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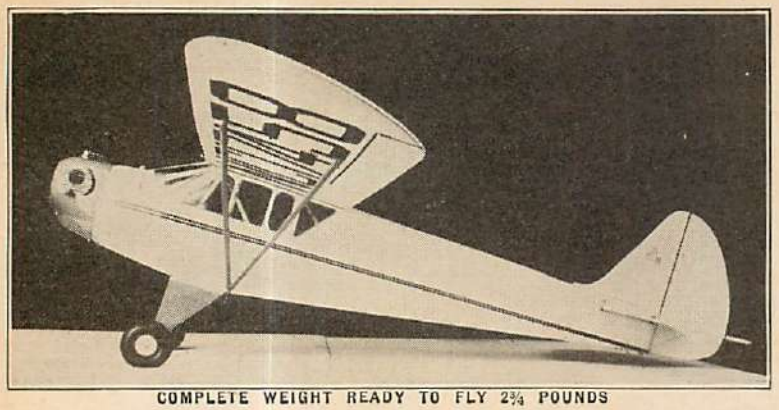

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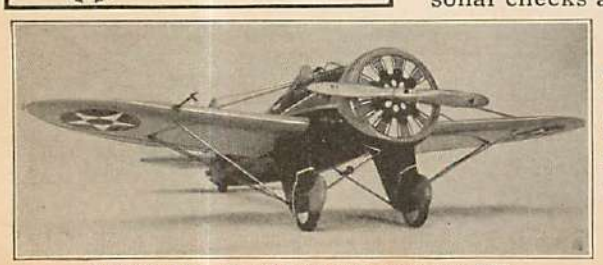

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AIR TRAILS

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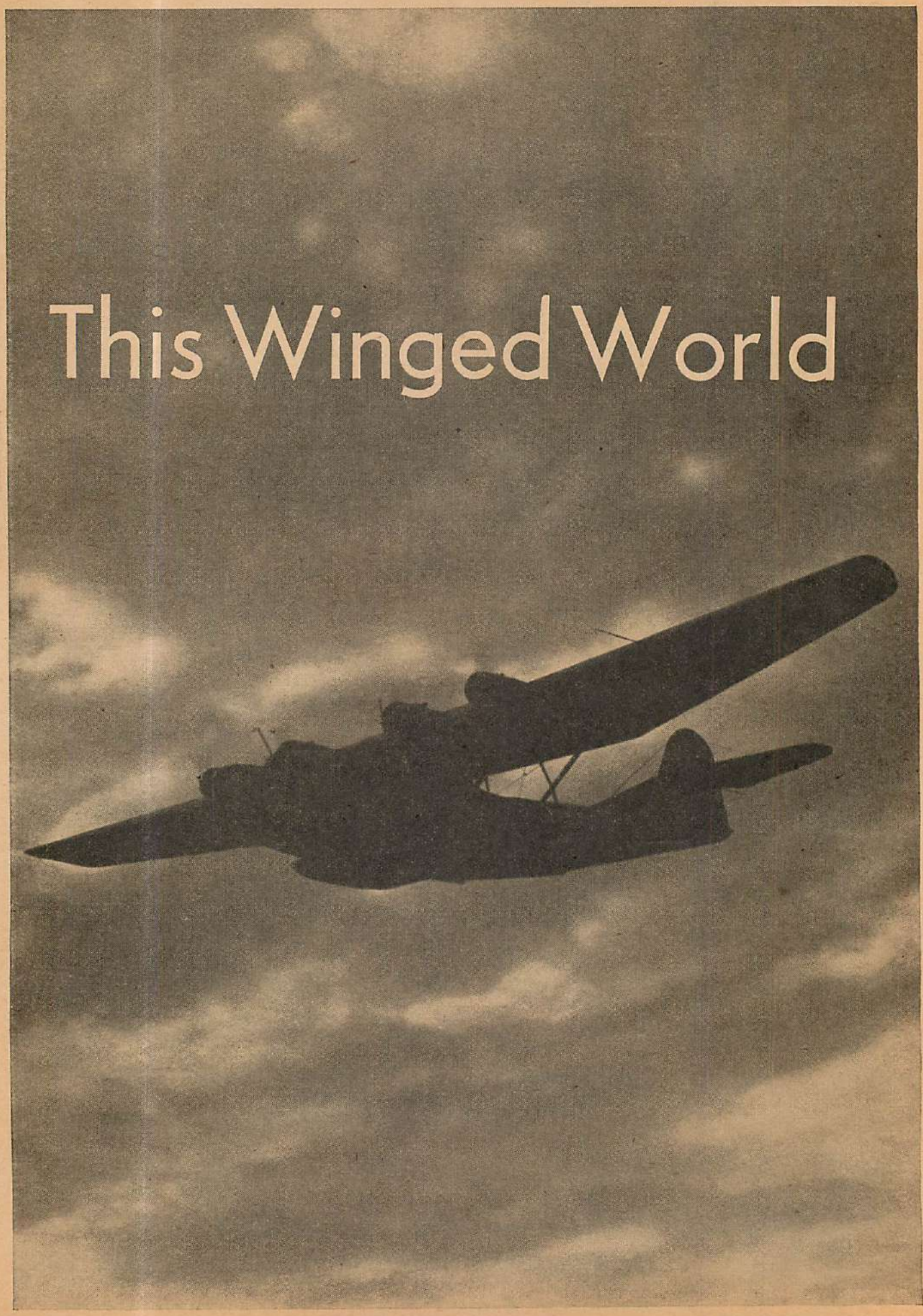
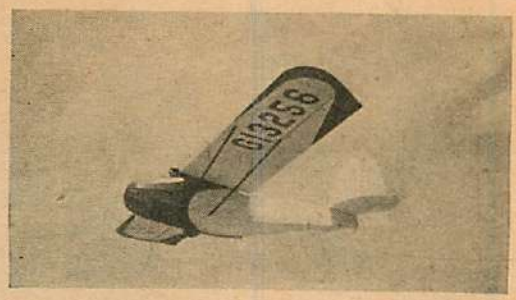
This Winged World



Gliders and Sailplanes at Elmira, N. Y.

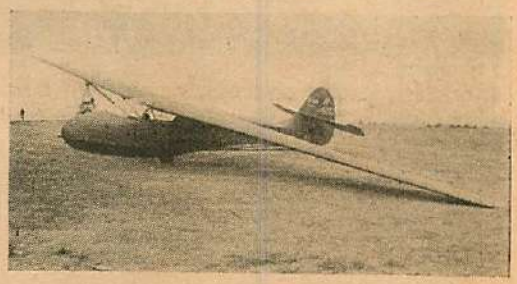
Echoes of the International Soaring Contests

The Universal Utility was one of the successfully performing ships at the meet.

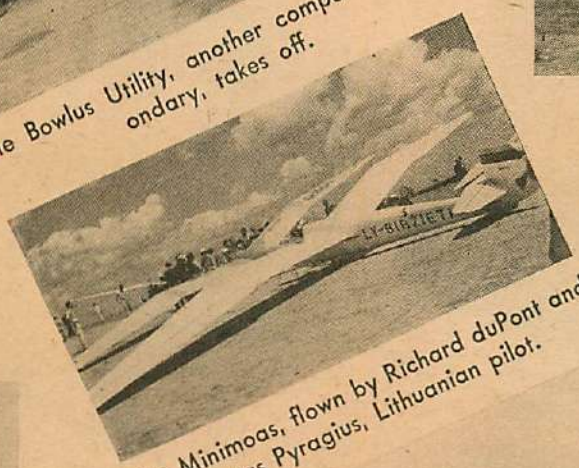


Pete Bonataux's utility goes aloft by winch tow, to add points to the fine record of the North Jersey Soaring Association.

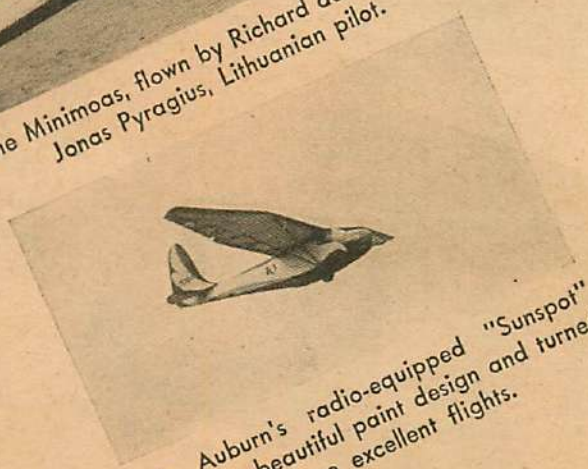
The Bowlus Utility, another competing secondary, takes off.



The Buxton Transporter, a two-place ship, has been a capable sailplane entry at many meets.

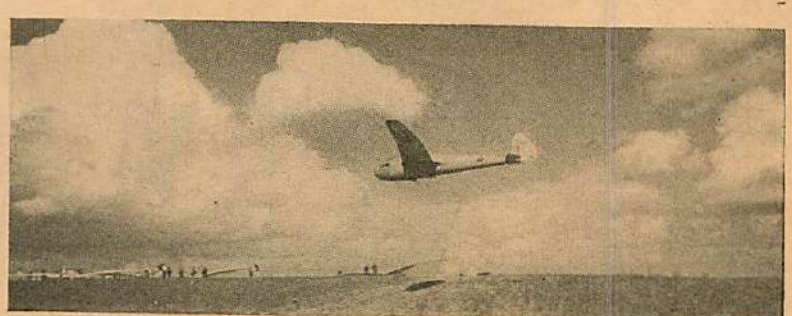


The Minimoas, flown by Richard duPont and Jonas Pyragius, Lithuanian pilot.



Bob Auburn's radio-equipped "Sunspot" sported a beautiful paint design and turned in some excellent flights.

Harland Ross, holding the Air Trails Trophy, won for outstanding "C" flight. He flew the Ross-Stephens sailplane for a distance of 121 miles.



The Ross-Stephens American-built and designed sailplane, Air Trails Trophy winner and second-place winner Mrs. Warren E. Eaton award for American-designed utility ships.

AT THE NATIONAL MODEL CONTESTS, DETROIT, MICH.

Berry Brothers Photo

Modelers, young and old, came from all points of the compass to compete for internationally famous trophies.

Maxwell Bassett, by adding another gas-model victory, proved his supremacy against stern competition.

Berry Brothers Photo

William Enyart, Chairman N. A. A. Contest Committee, examines a steam-powered entrant.

Chester Lanzo, a more inventive builder, flew his radio-controlled gas model to first place in the new class.

Berry Brothers Photo

Alvie Dague, 1937 sensation, and H. M. Jellison, contest director.

Berry Brothers Photo

Thomas B. Colby, president Sportsman Pilots Association, and William B. Stout, designer, with trophies they donated.

Vernon Boehle, a veteran of many national contests, boasts another spectacular record.

AIR PROGRESS

A Summary of Aviation News

This Sikorsky Clipper of Pan-American Airways typifies the precision of modern air-transport operations.

TRANSPORT

Probably no era in the history of aviation has seen the strides as have been made this summer. Pan-American lines have been extended all the way across the Pacific to China and even as far south as New Zealand. A regular-scheduled line between New York and Bermuda has enjoyed unbelievable success, Pan-American and Imperial Airways alternating on the run. The observation flights between New York and Southampton, England, continue with every assurance that scheduled flights will be here by next summer.

The flights of the Russian airmen across the north pole from Moscow to the borders of the United States have opened up a new possibility and raised many touchy international defense problems. The two flights accomplished at this writing indicate that weather across the north pole is not as bad as might have been expected, and that with proper radio communication and weather information, navigation is not particularly discouraging. The reason these flights have not been given a great deal of publicity rests in the sudden realization that a new frontier has been created. If Russian planes can fly from Moscow to the United States, it is quite obvious that planes from other countries in Europe and Asia can approach our borders from the same direction.

The Pennsylvania-Central Air Lines of Pittsburgh recently created a new record for air-mail bids when it contracted to carry mail between Washington and Buffalo at a rate of 8/100,000 of a cent per mile. At this rate the line would be getting a return of about 1 cent a month, but would, of course, obtain certain concessions. It is believed the line hopes to tie up with a Canadian line to continue the run through to Toronto. This indicates that for the first time in years, air transport appears to be a very profitable business.

The post-office department is so delighted with the success of the initial trips of the Pan-American-Imperial Airways efforts across the north Atlantic that Harlee Branch, second assistant postmaster general, is confident that overseas air mail will be on a paying basis within two years.

The U. S. Government, according to Secretary Roper of the bureau of *(Turn to page 62)*

30 Years Ago

The St. Louis Aero Club announced plans for the Lahm Cup race as a feature of the First American Air Meet. Great Britain's first army balloon, a semi-rigid named *Nulli Secundus*, built by Colonel Capper and S. F. Cody, an American, was destroyed in a rainstorm. The French army airship *La Patrie*, while on maneuvers near Verdun, was caught in a storm and swept across France, England and Ireland and disappeared over the Atlantic. No trace of it was ever found.

Henri Farman, the great French aeronaut, was tuning his pioneer biplane for a world's record flight of 770 meters at a speed greater than fifty miles an hour. Robert Esnault-Pelterie astonished the aeronautical world with his R. E. P. monoplane which had no outside bracing wires.

Scientific American announced the first air trophy to be offered at the Jamestown Exposition. Two machines were entered but neither was able to get off the ground.

Alexander Graham Bell was flying his "tetrahedral kite" over Bras D'Or Lake in Nova Scotia. Thomas E. Selfridge of the United States army was a passenger aboard this kite for a period of seven minutes. They hoped to fly it with a light motor.

A criterion of development, these time-tables reveal the supremacy of commercial air lines in high-speed, reliable and comfortable travel.

A Plane Every Hour!

A Dozen Transcontinental Round Trips Every Day!

Pullman Cars That Fly!

That is only a little of the great commercial passenger service in America now.

A Discussion of the Heavy Transport

by Captain Samuel Taylor Moore, U.S.A.R.

THE GREAT AIRWAYS

THE silence brooding over the myriad red and white lights of a New York airport for six dark hours is broken with the dawn.

Over the New Jersey marshes from south, west, and north the drone of faithful motors in the heavens is renewed, echoing ever so faintly against the towers of Manhattan, bathed in the rising sun twelve miles to the east.

It was 1 a. m. exactly when the *Owl* taxied downwind and, turning to head into the wind, roared along the floodlighted runway and into the air, heading west—the final schedule of a busy day. Right now those passengers on the *Owl*, refreshed by slumber, are sipping orange juice and coffee as the giant Douglas speeds above the sand dunes of Lake Michigan and the skyscrapers of Chicago's Loop beckon from early morning shadows ahead.

Here on the shores of Newark Bay the traffic control tower looking down on the spread of the world's busiest airport becomes active again. Two sky cops become intent on their tasks once more. A day of great, but only usual, activity lies ahead for them and for their successors in six-hour watches. Speaking mechanically, almost with boredom into the two-way microphones, the traffic cop of the moment directs the pilots of the approaching planes in precedence of landings. One by one the big planes head down from rose-tinted skies with motors idling, flaps extended, wheels coming down from their retracted positions. Gently they land three-points perfect, then, turning, waddle toward as many different canopies, each standing before its own passenger station. Newark has yet to use its beautiful new central air station.

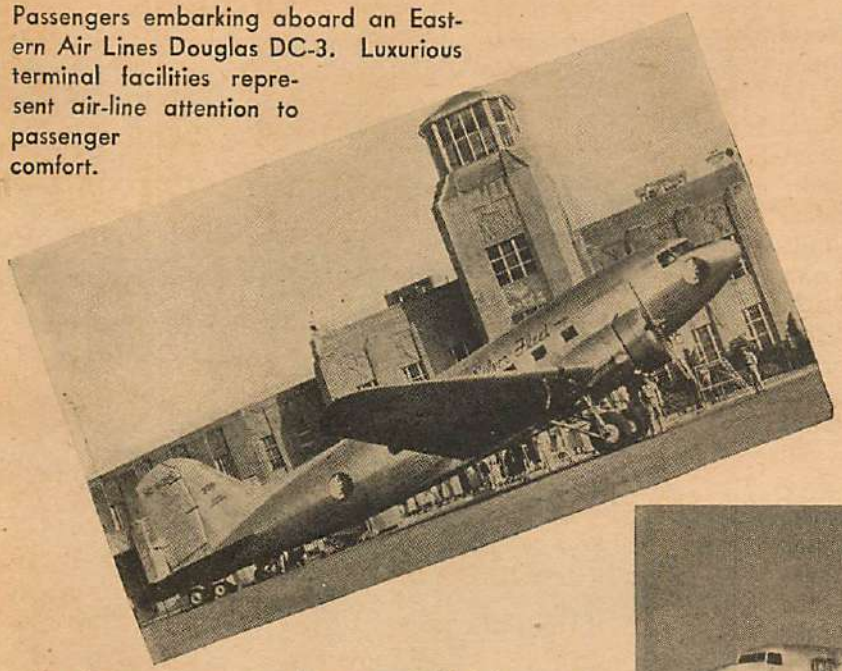
Let's look at the passengers debarking, as porters unload their luggage from a nose compartment and carry it to waiting cars.

Deep tans, bespeaking life in the semitropics, mark most passengers piling from one plane—happy returning vacationists and citrus growers from Florida. The moon was bathing the coconut palms when these boarded their plane in Miami at nine o'clock last night.

Among the passengers from another ship the men may be marked by the distinctive sombrero headgear of the cattle country, or the soft drawl of speech proclaiming their native N' Orleans. Both groups had dined with their families at home dinner tables last night before driving out to the airports.

From yet another luxury airliner may be singled out a radiant orchid-encumbered creature, while the cameras of news photographers click furiously, accompanied by flashing bulbs suggesting heat lightning in summer. It was less than sixteen hours ago that this delight to the eyes of a million movie fans waved a graceful farewell to her California admirers in the purlieus of Hollywood.

Those rather severe, unsmiling folk debarking from a fourth ship shout New England by their very decorous calm. Early rising, it was only ninety minutes ago that they looked down upon the lighted golden dome of the State house where hangs the Sacred Cod of Massachusetts.



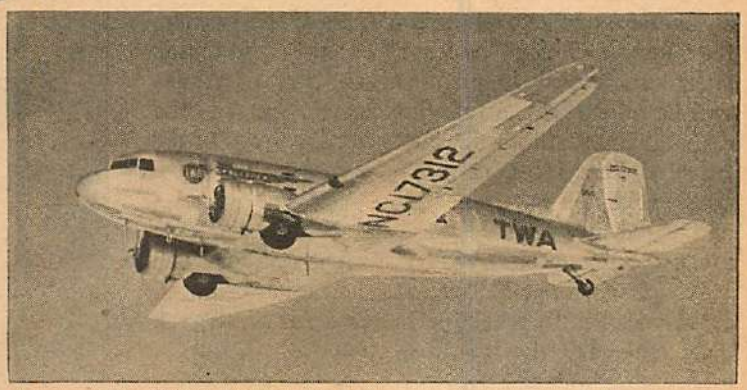
Passengers embarking aboard an Eastern Air Lines Douglas DC-3. Luxurious terminal facilities represent air-line attention to passenger comfort.

So far as dress, speech, or parochial interests may mark the people of any section of great America no part of the nation will fail to be represented to-day through the gates of Newark's air stations.

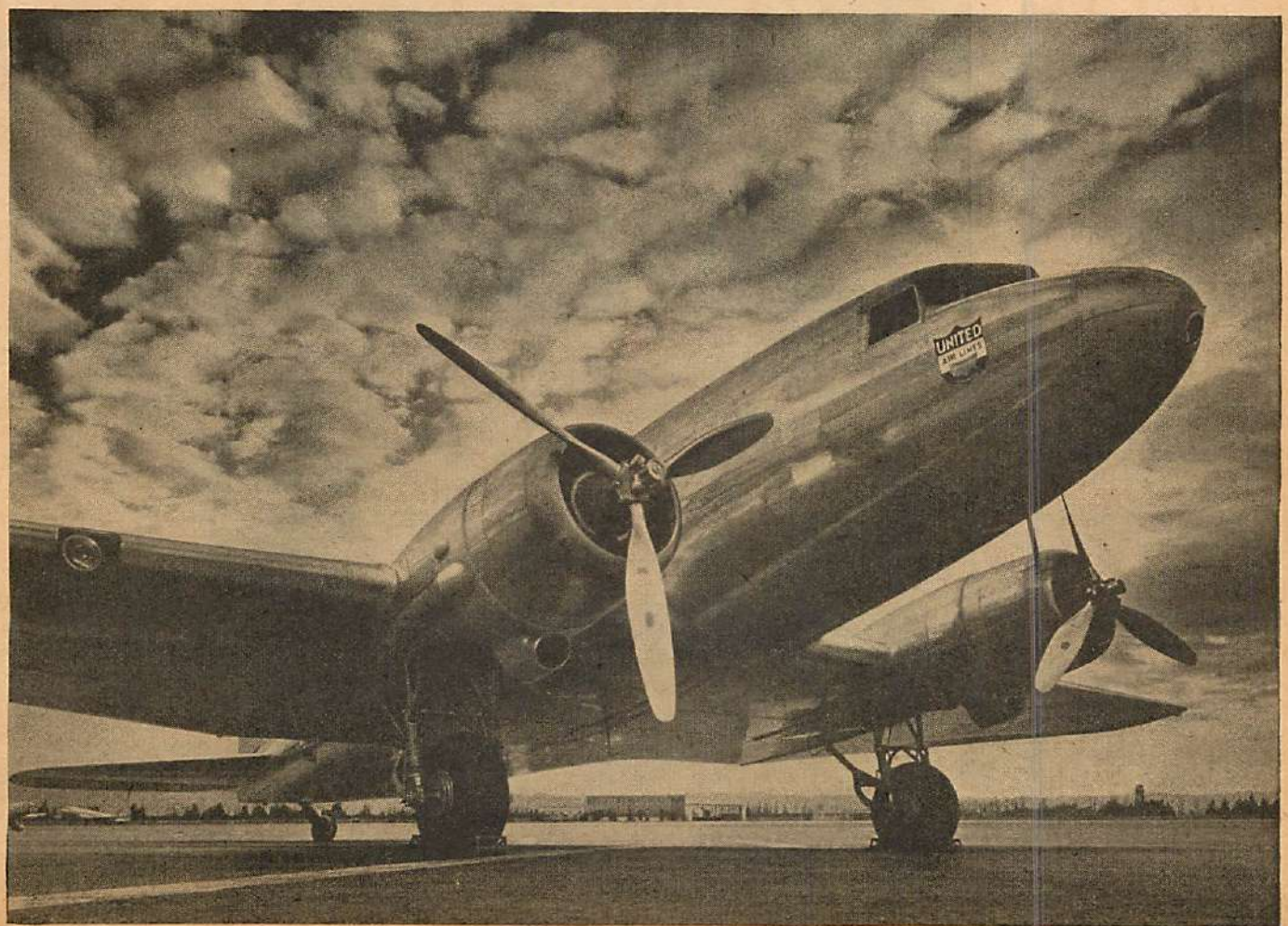
Most arrivals pile into luxurious busses, to be whisked along the Pulaski express highway, under the Hudson via Holland Tunnel, and on to as many missions as there are individuals, in the metropolis.

As those busses depart, others arrive with new air travelers. Checking tickets quickly in station waiting rooms, into waiting planes the departees parade, greeted at the door by smiling stewardess or steward, as the case may be. Motors, warmed in advance, roar into life as the door closes on the final passenger. The dispatcher waves his signal for departure. Into the wind the plane taxis. The sky cop says "go," holding off an arriving plane for safety. Then into the air, wheels disappearing into the wings.

Some go north. Exactly two hours from the time of departure the passengers



Above: The TWA SKYSLEEPER, operates eastward from Los Angeles to New York in 15 hours 10 minutes; westward in 17 hours.
Below: The 12-ton Douglas of United Air Lines.



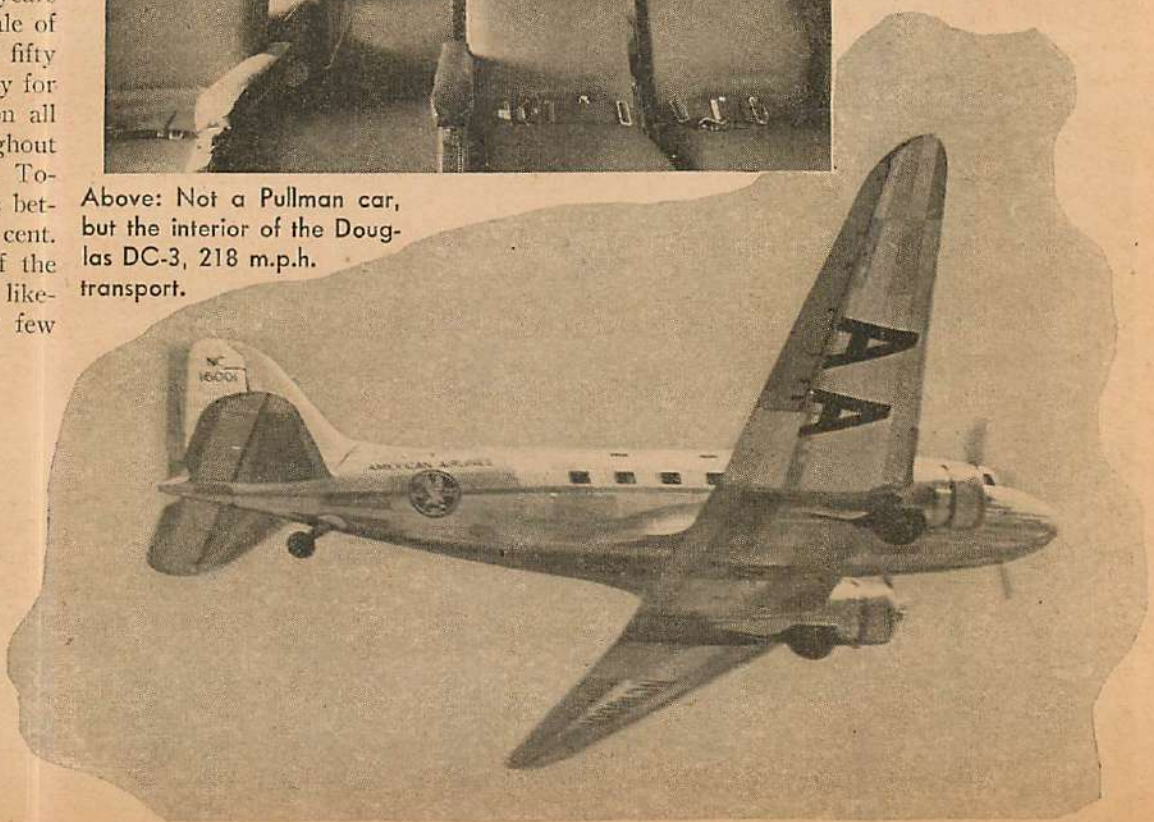
may look down upon the quaint cobbled streets and French atmosphere of Montreal, on the banks of the St. Lawrence. Morning departees for the West will lunch with friends in Chicago, or California-bound, enjoy a late supper at the famous Tait's in San Francisco. Other morning travelers may sip a Ramos Gin Fizz in New Orleans late that same afternoon. Those heading for Florida —eight short hours distant—may catch their own pompano for supper that night, off Palm Beach.

All through the day and far into the night this great activity in air transport continues, marked by impressive safety and high punctuality of schedule. Before the next *Owl* departs a total of at least one hundred and twenty airplanes will have landed and taken off from Newark Airport—an average of five an hour for each of the twenty-four hours. I say "at least" because before this story can appear in print several new schedules will be added to the time-tables. So great is the demand for seats by the fast-growing army of air travelers that frequently it is necessary to run a single schedule in two sections—i.e., two planes—and three and four sections of a single schedule are not uncommon. Last year five of every one hundred schedules throughout the nation required extra sections to meet the demand for air travel.

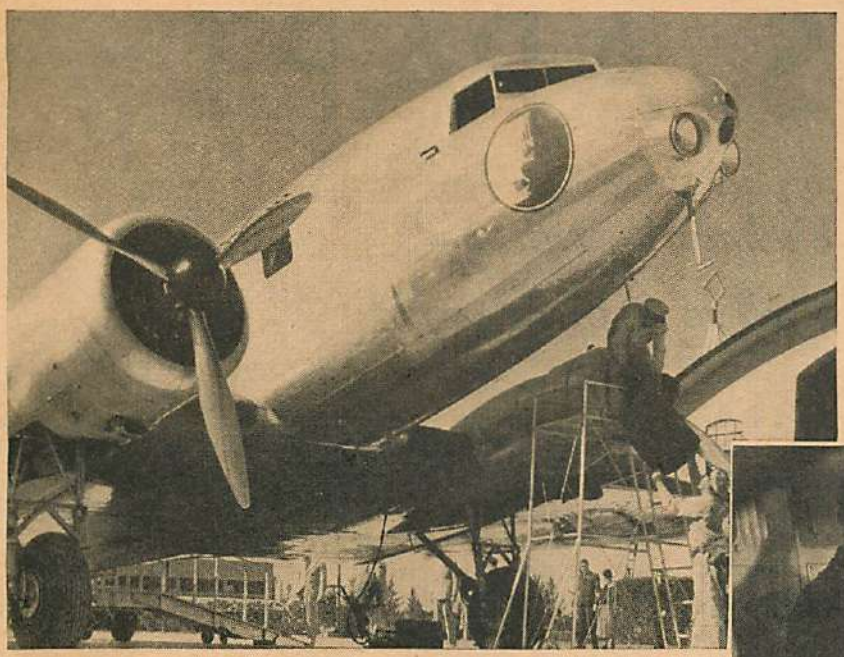
Moreover, the increasing popularity of travel by air is attested to by the rapid growth of average loads. There are certain schedules where seats must be reserved days in advance. Other schedules, for various reasons, are less in demand. Two years ago the average sale of seats was roughly fifty per cent of capacity for all planes flying on all schedules throughout the United States. Today the average is better than eighty per cent. And the length of the average journey likewise extends. A few

Above: The huge Sikorsky Clipper of Pan American Airways dissipates the distances of international travel into a matter of hours.

Above: Not a Pullman car, but the interior of the Douglas DC-3, 218 m.p.h. transport.



The American Airlines transport in flight is typical of the equipment to be found on all the major air lines.



Above: The interior of the DC-3.
Left: Loading mail aboard a Douglas.

The small, efficient galley of the United Air Lines Mainliner permits quick preparation of meals.

Meals served aboard the TWA SKYSLEEPER reflect the complete service tendered to their patrons.

The spacious interior of the Pan American Clippers is characteristic of the great planes in their service.

years ago it was three hundred miles. To-day the average is close to five hundred miles.

Yet another mark of progress is in the frequency of schedules. You may fly to Washington "on the hour—every hour," or take your pick of a score of schedules to Chicago, several of them nonstop in less than five hours. Three-stop schedules from coast to coast are available among a dozen transcontinental schedules. Some of the transcontinental routes are as direct as the proverbial crow is supposed to fly, to San Francisco or Los Angeles. Others lie through the southwest, Memphis, Dallas, Phoenix. If your destination is Seattle or Portland, you may have a choice of two routes, northwest from Salt Lake City, or a line swinging northward from Chicago through Minnesota, North Dakota, Montana, Idaho. With comparative frequency of schedule you may fly through the Middle West in all directions. Truly the air map of scheduled airlines operations to-day in the United States is best compared to a spider's web.

The berths aboard the American Airlines sleepers are the ultimate in practical transportation.

You will find quiet, enabling conversation with your seat mate in normal tones, and restful relaxation on all ships—heat for the cold, thin air of higher altitudes, individual control of ventilation at every traveler's elbow, leg room and seat comfort, suggesting your favorite overstuffed chair at home. All the new magazines are at hand, card tables, writing materials, should you weary of the changing panorama unrolling beneath you.

On every schedule flying through usual meal hours—breakfast, luncheon, or dinner—you will be served meals comparable to the menus of smart restaurants, food in quality to meet the exacting demands of the *gourmet*, in *(Turn to page 84)*

SKIES APART

He lived for his schedule—piloting was his habit—until——

by Pierre Gendron

THE great silver airliner squatted, nose high, in the floodlights of the control tower. Beyond it was blackness and above it a dark, low haze, so low it seemed to rest on the wide-spread wing tips. Into it the airport beacon wound its white and red rays ineffectually.

Jay Frazee, in the dark-blue, gold-trimmed uniform of a transport pilot, paced back and forth under the great wing impatiently. He was tall and dark and angry. Flight 18 out of Los Angeles might be late taking off to-night, late for the first time since he had flown it. And that would not be because of weather. The weather was bad for flying, but weather meant nothing to Jay Frazee. Schedule did. The delay would be because of Felix Wendt, vice president of Universal Air Lines, in charge of Western Operations. Felix Wendt was flying to St. Louis to-night on Flight 18 and had ordered departure held until he was ready.

Jay looked at his watch. One minute to ten. He scowled. One more minute and his record would be no more.

"Shorty" Wentworth, Jay's co-pilot, came out of the control office carrying a small board with papers clamped to it.

"What's the word, Shorty?" Jay asked irritably, taking the board from him.

Shorty shrugged. "Wendt is still in the drafting room with Beresford. Beresford looks mad as hell, but he's finishing a mechanical drawing, and Wendt is driving him. Guess it's the drawing we're waiting for."

Jay grunted, resumed his pacing. There were only three passengers aboard, two men and a woman, but that didn't matter. Cancellations were to be expected in this weather. All the same, planes, like trains, ought to leave on the dot.

