. Congratulations. . ."

**RAISE RABBITS FOR US**  
WE PAY YOU UP TO \$5.00 EACH. ALSO PUT YOU IN TOUCH WITH MARKETS EVERYWHERE. Large illustrated book and catalog, also copy of the AMERICAN RABBIT FARMER and monthly market bulletin showing names of buyers in various parts of America who continuously buy all rabbits offered them. All for 10 cents. Address  
OUTDOOR ENTERPRISE CO., 142 Main St., Holmes Park, Mo.

## ONLY BENJAMIN HAS THE GENUINE SAFE COMPRESSED AIR PISTOL

For Target & Small Game—Economical—Accurate—Practical—Adjustable Force—Amazing Maximum Velocity—Safe, Single Shot with Bolt Action—Hammer Fire, Hair Trigger—Safety—cal. 177 or 22 or BB Price \$7.50, Holster \$1.25. Also 177 and 22 Single Shot Air Rifle \$7.50—Single Shot BB Air Rifle \$6.00—22 Shot BB Repeater Air Rifle \$7.50—at Dealer or Direct—No license required—SAFE. The Only Genuine Compressed Air Pistols & Rifles On the Market. Full Details—Targets—Free—Write Today for Introductory Offer.  
BENJAMIN AIR RIFLE CO., 641 N. W'way, St. Louis, Mo., U.S.A.



## World War Souvenirs 1914-1918

For 6c in stamps I will mail you an imported Gnome 165 piston ring used on Nieuport 28 Pursuit plane. Useful paper weight. Send 3c for colored list authentic imported war souvenirs; cylinders into lamps, gears into desk ornaments, etc.

Marvin A. Northrop Aeroplane Co.  
Minneapolis, Minnesota

Two Beautiful Double Weight Professional Enlargements. 8 Guaranteed Never Fade Prints, 25c coin.  
CENTURY PHOTO SERVICE, LA CROSSE, WIS.

## FOR RECORD FLIGHTS!

Power Your Models In This Summer's Contests With  
**GENUINE MRL SPECIAL BROWN RUBBER!**

ORDER NOW at these NEW LOW PRICES

1/32"—35 ft. 5c—225 ft. 20c	1/8"—10 ft. 5c—225 ft. 60c
3/64"—25 ft. 5c—225 ft. 25c	9/64"—10 ft. 5c—225 ft. 70c
1/16"—20 ft. 5c—225 ft. 30c	5/32"—15 ft. 10c—225 ft. 75c
1/8"—20 ft. 5c—225 ft. 35c	11/64"—15 ft. 10c—225 ft. 85c
3/32"—15 ft. 5c—225 ft. 45c	3/16"—15 ft. 10c—225 ft. 90c
7/64"—15 ft. 5c—225 ft. 55c	1/4"—10 ft. 10c—225 ft. 110c

These Prices Are POSTPAID! FREE LUBRICANT with order!  
**SPECIAL BROWN RUBBER LUBRICANT**

Medium tube—10c 3 oz. can—30c 8 oz. can—65c  
**MRI. MICROFILM SOLUTION**

3 oz. can—30c 8 oz. can—65c  
**MRI. CONTEST CEMENT**

Small tube—5c Medium tube—10c Large 3 oz. tube—30c  
**CONTEST BUILDERS! ORDER EARLY**

ALL PRICES POSTPAID! No Orders Under 50c Accepted.  
**DEALERS! Write for NEW LOW Price List**  
**MODEL RESEARCH LABORATORY**

3531 G-N. Western Ave. Chicago, Illinois



# MODEL MATTERS

(Continued from page 63)

Field Artillery Armory, 5300 S. Cottage Grove Avenue.

The contests were held on the basis of the rules of, and with the sanction of, the National Aeronautic Association. The results were very interesting and gratifying from the standpoint of both the quality of models submitted, and the flying results.

The Outdoor Fuselage Contest results were as follows:

## Open Fuselage Event

(Contestants over 21 years)

1st Place—Trophy and trip to Indianapolis Contest, August 29, JOSEPH MATULIS, 1906 S. Halsted Street, Chicago, whose model was timed at 2 minutes 49.5 seconds in flight. He is a member of the Aeronut Club.

## Senior Fuselage Event

(12 to 20 years of age)

1st Place—Trophy and trip to Indianapolis Contest, August 29, JOHN HOBOLT, Black Road, Joliet, Illinois, whose model was timed at 10 minutes, 43 seconds. For this flight he will receive a gas engine.

2nd Place—Trip to Indianapolis Model Airplane Contest, Aug. 29, WILLIAM GOUGH, JR., 1838 Eddy Street, Chicago, member of the Illinois Model Airplane Club, whose model timed at 8 minutes, 52.2 seconds.

3rd Place—Trip to Indianapolis Model Airplane Contest, Aug. 29, JOSEPH KREBS, 9726 Parale Avenue, whose model was in the air 8 minutes, 7.4 seconds.

A number of models were lost to sight so quickly that they were not eligible, but were reported several hours later, in outlying suburbs, still in good condition.

## Scale Model Contest

(Open to all contestants)

1st Place—Trip to Indianapolis Model Airplane Contest, Aug. 29, Trophy, MICHAEL HOLLY, 5405 S. Maplewood Avenue, whose scale model of a Boeing P12B had an electric motor fuselage which revolves the adjustable pitch propeller at a realistic speed.

## Open Indoor Contest

(Contestants 21 years or over)

1st Place—Trophy and trip to Indianapolis Contest, August 29, JOSEPH MATULIS, 1906 S. Halsted Street, whose model did 10 minutes, 36.5 seconds. Mr. Matulis won his trip to Indianapolis on the Outdoor Contest, so the trip was given to second place.

2nd—CARL GOLDBERG, 1240 Rosemont Avenue, member Aeronuts, whose model did 9 minutes, 43.8 seconds.

## Senior Indoor Contest

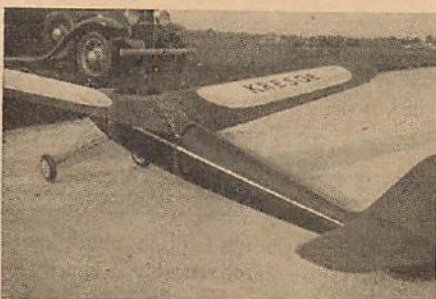
(Contestants 12 to 20 years)

1st Place—Trophy and a trip to Indi-

anapolis Contest, Aug. 29, WALLACE SIMMERS, New Lennox, Illinois, member Aeronuts, whose model made a flight of 12 minutes, 43.2 seconds. This flight wins the second gas engine.

2nd Place—Trip to Indianapolis Model Airplane Contest, Aug. 29, ANTHONY BALTUNAS, 4346 S. Washtenaw Avenue, whose model was in flight 12 minutes, 38.3 seconds.

3rd Place—Trip to Indianapolis Model Airplane Contest, Aug. 29, WILLIAM GOUGH, JR., 1838 Eddy Street,



A gas model entered by a member of the Kresge Aero Club, Newark, New Jersey.

member Illinois Model Airplane Club, whose model flew 11 minutes, 24.7 seconds. Mr. Gough won his trip to Indianapolis in the Senior Fuselage Event, so the trip to Indianapolis will go to the winner of

4th Place—ALVIN ANDERSON, 3451 N. Lincoln Avenue, member of Aeronuts, whose model was in flight for 11 minutes, 21 seconds.

These winners will receive two internal-combustion gas engines, five trophies, and nine trips to the Indianapolis Model Airplane Contest as a total of all prizes awarded. Three of the other contestants are so interested that they are considering going to Indianapolis to watch the meet.

The satisfactory conclusion of the All-Chicago Model Airplane Contest, with their awards, has been possible through the interest of the boys, the American Legion, and the various Park employees who assisted and sponsored the individual contests.

## TEXAS CENTENNIAL MEET

Results of contest sponsored by Golden Aircrafts Corp., July 29th, Dallas, Texas

### Class C Stick

#### Junior

- |                                     |      |
|-------------------------------------|------|
| 1. Babs McMinn, Tulsa, Okla.        | 3:51 |
| 2. Frank Smith, Jr., Houston, Texas | 3:16 |
| 3. Robert Rutledge, Houston, Texas  | 2:41 |

### Class D Stick

#### Junior

- |                                       |      |
|---------------------------------------|------|
| 1. Howard Collier, Gainesville, Texas | 1:35 |
| No second or third prizes.            |      |

### Class C Endurance

#### Junior

- |                                     |      |
|-------------------------------------|------|
| 1. Frank Smith, Jr., Houston, Texas | 3:39 |
| 2. Babs McMinn, Tulsa, Okla.        | 2:19 |
| 3. Robert Rutledge, Houston, Texas  | 2:07 |

### Class D Endurance

#### Junior

- |                                      |      |
|--------------------------------------|------|
| 1. Frank Smith, Jr., Houston, Texas  | 3:45 |
| 2. John G. Davis, III, Dallas, Texas | 2:30 |
| No third prize.                      |      |

### Flying Scale

#### Under 16 years

- |                                   |      |
|-----------------------------------|------|
| 1. Raymond Mathews, Dallas, Texas | 1:47 |
| 2. Jimmie Harrison, Dallas, Texas | 1:34 |
| 3. Turner Baxter, Dallas, Texas   | 1:28 |

### Flying Scale

#### Over 16 years

- |                                     |      |
|-------------------------------------|------|
| 1. Jack Holt, Henderson, Texas      | 2:58 |
| 2. Roy N. Dunklin, Henderson, Texas | 1:42 |
| 3. Ed Cheney, Jr., Ft. Worth, Texas | 1:59 |

### Solid Scale

#### Any age

- |                                     |  |
|-------------------------------------|--|
| 1. Ed Cheney, Jr., Ft. Worth, Texas |  |
| 2. B. M. Ford, Dallas, Texas        |  |
| 3. Billie Harris                    |  |

### Class C Endurance

#### Senior

- |                                |      |
|--------------------------------|------|
| 1. Paul Bowlin, Tulsa, Okla.   | 7:24 |
| 2. Alvie Dague, Tulsa, Okla.   | 6:05 |
| 3. Jack Holt, Henderson, Texas | 2:14 |

### Class D Endurance

#### Senior

- |                                   |       |
|-----------------------------------|-------|
| 1. DeWitt Ross, Tulsa, Okla.      | 14:16 |
| 2. Jack Holt, Henderson, Texas    | 2:51  |
| 3. Raymond Mathews, Dallas, Texas | 1:12  |

### Class C Stick

#### Senior

- |                                |      |
|--------------------------------|------|
| 1. Alvie Dague, Tulsa, Okla.   | 6:20 |
| 2. DeWitt Ross, Tulsa, Okla.   | 3:32 |
| 3. Alton Melton, Dallas, Texas | 1:   |

### Class D Stick

#### Senior

- |                                     |       |
|-------------------------------------|-------|
| 1. DeWitt Ross, Tulsa, Okla.        | 14:16 |
| 2. Jack Beckelman, Ft. Worth, Texas | 2:51  |
| 3. Rufus Pearce, Dallas, Texas      | 1:58  |

### Class E Endurance

#### Senior

- |                                    |      |
|------------------------------------|------|
| 1. Ligon Smith, Jr., Dallas, Texas | 1:26 |
| No second and third prizes.        |      |

## BROOKSIDE M. A. C. OF INDIANAPOLIS, IND.

An outdoor meet was conducted on Sunday, August 16th as a warming-up event for the American Legion Contest, held two weeks later.

The gas-model contest was run off in a strong wind. Wind never seems to agree with gas models, and there were numerous crack-ups. The wing on Vernon Boehle's 15-foot gas job was broken when a miniature tornado swept over the airport. Boehle had hoped to set a new open record with this ship. There were few rising air currents when he finally completed repairs at 5:30 p. m. The best flight Boehle made was 14 minutes and 55 seconds. The cabin fuselage event was held in the evening, when the air was calm. This eliminated the usually long thermal flights and made the contest one of strict flying ability.

Results are:

### Outdoor Cabin Fuselage

- |                   |      |
|-------------------|------|
| 1. Vernon Boehle  | 3:28 |
| 2. Carson Carroll | 3:08 |
| 3. Jim Cahill     | 2:46 |

### Gas Model

- |                       |       |
|-----------------------|-------|
| 1. Vernon Boehle      | 14:55 |
| 2. Don Lodge          | 9:46  |
| 3. Mrs. Thelma Stofor | 2:20  |



# LIGHTWEIGHT

(Continued from page 56)

model is the paper wheels. These were widely used a few years ago, but have been replaced by balsa wheels. There is no apparent reason for this loss in popularity, since paper wheels are as easy to make as balsa wheels, and are usually smoother running. Stiff writing paper should be used. A pencil compass is the only tool you'll need, besides a pair of scissors.

With the compass set at  $\frac{5}{8}$ " radius, lay out four circles. Cut out carefully. Next cut each circle along a radius. That is, cut a straight line between edge and center. Overlap the cut edges of each disk  $\frac{1}{8}$ ", cementing each paper circle into a shallow cone. The wheel is completed by joining two of these cones. Cement the edges and press lightly together. Slip the wheel on a piece of scrap wire and line it up while the cement is still pliable. A drop of cement on the center of each half of the wheel will make a smooth bearing surface and prevent the axle from tearing through the paper.

## WING AND TAIL

The cambered wing ribs, of shape shown in the fuselage drawing, are cut from  $3/32$ " sheet balsa. The camber is cut into them, as it is difficult to bend ribs so they retain their shape. The wing spars of the wing are tapered from  $\frac{1}{16} \times \frac{1}{4}$ " at the center to a tip size of  $\frac{1}{16} \times \frac{1}{8}$ ". A metal rule and a razor blade will do this nicely. A good procedure for wing-building is to work on a flat board or work bench. Add dihedral after the wing has been completely assembled. Some builders prefer to make the wing in one piece and then crack-and-cement the spars to add the dihedral. Others build the wing in two halves and join them with short lengths of spar material just long enough to fit over the top of the fuselage. By making the wing in two halves, you'll be able to use the same drawing for both halves. Light wire hooks are set in the spars for the rubber-band attachments to the fuselage.

The elevator and rudder are of extremely light construction. The elevator is flat and covered on top. The rudder, likewise, is flat. Use  $\frac{1}{16} \times \frac{1}{8}$ " balsa in

both. If you're planning to give the model a rigorous flying schedule, such as flying in gusty air or as a hydro, strengthen the elevator with a spar running lengthwise through the center and "beef up" the rudder with a similar spar.

## COVERING

Applying tissue covering on a lightweight model that can't be treated with dope or water-spray is a task that troubles the best of us. Select superfine tissue and iron out the wrinkles. Run the grain lengthwise along the wing and fuselage. Cover the wing in three sections—each half and the center section.

A good technique is to lay the tissue on the wing and pin the corners lightly to the spars. Next secure the corners with banana oil. Fasten the tissue to every part of the spar as soon as you've satisfied yourself that you've removed all bagginess in the tissue. Don't fasten the tissue to any ribs other than the two center ones. The fuselage covering should be banana-oiled to every part of the framework which it contacts.