Shorty stood watching Jay, as a boy would watch his hero, disturbed for him. He knew Jay was proud of his record, jealous about it. Shorty saw a slim, feminine figure striding toward them in the floodlight. He knew that figure, that determined chin and those clear, deep-blue eyes. He knew how brittle Catherine Mason's eyes could be upon occasion. He glanced at Jay with awkward discretion and said, "Guess I'll step aboard, skipper, and look the works over."

Jay did not see her until she faced him, half illumined by the floodlight. He stopped suddenly and his jaw set and his gray eyes upon her hardened.

"Jay——" Her voice carried a plea, but her face had set determination in it.

He said, grimly, "Hello, Kay."

"Jay, I'm going to ask a favor of you. It's not a great thing, really, but I suppose you'll think it is."

"Shoot," he said.

"Don't take up Flight 18 to-night."

His eyes did not change. "Why not, ex-air hostess?"

She winced, but she went on stubbornly: "Maybe it's just a—hunch, but—please don't fly it. Besides, nothing is flying west of the Mississippi—visibility zero, ceiling zero, this side. Nobody would think less of you for remaining grounded. Nobody else will fly it, if you don't."

His eyes narrowed. "Flight 18 hasn't missed going through yet."

"That record won't last forever."

He shook his head pityingly. "Never did get over that crash of yours, did you?"

Her eyes blazed. "You still think that wreck broke my nerve, don't you?"

He shrugged. "Air nerves are funny. Sometimes they go for no reason. Sometimes they don't come back. Sometimes, as in your case, there's plenty reason. Nobody blames you for quitting. You did your share. You're on velvet."

"I didn't ask for that publicity," she flared. "That heroine stuff made me sick. I was groggy after we hit the hillside. I hardly knew what I was doing or I might have pulled out more than those three."

"'Velvet,'" he explained patiently, "is an old air term meaning that by all the rules you should have been washed out and weren't."

"You're on velvet, too, then," she snapped. "On plenty."

He grinned. "I don't fly by rules."

"I don't know what you fly by, but whatever it is, its charm won't hold good permanently."

"So, we're going to have *that* argument again." In his voice was boredom. He took out a cigarette and lighted it.

"No," she said decisively. "It wouldn't do any good. You're too—pig-headed. But I'm not asking you to give up your flying career. I'm only asking you not to take up Flight 18 just this one night."

"Because of a jittery hunch," he said with disgust.

She looked at him levelly. "I had a hunch before, you know—the night of the crash."

Again his head moved from side to side sadly. "That crack-up sure did a lot of screwy things to you, Kay. You've never been the same since."

"Still my crack-up!" she exploded. "Whether you believe it or not, Jay, it wasn't merely that that started me thinking. It may have been part of it—a big part." Her tone dropped. "It wasn't a pretty experience. But I realized after that I wasn't getting any place. I'd gone as far as I could go in what I was doing. I was senior hostess for Atlas Air Lines and the most I could hope

Jay remembered where the shorter man had stood—he leaped for him——

for as a future was—to go on being that. It wasn't worth it." The challenge came back into her eyes. "But you wouldn't understand that. You like your job. You enjoy being a transport pilot——"

"Air taxi driver, you've called it," he reminded her.

"It's scarcely better," she said. "What if you are the tops in pilots? What if you do fly the flagship of your line? Where can you go from there?"

He flipped his cigarette ash carelessly. "There'll be the transatlantic service soon. Universal is working on a ship now—a honey! I'll get that. And if the government wakes up, there'll be plenty of places to go."

"Still as a pilot," she said.

"Why not?"

She went on as if he had not spoken. "—and at a pilot's salary when you could be designing ships, doing really big things, making a lasting name for yourself, and being of some lasting service to aviation."

"You grounded one flier with that sour chatter of *yours*," he said evenly. "That ought to be enough for you."

"Meaning—Don Beresford?" she said, an odd light coming into her eyes.

Jay didn't like that look, didn't understand it. It seemed to give her an advantage. "Who else?" he growled.

"Don Beresford's going to get somewhere in this man's game," she said with conviction. "He's going to design planes that will make history. You could do that, too, with your engineering background. You could go a lot further than Don Beresford. Only—you won't. You'll go on flying stubbornly, and one day you'll go down with your ship, heroically, and that will be the end of you."

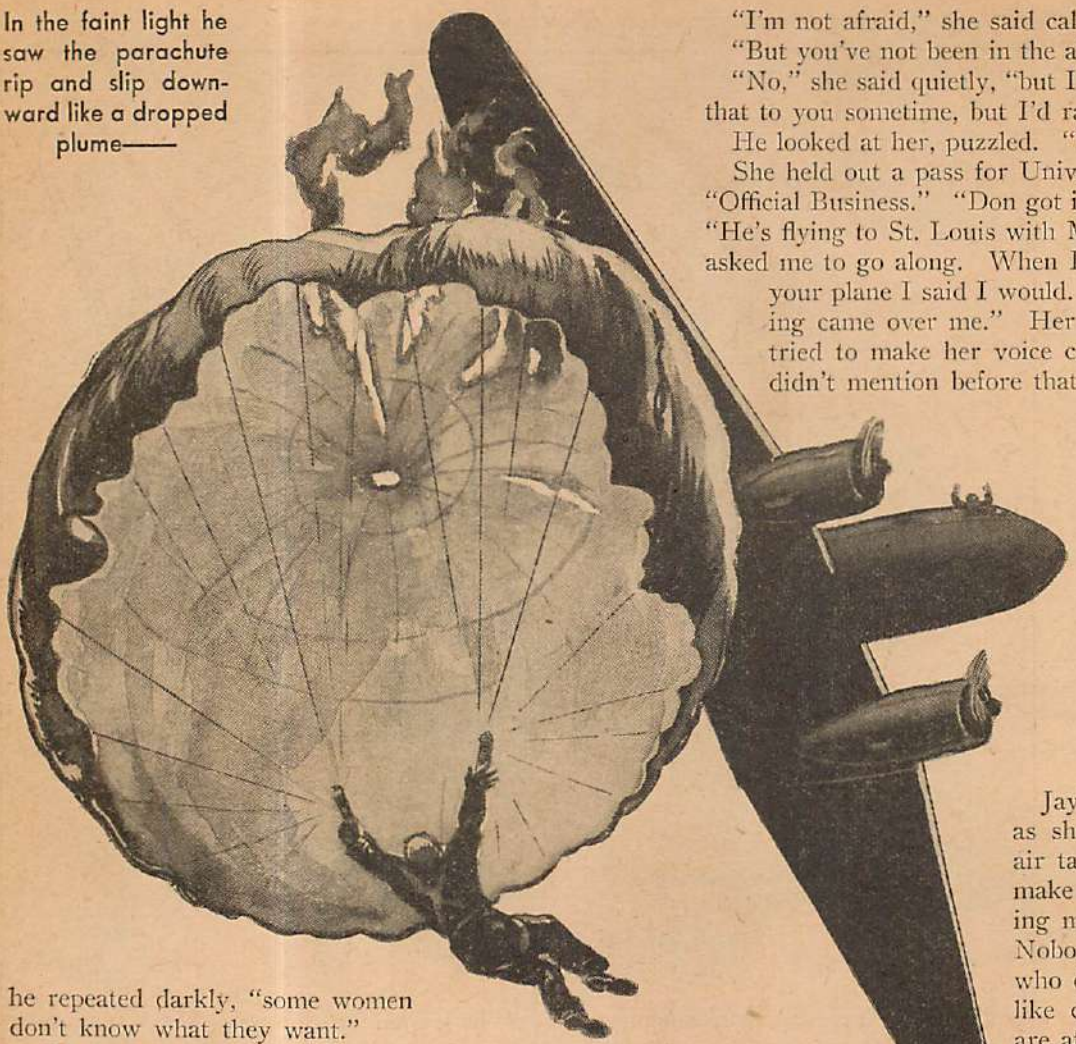
"Well——" He shrugged. "I don't see how it can make any difference to you. You've made your choice."

"Don Beresford, you mean?" she said provokingly. "At least Don Beresford is a man a woman wouldn't worry her heart out about."

"Some women," he said sharply, "don't know what they want." He was thinking of a trim, fair-haired girl in a blue dress who came into the flying office one day begging for a job as air hostess. Her blue eyes had been like bits of heaven, fired with eagerness. The cloud of disappointment that shrouded them when she was told Universal didn't use air hostesses had done something to Jay. He talked to her. Her one ambition was to fly, she told him—fly anywhere, any way, anyhow—but fly!

He had taken her to dinner that night. He learned between her eager questions about flying that her parents had been circus people, aerial performers. They hadn't wanted their only daughter to live their lives, had sent her to a convent. There she finally studied nursing, and there she remained until the week before, when her father had been killed by falling down a flight of stairs in a hotel. Her mother had retired professionally.

Jay took her to dinner again the next night, and the next. And then he told her about the job with Atlas Air Lines. Her joy had been something to witness. She had thrown her arms around him, kissed him. And he had realized it was all up with him, as a bachelor. "No,"



In the faint light he saw the parachute rip and slip downward like a dropped plume——

he repeated darkly, "some women don't know what they want."

"Perhaps you could tell them."

He suspected she meant it sarcastically. "Perhaps," he said harshly, "a nice, safe husband—a draftsman, maybe, a chap who works at a high table with pencils and paper and a T-square. And while he's thinking about what he wants to be doing, he's drawing pencil lines to scale that will execute some utterly stupid idea he knows damned well won't do the work. I know the kind. I was one once."

"Some engineers achieve great things," she said.

"Of course," he admitted. "But the vast majority don't. At least, they don't get the credit. Their ideas are stolen from them for a weekly wage, and they grow bitter and mean, or else they succeed, and grow fat and dull, and like to talk about what they did. Thanks," he said abruptly. "I'll stick to my flying."

She was smiling wanly. "Exaggerated as your picture is, it might be better than being married to a transport pilot who was always flying away from you in the night, who was more interested in the looks of his ship than in what you wore, and of whom the most you had really was a voice—on the radio—reporting his position, with maybe a little personal inflection in it for you when he said, 'O. K.!' But nothing more. And the times he didn't report——" Her eyes closed painfully. "It would be too much, Jay." Her voice had become a whisper.

"That's your crash again."

"Perhaps," she said. "You see, there would always be that—picture." She shuddered.

"Because you didn't go up again right after—before you had time to get—afraid."

"I'm not afraid," she said calmly, "not for myself."

"But you've not been in the air since," he argued.

"No," she said quietly, "but I'm not afraid. I'll prove that to you sometime, but I'd rather it wasn't to-night."

He looked at her, puzzled. "What do you mean?"

She held out a pass for Universal Air Lines marked: "Official Business." "Don got it for me," she explained. "He's flying to St. Louis with Mr. Wendt to-night. He asked me to go along. When I found they were taking your plane I said I would. Then to-night this feeling came over me." Her hands clenched and she tried to make her voice carry on normally. "I—didn't mention before that I was booked with you because I knew you'd think it was my crash influencing me. It isn't, Jay." Her eyes opened on him earnestly. "It's something else—something that warns me of tragedy. I even had it the night my father died. It's always—worked out." She had gone very white, very rigid.

Jay's face had grown harder as she talked. "I'm only an air taxi driver." He tried to make it hurt her. "I'm driving my taxi through to-night. Nobody has to ride with me who doesn't want to. I don't like carrying passengers who are afraid.'

Her eyes blazed, her chin went up; then she stepped aboard the airliner.

He stood staring at nothing, his jaw set.

In the floodlight two figures moved toward him. Jay threw off his thoughts. The squat, strutting figure was Felix Wendt. The other, tall and loose, was Beresford. Felix Wendt saluted Jay as a landsman salutes his yacht captain.

"Everything O. K., skipper?"

"O. K.," Jay said dryly. He returned the salute with a touch of irony. "But we're sixteen and a half minutes late."

"You'll make that up," said Wendt carelessly. He went aboard.

Beresford nodded to Jay. There was something close and something distant in the nod. Jay returned it, at par.

Jay boarded after them and slammed the door tightly.

Beresford sat opposite Felix Wendt. Kay was behind Beresford. The three passengers forward, the two men and one woman, were having some private argument. She was middle-aged and plump and fidgety. She was in mourning. The men were older. All three bore a strong family resemblance.

Jay went forward into the pilots' compartment and Shorty started the motors. Jay put on his ear phones and fastened his safety belt. In his ear, from the control tower, Frank was saying, "The air is yours, Jay—and the fog," he added emphatically.

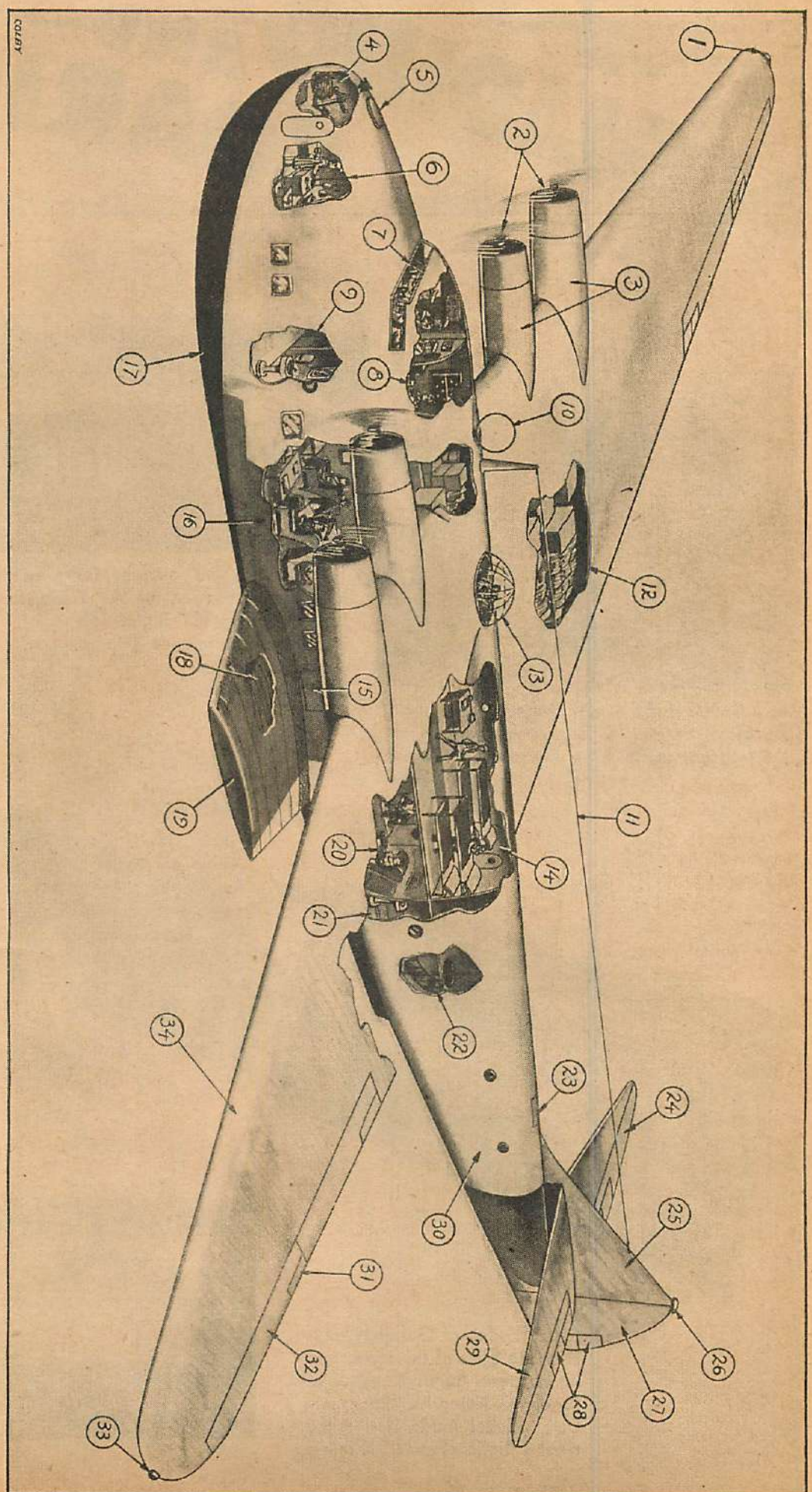
Jay took the controls. As his hand reached the throttles, Frank's voice in his ear stopped *(Turn to page 81)*

THE FLIER'S DICTIONARY

The twenty-fifth lesson in the technical terminology of the air. Save your files!

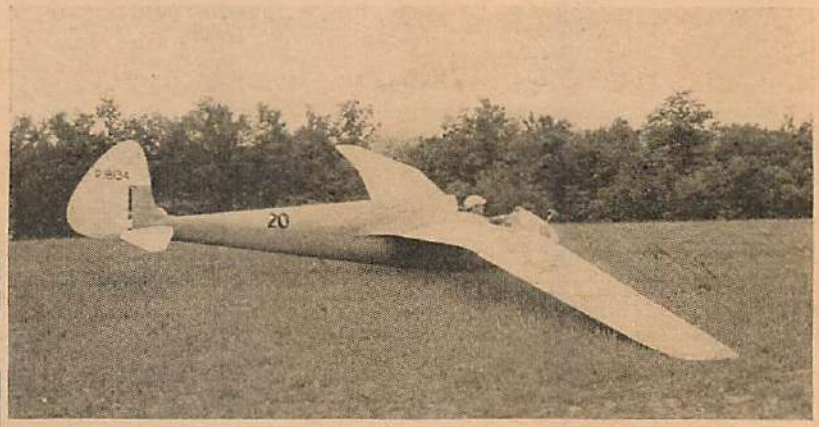
BOEING CLIPPER

1 Starboard navigation light (green)
2 1500 H.P. double-row air-cooled engines
3 Motor nacelles
4 Bow compartment for mooring equipment
5 Forward bow hatch
6 Galley
7 Flight officer's bridge
8 Radio room
9 Forward lavatory
10 Radio compass antenna
11 Radio antenna
12 Mail-and-express compartment in wing
13 Observation turret on top of fuselage
14 Crew's living and sleeping quarters
15 Main passenger door
16 Main passenger saloon and dining room
17 Water-tight compartments in hull
18 Gas tanks in sponson
19 Hydrostabilizers or sponsons
20 Private compartment
21 Aft lavatories
22 Circular stairway to upper or crew deck
23 Aft hatch
24 Elevator
25 Vertical fin
26 White aft navigation light
27 Rudder
28 Balancing areas (rudder and elevator)
29 Stabilizers
30 Aft baggage compartment
31 Aileron balance
32 Aileron
33 Port navigation light (red)
34 Wing or airfoil

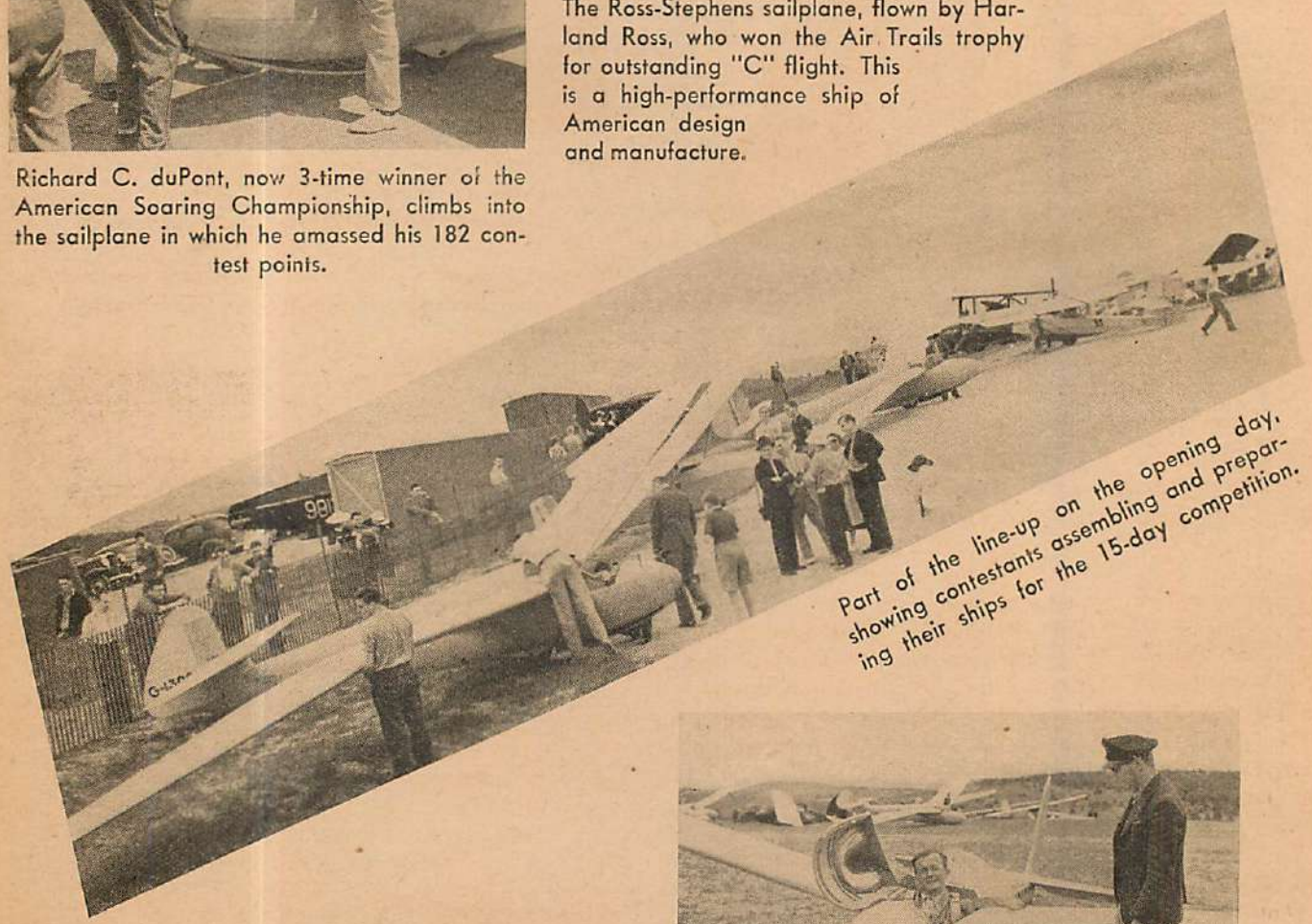


GLIDING AND SOARING

Richard C. duPont, now 3-time winner of the American Soaring Championship, climbs into the sailplane in which he amassed his 182 contest points.



The Ross-Stephens sailplane, flown by Harland Ross, who won the Air Trails trophy for outstanding "C" flight. This is a high-performance ship of American design and manufacture.



Part of the line-up on the opening day, showing contestants assembling and preparing their ships for the 15-day competition.

Peter Riedel, of Germany, outstanding pilot of the meet, and his assistant, August Kaenber, of Brooklyn. Flying his "Rhonsperber," Riedel made during the meet 3 flights of over 100 miles.

Part of the crowd that thronged the field during the meet, making the contest the most successful yet held.

Left: The Air Trails Trophy, awarded for the outstanding flight made in qualifying for the "C" license. This trophy has been established as an annual award.

Above: Richard C. duPont congratulates Harland Ross after awarding to him the Air Trails trophy.

FIGURES AND COMMENTS

By Lewin B. Barringer, General Manager, The Soaring Society of America, Inc.

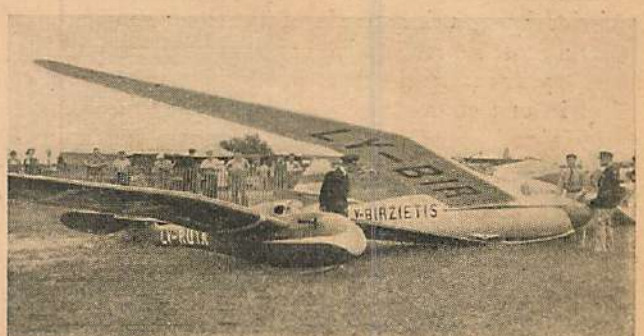
AS THE contest drew to a close the officials were confronted with a set of rather amazing statistics. Carefully going over these we are able to pick out some very significant facts which can be listed as follows:

During 2 weeks of weather so unfavorable that most secondary and utility types were unable to soar, a total of 2,224 miles of cross-country flying was made by intermediate and high-performance sailplanes. This total, which is nearly double that of last year, includes no less than 7 flights of over 100 miles distance. It definitely establishes the value of airplane-tow starts when no slope-wind soaring is possible, and also shows a great improvement in the technique of thermal soaring.

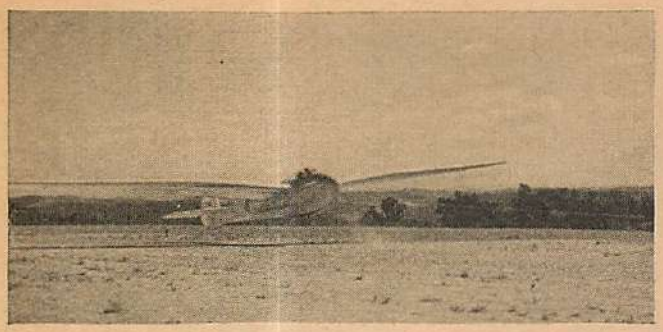
The 147 pilots flying 54 soaring craft entered in the contest made a total of 669 take-offs. This figure, which is also nearly double that of last year, can be attributed, to a large extent, to the successful operation of the 2 winches contributed by the M. I. T. Glider Club and E. Paul duPont, Jr. This method of launching has proven itself definitely superior, for a site such as Harris Hill, over either automobile-tow or shock-cord launching.

Three other total figures of interest are 68 altitude flights of 1,000 feet or better, 37 distance flights of more than 5 miles, and 115 duration flights of more than one hour. They show the impetus to real soaring effort given by the Points Award System.

Sailplanes and utilities of all descriptions, wheeling above the brow of Harris Hill, seek the altitude-giving thermal.



The Lithuanian pilots, Bronious Oskinis, left, and Jonas Pyragius right, with their high-performance sailplanes.



Emil Lehecka's "Rhonsperber" at the instant of take-off. Lehecka's 178 points tied him with Chester Decker for third place. The "Rhonsperber" is a world-famous German sailplane and has set many records.

Peter Riedel and Dr. Karl Lange inspect the Massachusetts Institute of Technology winch. The use of the guillotine which cuts the tow rope if necessary, is a safety factor.

The most outstanding performance of the entire contest, from a spectacular as well as scientific point of view, was that of Peter Riedel, the German pilot. Flying for the first time in this country, he covered a total of over 770 miles cross country, which included 3 flights of over 100 miles. His best flight was 133 miles to Tidioute, Pennsylvania, which won him the Bendix Trophy and cash award for best distance of the contest and the second A. Felix duPont Altitude Award for his height of 5,640 feet above the point of release. His total points for the contest were 196, which placed him well out in front. The American Soaring Championship can only be won by a citizen of the United States, so it was awarded for the third time to Richard C. duPont, President of the Soaring Society of America, who won first place in altitude with 5,980 feet and placed second with 182 points. Following closely were Chester Decker and Emil Lehecka tied in third place with 178 points, Harland Ross with 172, and the author with 171 points.

THE ELMIRA MEET

By Alexis Dawydoff

THE Eighth National Soaring Contest held in Elmira, N. Y., from June 26th to July 11th, may, in many respects, be considered the most successful of any so far conducted. Its sponsor, The Soaring Society of America, Inc., is to be congratulated both on results achieved and spirit shown. Although no national or international records were broken, the number of pilots and craft were far in excess of those represented at last year's contest—151 pilots as against 80, and 54 ships compared to 23. The amount of cross-country mileage flown was nearly double the 1936 crop. In the roster of this year's ships were 10 high-performance sailplanes, 4 intermediaries, and 4 two-place machines, the remainder being utility craft of the Franklin and Cadet type; a most representative contingent all around.

This year marks the first time foreign pilots have competed in one of our meets. Peter Riedel, of Germany, and Major Jonas Pyragius and Lieutenant Bronius Oskinis, president and vice president respectively of the Soaring Society of Lithuania, were welcome and stimulating guests.

The meet was conducted at Harris Hill, one of the half dozen sites available for soaring around Elmira. Thanks to the splendid work done by Chemung County and the W. P. A., Harris Hill has an excellent administration building, containing radio equipment and a meteorological laboratory, cabins for pilots and crews, and a large hangar. The take-off ground is roomy enough for good-sized airplanes to land on, and all during the contest many of them did just that. Pilots in everything from cabin Stinsons to Taylor Cubs came to witness the sport of powerless flying.

The meet officially opened at 2 p. m. on June 26th, with a dedication ceremony during which Major Pyragius, acting for the Lithuanian Aero Club, presented to the S. S. A. the busts of two Lithuanian transatlantic air heroes. A speech of acceptance was made by Earl Southee on the part of the contest board. Then all new pilots, or those with ships never before flown at Elmira, were requested to make their qualification flights at the American Airlines Airport. There Jay Buxton of the contest committee and Jack Sommers of Bureau of Air Commerce judged as to their right to take off from Harris Hill.

LOG BOOK

A log kept of the day-by-day flying activities might give an idea of how the meet progressed. Certainly it ought to show something of the unfavorable weather experienced!

June 27th: Overcast skies, occasional rain, poor soaring conditions. 13 pilots made practice hops. Peter Riedel, towed up by airplane to an altitude of 3,000 feet, stunted his Rhonsperber Sr. Due to the winch developed by Paul duPont and the one brought over by the M. I. T. group, take-offs were greatly facilitated. (Last year most of the take-offs were made from auto tow.) Gus Scheurer, originator of the winch, was in charge of launchings.

June 28th: Soaring conditions not improved, due to a low-pressure area in the vicinity and a polar front. Dick duPont took off at 2 p. m., but landed shortly after; Lew Barringer, Chet Decker, Emil Lehecka, Peter Riedel, Harland Ross, Ted Bellak, Bob Auburn, and others got in short flights.

June 29th: Weather still unsatisfactory. 67 pilots made flights to-day, but no distance. Dick duPont soared for 3 hours, Peter Riedel for 1½, and Emil Lehecka for 1 hour, 23 minutes. Harvey Stephens, Hollywood motion-picture actor, demonstrated his sleek American-built Ross-Stephens sailplane in a flight over the hill.

June 30th: Bob Auburn flew his radio-equipped "Sun Spot" glider and by means of a 3-way communication system regulated the speed of his winch tow and reported on his flight to Harris Hill. Lew Barringer and Bronius Oskinis took off from airplane tow, but soon landed, reporting unfavorable conditions. Major Py-

ragius stunted his Bro-V acrobatic glider and lost the cockpit cover while upside down. (The cover was later recovered from the woods by his crew.)

July 1st: Weather still bad. Some pilots took off for practice flights and "C" license qualifications. The meet was visited by A. Felix duPont and Lieutenant Commander Barnaby, ex-president of the S. S. A.

July 2nd: Richard duPont landed 28 miles from Canadian border, New Pulaski, N. Y. Air-line distance of 110 miles, unofficial altitude of 6,500 feet. Emil Lehecka came down at Truxton, a distance of 50 miles. Peter Riedel did 40 miles. Bob Auburn, 40 miles; Charles Tubbs in Schweizer all-metal Utility, 25 miles; Harland Ross in Ross-Stephens, 21 miles. Youston Sekella stayed up 2½ hours in the Elmira Association's Rhon Buzzard. Others making flights to-day were Jonas Pyragius, Chester Decker, Udo Fisher, Dan Sanborn, Fred Barnes, Dick Randolph, Dana Darling, Felix Charden.

July 3rd: Harland Ross, flying the Ross-Stephens ship, covered 84 miles from Elmira to Sunbury, Pa.; Chet Decker did 73 miles to Lock Haven; and Peter Riedel, 72 miles to Millville. Lew Barringer landed at Leolyn, N. Y., 45 miles from starting point, and Emil Lehecka chalked up 20 miles. Albert Rosse, of the Air-

A mishap, badly damaging 3 sailplanes at rest on the ground, marred the close of the meet. This picture is included to show that care is essential; carelessness inexcusable. No one was injured.

hoppers, gained his "C" license and Arthur Hoffman of the same club stayed up 3 hours in the club's Franklin. Other pilots aloft: Dana Darling, Henry Wightman, Fred Barnes, and Dick Randolph.

Weather improved.

July 4th: Peter Riedel flew a distance of 76 miles to Woolcott, N. Y., and Emil Lehecka 15 miles to Cayuta.

Conditions not so good.

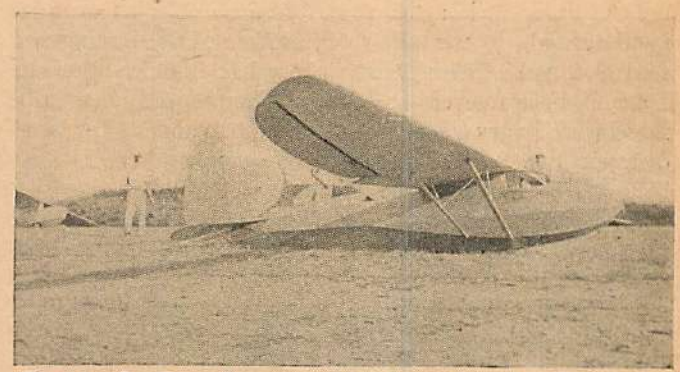
July 5th: Peter Riedel soared 113 miles to Sand Creek, N. Y., Emil Lehecka 109 miles to Richland. Chet Decker and Harland Ross covered 50 miles each. Art Schultz, in the A. B. C. sailplane, 12 miles.

July 6th: Peter Riedel broke this meet's distance record with a flight of 132 miles to Tidioute, Pa. He was aloft for 6 hours, 30 minutes. Chester Decker flew 51 miles; Lew Barringer, 25; Floyd Sweet, 12.

July 7th: Gliding activities at absolute standstill due to weather conditions.