The wing and tail surfaces are too weak for doping or spraying, but the fuselage tissue can be tightened by a light water spray. Don't be worried about wrinkles that appear in the wing and tail. The air moisture absorbed by the tissue over a period of time will be sufficient to shrink it. This operation can be speeded up by moistening with steam, but be careful—a thorough soaking by steam will be as damaging as spraying with water.

## FLYING

The motor is four strands of  $\frac{1}{8} \times \frac{1}{32}$ " rubber. It fits on to a wire shaft inserted through the nosing and the prop; the rear is attached to an "S" hook. Straight wire is useful in pulling the motor through the fuselage. A wire clothes hanger can be converted into a satisfactory winding hook. Winding is done through the uncovered section at the rear of the fuselage. As a safety measure, some builders like to wind the motor outside the fuselage, where it can't cause damage in case it breaks. After the motor is tightly wound, pull it

through the fuselage with the winding hook.

The rectangular nose plug consists of pieces of balsa sheet cemented together, the inner piece fitting between the nose cross braces. It is likely to become worn after a time and fall out when the rubber is slack. The propeller hanging loose at the front of the model naturally reduces the glide. Pin the plug in position for long flights. However, when you're testing your model, let the plug fall out and the decreased soaring ability of the model will insure its return for future flights.

Cement the elevator and rudder permanently atop the rear of the fuselage. The settings of both these surfaces can be changed by warping the rear edge, which is done by breathing over the tissue and gently twisting the framework. Make all major adjustments by sliding the wing backward or forward. Negative or downward prop thrust may be useful, but it is hardly necessary if you take reasonable care in balancing the model. The slight stalling tendency usually shown by lightweight models will not reduce the length of flight.

## WEIGHTS

Wing.....	.08 ounces
Prop, nose plug,	
shaft, etc. ....	.19 "
Rubber .....	.15 "
Fuselage, elevator,	
wheels, rudder....	.10 "
Total R. T. F. ....	.52 ounces

## MATERIAL

- 8 balsa fuselage longerons and braces  $3/32 \times 3/32 \times 18$ "
- 2 bamboo landing-gear struts  $\frac{1}{32} \times \frac{1}{16} \times 12$ "
- $\frac{1}{16}$ " sheet balsa for ribs, tips, and plug
- 4 balsa strips for elevator and rudder  $\frac{1}{16} \times \frac{1}{8} \times 12$ "
- 1 balsa propeller block  $7/8 \times 1 \times 9$ "
- 4 spars tapering from  $\frac{1}{16} \times \frac{1}{4}$ " to  $\frac{1}{16} \times \frac{1}{8}$ ", 12" long
- small sheet of superfine tissue, cellophane, and stiff paper for wheels
- short length of wire, several washers, 6 ft. of  $\frac{1}{8} \times \frac{1}{32}$ " rubber
- cement and banana oil

# FUN AFLOAT

(Continued from page 52)

do well to keep our ships safe in the workshop. But it takes strong will power. I was never able to do it. After all, it's a lot of fun to see how much punishment a model will stand.

## MATERIAL

- 10 pcs. sheet balsa  $\frac{1}{32} \times 2 \times 18$ "
- 2 pcs. sheet balsa  $\frac{1}{16} \times 2 \times 18$ "

- 2" of tubing  $\frac{1}{16}$ " diam. (aluminum or brass)
- 2 pcs. of bamboo  $\frac{1}{16} \times \frac{1}{8} \times 10 \frac{1}{2}$ "
- small sheet of tissue
- banana oil, cement, clear lacquer (or heavy dope)
- 2 feet #14 wire

## FLOAT SPECIFICATIONS

- Length ..... 18 inches

- Maximum width.....  $3 \frac{9}{16}$  "
- Maximum depth.....  $1 \frac{7}{8}$  "
- Displacement..... 90 cubic inches
- Total supported weight..... 50 ounces
- Weight..... 1.2 "
- Tread .....  $9 \frac{1}{2}$ "
- Angle of floats to thrust line..... about 0 degrees

—G. S. L.



# THE NEW HAMMOND PUSHER

(Continued from page 23)

Excellent visibility all round is the natural result of locating the passenger compartment in the very nose of the ship. This is made possible by the mounting of the inverted engine behind a stainless steel fire wall in the rear of the cabin nacelle. Another aid to visibility lies in the fact that the seats are located well forward of the leading edge of the wing. The unusually large windshield and windows, combined with the level attitude of the ship when on the

ground, leaves nothing to be desired in the way of view while either taxiing or flying.

After a careful consideration it becomes clearly apparent that the Development Section of the Bureau of Air-Commerce knew what it was about when it chose the Hammond Model Y. While no aircraft can ever honestly be called "foolproof," there is no doubt that the Hammond engineers have eliminated the possibility of several common causes of

accidents. Despite the jeers of some of our manufacturer-influenced aviation publications, I believe that no fair-minded person can sincerely deny that Bureau Director Gene Dival's Development Section has taken a long step forward toward the creation of a really safe aircraft for the average man.

And if that's what the critics mean when they shout about governmental interference in the aviation industry, I say, "Let's have more of it!"

## NAVY HAWK

(Continued from page 40)

Making the ring is a tedious job. Start with a  $3 \times 3 \times 1\frac{1}{16}$ " block and scribe the circles of the ring on it. Carve the inside carefully and then cement it onto the cylinders, where it may be finished up without danger of breakage. Add the exhaust stacks and scoops.

The remaining halves of the dress snaps should be cemented in shallow depressions in the back of the nose form to match those on former 1. Do this carefully in order to get a snug fit.

### WING FRAMES

Only half of the wing-frame drawings are shown. To get the opposite sides, place a sheet of white paper under the drawing and a sheet of carbon paper, face up, under the white paper. Trace over the wing-frame drawings and the resulting tracings will be the opposite drawings required.

All wing ribs are accurately drawn. Cut two of each from  $\frac{1}{32}$ " sheet balsa. In building the wing frames, the best procedure is to fasten every part in place before cementing, and to complete the panel before removing from the board. The top wing should be made as one panel, with  $\frac{3}{4}$ " dihedral.

### TAIL ASSEMBLY

Make the vertical tail with unfinished parts. Block the outline members up with scraps of  $\frac{1}{32}$ " sheet to center the unfinished rib stock and spar. After removing from board, sand the ribs to the slight streamline shape, round the leading edge and taper the trailing edge.

Except for the sheet balsa tips, build the two stabilizer frames the same way. Since the individual parts of the tail surfaces are of minute size and the curves so slight, the light sanding of the assembled parts that have not been pre-formed or shaped is favored over the uncertain cut-and-dry method. This does not apply to endurance models.

### RETRACTABLE LANDING GEAR

The three views of the landing gear make it hardly necessary to explain its

action. Cut "A" shaped slots in the wells as shown and fit the wire parts to the model as in retracted position with the wheels on. After getting the desired action, cement the eyelets in which the swivel struts hinge and the short pieces of tubing in which the upper ends of the #14 wire struts hinge. To give the gear a better appearance, slide a length of  $\frac{1}{8}$ " aluminum tube over the lower half of the long strut before making the bend at the top, or sheath the lower half with sheet aluminum after the cementing is done.

Make the small tail wheel and cement it on.

### PROPELLER

Carve the propeller according to the blank on drawing No. 1. Bend the hook of the propeller shaft, run the shaft through the nose plug, several washers, and the hole in the propeller. If you prefer, bend a winding loop on the front end of the shaft before cementing it in place on the propeller. Stretching the rubber and winding it will give surprisingly greater endurance.

### COMPLETING THE MODEL

The best procedure is to carve a soft block to place between the fuselage and

top wing to maintain the proper line-up, then cement the cabane struts in place lightly to the wing; when dry, cut the wing loose from them.

Now cover all surfaces with the desired color of tissue and spray lightly with water. The tissue will sag badly when damp, but will become as tight as a drumhead when dry. Re-attach the top wing on the struts with cement. Be sure to peel the tissue away from the spots to be cemented. Block the model up in neutral attitude and attach the lower wing panels to the fuselage. Block the tips up  $\frac{3}{4}$ " and let dry, then fit the interplane struts.

Cement the tail surfaces in their positions. If an adjustable stabilizer is preferred, cement a spacer between the stabilizer halves and cement the halves to the fuselage at the rear only. Close the "A" slots in the landing-gear wells by cementing balsa patterns behind them. Attach wheels, windshield and cockpit cover, gun-sight, arresting hook, and fairings on the side of the fuselage.

If a flashier model is desired, light coats of colored model dope may be applied, with a small sacrifice of endurance.

### MATERIALS

1  $4 \times 4 \times 4$ " block medium balsa for motor ring, landing gear, etc.  
4  $\frac{3}{16}$ " sq. x 18" leading edges  
12  $\frac{3}{32}$ " sq. x 18" spars, longerons  
4  $\frac{1}{8}$ " sq. x 18" tail parts  
2  $\frac{1}{8} \times \frac{3}{16} \times 18$ " struts  
10  $\frac{1}{16}$ " sq. x 18" stringers  
6  $\frac{1}{16} \times \frac{1}{8} \times 18$ " trailing edges  
3  $\frac{1}{64} \times 2 \times 18$ " covering  
8  $\frac{1}{32} \times 2 \times 18$ " ribs, plywood  
1  $\frac{1}{16} \times 2 \times 18$ " gussets, ribs  
2 sheets colored tissue  
1 oz. tube cement  
1 oz. banana liquid  
2 oz. (2 colors if preferred) dope  
6" alum. tube, 9 bushings, 2 breast snaps, 6 washers, 12" #12 music wire, 24" #14 music wire, 3" sq. model celluloid, needle and thread for rigging, 3 loops or 72" of  $\frac{1}{8}$ " flat rubber for motor.

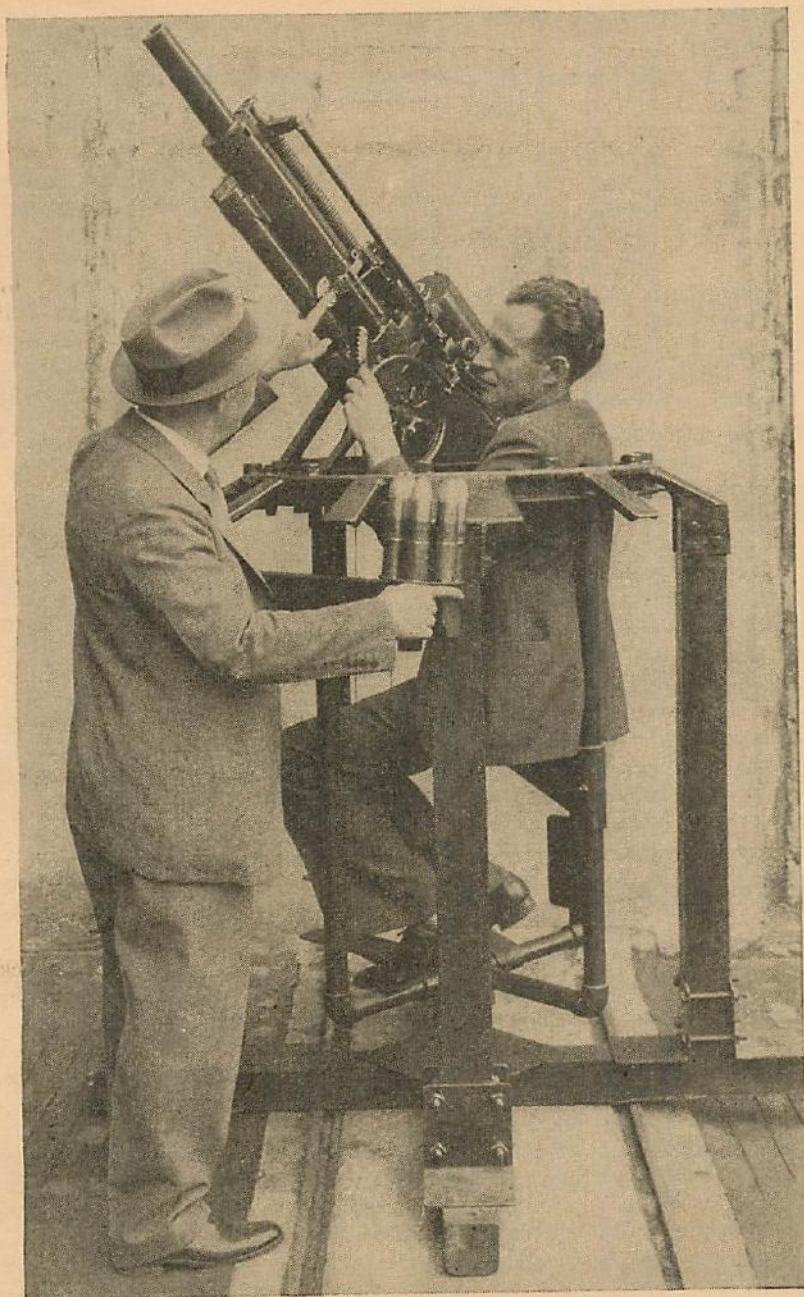
### CROSS WINDS

Answers for October

E	R	G		O	S	P	R	E	Y		F	O	G
M	A	I	N		C	O	I	L		T	R	I	O
S	A	R	O		I	D	L	E		H	E	L	D
	B	L	I	M	P		E	C	H	O	E	S	
S		S	A	I		S	T	I	R		A		
E	C	H	E	L	O	N		R	E	N	A	R	D
L	O	O	S	E		A	H	A			L	A	D
E	L	L		F	A	I		G	A	U	G	E	
C	I	E	R	V	A		S	T	O	R	M	E	R
T		Y	A	N	K		Y	A	M		S		
	A	C	O	S	T	A		C	L	O	D	S	
T	R	O	T		O	L	E	O		R	Y	A	N
H	E	N	S		M	E	S	O		Y	A	L	E
O	A	K		C	E	S	S	N	A		D	E	W



At the left of the 37 mm. cannon is its inventor, Joyce, and in the saddle is Lee Gehlbach, famous test pilot.



To the pursuit ship's rescue came the "motor cannon," a large-caliber rapid-fire gun of about 20 mm. caliber (0.7874 inches) that can be anchored between the cylinder banks of V-type engines to fire through the propeller hub. The engine's weight and rigidity successfully absorbed the ferocious kick-back. The effective range of the motor cannon's explosive shells was double that of machine guns. The pursuit plane was enabled therefore to remain outside the bomber's fire while having the latter practically at its mercy.

Some new weapon was obviously needed if the bombers, when caught unprotected by their own pursuit convoy, were to survive enemy fighter attacks. The answer was a cannon similar to the fighters' that could be fired, however, without having to point the whole plane at the elusive target.

Several "flexible" cannons are under development, and one has recently appeared. It is shown in the accompanying photograph. It fires 37 mm. shells (1.4567 inches) at a rate up to 100 a minute.