July 8th: Harland Ross, flying the Ross-Stephens Sailplane, covered 121 miles to Milford, Pa., and qualified for his Silver "C" license. Peter Riedel made a flight of 117 miles; Emil Lehecka, 104; Lew Barringer, 94. 74 launchings were made to-day and 10 pilots tried out for their "C" licenses. Duration of these flights extended anywhere from ½ to 3 hours.

July 9th: Storm front moving in on Elmira. Pilots with high-performance sailplanes went up to explore the front for altitude and duration flights. Peter Riedel set out cross country but landed at Ulster, Pa., 28 miles away. Emil Lehecka achieved most notable flight of the day when he soared on the storm front for 48 miles to Wyaloosing, N. Y. Dick duPont rode the front for 13 miles. All reported the smoothest sailing of the contest. Earlier in the day Art Schultz piloted his A. B. C. sail-



The A. B. C. sailplane, ably flown by Art Schultz to acquire his Silver C. This plane won the first prize for the best American designed and built "Utility" this year.

plane to a distance of 50 miles and was the second pilot to acquire his Silver "C."

July 10th: Riedel made a flight of 66 miles; Lehecka, 25; Decker and Barringer, 10 miles each. DuPont attempted to establish an altitude record and soared for over 5 hours, but was unsuccessful. An exhibition of stunt flying was given by Charlie Tubbs in the A. B. C. sailplane.

July 11th: Poor soaring conditions prevented any distance flights. Decker, duPont, Lehecka, and Barringer went up, but soon returned. Stunt *(Turn to page 87)*

Ethan Allen Murphy, director of the weather bureau, and Alexander McKenzie checking readings of the instruments.

Lewin Barringer, general manager of the Soaring Society, supervises the assembly of his sailplane.

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: Which plane would you consider the better for a transoceanic flight, the Boeing 247 or the Lockheed Electra? H. W. W., Portland, Oregon.

Answer: Your question is pretty hard to answer. So many things have to be considered. For instance, which ocean are you referring to? There is a vast difference between the Pacific and the Atlantic, as far as distance is concerned. If we take stock models of the Boeing and Lockheed we will find that neither has sufficient tankage for a flight across either ocean. They would have to be fitted with larger tanks and suitable instruments for long-distance flying. On actual performance, there is very little to choose between them. The Electra used by Merrill was equipped for long-distance flying. The Boeing used by Roscoe Turner and myself in the London-to-Australia race a few years ago also required modifications for distance flying. We had to have it equipped with special tanks and instruments. Beyond this, one would have to figure on engines and their fuel consumption and any particular features one wished to make use of during the flight. It must be understood that neither the Boeing nor the Electra are actual transoceanic planes, but were built for conditions and demands of modern overland air-line work.

Question: What subjects should I take to become a test pilot? M. C., Dayton, Ohio.

Answer: To become a test pilot you should first get the finest type of training available. By this I mean service training in the army or navy. There you will get experience on many types of planes and the practical management of many types of engines. Most successful test pilots to-day are former military pilots. After that, one should get actual factory experience, watching the building of planes and engines. This experience is very important, for one should know what to expect when he is given a ship to test.

There is more to testing than most people realize. It is more than 9-G dives. A complete test takes several weeks of intense work, and a test pilot should be as much an engineer as he is a pilot. He must be in perfect physical condition, of course, to stand the strain, but not necessarily a dare-devil as many believe. A good test pilot knows whether the ship will stand the strain he intends to place on it. In short, a test pilot is a completely trained man, and every science subject you can cram into your high school and university course will come in handy if you hope to attain such a position.

Question: How can one get into the army or navy air service? Are candidates appointed, as they are to West Point or Annapolis? V. M. S., Stuttgart, Arkansas.

Answer: Candidates for the air corps are selected from lists of applicants. Any one may apply, but they must first pass a stiff physical and education test. To pass the latter requires the equivalent of two years of a college course. Candidates for the navy are selected from applicants who have graduated from Annapolis and others from civilian life. If you are appointed to West Point, and can pass the physical examination, you will stand a good chance of being transferred to the air service later on.

Question: Can you advise me where, near my present residence, I can get a course in aircraft sheet-metal work? F. P., Danbury, Connecticut.

Answer: I suggest that you communicate with the Luscombe Airplane Corp. of West Trenton, New Jersey, and get their prospectus on aircraft sheet-metal work. This firm has a particularly interesting arrangement for students. Then there is the Casey Jones School of Aeronautics, 534 Broad Street, Newark, New Jersey, which seems to be your closest technical school of that type. Most of the well-known schools are in the West or Mid-West.

Question: What is used in making smoke for smoke screens? Can any other color but white be made? K. F., Salt Lake City, Utah.

Answer: Smoke used in smoke screens is usually made up with white phosphorus as a base. The smoke used by sky writing concerns is usually made in much the same way, but with their own formula, which they all seem to keep a secret. There are several methods of releasing it, too—through mechanical blowers or through connections with the exhaust tubes. I have seen many colors used at air shows and displays, and I believe practically any color can be made.

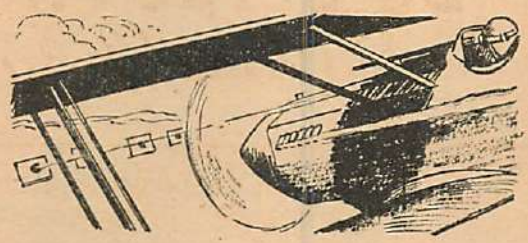
Question: Would it be possible for me to join the coast guard with tubercular glands that have healed and calcified? J. P., Middleboro, Massachusetts.

Answer: I would not care to make any statement on your condition, but would suggest that you first apply to a near-by navy recruiting station and get a proper examination by a service physician. They would tell you whether or not it would be wise to apply.

SPLIT-SECOND ACTION

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

DURING TARGET PRACTICE ONE "BUMPY" DAY AN ARMY PILOT DOVE HIS FALCON PLANE WITH ONE EYE CLOSED TO KEEP A BEAD ON THE BULLSEYE. THE PLANE, GOING FULL SPEED, CRASHED INTO THE GROUND. THE PLANE WAS SHATTERED BUT NEITHER THE PILOT NOR THE OBSERVER WERE SERIOUSLY HURT.



WHEN THE *LOS ANGELES*, ATTEMPTING A LANDING DURING A BLINDING SNOWSTORM, WAS SWEPT BY A VIOLENT, BROADSIDE GUST, THE GROUND CREW WAS ORDERED TO LET GO. THE SHIP HAD RISEN 500 FEET WHEN WORD REACHED THE CONTROL CAR THAT EIGHT MEN WERE HANGING BY THEIR HANDS FROM THE HANDRAIL. WINDOWS WERE QUICKLY OPENED AND THE MEN PULLED TO SAFETY. AMONG MANY ACTS OF HEROISM WAS THAT OF D. LIPKE A SEAMAN NEW TO THE CREW, WHO CLIMBED OUT ON THE HANDRAIL AND, HOLDING ON TO THE WINDOW FRAME WITH ONE HAND, HELPED TWO MEN TO SAFETY. HE WAS THE LAST INTO THE CAR AND DID NOT REALIZE HIS OWN PERILOUS POSITION UNTIL ALL WERE SAFE.

FLYING CADET F.H. McDUFF, PILOT OF AN OBSERVATION PLANE, WITH HIS SUPERIOR OFFICER IN THE FRONT COCKPIT AND A SERGEANT IN THE REAR GUNNER'S COCKPIT, WAS CLIMBING TO GO OVER THE SIERRA NEVADA MOUNTAINS WHEN THE LEFT MOTOR CAUGHT FIRE AND POURED FLAME OVER THE LEFT WING. THE PLANE BECAME UNMANEUVERABLE. McDUFF ORDERED THE SERGEANT TO CLIMB INTO HIS COCKPIT AND BAIL OUT AND THEN TOLD THE CAPTAIN TO DO LIKEWISE. BY THIS TIME THE SHIP HAD LOST SO MUCH ALTITUDE THAT WHEN McDUFF BAILED OUT HIS 'CHUTE OPENED A MERE 100 FEET FROM THE GROUND.

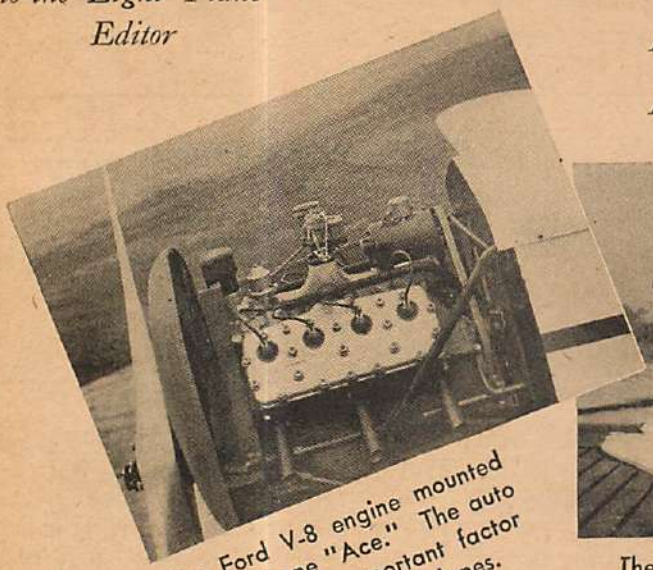
JON L. BLUMMER

AN AVIATOR, FLYING TWO PASSENGERS IN MAINE, WAS STARTLED TO DISCOVER A LARGE SNAKE CRAWLING ABOUT HIS LEGS. THE PASSENGERS HAD A VERY ROUGH RIDE UNTIL THE PILOT KICKED THE SNAKE AWAY. THE REPTILE BURIED ITS FANGS IN A WAD OF COTTON WASTE AND, AFTER SOME TRYING MOMENTS, THE AVIATOR GRASPED ITS TAIL AND THREW IT OVER THE SIDE.

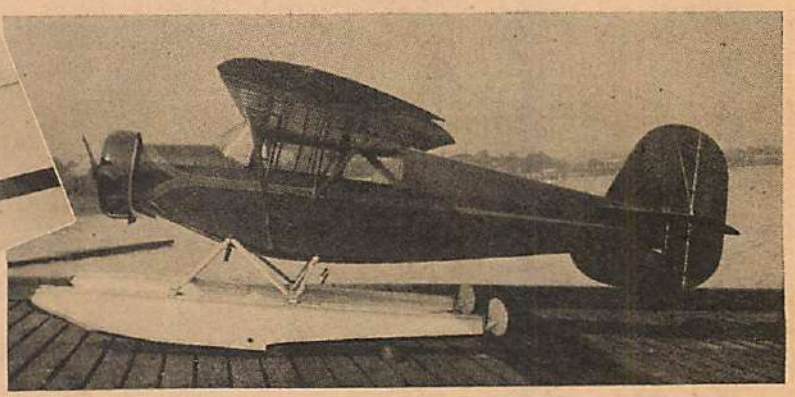
Send News Notes About Your Club to the Light Plane Editor

LIGHT PLANE

Follow this vital new department. Flying is within your reach.

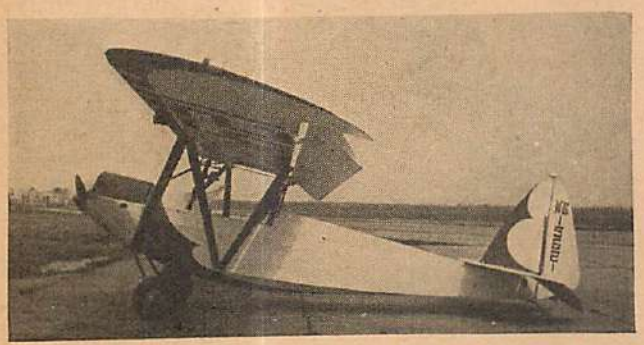


The Ford V-8 engine mounted in the Keane "Ace." The auto engine is an important factor in servicing light planes.



The float-equipped Rearwin 9000, fitted with the 90 h.p. Warner engine, is illustrative of the all-round possibilities of light-planing. The sea-going light plane is ideal for recreation or business, few spots being inaccessible to it.

The new and smaller Bird sport plane powered by the 85 h.p. LeBlond. Side-by-side seating is a feature.



The Heath Parasol appears in redesigned form; power by the 25 h.p. Heath or 40 h.p. Continental.

The Taylor "Cubs," now rolling from their new plant, are reaching an all-time high in popularity.

DOUBLE INTEREST

AT THE gliding and soaring meet held at Elmira, New York, in the early part of July, some twenty light planes flew over from Buffalo to witness the events. The mutual interest of the glider pilots revealed a close connection between these two sports. Some regarded the glider as a stepping stone to flying, while others put the two sports on an equal footing.

THE LIGHT PLANE CLUB

Before going ahead with the formation of a flying club, due consideration should be given to several important facts that are essential to the success of such an organization.

In the first place, it is very advisable that the prospective members get together and draw up some reasonable by-laws which will govern their activities. Only in this way will the club operate efficiently and harmoniously. It is important, for instance, that the members pay their dues promptly, as they are the very backbone of the organization.

As to the number of members in a club of this sort, there are two things to be considered. The makers of the Aeronca and the Taylor "Cub" are in favor of from seventeen to twenty members, thus reducing the individual costs. The Arrow Aircraft Corp., on the other hand, warn against having too many members, unless you have several planes, because too large a membership reduces the individual flying time, thus causing the club to become inactive from overweight.

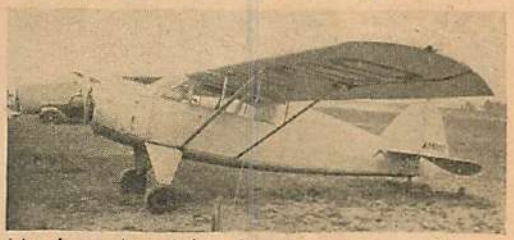
The responsibility of the members should be clearly understood from the start. For instance, if one of the group should damage the plane due to negligence on his own part or failure to comply with the department of commerce regulations, he should pay for all the damages incurred. If the accident should arise from the inexperience of the pilot, he should be required to pay only half

FLYING CLUBS

Conducted by Gerald H. Smith

The Pitcairn Roadable Autogiro is but one of the many projects in the designers' unceasing efforts to eliminate operating handicaps from light-plane flying.

The open model of the Porterfield "Zephyr" is another example of the complete and practical equipment now available to the private flier. Engine is the 40 h.p. Continental.



Newly ordered by the department of commerce is a light cabin plane similar to the one above. Designed and built by the Funk brothers, it is powered by an inverted Ford Model A engine of 60 h.p.

the damages. In any case, it would be wise to require all the members to pay the first twenty-five dollars. This covers all minor matters and removes any question as to who shall pay.

CHOOSING THE INSTRUCTOR AND PLANE

It is very important that a qualified instructor be carefully selected. In him will rest full charge of the flying and maintenance of the plane. It should be realized by all that his experience qualifies him to have reasonably complete control.

The selection of the plane itself is one of prime importance. The Annual Light Plane Survey in the July number of Air Trails should be of assistance to all. Also, it might be wise to have the instructor aid in the selection, if possible.

INITIAL AND OPERATING COSTS

The price of the plane is naturally governed by its size and the amount that the club members care to put into it. Light planes cost roughly from $1,200 to $3,000.

For example, say that it has been decided to buy a plane costing about $2,000, including transportation cost from the factory. The lump sum may be paid at once, or it may be paid on the installment plan, which is permitted by most companies. Divide the initial cost up among the members as an initiation fee. Then, if the installment plan is to be used, the installments can be paid by collecting monthly dues from the members.

The instructor, once he has been carefully chosen, should receive a salary of say fifteen dollars a week as a compensation for taking care of the plane. In addition to this, he should receive from two to three dollars an hour for instruction, i. e., dual flying, etc.

The total operating cost *per hour* for each member is arrived at in the following manner. The figures used are approximate and may vary slightly.

Depreciation on plane	$1.00
Hangar	.30
Gas and oil	.75
Maintenance	.25
Instructor	2.00
	$4.30

After the student begins to solo, the instructor's fee will be eliminated gradually, making the cost, roughly, two dollars and thirty cents an hour. To obtain an amateur license, which requires twenty-five hours of solo flying, the total cost should not exceed ninety dollars, depending on how much dual flying the student requires. This depends upon his natural flying ability. The article "Are You a Natural-born Flier," appearing in this issue, fully discusses this important phase of flying.

There are several ways in which the club can be placed on a paying basis and some expenses can be eliminated.

For instance, the instructor might be allowed to make commercial flights, such as for advertising purposes, taking up passengers, and in numerous other ways.

Nonmembers of the club might be allowed to take lessons, paying higher rates, say ten dollars an hour dual, and seven dollars an hour solo.

Competitions between neighboring clubs might be arranged, thus stimulating added interest.

The editor wishes to thank the Aeronautical Corp. of America and the Taylor Aircraft Co. for their many valuable suggestions on the formation of flying clubs. Several other manufacturers have assured us of their support, for which we are very grateful.

NEWS

The Funk brothers, designers of the Funk 2-place glider, have built a cabin monoplane powered by a 60 h.p. inverted Model A Ford engine, to *(Turn to page 91)*

Are YOU a

Official Photograph, U. S. Army Air Corps.

Above: Thousands of students are learning to fly this year in the Taylor "Cub."

Left: An army instructor clears up a flight student's problem.

BEFORE very long, judging from the way light airplane sales are jumping, thousands of these economical little flying machines will be humming through the skies of America. And the fact that you are reading Air Trails is a pretty good sign that you already have a plane or are among the vast number of people who expect to get one just as soon as possible.

But what about your flying aptitude? You have no doubt heard about that mysterious ability some people are supposed to have been born with. According to the talk around the fields, if nature gave you a good supply of it you are just one of nature's pets—and a "natural-born flier." If nature wasn't so generous with you, it's just too bad. And there's nothing you can do about it. So say the oracles of the hangar. Do not fifty per cent of the hand-picked, healthy young physical specimens chosen for training in the military schools "wash out" for lack of flying aptitude?

Just what, you may ask, are you, a person looking forward to owning an airplane, to make of all this? What is flying aptitude, anyway, and what if you happen not to have been born with it?

Well, according to the best authorities, nobody knows just exactly what flying aptitude is. It boils down to the statement that flying aptitude is the combination of all the qualities, physical, intellectual, and emotional, which enables a person to fly well. Experts have been trying for years to analyze these qualities and to devise laboratory tests that would show how much flying aptitude a person has.

It goes without saying, of course, that health, vision, sense of balance, and so on, must be good enough for the type of flying one expects to do. Tests for such physical qualities must be passed by all applicants for student permits and flying licenses. In addition, various complicated tests of a psychological nature, based on speed and accuracy of reaction to visual and auditory signals, are given to candidates for military-flying training.

It has been found that there are more good fliers among those making high reaction test grades than among those making low grades. But a good many with high grades make poor pilots and a good many with low grades make good pilots. This is due to the fact that such tests estimate only a few of the abilities which make up flying aptitude. The only adequate measure, at present, for flying aptitude is actual flight training, under the best possible conditions.

Flying is an art, like playing a musical instrument or driving a car. And flying aptitude can be compared to a talent for playing the violin. A person's hands may have all the fingers present and be the right size and as nimble as you please. The person may have enough sense of rhythm to beat a drum, and be able to prove in a test that he can tell a false note from a true one. But he may not have the makings of a great violinist. On the other hand, it is more than likely that he could learn to play a violin very well, in accordance with how hard he worked and how much thought he put into it.

But—a person with one finger missing on his left hand might possibly be a better violinist. That would be because he had other superior qualities which enabled him to compensate for his defect.

It's the same with flying aptitude. A person deficient in one quality may be able to overcome his deficiency

Natural-born FLIER?

By Lieut. W. M. Wood

Below: With the development of light planes, tourists are taking to the air. This couple is off for a week-end in an Aeronca.

Bottom: Robert Crawford, not a professional pilot, but a singer, arrives at Cincinnati, in his Rearwin, for a concert.

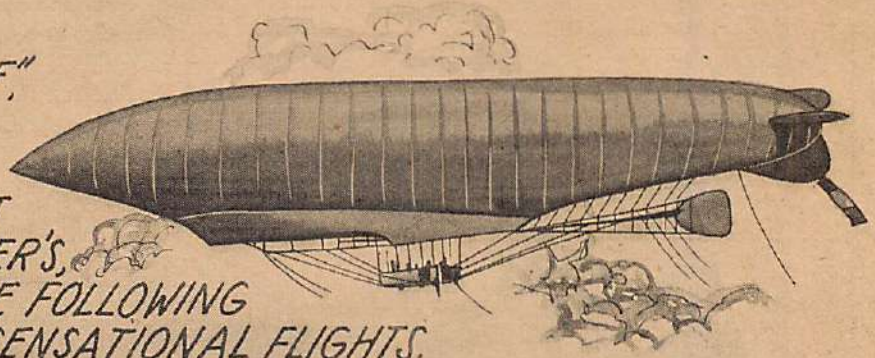
and make a better pilot than one who does not have any such conspicuous defect. It is recognized by doctors and students of psychology that the capacity of the human personality to compensate for deficiencies may be so great as to seem practically limitless.

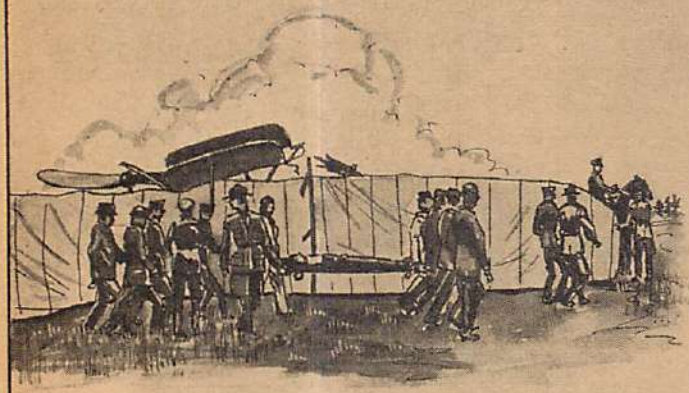
So, we will accept the fact that there is such a thing as flying aptitude and that about half of all military flying students in this country wash out of the flying schools on the ground that they lack a sufficient amount of it. Out of a large group of people some will naturally have more intelligence than others, some more musical talent, some more flying talent. But *your* flying aptitude is your own affair, and let's consider what all this means with respect to the possibility of your flying your own airplane.

First of all, you are not a natural-born flier. There are none. Nobody is born with special characteristics preserved and expanded by nature for use in flying. We are all products of our surface environment. Perhaps, in some dim future age, nature will have produced a race with special flying ability, evolved through centuries of experience in an environment of both earth and air. But at present you, with the rest of us, are a natural-born earthling, and you have to use your ordinary abilities in flying. *(Turn to page 79)*

Pictorial History of Man in the Air

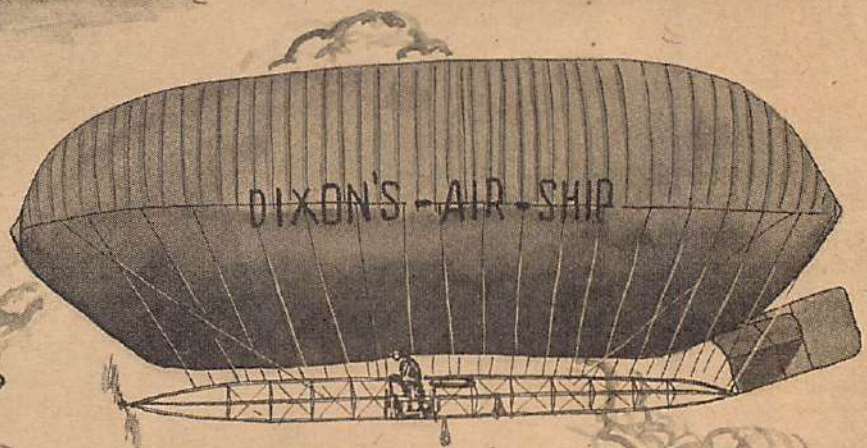
1908 THE "REPUBLIQUE," THIRD GOVERNMENT AIRSHIP OF FRANCE, IS LAUNCHED. A SHORT BRILLIANT LIFE IS HER'S, BEING WRECKED THE FOLLOWING YEAR, AFTER MANY SENSATIONAL FLIGHTS.

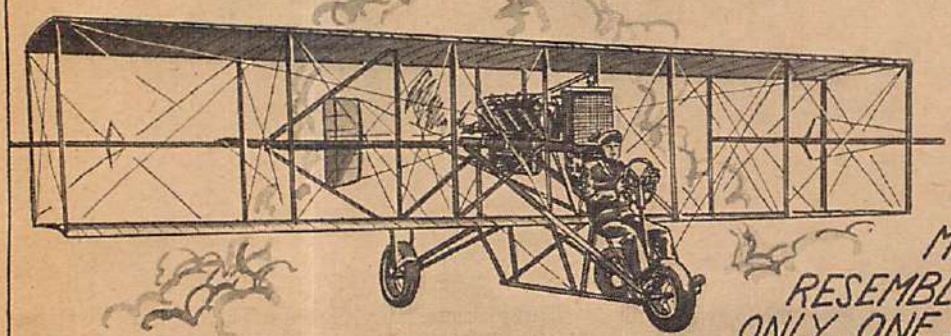




1908 LIEUT. T.E. SELFRIDGE IS KILLED AND ORVILLE WRIGHT BADLY INJURED IN THE WORLD'S FIRST AIRPLANE CRASH. THIS WAS AT FORT MEYERS ON SEPT. 17TH. SELFRIDGE DESIGNED THE "RED WING," CURTISS' FIRST AIRPLANE.

1909 CROMWELL DIXON, AMERICA'S YOUNGEST AIRSHIP PILOT, WITH ALREADY TWO YEARS IN THE AIR BEHIND HIM, IS A SENSATIONAL FLYER



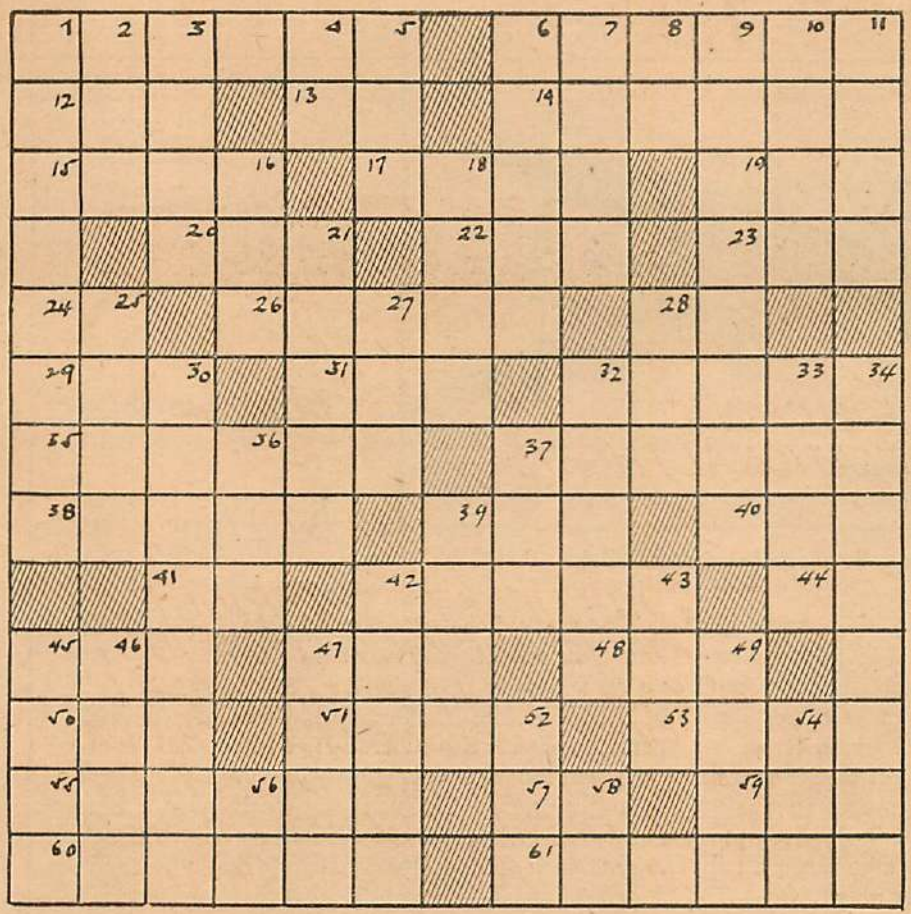


1909 C.F. WALSH BUILDS THE FIRST AIRPLANE ON THE PACIFIC COAST. THIS MACHINE, ALTHOUGH RESEMBLING A CURTISS, HAS ONLY ONE PUSHER PROPELLER

COLBY

CROSS WINDS

Can you answer the aeronautical definitions in this puzzle?



ACROSS

1—Revolving tendency in airplane caused by propeller rotation
6—Col. Lindbergh's new plane
12—Female sheep
13—Therefore
14—Polluted
15—Intermediate
17—Front end of airplane
19—Dirigible frame distortion in which center is lower than ends
20—Allow
22—Small inclosure for animals
23—Initials designating second additional message after body of a letter
24—Sixth note in musical scale
26—Type of powerful Armstrong Siddeley radial aero engine
28—Smallest U. S. State, abbreviated
29—Form of verb "to be"
31—Play on words
32—U. S. dirigible which crashed in Pacific
35—Most domesticated
37—First name of Bureau of Air Commerce director who recently resigned
38—Military foe
39—Colloquial name for airplane fuel
40—Seek legal redress
41—Thirteenth Greek letter
42—Quoted
44—South Dakota, abbreviated
45—Measure of length equal to 5½ yards
47—Dark viscous liquid
48—To be seated
50—First name of Arabian Nights hero who outwitted forty thieves
51—Competent
53—One of the Great Lakes
55—Instrument for writing
57—Accomplish
59—"— and outs"
60—Type of electric switch used on gas-model planes
61—Kind of Lockheed plane, in plural

DOWN

1—Pattern used in cutting structural shapes, as in plane models
2—Be in debt
3—Genuine
4—Personal pronoun
5—Period of time
6—One who hoards
7—Augury
8—Unit of power capacity of aero engine, abbreviated
9—Patronage
10—Envelop
11—Small casks
16—Mesh around balloon which supports basket
18—Unobstructed
21—Belgian all-wood single-seat light plane
25—Islands on west coast of Ireland
27—Material used for violin strings
28—Waste piece of cloth
30—Improving
32—Meditates
33—Burden
34—Unnecessary
36—Second largest existing bird
37—Consume
39—Female child
42—Metal rope with which airplane controls are operated
43—Perish
45—Engrossed
46—Type of shock-absorbing landing strut
47—Rear surfaces of airplane
49—Set of three
52—Leading manufacturer of airplane floats
54—Hotel
56—Balancing point around which an aircraft turns, abbreviated
58—Coördinating conjunction

CROSS WINDS

Answers for September

H	O	W	A	R	D	■	S	C	O	O	P	■
A	B	■	T	A	R	■	T	O	R	N	■	P
R	O	T	■	N	O	B	I	L	E	■	A	E
T	E	A	M	■	W	E	L	L	■	I	Z	E
■	■	M	A	G	N	E	T	O	■	M	A	P
B	I	A	S	E	S	■	S	I	M	P	L	E
A	P	R	O	N	■	■	P	I	R	E	R	■
L	E	A	N	E	D	■	M	A	N	I	A	S
C	E	C	■	R	E	S	U	L	T	S	■	■
O	A	K	■	A	X	E	S	■	S	O	L	O
N	C	■	A	T	T	A	C	K	■	N	O	N
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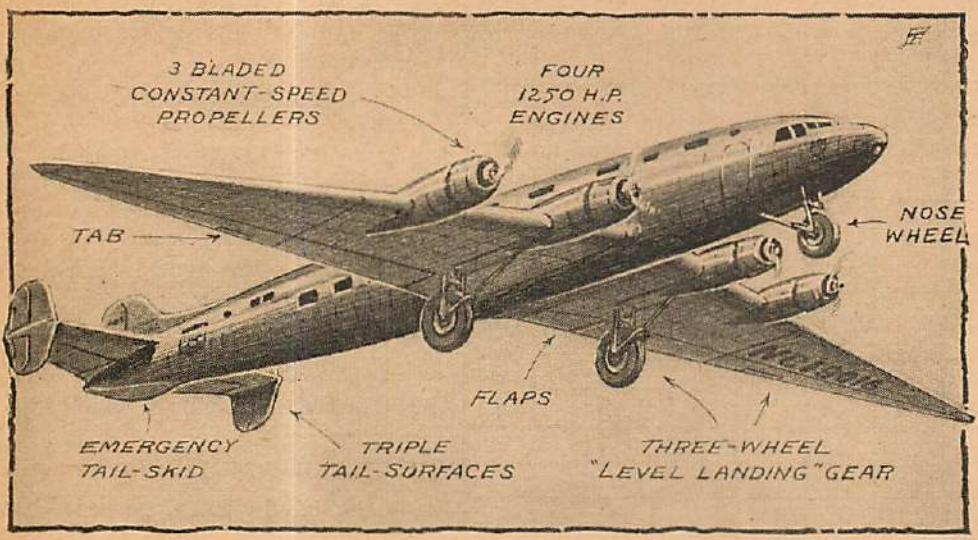
SUPER TRANSPORTS



Douglas introduces startling developments in the DC-4.