The important question is whether it is so mounted and balanced that it won't tear apart the fuselage structure in which it is used. The American Armament Corporation, its manufacturers, claim that it will not. The recoil force, they say, is held within 1,000 pounds by a hydraulic spring system which is calculated not to overstress modern heavy bomber structures.

Whether its practical range is equal to that of pursuit motor cannons remains to be seen when accurate information is forthcoming on the latter. Total ranges are not always in-

dicative for comparison, since it is the length of flat trajectory that counts in effective aiming. The AAC's weapon has an accurate range of 700

feet and a maximum horizontal range of 13,125 feet.

While projectiles of both the 20 mm. and the 37 mm. cannon have

supersensitive fuses and explode upon contact with the fabric of a plane, the 37 mm. projectile is, of course, more effective because it carries a larger amount of high explosive (cast TNT). Both of these projectiles include a self-destructing feature to burst the projectile at any predetermined range. This is to prevent projectiles from dropping to the ground and exploding in territory that is not unfriendly. The 37 mm. projectile is of a size which permits an important feature

TWO factors determine the outcome of aerial duels—speed, which includes rapid maneuverability, and armament. Since 1917, the definite speed advantage which the pursuit plane has held over the bomber has steadily decreased

as the big ships have been improved. In wartime the speed of the pursuit, or fighter, was as much as 50 per cent greater than that of its slower-flying adversary. The new bombers have reached the 250-mile stage, and the fighters (the latest ones) are doing about 300. There is now an advantage of only 20 per cent—not enough to allow the fighter to hold its own in a tussle with a big plane bristling with several movable machine guns that leave practically no "blind" spot uncovered.

# Air Cannon

*A new weapon in the old bomber-versus-fighter controversy that may settle the smaller plane's fate.*



to be included in its construction—that is, it is “bore-safe” and “detonator-safe” and therefore cannot be accidentally exploded in the bore of the cannon. The size of the 20 mm. projectile, unfortunately, does not permit this safety feature to be included.

The AAC 37 mm. cannon is fully automatic, and takes clips containing five rounds of ammunition, which may be assembled for any desired range or series of ranges. The firing-mechanism may be set “Safe,” “Single Shot,” or “Full Automatic.” The weapon is so designed that the last shot cannot be fired until a new clip of five rounds is placed in the weapon or unless the gunner intentionally fires the last round. The first shell is loaded on the ground by hand. By keeping an unfired round in the weapon at all times, the only break in continuous fire is the few seconds required to change clips.

The cannon may be mounted either in the nose of a bomber or in a gun turret in the rear of the fuselage, with the usual bullet-proof glass protective dome. It is capable of 360 degrees traverse, 15 degrees depression and 60 degrees elevation, the only restrictions on this zone

of fire being the location of propellers, wings, fuselage, and tail.

Mounting is on roller bearing on a ring around the edge of the cockpit. The cannon is traversed by means of gearing operated by a hand-wheel at the gunner's right hand. Elevation is accomplished by a left hand-wheel. The gunner, seated facing the gun, rotates with it. The traversing brake is operated by the gunner's right foot and the firing trigger by his left foot. Holding the traverse locked by the foot brake, his right hand is free to feed new ammunition clips from convenient racks.

The sight is a right-angle sight. Located on the left trunnion of the gun, the eyepiece remains fixed with respect to the gunner's eye in any position of the gun. The sight has a 23-degree wide angle of vision and a magnification of 2. The reticle of the sight is scribed with cross-hairs and circles. The projectiles are equipped with day and night tracers, which also facilitate sighting.

Wind-tunnel tests were made with a model of the gun in order to balance it as effectively as possible against wind-stream pressure, thus reducing the traversing and elevating hand-wheel loads.

There is a thermostatically controlled electric heater around the hydraulic cylinder to maintain constant temperature, regardless of altitude or weather.

Other data are as follows:

#### SPECIFICATIONS

Caliber ..... 37 mm. (1.457 in.)  
Length in calibers.... 20  
Length of recoil..... 10 in.  
Total piston rod pull 1,000 lbs.  
Elevation ..... -15° to +60°  
Traverse ..... 360°  
Cadence of fire..... 100 shots per min.  
Weight of gun with  
mount ready for  
installation ..... 235 lbs.

#### BALLISTICS

Weight of high  
explosive shell..... 1.1 lbs.  
Weight of complete  
round ..... 1.4 lbs.  
Weight of powder  
charge ..... 375 grains  
Weight of clip with  
five rounds of am-  
munition ..... 8.2 lbs.  
Muzzle velocity..... 1,250 ft. per second  
Maximum horizontal  
range ..... 4,375 yds.

## AMERICA'S FIRST FLIGHT

(Continued from page 32)

molestation to the said Mr. Blanchard.

And that, on the contrary, they receive and aid him with that humanity and good will which may render honor to their country, and justice to an individual so distinguished by his efforts to establish and advance an art in order to make it useful to mankind in general.

Given under my hand and seal at the City of Philadelphia, this 9th day of January, 1793, and of the Independence of America the seventeenth.

At the time scheduled for the ascension, all was in readiness, and the inflated bag commenced to sway gently. After wishing Blanchard a “happy landing,” Washington retired to the background and signaled with his handkerchief to “let go.” Amid a furor of loud shouting, the playing of a band, and several cannon salvos, the balloon ascended slowly to a “dizzy altitude” of two hundred feet, struck a gentle breeze, and was speedily whisked away. But following is the complete account of the feat, dated Philadelphia, Pa., January 10, taken from a rare pamphlet printed in 1796:

“Mr. Blanchard, the bold aeronaut, agreeably to his advertisement, at five minutes past 10 o'clock yesterday morning, rose with a balloon from the Prison

Court in this city, in presence of an immense concourse of spectators there assembled on the occasion.

“The process of inflating the balloon commenced about nine o'clock. Several cannon were fired from dawn until the moment of elevation. A band of music played during the time of inflating; and, when it began to rise, the majestic sight was truly awful and interesting. The slow movement of the band added solemnity to the scene. Indeed, the attention of the multitude was so absorbed that it was a considerable time ere silence was broke by the acclamations which succeeded.

“As soon as the clock struck 10, everything being punctually ready, Mr. Blanchard took a respectful leave of all the spectators, and received from the hands of the President a paper; at the same time the President spoke a few words to this bold adventurer, who immediately leaped into his boat, which was painted blue and spangled. The balloon was of a yellowish colored silk, highly varnished, over which there was a strong network. Mr. Blanchard was dressed in a plain blue suit, a cocked hat, and white feathers. As soon as he was in the boat, he threw out some ballast, and the balloon began to ascend slowly and perpendicularly; while Mr. Blanchard waved the colors of the United States, and those of the French Republic, and flourished his hat to the thousands of citizens from every part of the

country, who stood gratified and astonished at his intrepidity.

“After a few minutes, the wind blowing from the northward and westward, the balloon rose to an immense height, and then shaped its course toward the southward and eastward. Several gentlemen galloped down the Point Road, but soon lost sight of it, for it moved at the rate of twenty miles an hour.

“Great numbers, who had neglected to purchase tickets, were afflicted with considerable regrets at not having been immediately present in the Prison Court to see the preparations, and to witness the undaunted countenance of the man who thus sublimely dared to soar through the regions of the air.

“About half after 6 o'clock last evening we were happy to meet Mr. Blanchard again in this city, going to pay his respects to the President of the United States. He informed us that his aerial voyage lasted forty-six minutes, in which time he ran over a space of more than fifteen miles, crossed the Delaware River, and then descended a little to the eastward of Woodbury, in the State of New Jersey, where he took a carriage and returned to Cooper's Ferry, and was at the President's at half past 6 o'clock.”

While the flight was considered a success generally, Blanchard returned to France a disappointed man, for the “gate receipts” were not up to expectations, and he sustained a loss of more than a thousand dollars on the venture.



# AIR LINES IN THE LAND OF THE MIDNIGHT SUN

(Continued from page 31)

ranging from mid-April to October on the southerly link with the continent, to the short July 12-August 12 period on the northern Tromsø-Honningsvåg leg. But even in the winter Norway's coast is clear of ice, due to the warmth of the Gulf Stream along the shore.

There is also little if any icing of the planes—less, in fact, than is experienced in middle Europe. Storms also are not so frequent as they are farther south, although when they do come they sometimes reach a 100-mile velocity.

Visibility is usually very good, despite occasional low ceilings. The ceiling limit could never be used in the United States; it is about 200 feet, but visibility, owing to fortunate meteorological conditions, remains good for ten or fifteen miles.

In short, there are very few dangers in Norwegian transport flying. Schedules are carried through with practically 100 per cent regularity. Lighthouses along the coast—about twenty of them—also maintain radio beacons, and there is excellent weather-forecasting service.

Norway is rapidly becoming air-minded. Her population numbers less than three million, but there is a surprising growth of aeronautical interest.

There are air clubs of all kinds, an aviation magazine, and many model builders among the boys. In a country handicapped in the past by a very small number of planes and few air fields, it is notable that last year more than 100 pilot licenses were issued. The Norwegian Air Lines, besides transport and special mapping services, maintain a civilian flying school that is thriving.

The Norwegian people are taking to air transport enthusiastically, for it has greatly speeded travel and communication throughout the nation. Fares are low, being about the same as in the United States. In three months last year, 3,500 passengers and 30 tons of mail were transported. This year passengers carried averaged about 250 a day. Mail between Oslo and Bergen is delivered in 5 hours instead of the 36 hours that were formerly required for the trip by rail and boat.

The new air facilities will be important, also, to the 300,000 tourists who visit Norway each year. There is no more thrilling way of seeing her magnificent scenery—the countless islands, the deep, placid fjords, the rugged mountains and snowy glaciers—than viewing

it from the air. Most of the visitors want to see the midnight sun, and the Midnight Sun Airway will carry many of them up the coast quickly and comfortably over the land of the midnight sun. They will travel on the most northerly air line in the world, which reaches nearer to the Pole than any of Russia's regular routes or the Pan American Airways' system in Alaska. If they fly to Honningsvåg, they will have gone, by airplane, some 500 miles north of the arctic circle.

There, from the middle of May through July, they will see the spectacle of continuous daytime. Situated near the top of the world, with the inclination of the earth's axis pointing toward the sun, they see the sun for twenty-four hours. During the middle of the day it arches overhead; when the clock begins to show nighttime the sun slips toward the horizon. But it never quite reaches it; at midnight a sort of dim twilight has fallen, throwing long shadows across the ground. One can easily read a newspaper outdoors even in Oslo. Then the sun starts to rise again and a new day has started before the old one ends.

## RECORD THREAT

(Continued from page 46)

are  $1/20$ " square balsa, of 5 lb. stock. The cross braces are  $1/32 \times 1/20$ " on "edge," that is, with the narrow edge outwards. The boom longerons are cemented in a "spliced" or slanting joint to the fuselage and are  $1/32$ " square. After making the first side, make the second directly over it in order to have both exactly the same. When the sides are dry, cement the back ends together and put in the nose braces and the third set of cross braces. Then pinch the underside of the fuselage together at the proper place and cement these longerons together side by side with dope. When this is dry, the remainder of the cross braces may be inserted. You may now cut off the boom and make a plug for the rear of the fuselage. As shown in the sketch, it is made of two pieces of sheet, the smaller just large enough to fit snugly inside the fuselage end braces. Trim it to fit and cement the boom longerons to the corners of the plug.

The fuselage is braced with #4 tungsten wire, which can be bought at one of the model-supply houses that specialize in indoor supplies. Unravel about 2' of wire from the spool, wrap and cement it to one of the corners of the nose, and let it dry. Then unravel about 3' of the wire and attach a 2 oz. weight to the spool and let it hang straight down. Twist the fuselage

around so that the wire is wrapped around from corner to corner, around the fuselage and back to the nose again. This operation will require about  $12 1/2'$  of tungsten. Put a dot of cement at the point of contact of wire and wood. After the fuselage is entirely wrapped with wire, put a dot of cement where the wire crosses. When this is dry, try to twist the fuselage. *There should be very little twisting.* If there is any, tighten the wires. The fuselage is finished now except for covering.

The front plug is made of  $1/64$ " quarter-grained balsa as shown in the diagram. The face plate is cemented on and then  $1/20$ " square slivers of balsa are cemented on to it, and the inside then cut away.

### WING

The wing design is what is known as the swept-forward ellipse. In an ordinary ellipse the center-of-pressure line sweeps back; this has a tendency to wash out the wings in flight. In order to eliminate this effect, the ellipse is so distorted that the center of pressure falls on a straight line.

The two center-section spars are cut from  $1/16$ " sheet; they are  $3/32$ " at the center tapered to  $5/64$ " where the dihedral is put in. These spars should weigh, together, .003 oz. The

tip spars are tapered from  $5/64$ " to  $1/16$ " and they should weigh, all four together, .0038 oz. Of course, the edges of all the spars are rounded off and smoothed with #10-0 sandpaper. The fifteen ribs are cut from a sheet of  $1/32$ " quarter-grained balsa  $1/32$ " deep. They may be cut most easily by the use of an aluminum template.

After the ribs have been cut and the spars finished, the spars should be pinned to your full-size drawing. Attach the tip spars to the center spars with a dot of cement. The ribs are fitted into place by cutting off one third the excess from the front and two thirds from the rear, thus getting a uniform section throughout. Make a template for the  $1/32$ " tips from fairly thick cardboard, moisten the strips and bend them around the template. After they are dry, they may be butt-jointed to the spars. When the wing is thus far completed, it is advisable to moisten the spars (while the pins are still in place) in order that they may hold their shape better. The four stilts are cut of light balsa to the dimensions shown and sanded smooth. They are cemented to the wing after it is covered.

### TAIL

Bending the stabilizer and rudder is simple. Make a template of half the



stabilizer and the rudder from cardboard. Then cut three strips  $\frac{1}{32} \times \frac{1}{20}$ " and about 14" long, wet them, bend two around the stabilizer former and one around the rudder. After they are dry they should be pinned to a full-size drawing and the ribs inserted. The rudder ribs, of course, are straight.

### PROPELLER

The propeller of the original model was made from semi-carved prop blades. Semi-carved props have three advantages over the regular props: they save time in carving, they are much easier to balance because the grade of wood used in the blades is more nearly uniform, and the pitch is more nearly perfect than you can obtain with an ordinary block. The 14" prop had a pitch-diameter ratio of 1.8, that is, the pitch of the prop was 1.8 times the diameter, or 25.2". A propeller which would be exactly the same could be carved from a block  $1 \times 1\frac{3}{4} \times 14$ ". If you carve your propeller from a block, draw your diagonals from corner to corner on the wide face.

The tip should be thinned down to about  $\frac{1}{16}$ " and the hub to about  $\frac{3}{32}$ ". Then sand progressively, starting with #2 and ending with 10-0 paper, until the blades are  $\frac{1}{16}$ " at the hub and  $\frac{1}{64}$ " at the tips. The blade should have a camber of about  $\frac{3}{32}$ " deep and the cross section of an airfoil. Make a template of the blade shape, shape your blades to fit it, and insert your shaft. The finished propeller should weigh about .016 oz.