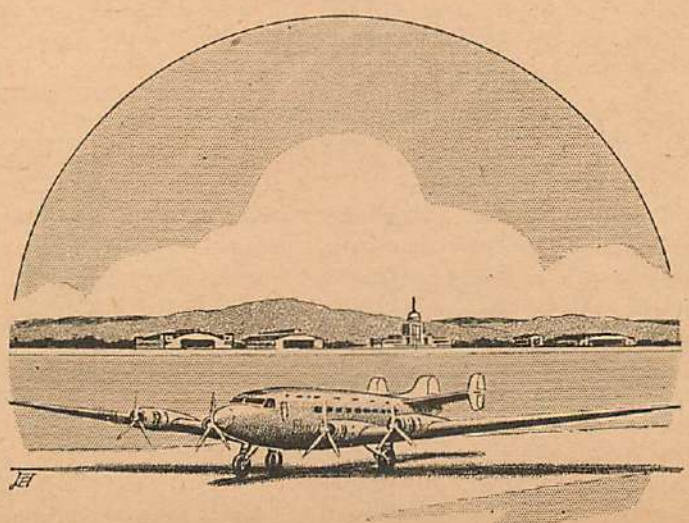
About the great new airliners under construction for the major air lines—the plane on the cover

By Frank Tinsley

THE extraordinarily rapid growth of aërial transport in the United States during the past decade has astonished the world. The high speed, comfort, and relative safety of our present-day sky-liners still seems incredible to those of us who look back a few short years to the first fumbling beginnings of American air travel. In those days of sporadic service and makeshift equipment, a transcontinental journey was a real adventure. Even after the major systems began to take form, a trip from coast to coast was something to talk about.

I remember one emergency hop from New York to Seattle taken only eight years ago. It was over the then comparatively new United Air Lines. The first leg was the Newark-to-Chicago run. It was flown in an old Ford "tin goose" with rough air most of the way. Time —about six hours. Then, after a three-hour wait, a shift was made to one of the big Boeing 80s. This was probably the best heavy transport of its day, being stable, commodious, and comfortable. It had seats for eighteen passengers and carried a crew of three—pilot, co-pilot, and hostess. On this particular flight there were just three passengers aboard. After several scheduled stops we wound up at Des Moines around midnight, in the midst of a heavy storm.

Three abortive attempts to get off convinced the pilot that prudence was the better part of valor so we squatted in the mud for the rest of the night. One of the passengers became disgusted with air travel on the ground and left in high dudgeon to catch a train. There were just two of us rattling around in the big cabin when we set down at Cheyenne.



How the DC-4 will appear at the airport.

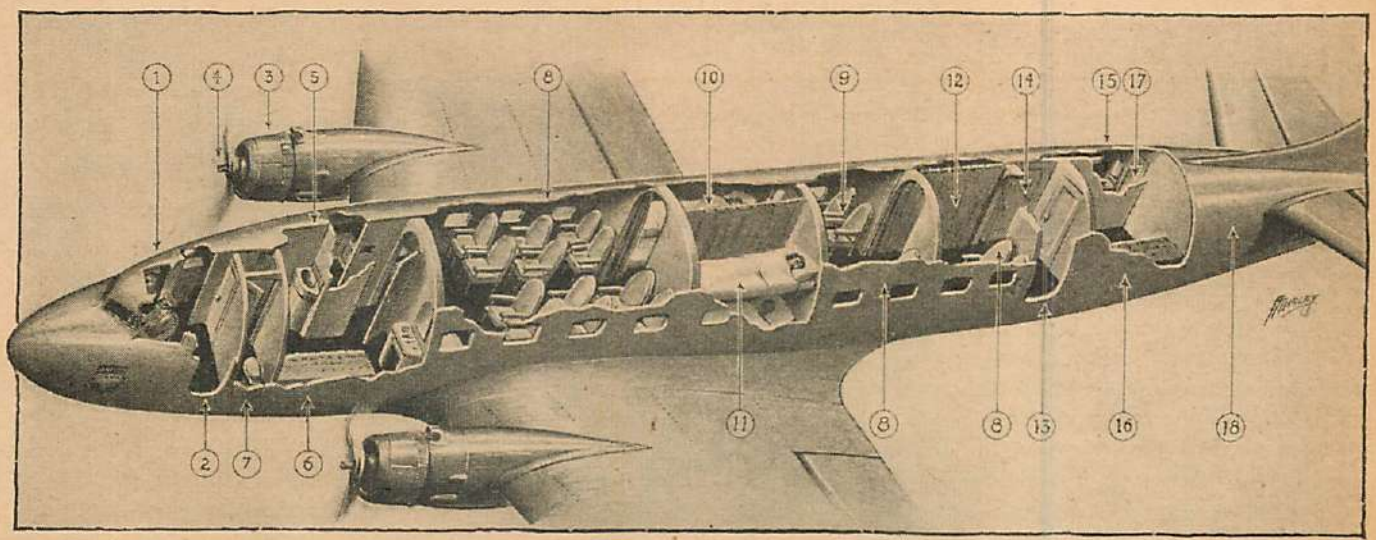
This marked the end of the division, so after a hurried lunch we were shifted again to a Boeing 40. This was an open-cockpit mail plane converted by the installation of a seat in the former mail pit to accommodate two passengers. Facilities consisted of a small window on each side through which to survey the Utah desert. My fellow traveler, a Cleveland lawyer bound for Reno, and I, sat wedged together in the narrow seat with our arms around each other in fraternal embrace. We finally bade a fond farewell at Salt Lake City, where I staggered off to a hotel for a much needed shower and sleep. At eleven p. m. I was back at the airport to continue my swift westward journey. The ship proved to be another 40, this one with separate seats placed in tandem. I crawled in, yawning mightily, and, in company with the U. S. mail, was carried safely through gloom of night over the Rockies to Boisé, Pasco, Portland, and Seattle, where we finally arrived about nine a. m. Total time elapsed—forty-eight hours.

Compare this with to-day's schedules and pause to give a great big cheer for the air-line boys who have miraculously advanced flying facilities to their present high level. Don't forget a second yip for the aeronautical engineers who designed the ships to do it with. They are principally responsible for the three great forward steps that have brought America's air lines to their present efficiency. The first of these steps was the introduction of the Boeing-247. Then came the Douglas DC-3 and its night-hawk sister, the DST. These ships, placed in service late in 1936, were half again as big and much

faster than the original low-wing jobs. Now we are witnessing the third step, another radical increase in the size and efficiency of our heavy transports.

Both the Boeing and Douglas organizations have produced new models that should go a long way toward maintaining the present U. S. lead in the heavy transport field. In collaboration with the engineers of Pan-American Airways, the Seattle company has been working on the development of a long-range stratosphere transport for transoceanic service. For some time now, the "Pan-Am" technicians have been playing with the idea of substituting fast, high-altitude land planes for the relatively less efficient flying boats now in use. The result of their cogitations is the new Boeing-307, which is being produced in both standard and stratosphere models.

The standard 307 is a four-motored, low-wing monoplane with a gross weight of 21 tons. It has a wing-span of 107 ft., measures 74 ft. from nose to tail and has an over-all height of 17 ft. Power is supplied by four



1. Pilot's compartment. 2. Door. 3. 1,400 h.p. Twin Wasps. 4. Constant-speed propeller. 5. Kitchen. 6. Wash room. 7. Lavatory. 8. Passenger accommodations. 9. Convertible seats. 10. and 11. Seats as converted for berths. 12. Aisle. 13. Passenger door. 14. Closet. 15. Men's lounge. 16. Stateroom. 17. Door. 18. Baggage compartment.

1,100 h.p. Wright Cyclone engines. Alternate passenger accommodations are provided. The day model is fitted with thirty-two comfortable seats. The night model sleeps twenty-six—eighteen in berths and eight in reclining chairs. In addition to the passengers and crew, both types have a capacity of approximately 3,700 lbs. of mail and express. The control-room position is a new departure in American design practice, being streamlined into the nose of the ship. A baggage compartment accessible in flight, two lavatories and a galley provide for the traveler's comfort.

The high-altitude version of the 307 is similar in design and equipment to the standard model. The only difference lies in the provision of a pressure-tight skin, reënforced windows, and pressure doors. It is stressed to resist a design pressure of six pounds to the square inch. This leaves an ample margin over the differential of two and one half pounds per square inch between the inside and outside air at the proposed operating level of 20,000 ft. Both passengers and crew ride in a sealed cabin, in which the air conditions approximate those found at the currently used flight levels of 8,000 to 12,000 ft.

Two newly developed mechanical superchargers, each operating on a fraction of the power of one engine, draw air through intake ports situated far out on the leading edge of the wings. This pure air is built up to a suitable pressure and distributed uniformly through the cabin. It is then drawn into an anti-pressure chamber in the rear of the cabin and exhausted into the outer stratosphere. Thus a constant circulation of pure, fresh air of normal pressure is maintained at all times.

The ability of the stratosphere Boeings to fly at such high altitudes results in great advantages both in speed and comfort. Flying in calm, thin air, high above clouds and storms, sleeper passengers are assured of a good night's rest in a comfortable, steady berth. Cruising speeds in the neighborhood of 250 m.p.h. bring into the realms of immediate possibility the long-dreamed-of "overnight Atlantic crossing."

Even larger than the new Boeing models is the latest product of Donald Douglas. Within one short year of the introduction of his famous "Sleeper," the Santa Monica engineer startles the world with a fresh version of his well-known long-wing design. The new DC-4, illustrated on the cover of this issue, is a four-motored, forty-passenger monoplane, more than a third bigger than its predecessor. Several radical departures from former models have been incorporated in the latest monster. Principal among them is the first use in the heavy transport field of the new three-wheel landing gear developed by the department of commerce. In addition to providing greater safety during take-off and landing runs, the "Level Landing" wheels permit passengers to remain horizontal in their berths and sleep peacefully through night landings. Another item new to Douglas transports is the triple-fin tail assembly.

The DC-4 has a span of 138 ft. 3 in., is 97 ft. 7 in. in length, and stands 24 ft. 4 in. off the apron. It is powered with four 1,400 h.p. Pratt & Whitney Twin-Wasp engines driving three-bladed constant-speed propellers. With a fully loaded weight of no less than thirty tons, the big girl carries a useful load of 20,000 lbs. at a top speed of 237 m.p.h. She lands with flaps at 68.5 m.p.h., reaches a service ceiling of 24,000 ft., and has a range of 2,200 miles.

Built for day-and-night service, the DC-4 accommodates forty passengers in two rows of *(Turn to page 90)*

The MOON GOD

Fate weaves a strange pattern and Bill Barnes slips alone into the North.

By George L. Eaton

Fate weaves strange webs and men know not the hour in which their lives will be caught into the pattern.

IN INDIA, Maharaja Nadir Singh spoke harshly to his henchmen: "The great Cameroon diamond has been bought by a secret syndicate of American men. Learn who they are, for I desire this gem. I will pay two million dollars to whoever obtains it. And I care not how it is done."

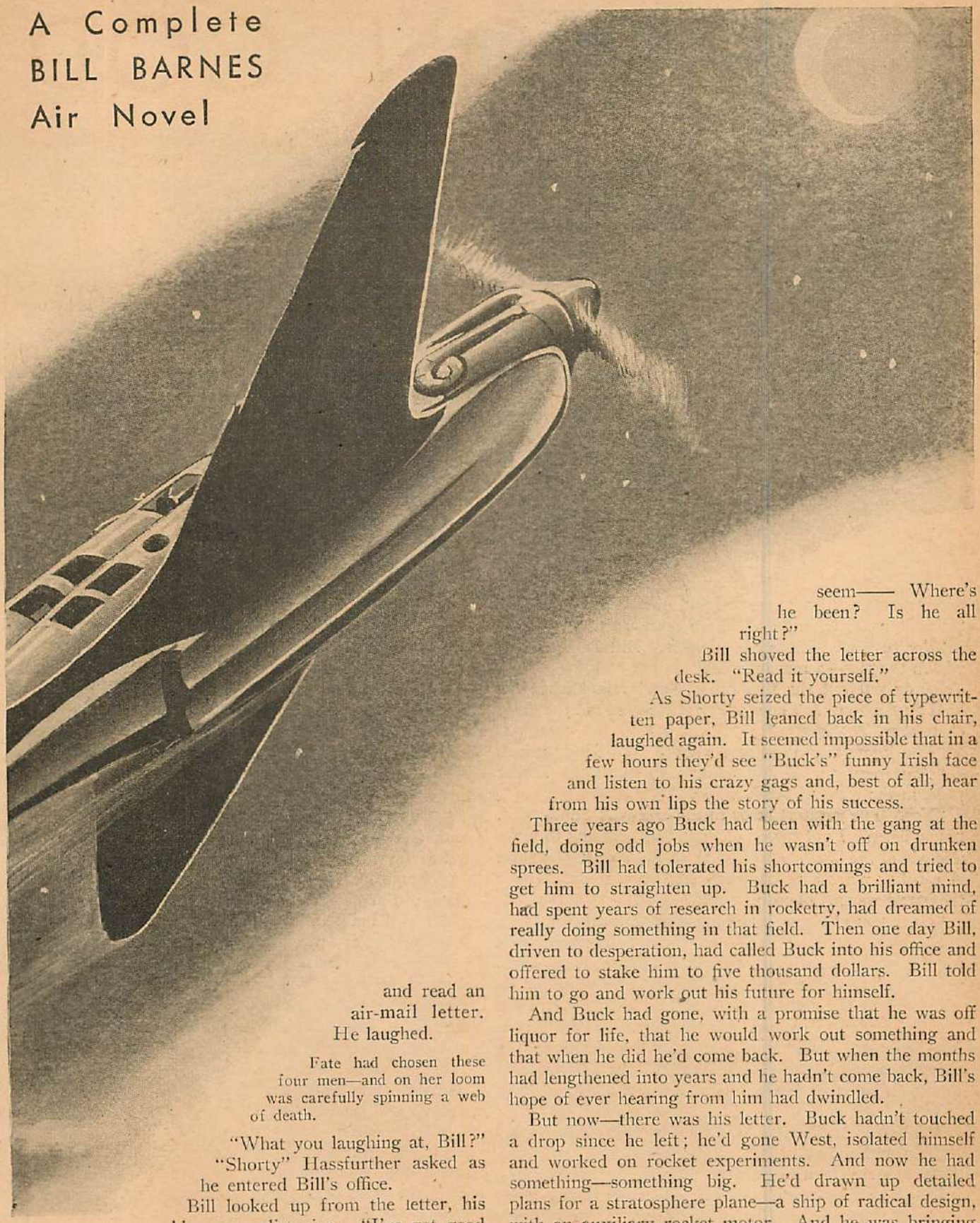
In far-away America, a Douglas transport plane roared eastward, bound for New York. In its cabin a man named Carter Finch eyed his fellow passengers and coldly planned a murder.

In Canada, high up in his observatory hidden in a turret of his residence, the millionaire Adam Preston focused a telescope on the rising moon and shivered.

In Long Island, the world-famous pilot, Bill Barnes, sat in his office in the administration building

The plane tore into the night, riding a trail of blazing whiteness——

A Complete BILL BARNES Air Novel



and read an air-mail letter. He laughed.

Fate had chosen these four men—and on her loom was carefully spinning a web of death.

"What you laughing at, Bill?" "Shorty" Hassfurther asked as he entered Bill's office.

Bill looked up from the letter, his blue eyes glistening. "I've got good news. Buck Woodland's coming back."

Shorty stopped in surprise. "You wouldn't kid a guy, Bill?"

"No. Just got word—air-mail special. Buck's coming on the transport from the West coast. Lands at the Municipal Field at eleven forty to-night."

Shorty looked at Bill incredulously. "The little son of a sea cook!" he gasped. "Three years. It doesn't seem—— Where's he been? Is he all right?"

Bill shoved the letter across the desk. "Read it yourself."

As Shorty seized the piece of typewritten paper, Bill leaned back in his chair, laughed again. It seemed impossible that in a few hours they'd see "Buck's" funny Irish face and listen to his crazy gags and, best of all, hear from his own lips the story of his success.

Three years ago Buck had been with the gang at the field, doing odd jobs when he wasn't off on drunken sprees. Bill had tolerated his shortcomings and tried to get him to straighten up. Buck had a brilliant mind, had spent years of research in rocketry, had dreamed of really doing something in that field. Then one day Bill, driven to desperation, had called Buck into his office and offered to stake him to five thousand dollars. Bill told him to go and work out his future for himself.

And Buck had gone, with a promise that he was off liquor for life, that he would work out something and that when he did he'd come back. But when the months had lengthened into years and he hadn't come back, Bill's hope of ever hearing from him had dwindled.

But now—there was his letter. Buck hadn't touched a drop since he left; he'd gone West, isolated himself and worked on rocket experiments. And now he had something—something big. He'd drawn up detailed plans for a stratosphere plane—a ship of radical design, with an auxiliary rocket motor. And he was bringing the plans with him, for Bill to see. Perhaps they'd be able to work together—to build the ship——

Shorty put down the letter. He said, "He's found himself."

Bill nodded. "It's swell. I've never had such a kick out of anything." He frowned and then added, "I hope the guy's careful. If he's really got what he claims, those plans are invaluable. That means—danger."

Shorty said, "You mean——"

But the veteran pilot never finished the sentence. His eyes suddenly swerved toward the office door. He just had time to catch a glimpse of an arm probing through the opening, of fingers closing on the light switch. Then the office was plunged into total blackness.

Bill jerked around. "Hey! What——"

Through the open door glided two figures. They were garbed in voluminous black gowns with cowls over their heads. Each held a lighted candle and the reflected light shone up into their faces. One of them was much shorter than the other, gnome-size.

The effect was horrible. The taller one spoke in a hollow, deep voice. "We come from the grave. Beware! We are the living dead!"

The deep voice suddenly broke into a shrill treble. "Beware!"

Bill said, "All right, Sandy. Let's have some lights now."

The taller figure stopped. "Gosh!" it said, and turned on the lights.

The illumination showed "Sandy" Sanders, the kid ace of the flying organization, holding the monkey mascot, Alphonso, by a hairy hand. The small gown worn by the monkey completely concealed his body, except for his long tail and the simian face which peeked out from beneath the cowl. His little eyes were snapping.

Shorty laughed. "Beauty and the beast," he said.

Sandy gave him a nasty look, then turned to Bill. "Was it realistic, Bill? Did we scare you?"

"I'm covered with goose pimples," Bill said. "Now what's the gag—a masquerade?"

Sandy put out the two candles and relinquished his hold on Alphonso. The monkey scampered out the door, chattering.

"You know who the great Tagore is?" Sandy asked.

"You mean the Hindu actor who plays the horror parts in the movies?" Bill asked.

"Yes. The greatest actor in the cinema," Sandy said. "Now listen. I got tipped off that they're going to make a movie of the book, 'The Living Dead,' starring Tagore. A monkey plays a prominent part in the story. That's the part I want Alphonso to get."

"Have you got him signed up yet?" Bill asked.

Sandy hesitated. "Well—no. But I have the book and I'm acting all the scenes with Alphonso, to give him practice. Tagore's a hard man to see. I've written a lot of letters to the movie company and they say they're keeping Alphonso in mind for the part." The kid suddenly grinned. "But I'm going to pull a fast one. I'm going to take Alphonso to see Tagore. He's flying from the coast, lands at the Municipal Airport at eleven forty to-night."

Bill looked at Shorty. "On the same ship with Buck."

Bill told Sandy about Buck Woodland.

"That's swell," said Sandy. "Maybe he'll strike up a friendship with Tagore. Maybe it'll make things easier for me." He turned toward the door. "I'm going to fly the Eaglet over to the airport. O. K., Bill?"

Bill nodded. "All right. I'm taking the Lancer. Shorty's going in his ship. We'll all go together. It'll be welcome home to old Buck."

AT eleven o'clock the Lancer, the Eaglet and Shorty's Snorter landed at the Municipal Airport. The machines were rolled into a vacant hangar, out of the drizzle of rain. The pilots entered the terminal building to await the arrival of the transcontinental plane.

She was coming along on time, the dispatcher reported. And then Sandy heard bad news. Tagore wasn't aboard. His reservation had been canceled at the last minute.

"A rotten break," Sandy said, looking into Alphonso's face. "But never you mind, Alfy. We'll contact Tagore sometime. I'll see that your genius isn't thwarted."

Alphonso was busily eating peanuts and didn't seem to care one way or the other.

II—ON TIME

TRANSCONTINENTAL PLANE 128 was within forty minutes of her last stop at the Municipal Airport. The cabin, with its two rows of seats and the narrow aisle in between, was almost dark. All individual lights were extinguished and the majority of the passengers were tilted back in their chairs, asleep. There was no hostess aboard, and the co-pilot who looked after the passengers' needs was up forward in the bird cage, with the door closed.

Carter Finch sat at the rear of the left row of seats and surreptitiously raised a bottle of whisky to his lips. He was a tall, compactly built man in his forties, with a thin, sardonic face and small, greenish eyes. His oiled hair was slicked back like a skull cap and a carefully trimmed black mustache penciled his upper lip.

He lowered the bottle without a drop of liquid having passed his lips and leaned across the aisle to where Buck Woodland sat in the last seat of the right row.

"Have another," Finch whispered drunkenly and passed him the bottle.

Buck's blue eyes were bloodshot. He was very drunk. He took the bottle unsteadily, drank deeply. Then he said, his voice thick, "Yuh know—I shouldn't do this. I told Bill I was on the water wagon. Been on it for three years——"

" 'Bout time for a little celebration, partner," Finch said, and laughed. "You deserve it. That must be a wonderful airplane you said you've designed."

"Wunnerful," Buck said, lolling in his seat. "Best airplane in the world. Worked hard for three years. Bill and I will build it. We're pals. We'll make millions. Nothing like it anywhere. A wunnerful airplane——"

Finch's gaze settled momentarily on Kabu, a dark-skinned foreigner who was seated in front of Buck Woodland. Kabu was reclined as if sleeping. But in the dim light Finch saw the man's head move, and for a brief second their gazes locked.

From outside came the muffled roaring of the twin engines. The transport lifted on an upcurrent of air, swayed and then settled.

The bottle of whisky passed back and forth between Buck and Finch. And gradually Finch, who had been plying his companion with drink and questions almost since the start of the flight, grew bolder. They would soon be at the Municipal Airport, where Buck had said Bill Barnes was waiting.

Finch said, and slurred his words to simulate intoxication, "You try to kid me about a rocket airplane. What do you think this is? Send an airplane up by rockets! You must think I'm crazy to swallow that, partner."

Buck, drunkenly indignant, insisted. "I got it all drawn up. I could show you. I could prove it to you——"

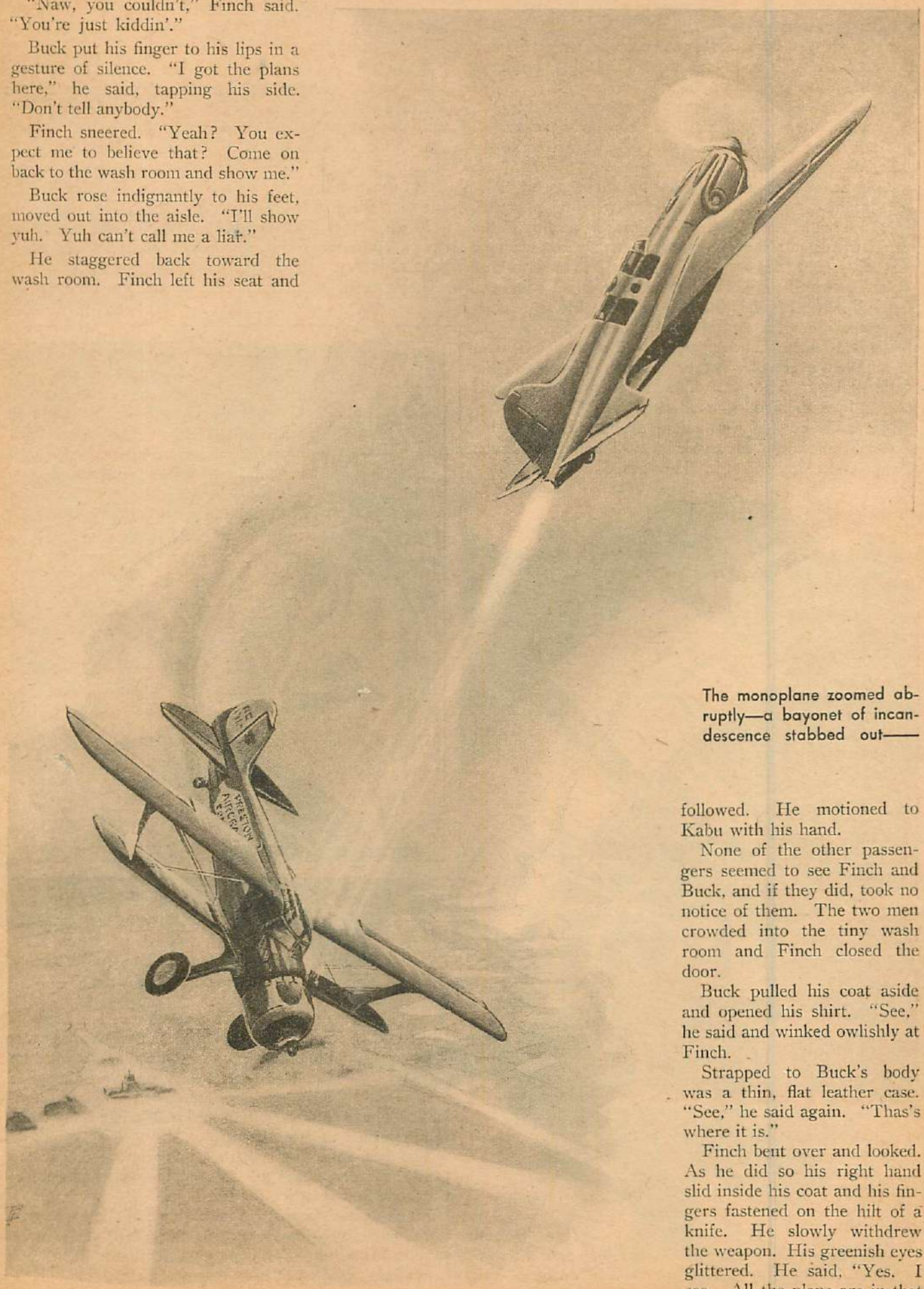
"Naw, you couldn't," Finch said. "You're just kiddin'."

Buck put his finger to his lips in a gesture of silence. "I got the plans here," he said, tapping his side. "Don't tell anybody."

Finch sneered. "Yeah? You expect me to believe that? Come on back to the wash room and show me."

Buck rose indignantly to his feet, moved out into the aisle. "I'll show yuh. Yuh can't call me a liar."

He staggered back toward the wash room. Finch left his seat and



The monoplane zoomed abruptly—a bayonet of incandescence stabbed out——

followed. He motioned to Kabu with his hand.

None of the other passengers seemed to see Finch and Buck, and if they did, took no notice of them. The two men crowded into the tiny wash room and Finch closed the door.

Buck pulled his coat aside and opened his shirt. "See," he said and winked owlishly at Finch.

Strapped to Buck's body was a thin, flat leather case. "See," he said again. "Thas's where it is."

Finch bent over and looked. As he did so his right hand slid inside his coat and his fingers fastened on the hilt of a knife. He slowly withdrew the weapon. His greenish eyes glittered. He said, "Yes. I see. All the plans are in that case?"

"Yes," Buck said. "Three years of hard work. A wunnerful airplane——"

Finch stepped back. His gaze centered on a plane on Buck's chest. Then, in one savage upthrust, he drove the knife into the body of Buck Woodland.

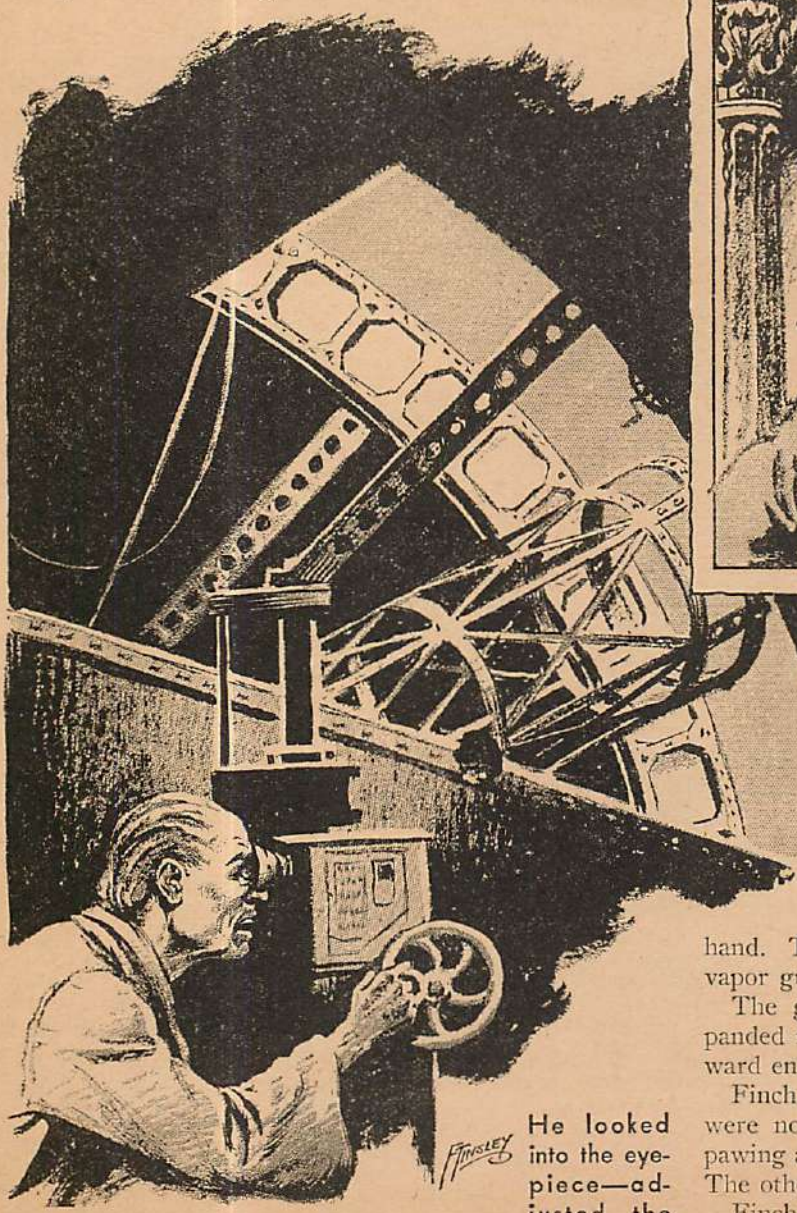
The force of the blow jammed Buck against the wall. A gasp shuddered from his lips. His body jackknifed.

Finch seized Buck's coat lapels and lowered him to the floor. He was dead.

Finch jerked the knife out; hot blood soaked his hand. He cut the straps that held the leather case to Buck's body and pulled the case free. A quick inspection of the inside revealed a roll of thin paper covered with drawings.

Finch folded the case, hastily jammed it into his coat pocket, returned his knife to its scabbard and stood up. He put his hand against the wall to steady himself. Then he opened the door and stepped outside. He failed to notice that on the white-enameled wall of the wash room he had left a set of clear fingerprints stamped in his victim's blood. The print of the right index finger was marred by a diamond-shaped scar.

The cabin outside was quiet. Kabu slid out of his seat and came back. He carried a small hand bag. Finch whispered to him, "I got it. He's dead."



He looked into the eyepiece—adjusted the focus——

The swarthy foreigner showed no emotion. "We're almost at the field. We'll have to work fast. Now?"

Finch said, "Now."

Kabu put the bag on the floor, opened it. He quickly took out two compact gas masks, handed one to Finch. Then, making sure that none of the other passengers were observing them, the two men bent down and donned the masks. They replaced the fedoras on their heads.

Kabu pulled a pair of heavy gloves over his hands. From the bag he took a pasteboard box and opened it. Inside, bedded in cotton, were ten small glass bulbs.

Finch shot a look through a window. Far below he saw a sprinkling of lights on the ground. He whispered, "Hurry. Before the co-pilot comes back."

Kabu came to his feet. He jerked the brim of his fedora over his masked face and bent his head. In the darkness the gas mask was almost obscured. He walked forward up the aisle and began crushing the glass bulbs one after another in his gloved right hand. They shattered with a faint hiss and a filmy white vapor gushed up from each.

Maharaja Nadir Singh spoke harshly, "I care not how it is done"——

The gas from the bulbs was concentrated. It expanded rapidly, filling the cabin. Kabu reached the forward end and smashed the last bulb.

Finch waited, his nerves taut. Two of the passengers were now struggling to get to their feet, their hands pawing at their faces. Then they collapsed in their seats. The others, who must have been sleeping, didn't stir.

Finch moved up the aisle to join Kabu, checking the passengers as he went. They were all unconscious.

The air was thick with gas fumes, which were now drifting to the rear of the cabin.

Kabu stood in front of the door leading to the pilots' office. Finch joined him and glanced quickly at the luminous dial of his wrist watch. In a few minutes the sign for all passengers to adjust their safety belts in preparation for a landing would flash on. And right after that the co-pilot would come back to check up.

So far the timing had been excellent. But now a minute's delay might wreck everything.

Finch probed into a side pocket of his coat and took out a coil of thin, wirelike rope. He held it concealed in his left hand, signaled to Kabu with a nod of his head. Then he jerked off his gas mask, tossed it

Bill Barnes sat in his office and read an air-mail letter—he laughed—

to the floor behind him, and, holding his breath, pulled open the door to the pilots' office and slipped inside.