### COVERING

Cover the model with microfilm. The wing should be covered in one piece and the dihedral put in by breaking the tips upward. If the film at the dihedral is "floppy," it may be tightened by holding the wing about a foot above the burner of a gas stove when the flame is turned down so low that it almost goes out.

### LANDING GEAR

The landing gear is made of two spars cut from  $\frac{1}{16}$ " sheet balsa  $\frac{1}{8}$ " wide tapered to  $\frac{1}{16}$ " and sanded smooth. Axles are made of wire .012" in diameter and cemented to the spars. The wheels are easily made by bending a strip of balsa  $\frac{1}{64} \times \frac{1}{20}$ ", soaked in water, around a bottle neck  $\frac{3}{4}$ " in diameter. Then the wheels are sliced off, joined, and the spoke inserted. Slip the wheels over the axles.

### ASSEMBLING AND FLYING

Cement the landing gear to the fuselage, and the stabilizer and rudder to the boom. Notice that the rudder is underneath. Make sure that stabilizer and rudder are exactly perpendicular to each other. Cement the wing stilts to the wing and to the fuselage at the indicated position. Drop a loop of  $\frac{3}{32}$ " brown rubber 19" long through the fuselage, attach the prop and wind up the motor to about 500 turns. Attach the rubber to the rear plug hook with an S hook and put the plug into place. Set the model on the floor, the two wheels and the rudder touching, and then release it.

The model should hop off, turn in 40° circles, and reach an altitude of about 30'. If there is a tendency to dive, the wing must be moved forward; if there is one to stall, backwards. The rudder may be warped for turn.

Increasing the length of the rubber is an effective method of keeping your plane off the rafters. By increasing the length you add weight to keep the plane down and you also increase the possibility of greater endurance. A lubricated 19" length of  $\frac{3}{32}$ " rubber can take 2,300 turns with ease.

### WEIGHTS

Wing	.013 oz.
Elevator and rudder	.002 "
Fuselage, boom, plugs, L. G.	.025 "
Prop	.016 "
Rubber	.05 "
	.106 "

### SPECIFICATIONS

Wing area	99.1 sq. ins.
Tail "	30.2 " "
Wing incidence	$31\frac{1}{2}^\circ$
Elevator "	$0^\circ$
Prop "	$0^\circ$
Prop pitch	25.2 inches

### MATERIALS

(All balsa of  $4\frac{1}{2}$ -5-lb. stock)  
 1 sheet  $\frac{1}{32}$ "  
 1 sheet  $\frac{1}{16}$ "  
 4 strips  $\frac{1}{20}$ " sq. x 18"  
 semi-carved prop P/D 1.8 or block  $1 \times 1\frac{3}{4} \times 14$ "  
 dural thrust bearing and washers  
 microfilm solution  
 cement  
 .016, .012 wire

## IT'S THE FINISH

(Continued from page 45)

applied, dries quickly, and produces a fine finish. The lacquer as it comes out of the can is too thick for use, and must be thinned out. Use 3 parts of lacquer to 2 of lacquer thinner. Apply with a soft camel's-hair brush. A brush  $\frac{1}{2}$ " wide will do for models up to 8" wing span. For larger models, use a 1 to  $1\frac{1}{2}$ " brush. Give the parts three coats of lacquer, allowing each coat to set well before applying the following one. After the third coat has set for three hours, the parts may be sanded. Remember to use the waterproof sandpaper with plenty of water.

Make the lacquer a trifle thinner and give the parts four more coats, sanding lightly between coats. Use a finer sandpaper now, wet or dry No. 320 or 7/0. The parts are now ready for the final three coats. Apply two coats and allow to harden thoroughly. Sand the parts very lightly and apply a thin last coat. Do not sandpaper this coat, but instead, use some rubbing compound. Simoniz cleaner will do perfectly. This compound helps to smooth out the final coat

and provides a clean base for the final wax coat. Do not wax the parts yet; they must first be put together.

The landing gear must go on first. In most cases this is a difficult job, and scratching or marring of the fuselage paint may result. If a metal landing gear made from pins and sheet brass is used, much of this damage can be eliminated. A typical landing gear is explained in figure 6.

The bottom wings should now be joined. Use both pins and cement for a sound joint. Make sure the wings are aligned before the cement sets. Follow the same procedure for joining and attaching the tail surfaces.

Attach the top wing by means of the struts, without cement at first. Then, after making the necessary corrections for proper alignment, take it off and wax all the parts except the struts. Now apply a small drop of cement at the ends of the struts and replace the top wing. Align it properly and allow the cement to set completely before doing any more work on it. Now paint the struts and the landing gear.

On small models, the flying and landing wires are put on by merely cementing them to their respective struts. It

is not necessary to tie knots. First cement one end and let the other end hang loose until the cement has set. The other end may then be cemented to its strut. Make sure that the thread is pulled taut before the cement sets. The excess thread may be cut off with a sharp knife or razor blade. White or gray thread makes a good substitute for wire.

On models where a fillet is necessary between wings and fuselage, a perfect fillet may be made by using plastic wood. The fillet is modeled to the proper shape, and when it has completely hardened it may be sanded smooth. Where a fillet is unusually large, it will be necessary to build it up in several layers, allowing each layer to set thoroughly before applying the following layer. On small models, the automobile lacquer glazing putty is ideal.

In using a color combination of white and red, the white must be applied first and care must be taken not to get red on any part which must finally be painted white. Should this happen, blushing will take place and the white will turn pink, no matter how many coats of white may be put over it.



No other model airplane manufacturer ever dared give such high quality in a kit at so low a price, as proven in these—

# 20" SCIENTIFIC HI-FLYERS

(Registered U. S. Pat. Off.)

—and furthermore, we say—

## GUARANTEED TO FLY 500 FT.

These are the famous kits that feature the

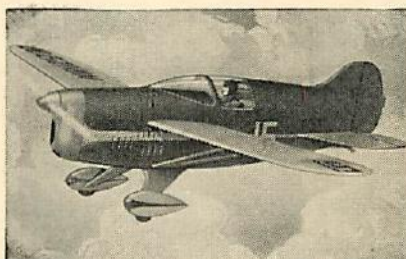
### BRIDGE-TYPE LANDING GEAR

*Popular Models! Easy to Build! Complete to the minutest detail!*

# 50c

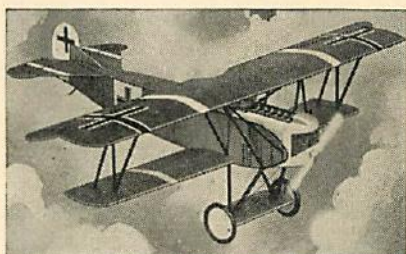
EACH  
Post Paid

**ASK YOUR DEALER TO SHOW YOU THESE KITS TODAY**



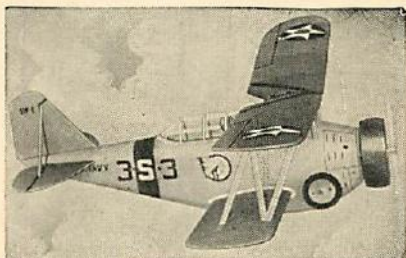
ART CHESTER RACER 50c P.P.

A plane that needs no introduction since it has made a swell showing for itself at the National Air Races. The kit is complete in every respect. You will be more than satisfied with it.



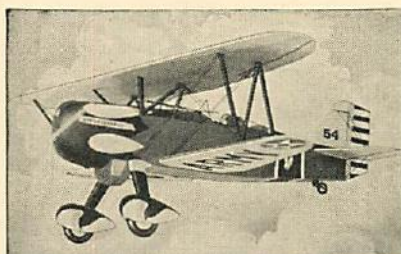
FOKKER D-7 50c P.P.

A thrilling model of the famous death Phantom Fokker flown by the Mad Baron of World War fame. A perfect reproduction including all details.



GRUMMAN FIGHTER SF-1 50c P.P.

One of the newest fighters of the U. S. Navy is the Grumman SF-1. Many finished parts are supplied in the kit including a finished balsa cowl.



CURTIS P6-E ARMY HAWK 50c P.P.

A faithful model of one of Uncle Sam's fastest fighters. Kit is complete, containing everything necessary to build a beautiful flyer.



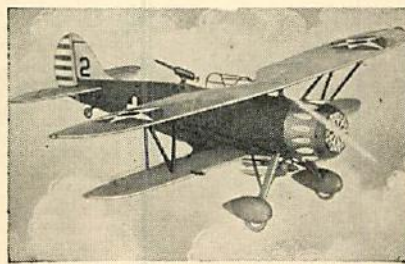
BOEING FIGHTER XF7B-1 50c P.P.

The most modern pursuit model of a low wing design. A perfectly detailed model airplane kit with many finished parts including full insignia.



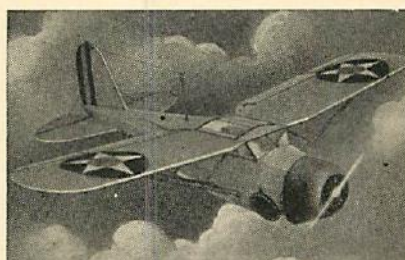
BEN HOWARD'S "MR. MULLIGAN" 50c P.P.

Designed by Benny Howard, famed designer of low-powered racing planes "Ike," "Mike," and "Pete." The "Mr. Mulligan" has become the most talked about plane of the year.



WACO MODEL "D" MILITARY 50c P.P.

The most modern fighting model of a bi-plane design. Very beautiful and unusually well detailed. Authentic as only SCIENTIFIC makes them.



CURTIS FIGHTER XF13C-1 50c P.P.

Beautiful flying miniature of the masterful fighter now used by the Navy. Exciting to build—thrilling to fly. Capable of long flights.

## SCIENTIFIC MODEL AIRPLANE CO.

218-220 AT-11 Market St., Newark, N. J.

In England: H. & S. Norman, 46 Derby Rd., Kirkhams, Prestwich, Lancs.  
In Australia: Swift Model Aircraft, 156 Adelaide St., Brisbane, Queensland.  
In South Africa: Stratosphere Model Aircraft Supplies, P. O. Box 3248, Johannesburg.  
In France: E. Kruger & Co., 9 Rue St. Sebastien, Paris.

## Boy! <sup>HOW</sup> IT FLIES!

Not a Kit!  
Nothing to  
Build!

Remove it from box and it's all set to go places! Nothing to do but fly it and what fun you'll get! Has made 600 ft. flights! "Scrappy" will amaze and thrill you! Send today!

**50c**  
COMPLETE



18" Wingspan  
16 1/2" Long  
Wgt. 1 1/4 oz.  
READY TO FLY!



*Doubles  
World-Wide  
Radio Enjoyment  
and Slashes  
Radio Current Bills  
in Half!*

# Only MIDWEST GIVES YOU PUSH BUTTON TUNING

plus Exclusive New  
**ELECTRIK-SAVER**  
for 1937



**ELECTRIK-SAVER** cuts radio wattage consumption 50%... enables 16-tube Midwests to consume no more current than ordinary 7-tube radios and to operate on voltages as low as 80 volts.



**PUSH  
BUTTON  
TUNING**  
Finger tip tuning is made possible with the Midwest Automatic Push Button Tuning System. Doubles radio enjoyment.



## NEW 1937 *Air Tested* **16-TUBE** MIDWEST FIVE-BAND RADIO

**SAVE UP TO 50% DIRECT FROM FACTORY**

NO middlemen's profits to pay! See for yourself that Midwest offers you greater radio values—enables you to buy the more economical factory-to-you way that scores of thousands of radio purchasers have preferred since 1920. Never before so much radio for so little money! Why pay more? The broad Midwest Foreign Reception and Money-Back Guarantees insure your satisfaction. You get 30 days FREE trial in your own home!

Once again, Midwest demonstrates its leadership by offering the world's most powerful and most beautiful ALL-WAVE 16-tube, 5-Band Radio. A startling achievement, it makes the whole world your playground. Powerful Triple-Twin tubes (two tubes in one!) give 18-tube results. This advanced radio is a master achievement, a highly perfected, precisely built, radio-musical instrument that will thrill you with its marvelous super performance...glorious crystal-clear "concert" realism...and magnificent foreign reception. The Dual Audio Program Expander gives a living, vital realistic quality to voice and musical reproduction.

### 74 ADVANCED 1937 FEATURES

This Super DeLuxe Midwest is so powerful, so amazingly selective, so delicately sensitive that it brings in distant foreign stations with full loud speaker volume on channels adjacent to powerful locals. Scores of marvelous Midwest features, many of them exclusive, make it easy to parade the nations of the world before you. You can switch instantly from American programs... to Canadian, police, amateur, commercial, airplane and ship broadcasts... to the finest and most fascinating foreign programs.

With a Midwest, the finest entertainment the world has to offer is at your command. It is preferred by famous orchestra leaders, musicians, movie stars and discriminating radio purchasers everywhere. You can order your Midwest "Air-Tested" radio from the new 40-page catalog with as much certainty of satisfaction as if you were to come yourself to our great factory. (It pictures the beautiful 1937 radios... in their actual colors!) You pay as little as \$5.00 down! Three iron-clad guarantees protect you: (1) A Foreign Reception Guarantee — (2) Absolute Guarantee of Satisfaction — (3) One-Year Warranty.



MIDWEST USES LESS  
CURRENT THAN AN  
ORDINARY LIGHT BULB

Fill in coupon  
NOW, and mail  
TODAY!



I FIND MYSELF  
SINGING ALONG WITH  
MIDWEST'S MARVELOUSLY  
LIFE-LIKE PROGRAMS—  
*Irene Dunne*



A COMPARISON CON-  
VINCED ME I SHOULD  
HAVE A MIDWEST. IT IS  
A SPLENDID PERFORMER.  
*Fred MacMurray*



**MIDWEST RADIO CORP.**

DEPT. E-40  
Established 1920

CINCINNATI, OHIO, U.S.A.  
Cable Address MIRACO...All Codes

only  
**\$49.95**



WITH  
**GIANT THEATRE-SONIC SPEAKER**  
(LESS TUBES)

**TERMS AS LOW AS \$5.00 DOWN**

Only MIDWEST Gives You  
**16 TUBES • 5 WAVE BANDS**  
9 to 2200 METERS • ELECTRIK SAVER

• PUSH BUTTON TUNING •  
• AUTOMATIC AERIAL ADAPTION •

**DUAL AUDIO  
PROGRAM EXPANDER**

**30 DAYS FREE TRIAL!**

MAIL COUPON TODAY for  
**Free 30-DAY TRIAL OFFER**  
and 40-PAGE FOUR-COLOR Free CATALOG

MIDWEST RADIO CORPORATION  
Dept. E-40, Cincinnati, Ohio

Without obligation on my part, send me your new FREE catalog and complete details of your liberal 30-day FREE trial offer. This is NOT an order.

Special offer and prices prevail only when dealing direct with factory by mail.

Name.....  
Address.....  
Town..... State.....