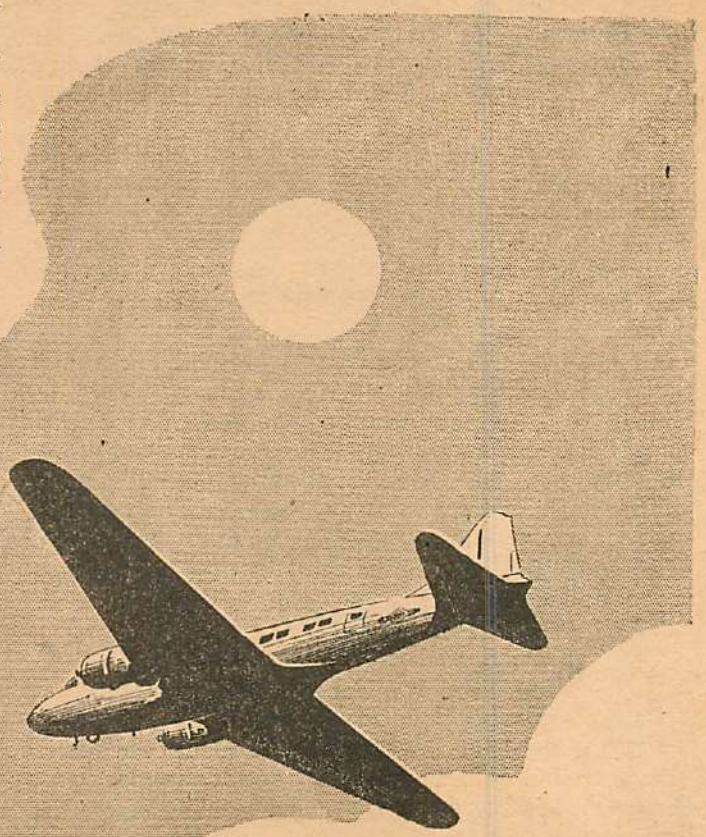
He closed the door after him. Directly ahead were the two pilots seated at the controls. The chief pilot looked back in annoyance. He yelled, "No passengers allowed up here, sir."

Finch's eyes were wide with faked alarm. He said, "There's some one sick. Quick!"

The co-pilot twisted out of his seat. "I'll see," he said to his companion.

"Come on," he said as he passed Finch. He yanked open the door and hurried into the main cabin.

The chief pilot held to the control wheel, his eyes on



A Douglas transport roared eastward——

the instrument panel. Finch acted with the sureness of long planning. Before the pilot could look back, before he could send out a radio warning, Finch was behind him. The coiled rope in Finch's hand was now a loop. He threw the loop over the pilot's head and jerked it tight.

The pilot's hand flew up to tear the rope away. He rose from his seat. Finch, with a savage wrench, pulled the man backward. The pilot's face went purple.

Finch pulled him from the seat. He took an automatic from his pocket and slashed the butt end across the man's temple. The pilot went limp.

Finch loosened the rope and let him fall. The big transport was dipping now.

Finch scrambled into the seat, rammed his feet against the rudder pedals and gripped the wheel. He brought the transport back on an even keel.

Down below, just ahead, he could see a square of bright light and a whirling finger of luminosity stabbing through the black sky—the Municipal Airport.

A faint crackle was coming from the co-pilot's set of ear phones, where he had left them hanging to the back of the seat. Finch ignored the signals. He knew what he had to do and calmly went about it. He pushed the control column forward and took the big ship lower. Rain began beating against the glass and the lights of the field ahead blurred.

Kabu hurried into the pilots' office. He was smiling. He said, "I got the co-pilot easy. He's tied up. I'll do the same to this one." He indicated the limp form of the chief pilot.

Finch nodded. "Good. I'm going to land at the north edge of the field. Be ready to beat it when I say the word. They won't see us leave. It's too far. This rain's a break."

The transport dipped over the airport in a wide circle. Finch crowded close to the windows and watched. He let down the landing gear, switching on the landing lights. The powerful beams sliced through the blackness.

Kabu was working silently over the unconscious chief pilot, gagging and trussing him. Finch was utterly cool. He adjusted the flaps, put the nose lower.

A section of the field was bathed white. Finch saw the wind indicator, the red lights which lined the runway that was to be used. But he wouldn't come down there.

He cut the engines, nursed the transport lower until the illuminated ground was right at hand. Then he leveled off. The ship contacted the ground at the deserted north end of the field. A heavy rumble came from the undercarriage and Finch applied the brakes.

The transport came to a smooth stop. Finch gunned the port engine and released one of the wheel brakes. The big ship swung around until its nose was pointed at the buildings far across the field.

"You ready?" Finch asked.

"Yes," Kabu replied.

"Get back to the door. Get it opened. Hurry!"

Kabu disappeared.

Finch nudged the throttles open, feeding even power to both engines. The machine rumbled forward at taxiing speed, heading for the terminal building across the field.

Finch leaped to his feet, ran back through the door and down the length of the passenger cabin.

Kabu was holding open the door in the side of the fuselage. Finch said, "Jump out," and followed when the man obeyed. They hit the ground running.

And with no human hand at the controls, the big transport moved on across the turf.

Finch and Kabu raced for the wire fence that bordered the north end of the field, climbed over it and sprinted through the darkness to where an automobile was waiting.

BILL, Sandy and Shorty stood at the end of the marquee which extended out from the terminal building. They looked across the field at the transport taxiing toward them.

Some one behind Bill said, "What the hell's the matter with those guys? They're supposed to use Runway 3."

The rain came driving under the marquee and the wet canvas flapped noisily. Bill drew his coat collar higher.

Shorty said, "Can you imagine seeing Buck? By golly, it's going to be swell."

Bill's eyes were on the transport as it jolted closer and came into the full radiance of the floodlights.

"Come on!" a rain-soaked mechanic said impatiently. "Shake it up."

The transport's taxiing speed continued. She was now within a hundred yards, aimed straight for the terminal building.

Bill waited for the pilot to swing the ship around parallel to the building, so that the marquee could be extended to reach the passenger door. But the ship didn't turn, didn't slow.

And suddenly Bill realized that it wasn't going to. The prow of the fuselage loomed high over the end of the marquee. Bill shouted a warning. The men under the canvas shelter fled to left and right.

And not a minute too soon. Like a mighty tank, the transport plowed into the marquee, smashing it down, crushing the metal railings flat. Her engines were snarling, her propellers flailing.

She rolled on, drove straight into the side of the terminal building. There was a crash and the transport came to a stop.

That was on March 19, 1936.

III—SECRECY

THEN—fourteen months later, at eleven o'clock, on the night of May 24, 1937——

On the banks of the Humber, beyond the town of Weston, in the province of Ontario, Canada, lay the estate of the eccentric millionaire, Adam Preston. Armed guards paced noiselessly through the shadows of the high stone wall that circled the grounds. The iron gates were closed, with orders for no one to be admitted.

Set far back in the rolling, wooded land was Castle Falcon, the millionaire's residence. At the main entrance, a long, black limousine waited under a porte-cochère, its engine purring, a uniformed chauffeur at the wheel.

At five minutes past eleven Adam Preston hurriedly left the castle and entered the car. The limousine, headlights extinguished, crept down the winding, drive, passed through the gates, as they opened, and turned into the narrow road that swung down through the hills.

In the distance the town of Weston was holding its annual Queen Victoria's birthday celebration. Fiery skyrockets crisscrossed high in the heavens, cascading showers of colored stars. Thunderous salutes of giant firecrackers thudded through the still air.

Adam Preston sat in the tonneau and watched the display, his pale-blue eyes alive with interest. Two days before he had presented the town with truckloads of fireworks, consisting mainly of giant skyrockets. He had said that he had wanted to aid in the celebration.

But there had been another reason for his lavish gift—a reason that was now sending him through the night.

The limousine sped past the western border of the estate and a quarter of a mile beyond. There it slowed, turned sharply to the right and passed through a gateway. A large overhead sign read:

THE PRESTON AIRPLANE CO.
GREGORY PRESTON, President.

Ahead, faintly outlined in the moonlight, was a group of small factory buildings and hangars. The car came to a stop beside the one-story office building.

A man, garbed in khaki overalls, darted from the shadows. He held a gun in one hand, a flashlight in the other. He winked the light on, momentarily bathing the pale face of the millionaire.

The beam of light died. The man quickly opened the rear door and said, "It's you, Mr. Preston. Your nephew's waiting for you, sir.

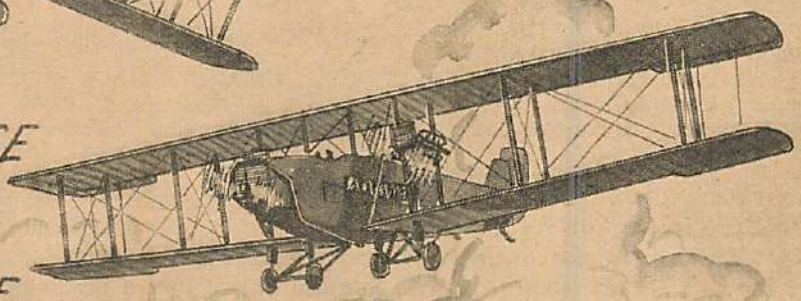
Gregory Preston, president of the small airplane company and nephew of the millionaire, ran up as the old financier stepped from the car. Gregory was in his late thirties, tall and well-built. He seized his uncle by the arm and hurried him around the office building to the landing field.

"Everything's almost ready, Uncle Adam," Gregory said excitedly. "Finch and the mechanics are making a last check-up."

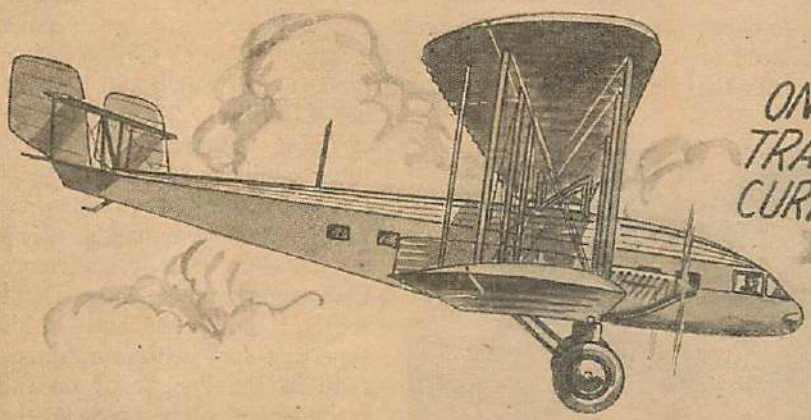
(Turn to page 64)

Transport Development

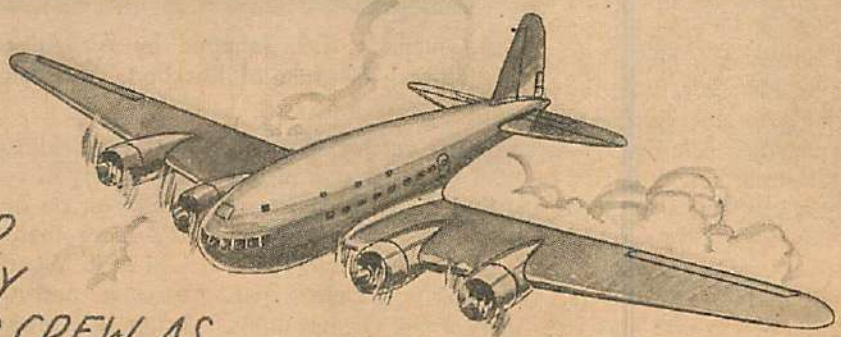
ONE OF THE FIRST REAL TRANSPORT PLANES WAS THE CURTISS "EAGLE" OF 1920. IT WAS POWERED WITH 3 CURTISS "SIX" ENGINES, AND COULD CARRY EIGHT PASSENGERS AT 99 M.P.H.



THE BRITISH HANDLEY PAGE W8F OF 1925 CARRIED 10 PEOPLE AT 102 M.P.H. IT HAD ONE ROLLS-ROYCE AND TWO SIDDELY ENGINES



ONE OF 1930'S OUTSTANDING TRANSPORTS WAS THE 138 M.P.H. CURTISS "CONDOR," THIS CARRIED 18 PASSENGERS, TWO PILOTS AND A STEWARD



PLANES OF THE PRESENT, SUCH AS THE NEW BOEING 307 WITH 4 1100 H.P. ENGINES, CAN CARRY 32 PASSENGERS AND CREW, AS WELL AS A TON OF MAIL AT A SPEED OF 250 M.P.H.

COLBY

The Honor Roll for October

FLIGHT LIEUTENANTS

W. Warren Bates, Hardy, Neb.
Gindo Bianchi, Somerville, Mass.
Jerome W. Cowan, Chicago, Ill.
LaVerne Cressman, Kitchener, Ont., Can.
Melvin DuPont, Rutland, Mass.
Ward Fisher, Castle Rock, Wash.
Donald Johnson, Fair Haven, Vt.
Kenneth J. Lampel, Bronx, N. Y.
Paul McDowell, Los Angeles, Cal.

ENGINE MECHANIC

Robert Chernoff, Brooklyn, N. Y.
Warren G. Honecker, Sewickley, Pa.
Bob Weaver, Greenville, Ohio

OBSERVER

Dr. William H. Robey, Sullivan, Mo.

AIRPLANE MECHANIC

Larry Miller, Brooklyn, N. Y.
Clifton Bading, Mathis, Texas

PHOTOGRAPHER

Harold Preston, Jamestown, N. Y.
Arlo Koontz, Onawa, Iowa
Walter McCabe, Jr., New York City
Alfred H. Borkenheim, New Albany, Ind.

TOPOGRAPHER

George Southward, Hamilton, Ont., Can.
Shelby Martin, Ross, California
Bob Hubert, St. Helens, Ore.
Arthur Patak, Carlstadt, N. J.

Time to Check Up

GREETINGS Air Adventurers!

Well, the summer is about over and we approach the long winter months, months that can be put to profit, if you are still interested in flying.

These are the months when model, light-plane, and glider clubs can be doing their heavy planning for next year. Now is the time to examine the organization and weed out the halt and the lame. Now is the time to check up on the equipment and see what is to be replaced or repaired. In other words, now is the time to bolster the foundations of our aviation organizations all over the continent.

During the last few months, we of Air Trails have been amazed at the growth of interest in club and private flying. We had hopes when we started out, but the growth has been so fast that now we must settle back, consolidate our gains and plan for wider efforts for 1938.

How are your club finances? This would be a fine time to check up on the general assets and plan accordingly. You can raise money in many ways. Most concerns will be glad to assist you in any of these matters. We have met and talked to scores of them during the past few weeks and they want to know your problems. Make it a point now to know your dealers and manufacturers. Perhaps you have a particular problem that may face many flying organizations. Tell the manufacturers and ask them their opinions. They're all grand men to know and they're more than willing to meet you better than half way on anything.

Perhaps you have a motor that needs a full overhaul. Can you do it yourself, or do you need technical assistance? Why not write to the manufacturer and tell him about that motor? He'll be glad to send you the best advice his engineers can offer. Perhaps you can make a deal with him for a trade-in. That takes money, of course, but you have the whole winter to work on it and you can devise some particularly interesting events to raise that money, if you are true Air Adventurers.

Maybe your club plane needs a complete overhaul and rigging check. Don't quit on it now just because the weather is not suitable for regular flying. Club together and get into that hangar and rip her down and go over her carefully. That's the fun of flying. Again, the manufacturer might be consulted by letter, and you might tell him what you have on your hands. He's a good chap, usually, and more than eager to help out. Don't forget, the more machines of his type that stay in the air, rather than in the hangar or on the second-hand plane markets, the better he likes it and he's going to make sure his ships do stay in the air.

Grumman JF-2, snapped by Air Adventurer Harold E. Hale of Rockport, Massachusetts.

You glider fans must keep up with the field, too. They're going places next year. We saw plenty of real gliding at Elmira this summer, but we can't rest on our laurels now. You've got to keep up. It's more than shock cords, turn buckles, and panels. Old Man Weather has a million more problems for you to solve, and a heavy winter of meteorology study will bring just rewards next spring.

Also, remember that we of Air Trails are doing our best to make your contacts with the manufacturers all the more pleasant. They know about the Air Adventurers and they hope we "go to town" this winter. They're with us to the limit and we want you to justify our trust in you. You know all about our Creed and there is little

excuse for repeating it here, but we do want you members to keep plugging and get the membership up. Show your flying friends and others interested in aviation the coupon below. Get them to sign the application and send it in with ten cents for their certificate and wings. Once it is approved, you can leave the rest to us.

If you want a copy of the Creed and of the requirements for craftsman's awards and lieutenant's or captain's ratings, write to me and ask for it.

Happy landings!

Your Flight Commander,

Albert J. Carlson

AIR ADVENTURERS NEWS

OUR members from overseas have been getting their examination papers through in batches of late, and we wonder what it will be like when Pan-American and Imperial Airways run regular schedules to Europe and Australia. Speaking of Australia, E. H. Cocks of Kiama, N. S. W., Australia comes through with a fine résumé on the contents of Air Trails and includes membership coupons from A. Murray of Eastwood and Kenneth McGee of Girraween.

Air Adventurer Miss Franny Loomis of Merrill, Oregon, submitted this Stinson Reliant picture.

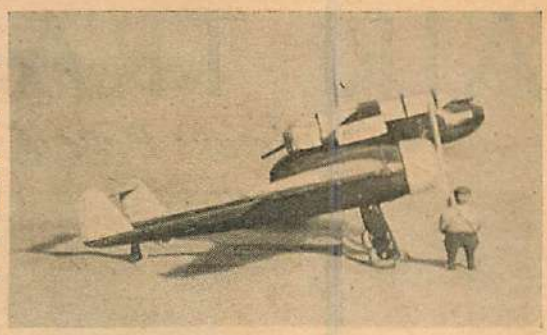
We even have a German member, Hubert Zuerl of Munchen, who has forwarded his application and a promise to reward us with suitable photographs and information on modern German aircraft. We'd like a lot more members like Zuerl, who have good news sense and who are willing to contribute suitable photographs.

Harold Conroy of Winnipeg, Canada, who is a loyal "Sandy" Sanders fan, wants George L. Eaton to write a novelette in which Sandy plays a more important part in the story. Naturally, he liked the *Canada's Transcontinental Airway Ready* feature a lot. We believe it is the first time such an article has been so well presented.

We wish we could publish the detailed drawing of Hood Aerodrome, of Masterson, Wairarapa, New Zealand, which has been sent in by Terence N. Taylor of that town. He gives the most complete details and a list of interesting figures, including position as to latitude and longitude, magnetic variation, altitude and area of the landing ground. He admitted that he pestered the ground manager to death getting the details, but it shows what can be done, with a little care and persistence. We rate Air Adventurer Terence Taylor tops when it comes to observation.

Another airport map has been sent in by Jimmy Fitz Gerald, Jr., of South Pittsburg, Tennessee, who has selected an unused piece of ground near his home and drawn it to scale and made suitable notes and suggestions for developing it into a modern airport. A fine piece of work and one worthy of a high rating.

Kenneth Alden of Cambridge, Massachusetts, gives us a first-class observer feature on air-traffic control. From



Dr. William H. Robey posed this picture of a model and dummy pilot.

the information offered, it is clear that he went to a first-class airport and managed to get inside the control tower and watch the system in action. He told many amusing and interesting features of the work and explained the system of advising incoming planes.

Our annual pictorial plan goes well with hundreds of our members. LaVerne Cressman of Kitchener, Ontario, is sold on the idea. Cressman is out for his engine mechanic's certificate. He is taking a course in aircraft motors at the Kitchener airport, and he's particularly interested in superchargers.

Air Adventurer E. D. Sharp has sent in a particularly flattering discussion on the July issue of Air Trails. Sharp has been with us two years and has a warm spot in his heart for Air Trails.

Another airport plan comes through from Samuel McCulley of Berlin, New Jersey, which shows hangar positions, runway directions and dimensions of Central Airport in Camden, New Jersey. He includes a key explaining the boundary lights, approach lights and obstruction lights. According to McCulley the airport is twenty feet above sea level and has natural drainage.

There's nothing like a pilot post in the U. S. navy, according to Arlo Koontz of Anawa, Iowa. He figures that while transport pilots may get more pay than the navy crowd they do not get half as many thrills. "And another thing," adds Arlo, "in case war came along, you would be a cinch to see some action, if you were a navy flier."

Roy Kaufman of Bridgeport, Connecticut, wants to be a mechanic because aviation needs airplanes and airplanes won't fly without motors and *some one* *(Turn to page 95)*

(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 .....

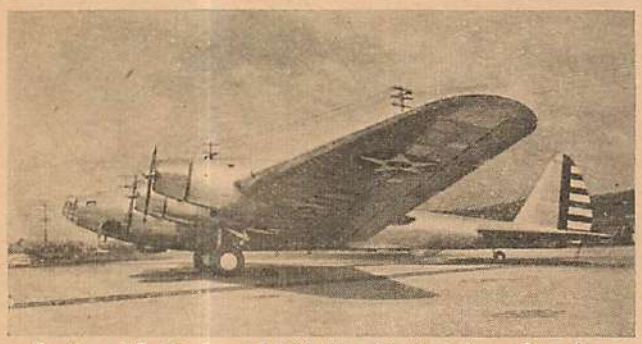
.....

☐ Check here if interested in model building.

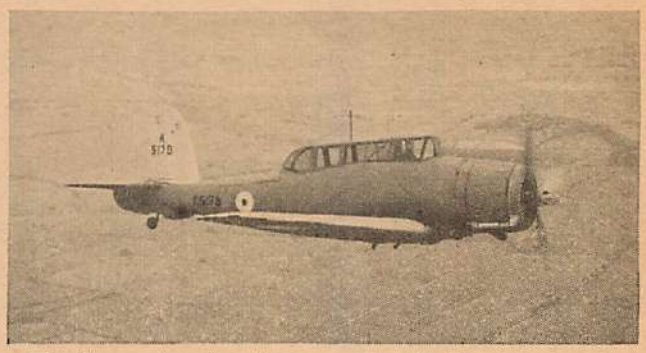
(This coupon may not be used after November 15, 1937.)

AIR TRAILS GALLERY

A Picture Page of Modern Planes for the Collector

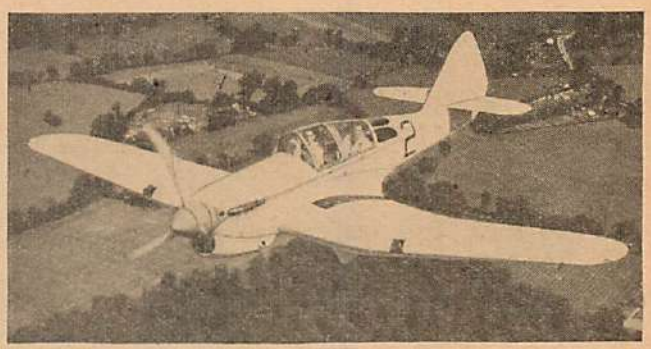


Boeing XB-15, four 1,000 h.p. Twin Wasp Srs., has complete living accommodations and two auxiliary gasoline power plants for electrical system. Defensive armament includes six gun emplacements.

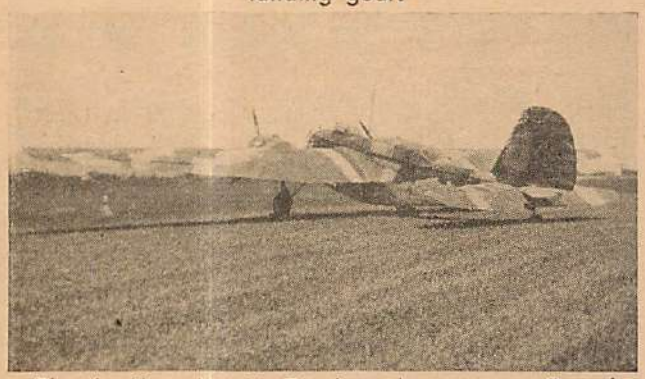


Blackburn dive bomber, new British ship fitted with 730 h.p. Bristol Mercury engine, has folding wings and water-tight compartment fuselage.

Cessna CR-3A racer, 145 h.p. Warner Super Scarab has full cantilever wings and retractable landing gear.

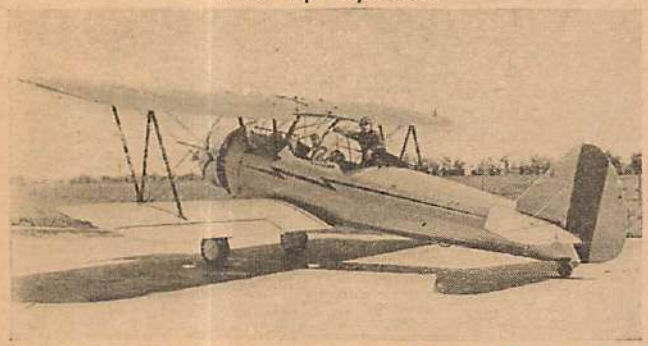


Miles Trainer for R. A. F. does nearly 300 m.p.h. Ship is fitted with split-flaps, controllable pitch prop and Rolls-Royce Kestrel of 745 h.p.

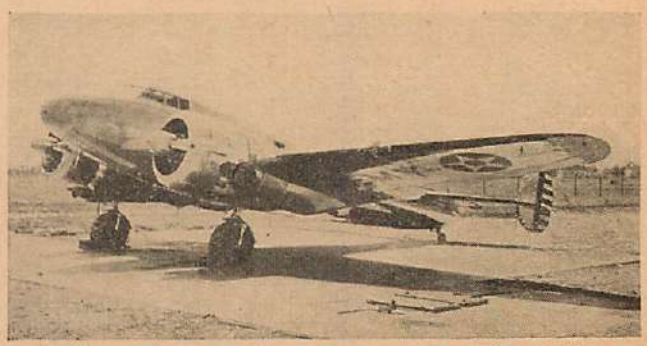


The familiar Martin Bomber shown camouflaged for recent army-navy maneuvers. The older model 139W is fitted with 800 h.p. Cyclones, the 146 with 1,000 h.p. Cyclones.

Beechcraft C-17H amphibian, 285 h.p. Jacobs 2-5; amphibian gear is that recently developed by Edo, the wheels retracting into the recessed floats.



Stearman 76-C3, one of a fleet for Brazilian army air corps, is powered by Wright R975-E3 450 h.p. Whirlwind.



Lockheed stratosphere plane, two 400 h.p. Wasp Jrs. supercharged, has turbine-supercharged fed, pressure-sealed cabin.

MODEL MAKING—

Air Trails Department of Practical Construction

Model Suggestions

Write us a letter this week

The Air Trails Model Department has presented the finest articles and plans that could be assembled each month. Not content with resting on progress made, the editors are endeavoring to improve an already satisfactory department. Many things which are paramount to your satisfaction we will learn only through your comment.

Do you have any suggestions for improving the plans appearing in Air Trails? What kind of plans do you prefer? How should they be drawn? Who are your favorite model designers, regardless of association with Air Trails? Are there any things which you would like added to the department to make it more complete? Have you suggestions for improving the general makeup of the Model Department? Is there anything missing?

Your suggestions and criticisms are important to keep this department keyed to the interests of its readers. By addressing a letter to the model staff, to acquaint them with your opinions, based on your own experience as a model builder and hobbyist, you will make possible the rendering of an even greater and more complete service.

11 Model Building Items

AIR TRAILS ADVERTISERS—OCTOBER, 1937

OLD MODELS

What becomes of them?

by Gordon S. Light

WHAT becomes of your old models? Every modeler has had this question put to him at some time. Many people seem extremely anxious to learn the fate of old models. And this is ofttimes their first question after you've told them a few details of your model work. With some people this question is obviously the opening wedge for the request that you give a model to their son or nephew. But with the majority this question represents a genuine interest in the fate of the old models.

It seems as though most old models are retired to the workshop following active flying days. If the model has turned in some outstanding flight it usually rates a place of honor. Completely assembled as it was during the last flight, it is suspended from the ceiling or rested atop a closet or on a specially built shelf. Here it is available for inspection by visitors.

The less-fortunate models are disassembled and packed away in boxes. Or the parts are piled ingloriously in some corner of the workshop. Sometimes parts of old models are called upon to do service in the new model which is being built. But, for the most part, they become dust-covered and shopworn, eventually finding their way into the scrap box after being salvaged for any useful fittings or metal parts.

It really takes a hard-hearted modeler to consign any model to the scrap box. When you set about the disagreeable task of cleaning the shop you'll find each model recalls some pleasant experience. And you'll remember all the good flights the model turned in. Instead of discarding it you'll put it aside, thinking you'll fly this model again sometime. In this way the pile of old models in the workshop continues to grow. But usually you can muster sufficient courage to discard a few of the oldest and most dilapidated models regardless of service.

The fate of most models is to finally reach the wastebasket after a several-year rest in the shop. But many suffer entirely different and, in many cases, more violent fates. Some models seem destined to die in action. They crash into trees or fly through wires. Their end comes when you decide it's not worth while to repair the damage of the last crack-up or when the model is perched atop some high tree or building, having defied all your efforts to reach it.

The most spectacular ending for a model is to disappear high in the sky in a thermal current. It's always pleasant to conjecture as to how long it flew and where it finally landed.

Although some models are no longer of value to experienced modelers, youngsters are only too happy to get them. And this is a mighty pleasant way to dispose of your old models.

Occasionally you'll be able to sell a model. But in most cases they're given away. The thrill that the model gives the youngster proves ample payment. Usually the model is back in your shop for repairs immediately following the first flight. In the hands of an inexperienced youngster it is doomed to an extremely short life.

Giving your old models to youngsters pays dividends. It is probably the most profitable way to dispose of your old crates. Once you've made friends with the neighboring youngsters you'll find the problem of retrieving the model after each flight has been solved. Youngsters never seem to tire of this task and they'll tackle the longest flight. And they'll climb trees after wayward models, or retrieve them from the neighbor's garden—their enthusiasm carrying them through situations that ofttimes prove mighty awkward for an older person.

In speaking of old models, note should be taken of the commendable practice of the nationally known contest veterans. Evidently these builders dislike retiring proven designs, for the two or three years of competition which fall to each particular model reflect sagacious as well as sentimental motives on the part of the experts. Perhaps we should follow their example for more enjoyable model building.

I should like to take this opportunity to explain an improvement which is about to be made in the handling of questions addressed to this department. Due to both their ever-increasing number and to the natural delay in publishing the answers, it has been decided to answer by mail each question received. By doing this, it is expected that a better service will be available to readers.

Contest Calendar

READERS and CLUBS. Notices should be mailed to the Contest Calendar, Air Trails, 79 7th Ave., New York City, at least 2 months in advance; news of winners and results immediately after the events.

FOURTH ANNUAL Model Builders' Convention, September 11th, New York City. Leading Eastern model builders and leaders will meet to discuss rules and regulations, plans for future activities, and exchange of ideas on design.

ANNUAL CONTEST of the Ace Model Club, Marshalltown, Iowa. Tentative date July 4th; announcements to be made later. For further information address Ace Model Club, 19 South Center Street, Marshalltown, Iowa.

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.)

Model Academy

The American Academy for Model Aeronautics is celebrating its first birthday. It has had rather uncertain existence during the past year, following its organization at the 1936 national meet in Detroit. But difficulties have been cleared away and the Academy looks forward to a successful year in its efforts to put model building in this country on a higher scientific basis. It is affiliated with the National Aeronautic Association and has the power to carry on its activities in this country under license of the Federation Aeronautique Internationale. The Academy has been charged with the formation of official contest rules and regulations for model flying in this country. Membership in the Academy is open to any modeler who has shown continued interest in the hobby and is qualified to give evidence of his ability and interest.

Full information about this active organization can be obtained from Ernest A. Walen, 8 Lawndale Street, Springfield, Mass.

New Utrecht High School Airplane Club, New York

The Aviation Club of the New Utrecht High School completed in 1936-37 semester a successful program of aeronautical activities. In anticipation of even greater progress during the 1937-38 term, plans are on foot to organize a city-wide, high-school aviation club. Accordingly, members of other New York City high school aviation clubs are requested to address Mr. Ben L. Davis, 175 Beach Street, Rockaway, N. Y., for further information.

James Kagawa, of Hawaii, and his pontooned stick model.

Chicago Aeronuts

Peace and contentment reign among the model builders of Chicago. The Aeronuts once more occupy the top of the list for national record holders. Club member Milt Huguelet captured the junior record for Class A ROG shortly before the national contest. This put the Chicago boys out in front. The results at the nationals only increased their lead over modelers from other cities. Wally Simmers turned in a flight of 21:30 to win the Stout Indoor Trophy. This is the highest time ever recorded in the Stout event. And, too, it is a new Class B indoor stick record.

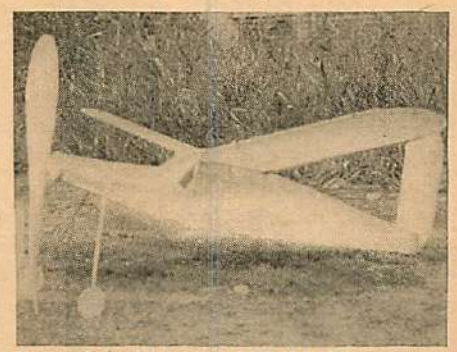
Carl Goldberg did not bring the Springfield Trophy for indoor stick models back to Chicago. This trophy was beginning to feel right at home in Chicago—Goldberg having won it for the last three years. Carl missed the trophy by only a few seconds, which is probably the result of his spending too much time tinkering with his gas model and too little time practicing indoor flying. Carl's gas model took second. It hasn't been heard from since it flew out of sight after 52 minutes.

Built by Raymond Levy, this Cyclone-powered model won the French championship with a flight of 19 minutes.

The 'nuts all enjoyed their model session in Detroit. With the experience of one more national meet to back them up they say, "Wait until next year!" But we don't think there's any need to wait. We're convinced they're the tops. If you doubt it—look at the records!

Illinois Model Airplane Club

The I. M. A. C. has had a very successful contest season, winning the Chicago Junior Birdmen of America and placing high in the last national meet in Detroit. Club member Walter March was high-point winner of the J. B. A. meet. All his ships were consistent performers. He won first in the stick-model contest. He has done this for the past three consecutive years. William Gough, also of the I. M. A. C., was another star performer of the Junior Birdmen contest. He took first in the glider event. Alvin Anderson, Robert Kergard, and Harry Dolfi, all of the I. M. A. C., placed high in this contest.



A model of the Wakefield Cup winner for 1935, built from plans appearing in the April 1936 Air Trails.

At the Detroit meet the club was equally successful. Alvin Anderson won the Berryloid contest for the best finished model. Harry Dolfi took sixth in the Stout outdoor fuselage contest and a fifth in the indoor stick event. Frank J. Paryhaza was well on his way to a long flight with his indoor tractor when he hooked a rafter after 10 minutes.

The I. M. A. C. is staging a drive for increased membership. Any one living near Chicago is invited to write to the I. M. A. C. and join the activities of this active group. Address your letters to Frank J. Paryhaza, Publicity Director, Illinois Model Airplane Club, 1789 N. Mozart St., Chicago, Ill.

The I. M. A. C. is active in gas modeling. The recent talk of banning gas models has rallied them to the support of the gas model. They've declared themselves to be against any restriction that would in any way hamper the activities of gas-model flying.

Hartford, Conn., Results

The First Annual City Model Airplane Meet, sponsored by the amuse-

(Turn to page 62)

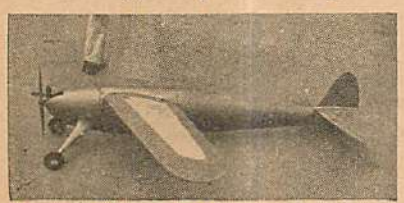
A model sailplane in flight, built by James Kagawa of Hawaii.

A scene at the indoor model competition, held in the Gross Island blimp hangar.

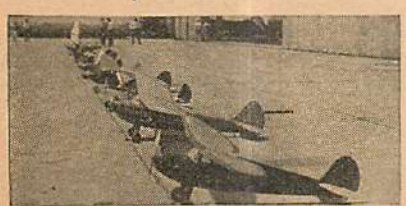
Bob Sommers and Robert Guilfony, both of St. Louis, winding a rubber motor.

Wilbur Tyler, left, and Bruno Marchi, right, prominent Boston builders.

Frank Zaic of New York and two of his typically fine designs.



Petrides' beautiful streamlined gas job was lost.



Above: The gas model line-up for the Berryloid best finish event.

Below: Roy Wriston and his latest "Diamond."

THE National CONTEST

1937 NATIONAL MEET—DETROIT, JULY 7-12th

BUSSES, trailers, boats, automobiles, motor cycles, and airplanes were pressed into service to bring modelers to Detroit for the tenth national model meet. Modelers came from all parts of the country. They have become accustomed to the trip to Detroit for a national meet—5 of the 10 meets have been held there. And from present indications we will be back in Detroit again in 1938.

July 7th-12th were the days of the meet. Actual flying did not get under way until Thursday, July 8th. But modelers began to converge on Detroit several days before the contest. They talked shop with old friends, did some last-minute model building and some of the more ambitious test-flew their models.

The Wakefield and Moffett events were run off together, since the rules governing these 2 contests were identical. These events got under way Thursday morning at the airport. There was considerable speculation on the part of the entrants and the officials as to what effect the increase in weight rule (8 ounces per 200 square inches) would have on the length of flights. Good weather, coupled with splendidly designed and built models, proved that weight is of little importance when it comes to turning in a long flight.

The winning Wakefield flight was 8:26.1, which is almost twice the 3-flight average turned in last year in Detroit with a model of only half the weight. Herbert Fish of Akron won first place on the Wakefield team. He lost his model during the contest and we certainly hope he was able to work fast enough to have a new model in England by August 1st for the Wakefield contest.

Wakefield contestants were disappointed to learn that it would not be possible to send a team to England for the contest as originally planned. However, it was rumored when the magazine went to press that a team of three, including Alvie Dague and Herbert Fish, would be in England for the contest. At the last minute it was possible to make arrangements for the trip. All are well qualified to represent us at this contest. Dague placed second in the elimination contest—only .7 seconds behind the winner. He also won the Mulvihill and the Bloomingdale indoor events. Dague is one of our outstanding modelers and we're sure hoping the Wakefield trophy is included in his baggage on the return trip.

James Cahill of Indianapolis, Indiana, won the Moffett Trophy with the splendid time of 15:45.1. The trophy returns to this country after a year's stay in New Zealand. New Zealand modelers made a determined effort to win the trophy again. However, they are handicapped by *(Turn to page 91)*

Two contestants winding a stick job.

Joseph Conradi, left, and Dave Selzer, right, prepare a twin pusher.

The Akron delegation. Herbert Fish, Wakefield elimination winner, standing third from left.

CONTEST SIDE LIGHTS

Alvie Dague singing the stick model's theme song: "I Ain't Got Nobody!"

Nat Polk had a 30-year-old contestant in tears because his parents' consent did not accompany his entry blank.

Bassett's and Goldberg's models left the country; they flew into Canada. Bassett has located his model. How to get it from Canada to his home in Philadelphia is worrying him now.

Wally Simmers has a mascot—a duck, but no quack at this model game.

The radio broadcast of the gas-model events on Sunday was received by spectators in their automobiles parked around the fence of the airport.

Many modelers used house trailers, taking up temporary residence at the airport.

The *Daily Blurb*—the annual contest comic paper—was an outstanding feature of the contest. The *Daily Blurb* is published by the Boston modelers. In their own language—the *Blurb* is incomparable, colossal, and unique.

The "outstanding"(?) performance of the Boston group at the meet earned them the right to live in Ye Dogge House for the next year. "Even if I can't collect cups, I can at least collect fleas," mused Wilbur Tyler, as he led the Boston delegation into the canine shelter.

Bluenose Bruno Marchi, of Boston, was disgusted with his contest showing. He announced his retirement from model building—that is, for at least 2 weeks.

John T. Dilly, of Galt, Ontario, had a pleasant time in Detroit. Between drinks of ginger ale he did manage to make 1 or 2 flights.

Joe Lucas, of Chicago, holds the "pop-drinking" record—20 bottles.

It was impossible to persuade Farmer Brown to lower his 10-cent rate for return of models. No one has seen or heard of the unfortunate modeler who offered him 9 cents for the return of his model.

"Dynamic Dan"—*Daily Blurb* reporter—interviewed Farmer Brown about the 10-cent charge for returning models. Not only did he refuse to lower his rate, but he charged Dynamic Dan 10 cents for landing on his field.

Torrey Capo, Boston, laboring to wind his indoor stick.

Three fliers coöperate to wind a twin pusher.

Complete results of both the Detroit meet and the Wakefield FINALS.

Alvie Dague, Tulsa, 2nd place Wakefield, Mulvihill and Bloomingdale Trophies, 3rd place Moffett.

Bob Jeffery, speed modeler and builder of note, looks things over.

Above: Back stage the outdoor entrants assembled countless models.

Below: A boy from North Carolina and another from Louisiana.

The Diamond, in qualifying for the 1936 Wakefield, flew out of sight in 41 min. 10 sec.

The DIAMOND

Complete plans for building a proven contest model—a design flown by the Tulsa group to many competitive victories

By Roy Wriston
In collaboration with
Gordon S. Light

THE DIAMOND qualified for the hall of fame during the Wakefield contest last year in Detroit. Wriston had qualified for the finals with a flight of 41 :10, before the model passed out of sight. It was flying at about 1,500 feet when Roy and the timers were unable to continue the chase. They came to a river with no bridge in sight. That put Roy in the sorry predicament of being on the Wakefield team without a model.

That night, at the hotel in Detroit, the boys from Tulsa really did some high-powered modeling in preparation for the finals next day. Roy set about converting a spare Diamond wing of 150 square inches into one with the necessary 200 square inches. It was also necessary to increase the cross section of the fuselage of the Diamond to meet the Wakefield overall cross-section formula. To bring the model up to weight requirements, about 1 ounce was added to the bottom of the fuselage, directly below the center of gravity. By 5 :30 the next morning, Roy had things pretty well under control. Alvie Dague and Gifford Heffley helped in the last-minute preparations.

Roy started adjusting his model as soon as he reached Wayne County Airport about 10 in the morning. This was a few hours before the contest actually got under way. During the first few glides, the model stalled and dived in, breaking the propeller. This was quickly cemented and testing was resumed. Under power the model stalled rather violently. This was partially removed by downthrust.

But Roy didn't have time to adjust his ship thoroughly. And while he was still uncertain about its behavior, he gave it an official flight. It turned in a flight of 1 :40, still showing a stall after the take-off. This could have been cured by a slight increase in downthrust. However, Roy feared the dive that might result from the addition of too much downthrust. It was the choice of 2 evils and the stall seemed the less serious. On the second flight the model climbed steeply. The timers lost it after 9 :15. Roy followed it to the middle of the airport and finally retrieved it after 20 minutes.

The little time which Roy was able to spend adjusting his model showed up on the third flight. The last official flight was disastrous. The model gained little altitude and turned in a short flight. This flight made modeling history. Had the flight been about 22 seconds longer the Wakefield trophy would have remained in this country. The final tabulation showed Wriston's 3-flight aver-

Roy Wriston and his 2nd place 1936 Wakefield model. A modification, flown by Alvie Dague, placed 2nd in the 1937 Wakefield eliminations.

ABOUT ROY WRISTON

MUCH of the model interest in Tulsa, Oklahoma, can be traced directly to Roy Wriston. His enthusiasm and skill in modeling is contagious. It has spread among the Tulsa builders and has produced the most enthusiastic group of modelers in this country.

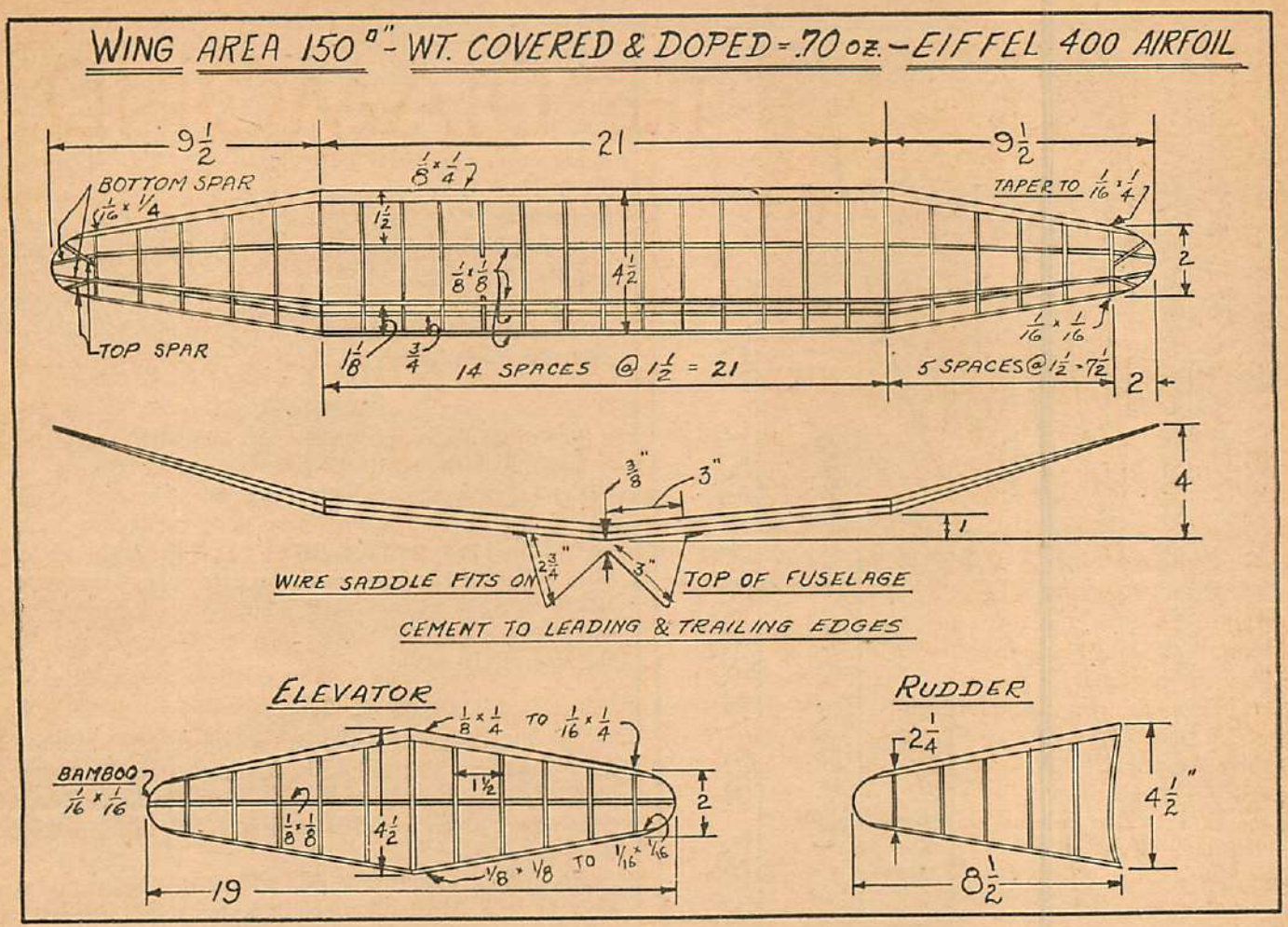
Roy started down the balsa-and-tissue trail back in 1929. Traveling was a bit rough at first and he didn't have much success. In 1932 Wriston took a holiday from modeling. But the next year he was back in it again. He won the Jimmie Allen Air Race and, together with his mother, flew to Chicago and visited the World's Fair with all expenses paid.

Upon his return to Tulsa, he helped reorganize the Model Aeronautical Engineers of Tulsa. And he has served as president for the last several years.

It would take too long to list all of Roy's outstanding contest performances, but here are a few of them: second to Carl Goldberg in the indoor stick event both in 1935 and 1936; second in the Wakefield event in 1936; twice winner of the MAE trophy for outstanding model ability; and second in the indoor fuselage contest this year at Detroit.

Roy shows championship style indoors and outdoors. In 1935 he won the indoor and outdoor contest in the same day, during a meet between Tulsa and Oklahoma City.

His ambition is to become a petroleum engineer with aviation as a hobby. And ambition No. 2 is to win the Wakefield trophy and the indoor stick event in competition with the old champion—Carl Goldberg.



age was only 7 seconds behind that of Judge, the English winner.

After the contest was over, I had the satisfaction of watching Wriston complete the adjustment of his ship. After several trial flights it was flying perfectly—turning in flight after flight that would have clinched the Wakefield trophy for the United States.

But the strain of working all night, plus the disadvantage of flying an untested model, had taken its toll. Wriston did a good job under terrific handicap. Winning second place was an outstanding accomplishment under the circumstances.

THE DIAMOND

The first Diamond built by Wriston flew out of sight after 24:30. The second one made a flight of 5 minutes in a contest held during winter with 5 inches of snow covering the ground and the temperature close to 32 degrees. The next 2 Diamonds were converted for use in the Wakefield event. While this model was not originally designed for the Wakefield, the only changes necessary are to add 2 strands of rubber, 1 ounce of weight and substitute a wing of 200 square inches area.

CHANGES FOR THE NEW CONTEST RULES

For this year's competition under the new weight rules, the fuselage length was increased to 36" length. The rudder design was changed (visible on the photos) and the weight was boosted up to 6 ounces—the necessary amount for 200 square inches. The basic design was not changed and good results were obtained. On 4 consecutive test flights during cloudy weather (not cumulus clouds) the 1937 Diamond turned in 4:49, 5:52, 2:17, and 6:06. On the 2:17 flight the rubber knotted and the ship came down with many turns left in the rubber motor. Roy put about 550 turns in the motor on all these flights.

THE ORIGINAL DIAMOND

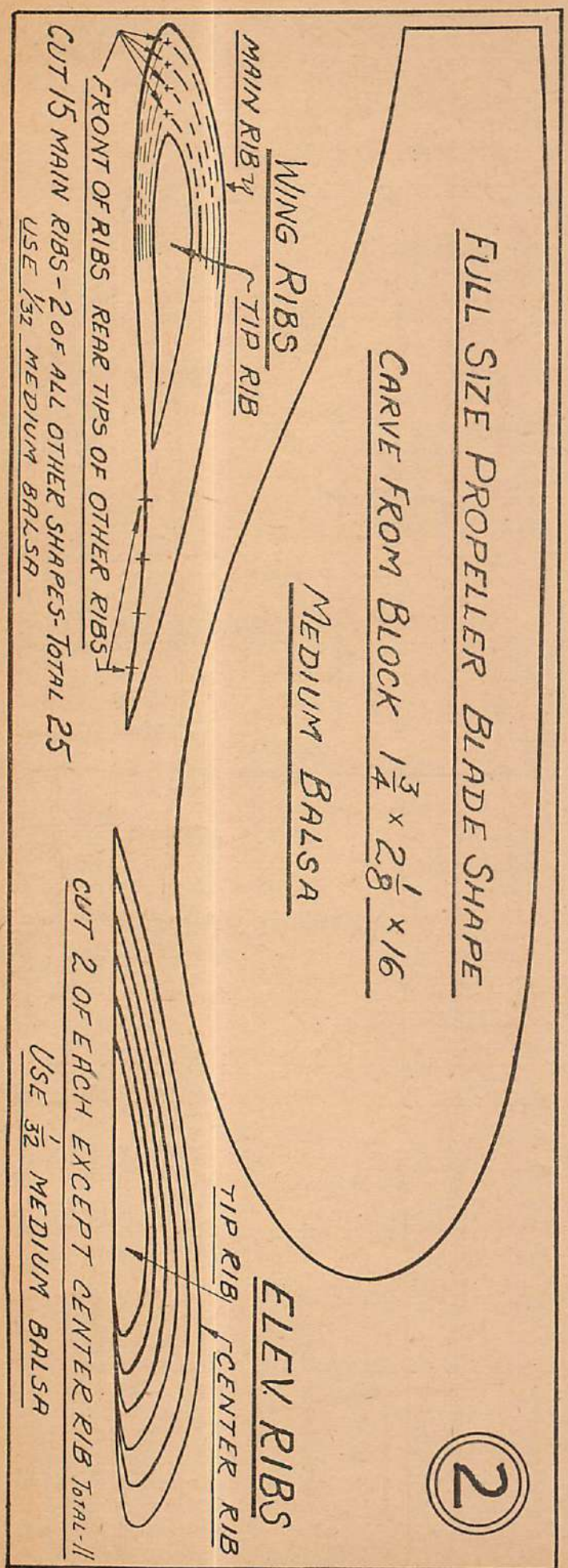
But any achievements of the converted Diamond can be traced back to the successful features incorporated in the original design. Therefore, we thought it more important to describe the original Diamond. You can make the changes suggested by Wriston if you have contest ambitions. Or if you are interested only in a good flying model, build the model exactly as described in this article.

CONSTRUCTION

Construction of this model is not difficult. It is the same as that used in practically any other fuselage model. We've omitted detailed instructions and procedure but have made a special effort to point out the difference between the Diamond and other models. Also included is a thorough account of the technique of balancing and adjusting the finished model.

FUSELAGE

Medium- to light-grade balsa is used throughout the construction. Medium is recommended for the fuselage. The Diamond shape is not difficult to obtain. Each side of the fuselage is the same shape. Therefore, the easiest way to build the fuselage is to consider it as a square cross section—building it up from 2 side panels and joining them with cross braces. After the fuselage has been assembled, it is turned on edge for adding the landing gear and mounting the tail surfaces.



WING AND TAIL SURFACES

Rib snapes for both wing and elevator are shown exact size in the drawing. Rudder ribs have not been shown, since they are cut from $\frac{1}{32}$" sheet balsa to a smooth streamline curve. The elevator is the same shape as the tips of the wing. The wing is mounted to the fuselage with two wire saddles, which rest atop the fuselage and are fastened with rubber bands. These wire saddles are cemented to the leading and trailing edges of the wing.

Tissue is put on with the grain running lengthwise on all surfaces. It is sprayed with water and doped with one coat of medium, thinned, nitrate dope.

PROPELLER

The propeller is cut in the usual manner. The blank is laid off as shown in the drawing. The back of the blades are first cut to a flat surface; then the blade itself is cut to shape. The next step is to camber the rear face of the blade to the depth of $\frac{1}{8}$". The front of the blade is finished and the entire propeller sanded smooth. Brush on three coats of dope. The hub of the propeller should be about $\frac{1}{4}$" thick, tapered to about $\frac{3}{32}$" at the tips of the blades.

ASSEMBLY AND FLYING

The detailed weights of the Diamond are: rubber, .85; propeller, .25; tail, .35; wing, .70; fuselage, .85. Total—3.00 ounces. Area: 150 square inches. These weights are given for 18 strands of $\frac{1}{8}$" flat rubber with 2 inches slack.

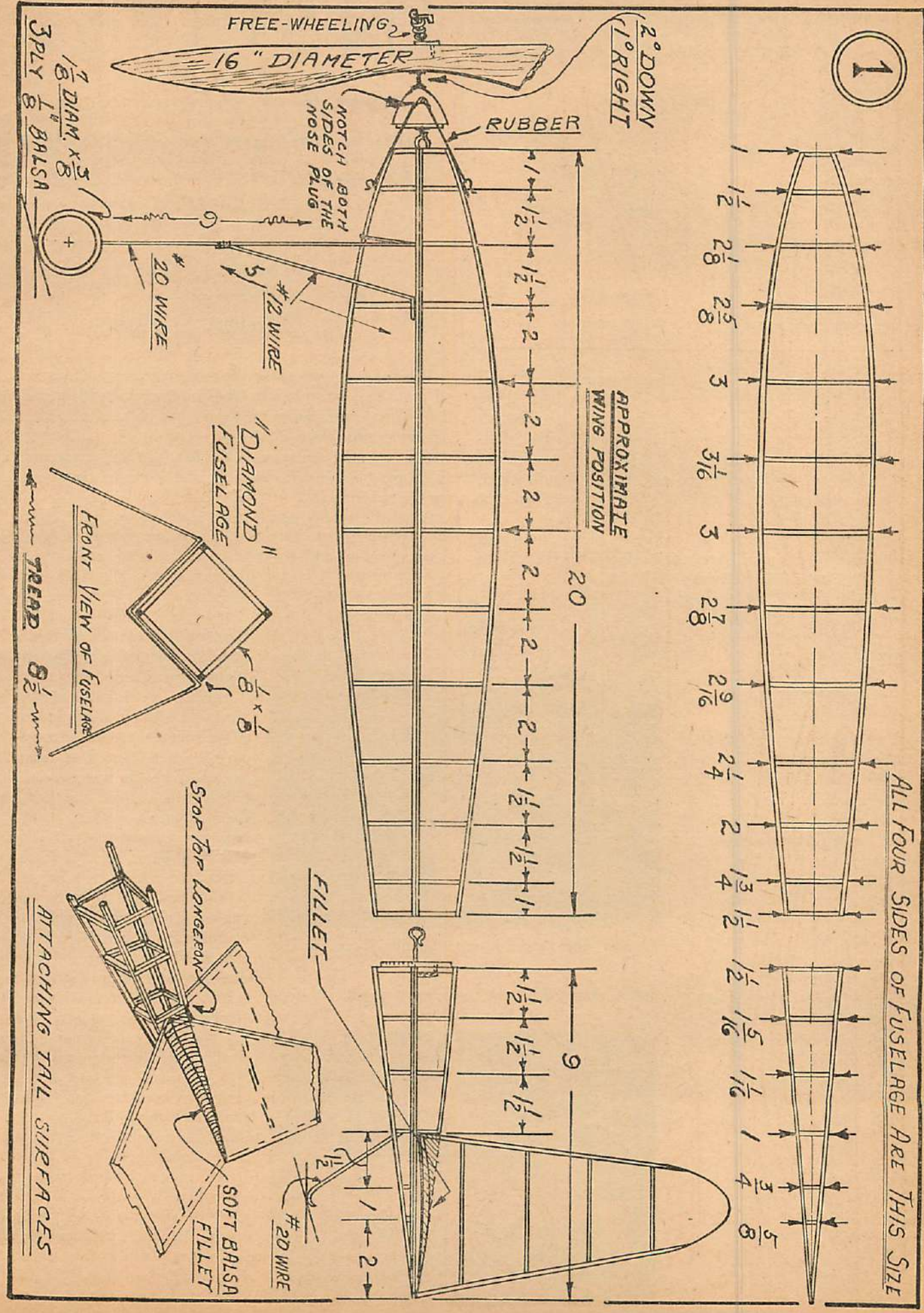
About 650 turns can be packed into the rubber. This number will vary with the skill of the man behind the winder and the condition of the rubber. The model is wound through the front of the fuselage—hooking the end of the propeller shaft directly to the winder. The other end of the rubber is held at the rear hook.

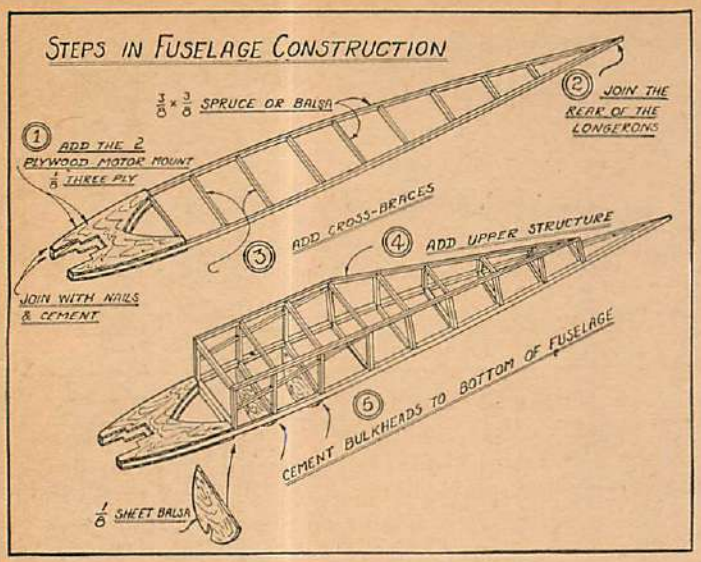
The following description of the method of test flying was prepared by Roy Wriston. His success indicates the method is a good one. Follow his suggestions closely. Poor flying ability is more often a fault of the modeler than the model.

Select a very calm evening for test flying. A grassy field will reduce damage to a minimum during the first few treacherous trial glides. If your model shows stalling tendencies during these glides, move the wing backward a trifle. If it dives, move it forward. However, don't move the wing too far away from the center of gravity. While this might produce a reasonably good glide, it is practically certain to cause a disastrous flight under power. If necessary, change the incidence of the wing rather than resort to any great change in the position of the wing. The usual incidence used is raising the leading edge $\frac{1}{8}$" above the trailing edge. The center of gravity should be at the center of the wing.

Start the power flights only after the glide is satisfactory. Try about 100 turns for the first flight. Then increase the number of turns to about 250. Bad adjustments will be revealed during a flight under this amount of power. Correct any stalling tendency by increasing the negative thrust. This is conveniently done by changing the angle of the nose block. Insert small slivers of balsa between the top of the block and the first fuselage cross brace. Cement these blocks to the nosing as soon as you are satisfied with the adjustment.

(Turn to page 90)


1
FREE-WHEELING
16" DIAMETER
2° DOWN
1° RIGHT
RUBBER
NOTCH BOTH SIDES OF THE NOSE PLUG
1/8" DIAM. x 3/8
3 PLY 1" BALSA
#20 WIRE
#12 WIRE
APPROXIMATE WING POSITION
20
9
"DIAMOND" FUSELAGE
FRONT VIEW OF FUSELAGE
1/8 x 1/8
TREAD 8 1/2
FILLET
#20 WIRE
SOFT BALSA FILLET
STOP TOP LONGERON
ATTACHING TAIL SURFACES
ALL FOUR SIDES OF FUSELAGE ARE THIS SIZE
1
1 1/2
2 1/8
2 5/8
3
3 1/16
3
2 7/8
2 9/16
2 1/4
2
1 3/4
1 1/2
1 1/2
1 5/16
1 1/16
1
3/4
5/8



INSPIRER

Plans for building a rugged gas model designed especially for beginners—the first of two installments

By Francis Tlush
in collaboration with
Gordon S. Light

THE INSPIRER was developed especially for Air Trails model enthusiasts. It is intended for those builders who haven't, as yet, built a gas model, or for those who haven't had much success with other difficult gas models. The Inspirer will tickle your modeling fancy and will give you much pleasure and enjoyment. And, too, the small cost of building this model will not warp your budget.

Construction is simple. However, clean lines and streamline appearance have not been sacrificed. With relatively little work the beginner can obtain an even footing with the expert through the championship performance of the Inspirer.

CONSTRUCTION

Fuselage

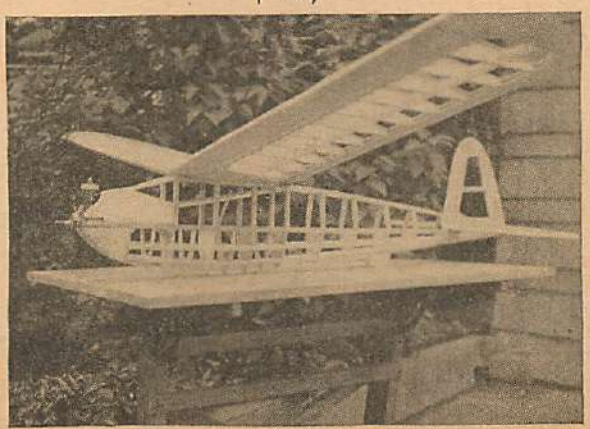
Fuselage construction is different from the methods usually used. There is little work involved. And, even better, there isn't much chance of your building the fuselage incorrectly. It won't be necessary to draw the plans full-scale. Merely following the dimensions given in the reduced drawing will supply all the necessary information.

First obtain 2 perfectly straight pieces of 3/8x3/8x52" spruce or bass, which serve as the basic fuselage longerons for the model.

Next cut the plywood motor mounts out of 1/8" birch or poplar plywood. Two pieces will be necessary—one for the top and the bottom of the main longerons. These pieces are secured to the longerons with small nails and cement. The rear ends of the longerons are now drawn together and fastened with small brads and cement.

Above: The model is exceptionally sturdy and a proven flier.

Below: The framework combines strength and simplicity.



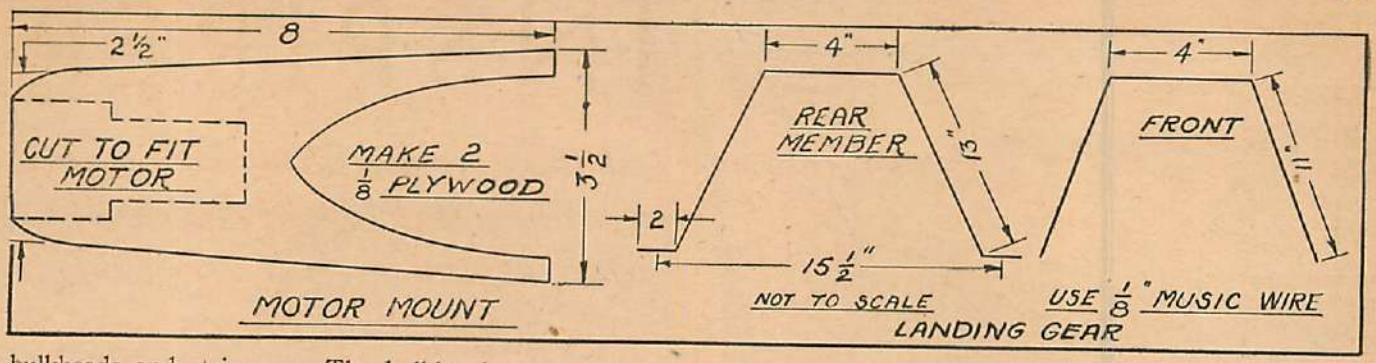
The various positions of the cross pieces can be marked off and the corresponding cross pieces cemented in position. The cross pieces up to #9 are of hard wood, the remainder are made of balsa. The longerons between station #9 and the rear of the fuselage are gouged out as shown on the drawing. This is done to remove all unnecessary weight.

After the main basic fuselage structure is completed the upper structure is added. Be careful to cut the front-cabin uprights and the rear-cabin uprights correctly to the proper length. The front ones are 3/16" higher than the rear ones. The top of the fuselage in the rear curves to a point, forming a triangular shape toward the rear.

Bulkheads are cut from 1/8" stock. The widest bulkhead is 3½" wide and it will be necessary to join 2 sheets of balsa. Merely coat the edges of the balsa with cement and press them lightly together, allowing enough time to dry. The balsa will be joined sufficiently strong for use as a bulkhead.

Bulkheads #4, 5, and 6 are cut out as shown for the battery box. The notches for the stringers—other than the main one—are cut after they have been cemented in position and the main stringer or keel (1/8x½" balsa) has been added. Secondary stringers are 1/8x¼" balsa and are bent to the shape of the fuselage. The main stringer is cut from 1/8" sheet balsa to the curved shape of the fuselage.

After the stringers have been cemented in position they are capped with 1/16x½" strips of balsa. This will help preserve the shape of the bottom of the fuselage by preventing the silk covering from sagging between



bulkheads and stringers. The bulkheads are cut away between the stringers, to prevent the covering from "sticking" when it sags during doping operations.

The tail block is carved from soft balsa and cemented in place. This is accomplished by cementing the block to the rear of the fuselage and cutting it to the correct shape. It is then removed, hollowed out and cemented permanently. The same procedure is followed in making the motor cowl and the fairings for the front of the cabin. These two parts are cut out of one solid piece of balsa. After it has been shaped, it is cut apart and the cowling section and front-cabin fairing are hollowed out separately. The wall thickness of the front-cabin section should be about ¼". The cowl has a wall thickness varying from $\frac{1}{16}$" at the front to ¼" at the rear.

The motor cowl should be cut to fit the particular motor you are using. On the original model the cowl was split on the top, both halves being hinged with adhesive tape. A rubber band inside the cowl kept the cowl closed, yet provided easy access to the motor. The front-cabin section is cemented to the fuselage bulkheads and is cut away as shown in the drawing.

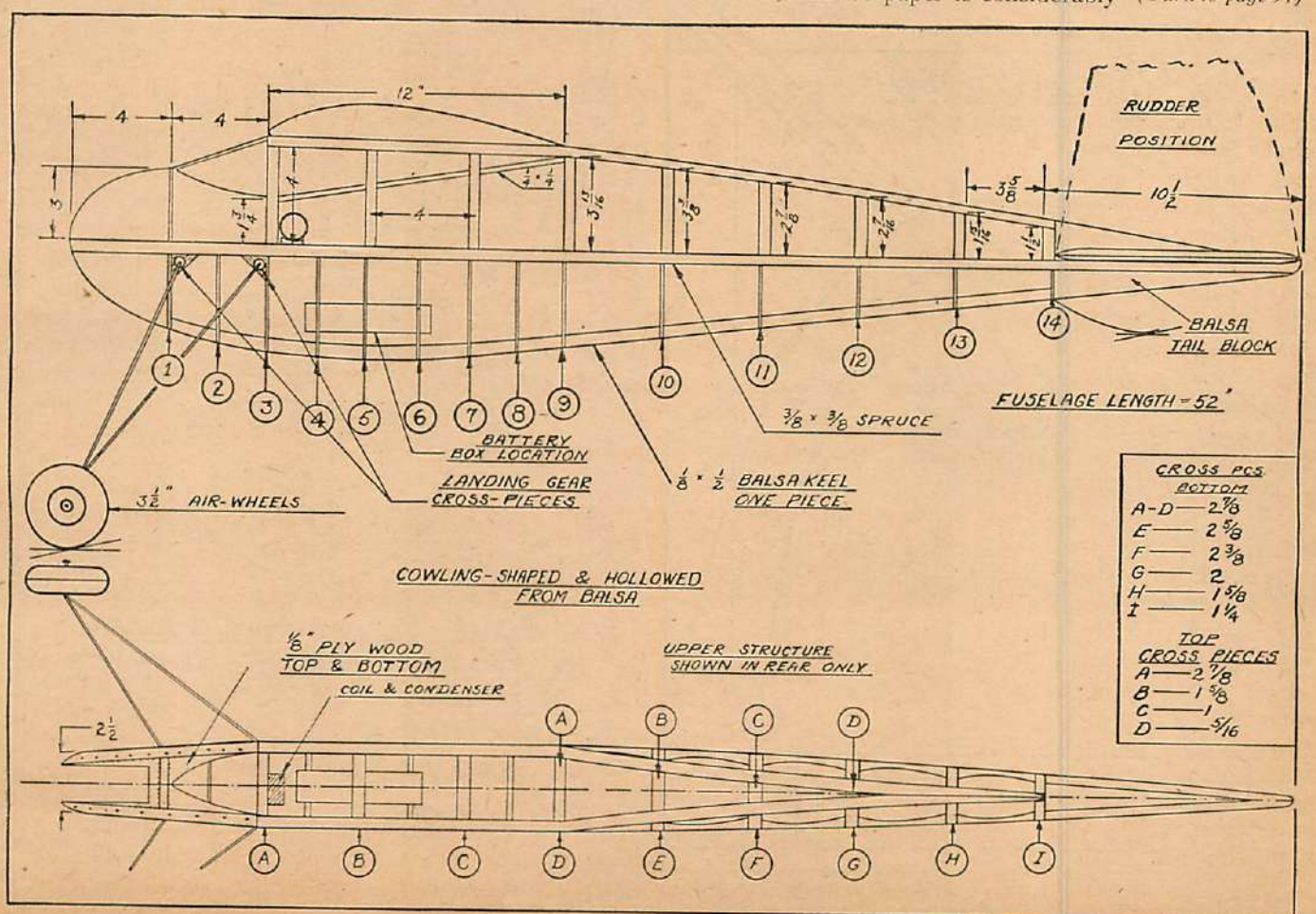
The bottom fuselage front is cut from a solid balsa block and hollowed out. Various methods can be used to attach it to the fuselage. The easiest is to use a few drops of cement. It can be removed, for servicing the model, by inserting the tip of a knife and cutting the cement.

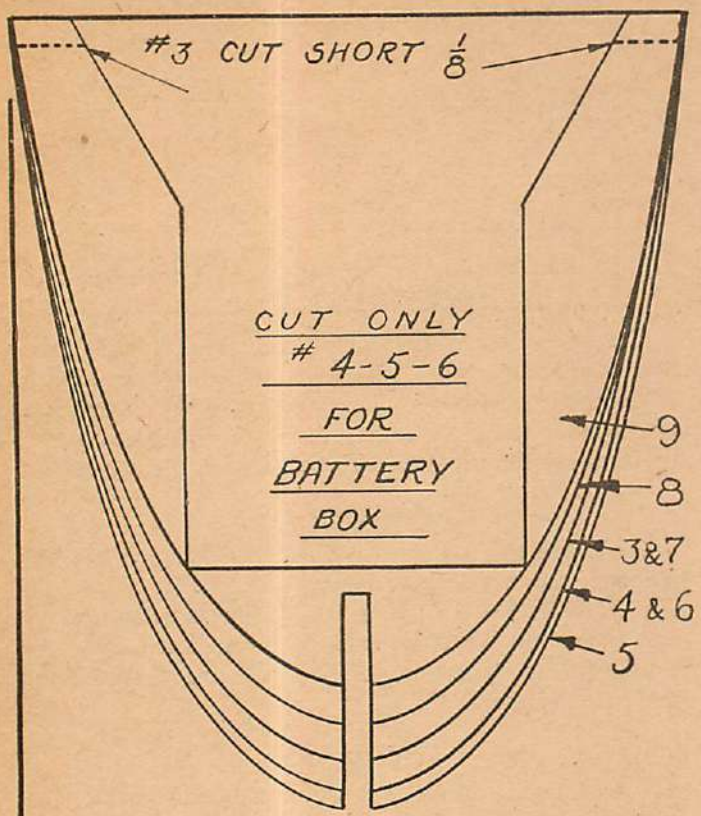
LANDING GEAR

½" diameter hard-wood dowels are used to secure the landing-gear struts to the fuselage. Drill holes in the dowels to receive the ⅛" wire. Insert the wire through the dowel and bend the ends to form each half of the landing gear. The ends of the wire are wrapped and soldered together.

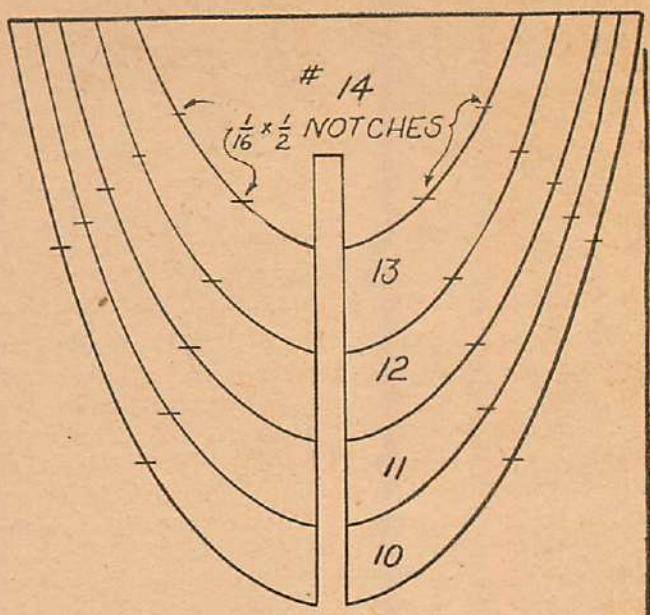
COVERING

The completed fuselage should be sanded smooth. Remove all excess cement with rough sandpaper and finish with a finer grade of sandpaper. Either silk or bamboo paper can be used as covering. Silk is more desirable, because it is lighter and also produces a more beautiful finish when painted or finished in its natural color. However, bamboo paper is considerably *(Turn to page 94)*

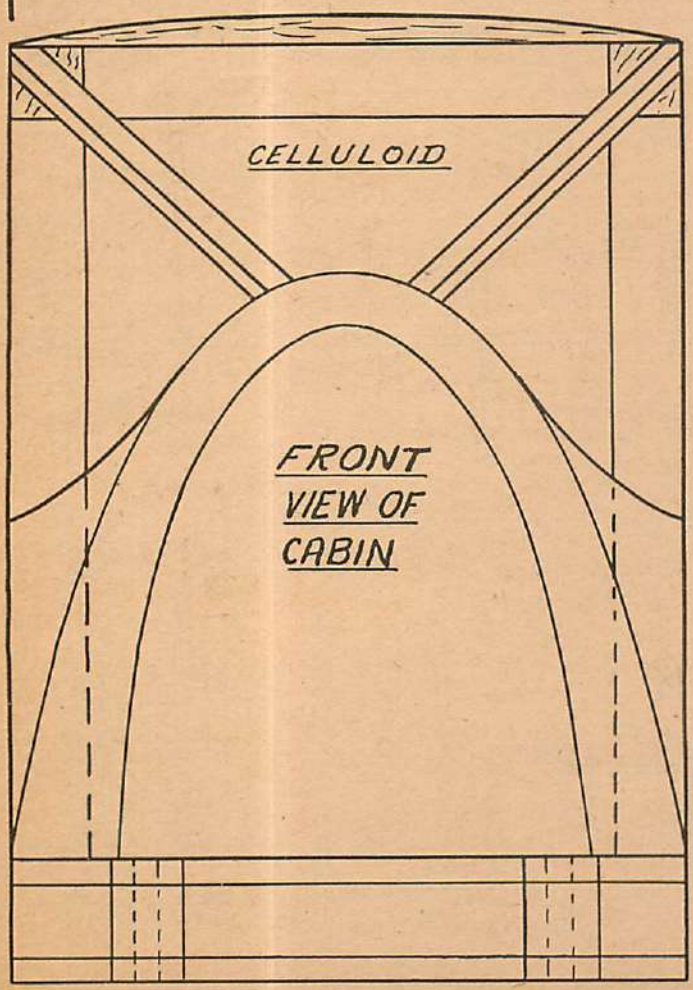


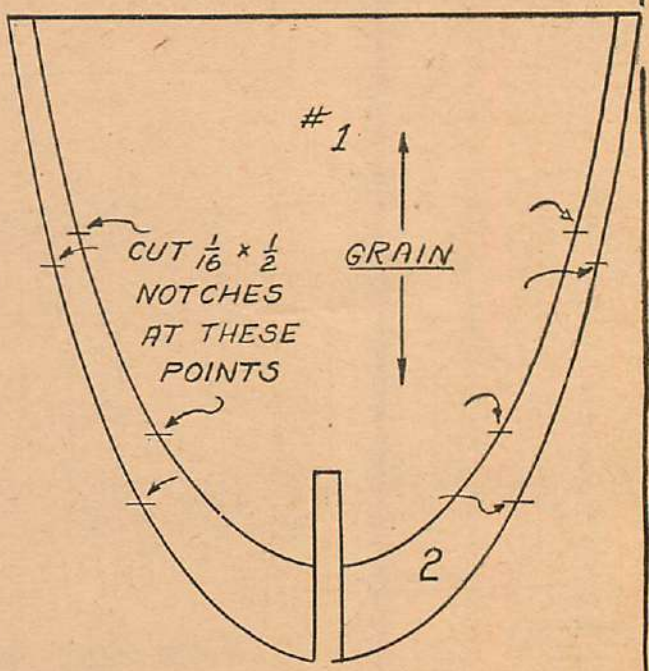


ALL BULKHEADS 1/8" BALSA

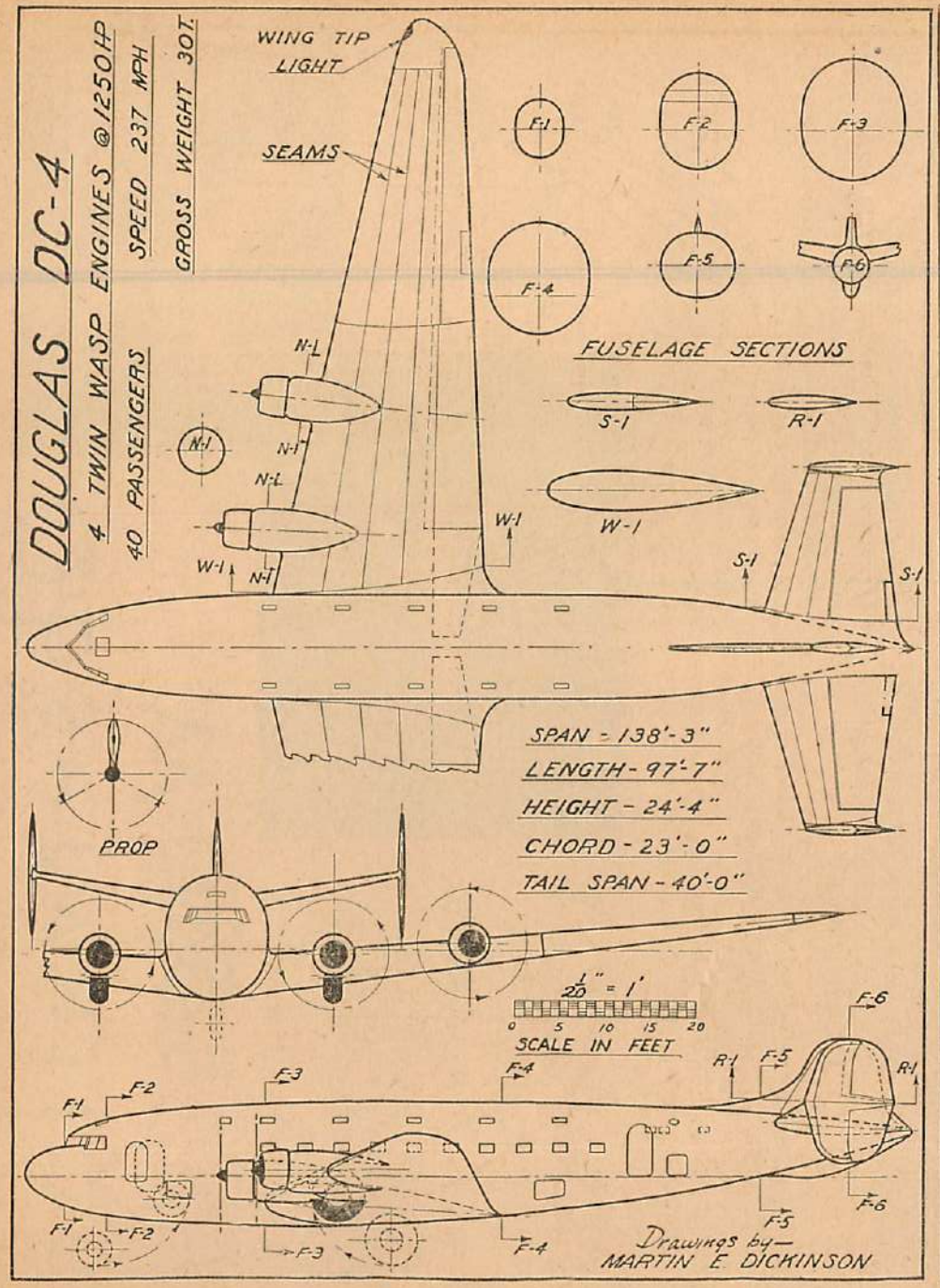


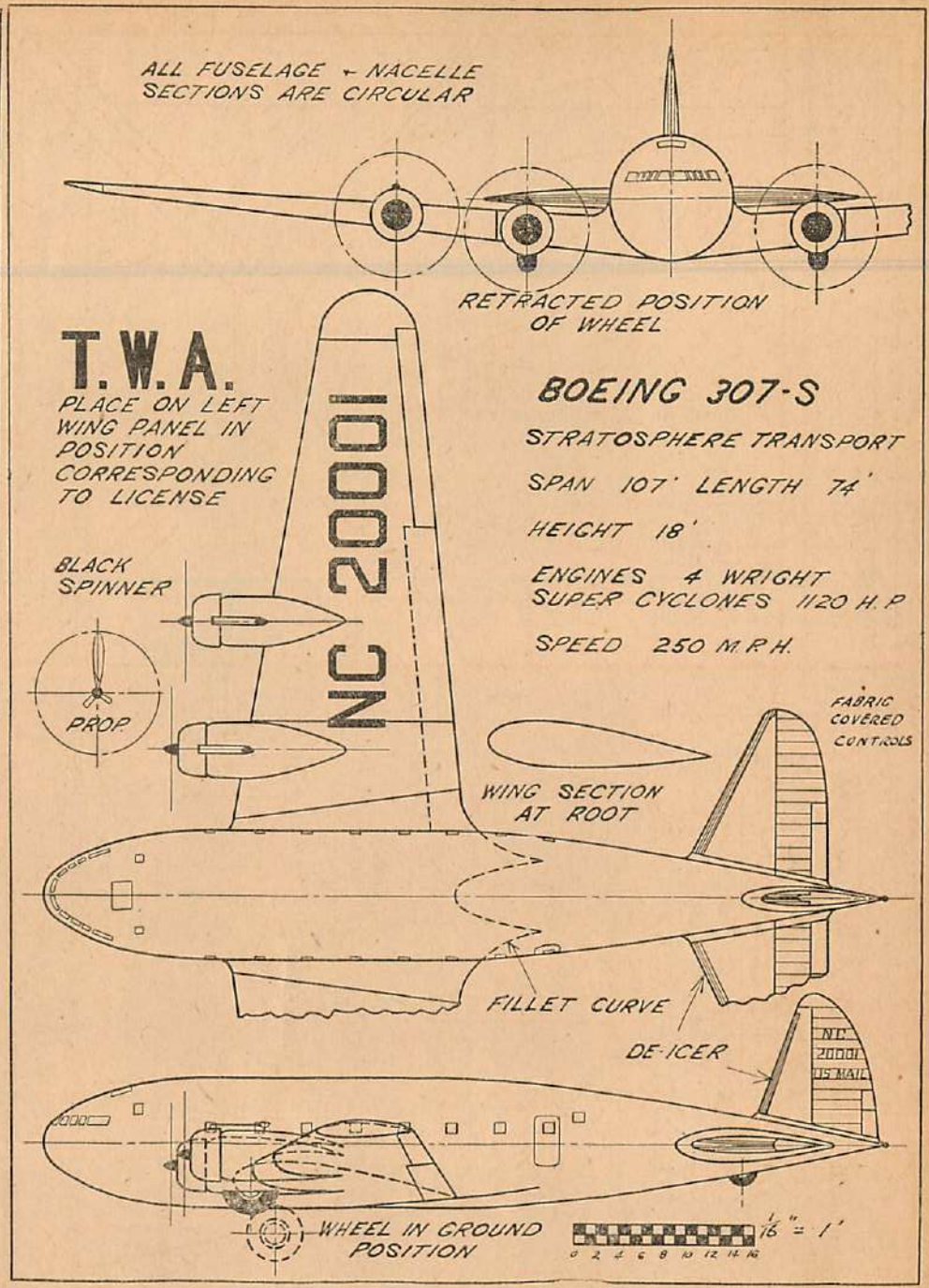
MAIN NOTCH 1/8 x 1/2
MAKE OTHER NOTCHES AFTER BULKHEADS HAVE BEEN ATTACHED TO FUSELAGE



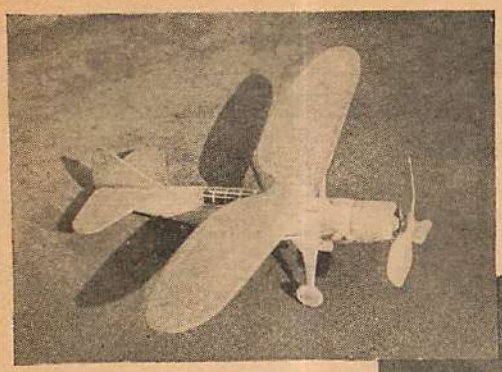


FRONT VIEW OF CABIN & MOTOR COWL. SHAPED FROM SOLID BALSA & HOLLOWED OUT. COWL IS SPLIT APART AS SHOWN ON THE SIDE VIEW

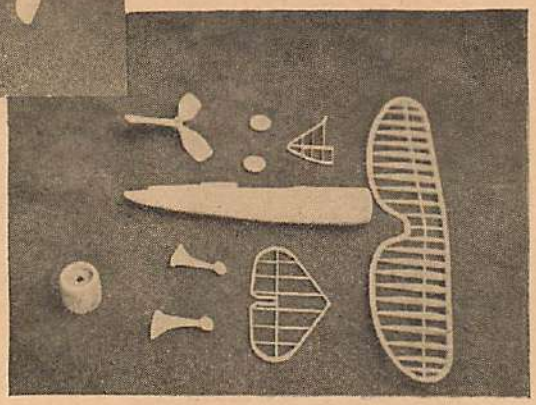

DOUGLAS DC-4
4 TWIN WASP ENGINES @ 1250 HP
40 PASSENGERS
SPEED 237 MPH
GROSS WEIGHT 30T.
WING TIP LIGHT
SEAMS
FUSELAGE SECTIONS
F-1
F-2
F-3
F-4
F-5
F-6
S-1
R-1
W-1
N-1
PROP
SPAN - 138'-3"
LENGTH - 97'-7"
HEIGHT - 24'-4"
CHORD - 23'-0"
TAIL SPAN - 40'-0"
1/20" = 1'
0 5 10 15 20
SCALE IN FEET
Drawings by—
MARTIN E DICKINSON


ALL FUSELAGE + NACELLE SECTIONS ARE CIRCULAR
RETRACTED POSITION OF WHEEL
T.W.A.
PLACE ON LEFT WING PANEL IN POSITION CORRESPONDING TO LICENSE
NC 2001
BOEING 307-S
STRATOSPHERE TRANSPORT
SPAN 107' LENGTH 74'
HEIGHT 18'
ENGINES 4 WRIGHT SUPER CYCLONES 1120 H.P
SPEED 250 M.P.H.
BLACK SPINNER
PROP
FABRIC COVERED CONTROLS
WING SECTION AT ROOT
FILLET CURVE
DE-ICER
WHEEL IN GROUND POSITION
1/16" = 1'
0 2 4 6 8 10 12 14 16

Observation Wings



Above: The completed model is realistic, including all external details of its prototype.



Right: The unassembled parts reveal a simplified but sturdy structure.

Complete plans for building a flying scale model of the Douglas O-46A army observation plane.

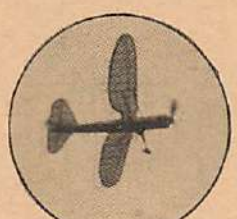
By Alan D. Booton

THE Douglas O-46A observation is one of the most beautiful planes in the air to-day. The admirers of military aircraft will soon have better chances of seeing the new O-46As, as they are becoming more common with the army's order of 115 rapidly nearing completion.

The design is exceptional for a flying-scale model, the parasoled wing and fine streamlining providing efficiency and stability in flight. Like its prototype, the model has the same grace of line—both for display and in the air.

FUSELAGE

The fuselage is carved from solid balsa and hollowed. Select two 1x2x13½" soft blocks and cement them together with three drops of cement, so they may be split apart later. Scribe the side blank first. You will find that the block is not deep enough, but by sawing the rear surplus off and cementing to the bottom at the front, ample depth will result. Finish sawing the side, then scribe the top blank and saw. Carve the shape with the aid of the fuselage sections, sand and dope to a smooth surface. Split the two halves apart and hollow them carefully to the thicknesses shown on the sections. Place the wood over a strong light to check the thickness.



Aloft!

Bend a rear hook similar to the one shown and cement it in position when the two sides are being recemented together.

The cowl drawing is simple and self-explanatory. The nose plug must be removable, but as much motor detail as desired may be added.

WING

The wing has been designed to retain the characteristic gull effect. Cut out the ribs and curved parts and cement them together, along with the leading edge, to form a complete outline. (It will be necessary to trace a right panel.) When dry, raise the whole outline ¼" with blocks and cement all the ribs in. When dry, crack the leading edge and trailing edge at ribs 2, and the leading edge again at 10, then block up in the final position shown on the front view and apply plenty of cement to the cracks. Cement the $\frac{1}{16}$" sq. spars in.

After the cement has thoroughly dried, remove the frame from the form and sand carefully to the final shape, taking every advantage of the gull effect. Cover the wing with orange tissue by attaching the outer edges of the paper first. Spray lightly and pin to the bench until dry.

TAIL SURFACES

Build the tail surfaces from unshaped stock and then sand to the final shape when dry. Cover them with orange tissue, using the method employed for the wings.

LANDING GEAR

Make the landing-gear struts of two plys of $\frac{3}{16}$" sheet and sandwich the shock-absorber axle wire between. The shock absorber is arranged so the lower half of the strut will bend back and still not bruise the trailing edge at the joint. The tail wheel is cemented in place rigidly.

PROPELLERS

A scale-propeller design is included, should one be desired. The flying propeller takes advantage of the three-blade design, because of the limited diameter. Cut three blocks as shown, apply cement to the bevel ends and let dry; then apply more cement and then join the three blocks together, tacked to the bench. Let dry several hours and then blank and carve in the usual manner.

ASSEMBLY AND FINISH

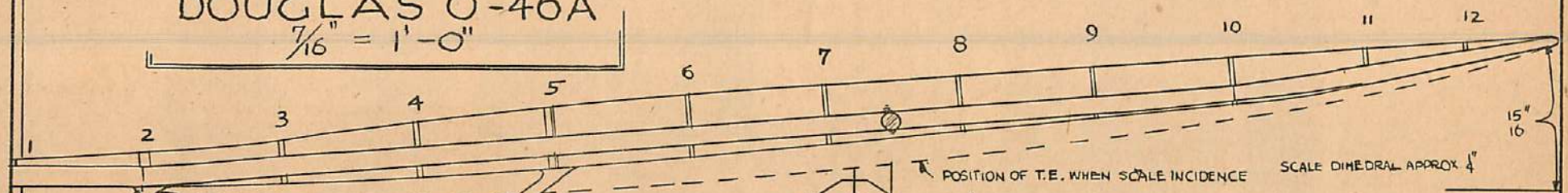
Cement the cockpit cover on. Cement the stabilizer on and then the fin, and finish covering at bottom fin rib. Add the stabilizer struts. To get the wing on easily, cut a ⅛" sheet incidence block to the shape of the space between the wing and the fuselage on the drawing and pin the wing in position. The struts can then be cut and fitted accurately. Use bamboo slivers for the rigging wires. Cement the landing gear struts on. The model will have a better appearance if illustrated design for the wheel is used. Cement the cowl on as noted on the drawings.

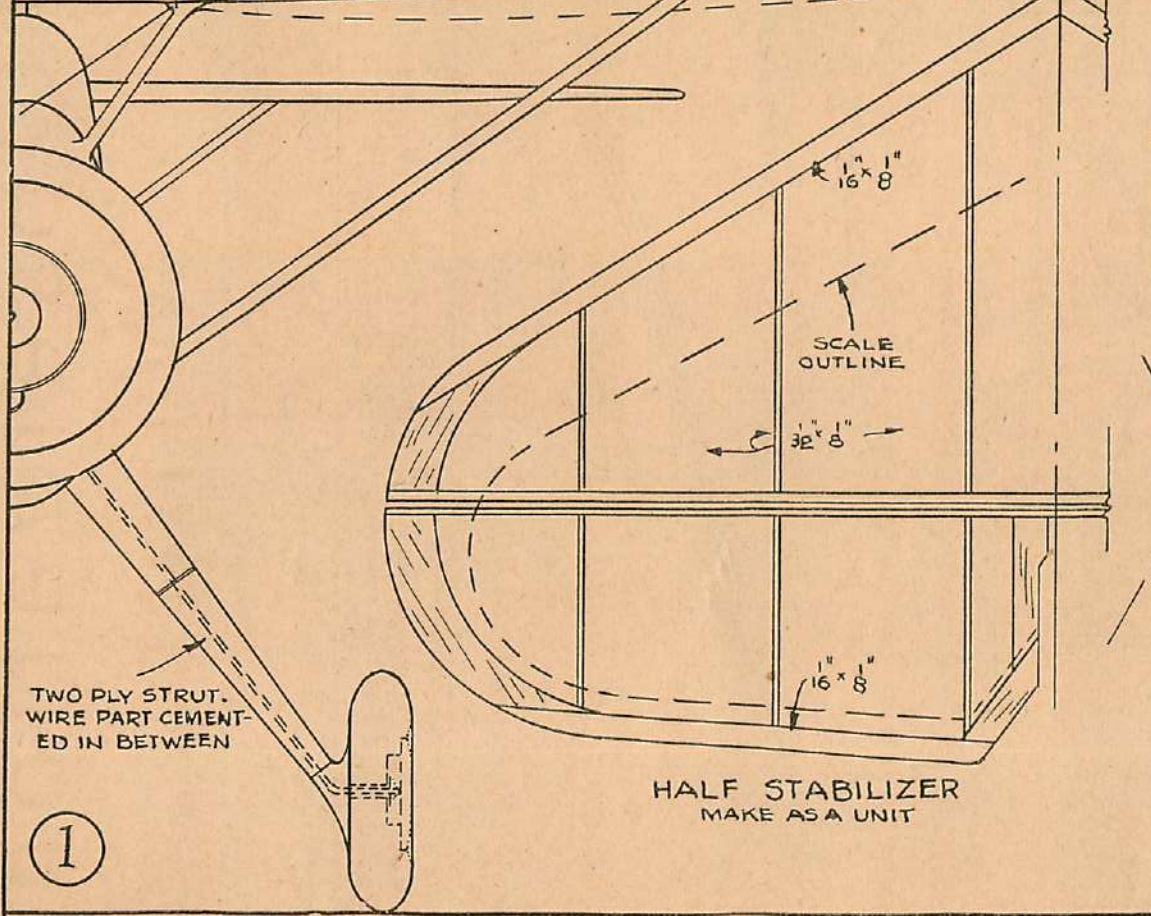
Insert the prop shaft through the nose plug, several washers, and the propeller, make a small *(Turn to page 78)*

AIR TRAILS

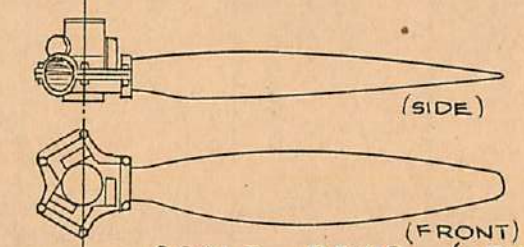
FLYING SCALE MODEL of the DOUGLAS O-46A

7/16" = 1'-0"

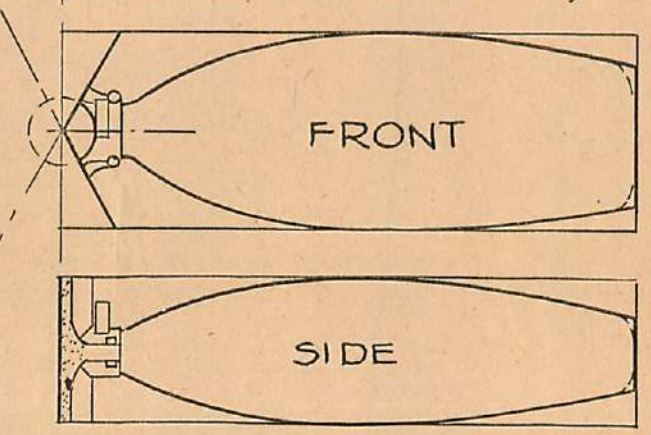




HALF STABILIZER
MAKE AS A UNIT

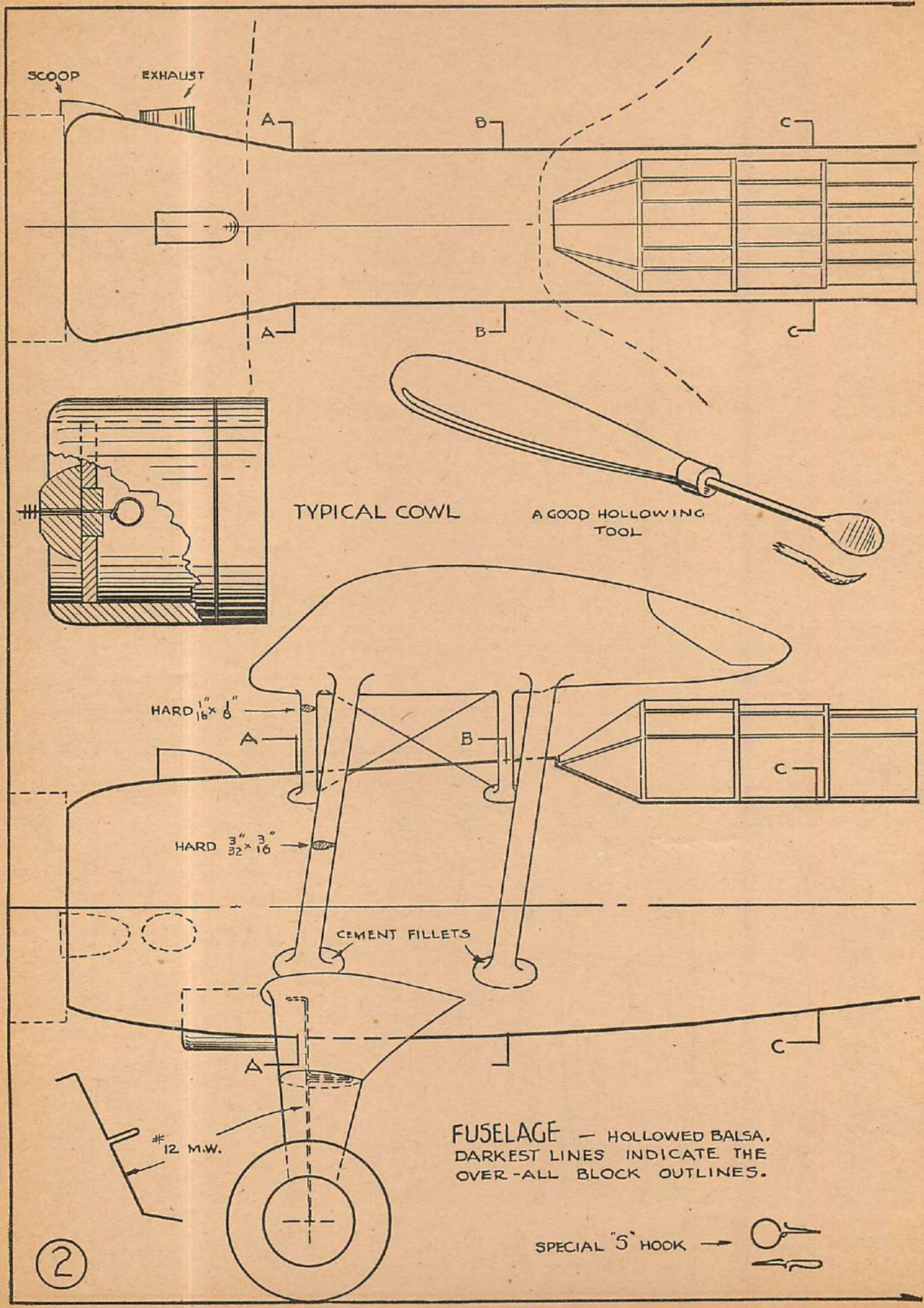


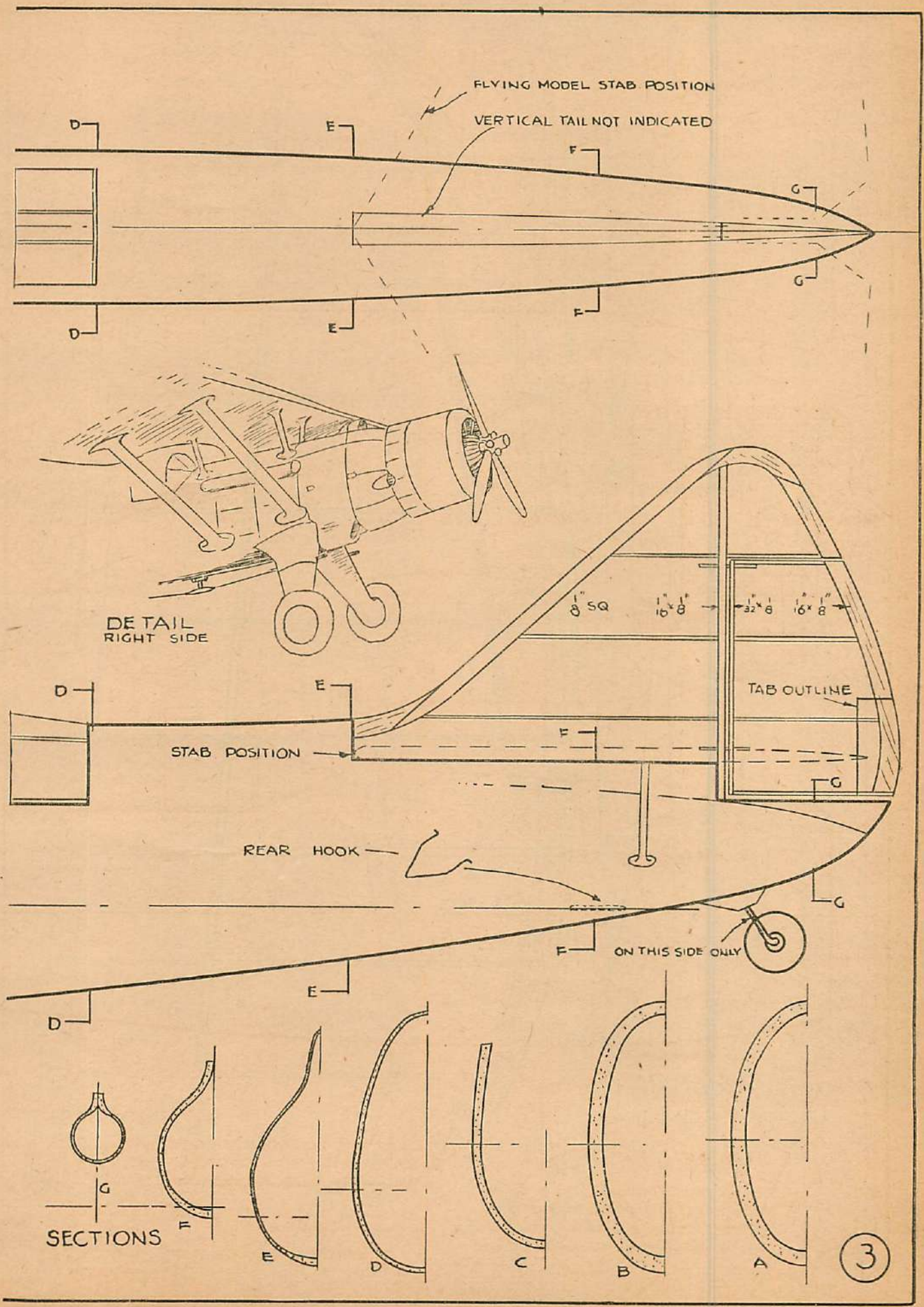
SCALE PROP. (3 BLADED)

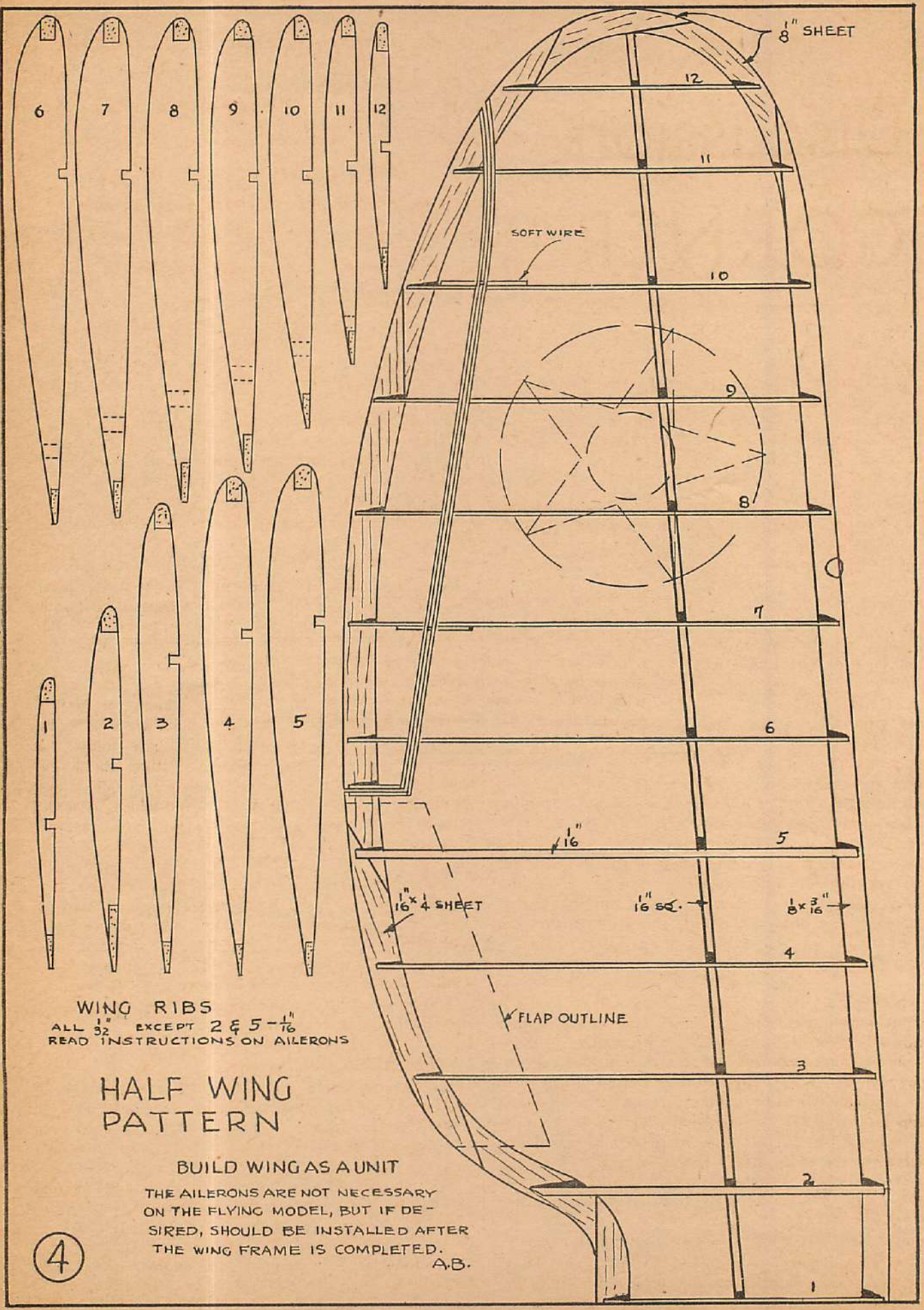


FLYING PROP. (3 BLADED)
READ INSTRUCTIONS

(1)


SCOOP
EXHAUST
A
B
C
A
B
C
TYPICAL COWL
A GOOD HOLLOWING TOOL
HARD 1/16" x 1"
A
B
C
HARD 3/32" x 3/16"
CEMENT FILLETS
C
A
#12 M.W.
FUSELAGE — HOLLOWED BALSA. DARKEST LINES INDICATE THE OVER-ALL BLOCK OUTLINES.
SPECIAL "S" HOOK
2


FLYING MODEL STAB POSITION
VERTICAL TAIL NOT INDICATED
D
E
F
G
DETAIL
RIGHT SIDE
1/8 SQ
1/16 x 1/8
1/32 x 1/8
1/16 x 1/8
TAB OUTLINE
STAB POSITION
REAR HOOK
ON THIS SIDE ONLY
SECTIONS
A
B
C
3



WING RIBS
ALL 1/32" EXCEPT 2 & 5 - 1/16"
READ INSTRUCTIONS ON AILERONS

HALF WING PATTERN

BUILD WING AS A UNIT

THE AILERONS ARE NOT NECESSARY ON THE FLYING MODEL, BUT IF DESIRED, SHOULD BE INSTALLED AFTER THE WING FRAME IS COMPLETED.

A.B.

The Discussion CORNER

The model art progresses through exchange of ideas. The Discussion Corner is a monthly sounding board for your opinions. For November the subject is climb. *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.*

ALL other conditions remaining the same and proportionate, any outdoor model's performance will be improved by using the highest-possible aspect ratio, providing that structural strength is not sacrificed. This is especially noticeable in contest models. Usually a better climb and a longer glide results.

For rubber-powered models I found an aspect ratio of 8½:1 to 9½:1 most efficient. However, since wings of lower aspect ratio generally can be made much stronger per given span than those of a higher aspect ratio, the proportions for gas-model wings would be satisfactory at 6 or 7:1.—E. T. ROBINSON, Bridgeport, Ohio.

Aspect ratio varies with different models, being influenced by many things, most important of which are: wing area, speed, prop size, tip loss, and stability of the wing section used. Models using a lower aspect ratio naturally require a wider chord, which in itself provides a greater lift-drag ratio, thus offsetting the inefficiency of larger wing tips.

An elliptical wing of extremely low aspect ratio will surpass in performance many wings of slim proportions. However, this low-aspect ratio does not permit the use of large diameter propellers because of torque. Unless a stable section is used the wide chord makes the ship longitudinally unstable.—JASON ELLIS, Belle Fourche, South Dakota.

I believe that the performance of an outdoor model is definitely not improved by the use of as high an aspect ratio as is structurally possible. With present methods of construction aspect ratios of 16 and even 18:1 are possible. Of course, such aspect ratios are out of the question for high efficiency in models, and in my opinion ratios of even 12:1 are not good. This is because the section on a high, aspect-ratio wing becomes too flat in relation to the span, thus losing efficiency. Therefore, for both gas and rubber-powered models, I prefer and use a ratio of approximately 8:1.—ELWOOD BORDEN, New Bedford, Massachusetts.

The only advantage to be gained in using a wing whose aspect ratio is as high as structurally possible will be the reduction of drag at the tips. However, it is impossible to plot the airfoil section of the high, aspect-ratio wing as accurately as that of the larger rib section of the wider wing. Smaller airfoils do not hold the air flow as well as the larger sections when at high angles of attack. Consequently, smaller airfoils stall earlier.

I have had more success with the 8½:1 aspect-ratio wing than with higher aspect ratios using the same airfoil.—WILLIAM HEINZ, Baltimore, Maryland.

Generally speaking, high-aspect ratios are desirable because of the good glide they give, but the exact ratio depends on the size of the model. Large models have performed well, using aspect ratios of as high as 14:1, while for smaller models the ratio may be as low as 7:1. The chord should never be less than 3 inches. Smaller sections are seldom of true airfoil shape and are usually less efficient. I have found that for weight lifting the lower-aspect ratios should be used. Low aspect-ratio wings do not stall as easy as high aspect-ratio wings. I prefer ratios of 8 to 10:1.—JOSEPH WALSH, New Bedford, Massachusetts.

While high-aspect ratios are extremely beneficial it is not necessary to make the wings abnormally narrow. More ribs would be needed and the center of gravity of each wing would be farther out from the fuselage, making the ship slow in recovering from upsetting gusts of wind. Longer wings would be more liable to twist.

The most practical aspect ratio is about 9 or 10.—J. BLOOM, Roxbury, Massachusetts.

COMING UP are these topics:

For December—*Does designing the outline shapes of wing tips, rudders, and stabilizers materially affect a model's performance? Does the model with a pleasing appearance show a noticeable superiority in performance?* Answers must reach us by September 15th.

For January—*Would the use of a retractable landing gear on the new, weight-rule models improve performance enough to justify difficulties in design and construction?* Answers must reach us by October 15th.

For February—*In designing the outdoor model what fuselage cross section do you consider to afford maximum efficiency?* Answers must reach us by November 15th.

This Month's Topic

Is performance in the outdoor model improved by using wings whose aspect ratio is as high as structurally possible? What aspect ratio do you consider to be best?

Low-Winged Efficiency

Replica plans of a new transport—the Beechcraft-18.

By William Winter

ALREADY noted for the speed and efficiency of their designs, Beechcraft have completed and tested a new 8-passenger, twin-motored low-wing of metal construction. Powered by two Wright Whirlwinds, developing 320 h.p. each, the Beechcraft Model 18—grossing 6,500 lbs.—can cruise at 192 m.p.h. at 10,000 ft. for 1,070 miles. With flaps, the landing speed is 50 m.p.h. The climb is 1,250 ft. per min. Hamilton-Standard controllable-pitch propellers are included in the equipment.

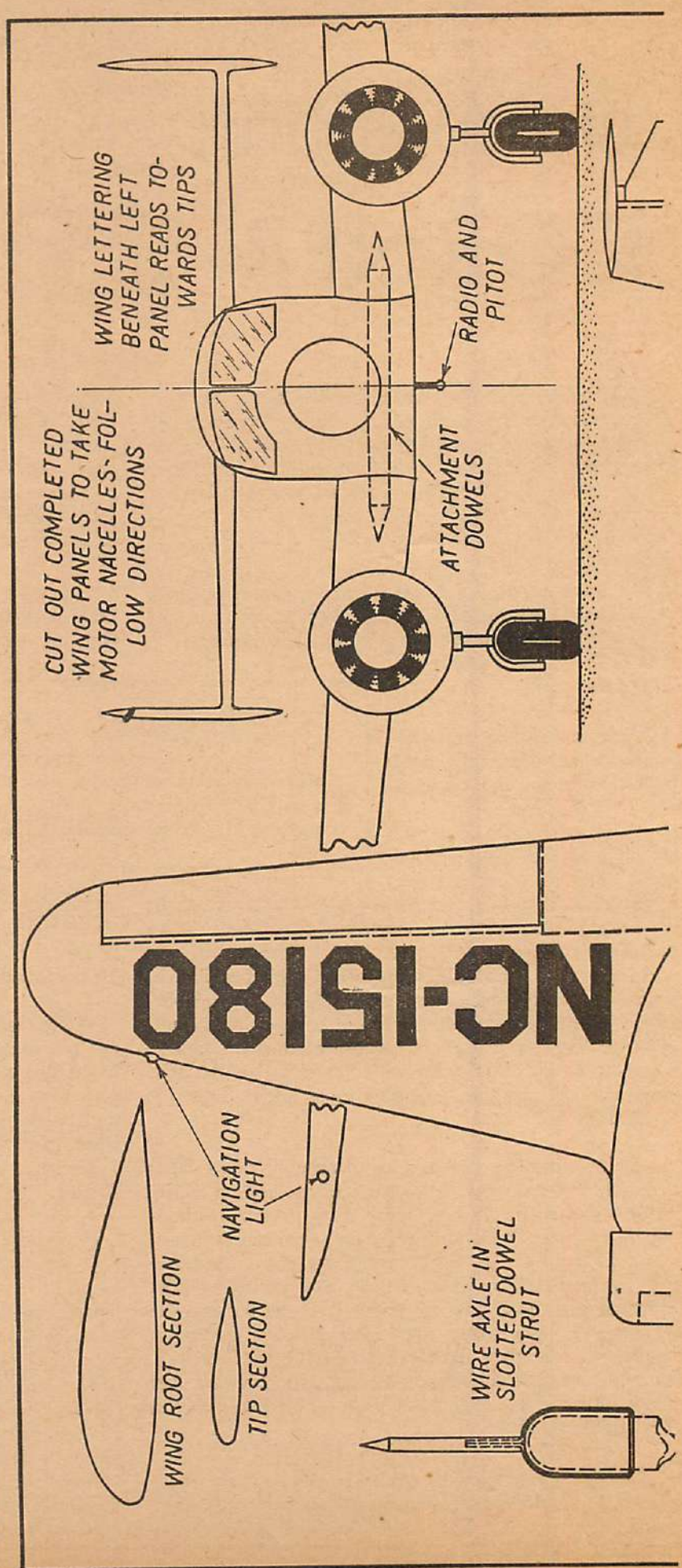
Dimensions are as follows: Span 47′ 8″, length 31′ 11″ and height 9′ 5″.

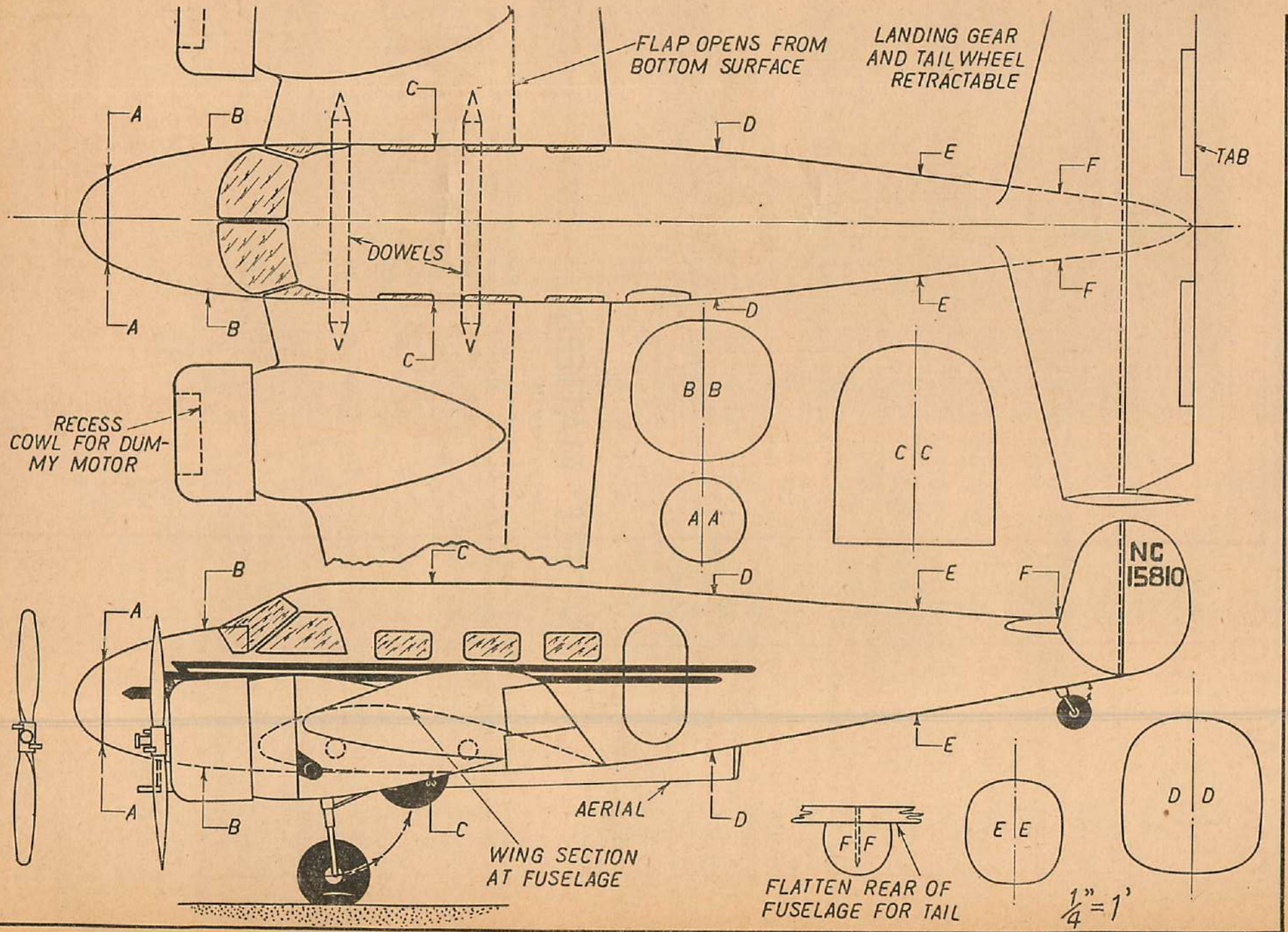
CONSTRUCTION DIRECTIONS

Material sizes are included in the Bill of Material; refer to it when necessary.

Trim a soft balsa block to the outside dimensions of the fuselage. On its largest side mark the profile of the body and cut away the excess balsa. On the top surface of the partly prepared block pencil the outside contours of the fuselage and again cut away the surplus wood. Checking with the cross sections given on the plan, round the fuselage corners to the desired shape. Using a hand drill, prepare the ⅛″ holes to receive the wing-attachment dowels. Flatten the rear top of the block for the installation of the stabilizer. Use progressive grades of sandpaper to work the surface to a satin finish.

Outline the wing panels—one left and one right hand—on a soft balsa block of ample area. Trim roughly with a coping or scroll saw, allowing a margin for precise finishing. Shape the wing panels to the requisite airfoil sections by checking with the sections given. Carve the motor nacelles—including cowls—from soft balsa, adhering to circular cross sections. Cut out the leading edge of each panel to fit its particular motor nacelle. Fit the nacelles in place and after an ample application of thickened cement has dried, mold with plastic wood and fillet contours of wing and nacelles. Drill ⅛″ *(Turn to page 95)*




FLAP OPENS FROM BOTTOM SURFACE
LANDING GEAR AND TAIL WHEEL RETRACTABLE
TAB
DOWELS
RECESS COWL FOR DUMMY MOTOR
NC 15810
AERIAL
WING SECTION AT FUSELAGE
FLATTEN REAR OF FUSELAGE FOR TAIL
1/4" = 1'

AIR PROGRESS

(Continued from page 7)

air commerce, will spend $7,000,000 during the next two years to make air transportation safer. A sum of $882,000 will be spent this year to modernize the airways guides and put in new radio stations.

The first nonstop transcontinental flight ever completed in a seaplane was carried out a short time ago by Richard Archbold, who used a twin-engined Consolidated ship. He flew from San Diego to North Beach in 17 hours, two minutes.

AIR FORCES

A new acrobatic team recruited from the Tactical School at Maxwell Field, Ala., will in all probability be seen at the National Air Races this year.

More than 195,000 people saw the recent Royal Air Force display at Hendon. One feature was a fly past of 260 first-line aircraft in five-column formation. The usual military acrobatics, smoke-screen designs, and mock-bombing displays filled out a long program.

Another feature of the display was the attack on a kite balloon by several Wartime aircraft.

Flight tests of the new Boeing YB-15, the new and bigger Boeing bomber, have been carried out by Eddie Allen, the noted test pilot. This is the new all-metal twenty-ton bomber that boasts complete living quarters for the crew and a separate 110-volt electric-generating plant run by two auxiliary gasoline engines.

Figures have finally been released in the new Rolls Royce "Merlin" engine. According to official figures published in British magazines the "Merlin" is rated at 1,050 h.p. The new Bristol "Hercules," the fourteen-cylinder two-row air-cooled sleeve-valve motor, is rated at 1,375 h.p. in a moderately supercharged form.

The U. S. navy has purchased eleven Sikorsky P. & W. Hornet S-43 amphibians.

GENERAL

Three Lockheed Electras and four Lockheed-14s have been ordered by Trans-Canada Airways. The Ansett Airways of Australia have also ordered three Electras. K. L. M. now provides motion-picture shows for its passengers using their Douglas transports on long-distance night flights.

All mail in Great Britain is now sent first class by air at no extra charge, where air lines connect points involved. This includes South Africa, Zanzibar, Kenya, Rhodesia, Sudan, Nyasaland, and Uganda.

The finding of a wheel from the plane of the late Sir Charles Kingsford-Smith, who was lost in November, 1935, has given rise to new hopes for his safety. The wheel was found floating in the sea off Burma. Experts believe from parts of the undercarriage found that it had been lowered for a landing on ground, which may indicate that the famous Australian pilot may still be alive on some uninhabited island in that area.

Italy recently added another record to her long list when Colonel Attilio Bisco, flying a Savoia-Marchetti S-79 bomber, covered a 1,000-kilometer course in 2 hours 21 minutes 20.4 seconds, while carrying a load of 4,490.2 pounds. Bruno Mussolini, 19-year-old son of Premier Benito Mussolini, acted as co-pilot to Colonel Bisco during the flight.

The British have captured the altitude record back from Italy. On June 30th, Flight Lieutenant M. J. Adam of the Royal Air Force, piloted the same Bristol monoplane that had held the record some months before, to a height of 53,937 feet, which bettered the Italian mark by 2,575 feet.

The Soviet fliers, Gromoff, Yumasheff, and Danilin, broke the world's long-distance nonstop record on July 14th, when they flew from Moscow to a spot near March Field in California. The official distance was 6,262 miles, or 608.5 miles farther than the previous record held by the Frenchmen, Rossi and Codos.

MODEL MATTERS

(Continued from page 43)

ment committee of the board of aldermen and the aviation committee, in conjunction with the W. P. A. Recreation Division of the Hartford Park Department, was held on July 5th at Brainard Field, Hartford. The meet was conducted by the Model Aero Engineers of Hartford.

Contestants in the one event (hand-launched flying scale) numbered 40, while 750 spectators were present at the activity. The prizes were awarded by Alderman John Fay of the amusement committee.

Following are the prize winners:

Senior Group

1st	Edward Rosen	147.75 pts.
2nd	Edwin Goral	129.50 pts.
3rd	Bernie Banowich	121.50 pts.
4th	Raymond Rosen	109.50 pts.

Junior Group

1st	Frank Lattanzio	140.50 pts.
2nd	D. Varley	113.04 pts.
3rd	William Zaleski	109.25 pts.
4th	Charles Downey	107.08 pts.

First, second, third and fourth prizes were, respectively: silver trophy, gold medal, silver medal, and an airplane ride. Duplicates of the senior prizes were awarded to the juniors.

Fred Bull was contest director, Alfred W. Schmidt assistant contest director, and judges were as follows: Medos J. Palshaw, Chester Ehman, James Grant, Paul Schmidt, Arthur Benoit, D. Allen Seymour, and Edward Brant.

The Hartford Aero Engineers have now won, in the last 2 contests entered, 21 out of a possible 26 places.

Lancaster, Pa., Contest

An outdoor flying meet was held at Lancaster, Pennsylvania, on Sunday, June 27th. It was the first meet of its kind in this community and was well attended both by modelers and spectators. Preparations are well under way for a bigger meet later in the year. Flying was done on the old Lancaster Airport. Winners in the events were:

Stick Model

1st Robert Berghaus, Marietta, Pa.
2nd Robert Barnes, Lancaster, Pa.
3rd Bayard Berghaus, Marietta, Pa.

Flying Scale Model

1st James Koller, Reading, Pa.
2nd Warren Stuffey, Reading, Pa.
3rd Robert Gable, Reading, Pa.

Gas Model

1st Clifford Hain, Reading, Pa.
2nd Alex Landis, Lebanon, Pa.
3rd Robert Berghaus, Marietta, Pa.

Model material and supplies and free airplane rides were given to the winners.

Model activities in Lancaster country are under the direction of James B. Shaeffer, Lititz, Pa.

Ace Model Club Contest

Marshalltown, Iowa

The Ace Model Club of Marshalltown, Iowa held, on June 27th, its second annual model contest in competition with a commercial air show. Two trophies and 4 medals, purchased by the Junior Chamber of Commerce, were presented by the Mayor of Marshalltown, Mr. G. W. Darling. The Iowa Newsreel Service displayed activities at the contest throughout the State of Iowa.

Although the contest was not for gas models, 9 were present for demonstration purposes. Seven of these were brought by the Aeronca Gas Model Club of Waterloo, Iowa. The Fort Des Moines Model Club put on an exhibition of rubber-powered models and gliders.

Address the Ace Model Club, 19 South Center Street, Marshalltown, Iowa.

MEGOW'S Latest

MONOCOUPE 90A

Exact outline scale model kit of one of the best-liked light two-place sport planes. Its aerodynamic design makes it a very stable flier. 30 in. wingspan.

Gull Wing STINSON RELIANT

Exact in outline scale and external details. Designed principally for flying. 30 in. wingspan.

Large 30 in. Wingspan Fliers and Exact ½ in. Scale Detail Models **50¢** (Postage 10c ex.)

MISS STRATOSPHERE

Exact ½ in. scale model kit of Col. Clarence Chamberlain's high altitude ship, introducing a new type of construction with wood veneer as a covering.

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New BROWN JR. $21.50

SYNCRO ACE $15.00

MORTON CHALLENGER $13.95

Full line of Gas Motor Supplies

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Outstanding among all gas-powered models. Large, but folds to carry in car. Easy-to-follow plans. Uses any model airplane motor. 3¼" rubber wheels, well forward for safe landings. Wingspan 67 in. Length, 47 in.

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Megow ship models include easy-to-follow plans and all materials. Dozens of types such as the BOUNTY, SETH PARKER, SANTA MARIA, QUEEN MARY, yachts, etc., from 10c to $6.00. Clipper ship GREAT REPUBLIC, $1.00 plus 15c postage.

Al Williams' famous GULFHAWK

A new model kit of the famous Grumman. Duplicate of the latest navy fighting plane, plus new features added by Major Williams.

Additional models have been added to Megow's new 50c line announced recently. More large wingspan flying models, and more ½ inch scale detail models . . . . and of today's most famous ships, too! Graceful, light and colorful, they give the builder something to be proud of . . . . and yet they are easy to build!

These new models bear famous names, and are sponsored by famous aviators . . . . Al Williams, Clarence Chamberlain and others.

Megow models are available in scores of kinds and sizes, from small solid designs up to giant fliers and gas-powered models.

Ask your dealer to show you the new models shown here, or use the coupon for ordering direct from us, if he cannot supply you. The coupon with 5c postage will also bring you the latest Megow catalog showing scores of world-famous airplanes and boats.

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THE MOON GOD

(Continued from page 36)

"No word has leaked out?" the financier asked.

"No." Gregory's grip tightened on his uncle's arm. "You'll never regret putting your money into the ship. Once the R. A. F. sees a demonstration, I'll get a big contract. You'll get your money back, tripled—— This is the last test. Finch is confident there won't be a hitch."

"There can't be," the millionaire said. "It *has* to be successful. The whole world——" He let the sentence drop uncompleted.

Gregory didn't seem to notice. He had quickened his stride. His voice shook with excitement. "Finch says he'll get beyond sixty thousand feet. Look! There she is on her launching ramp!"

Out in the middle of the field, illuminated by the pale moonlight and the frequent bursts of exploding skyrockets, was a scene as weirdly fantastic as a movie setting of some picture of the future. A silver monoplane was there—a monoplane of strange design, with short, tapered wings and tail surfaces vaned and streamlined.

She rested not on her undercarriage. Rather, the amphibian landing gear had been retracted and she lay on her metal belly on an inclined framework of steel girders, her sharp prow aimed skyward at forty-five degrees. The stern of the dart-shaped fuselage, instead of tapering off, ended in a round hole of sooty blackness—the rocket exhaust nozzle.

Even now, as Gregory looked upon the ship, he could scarcely believe his eyes. With her beryllium skin agleam with high lights, she was incredibly perfect. She was a ship of the future—the fulfillment of a dream.

The dream had been born thirteen months before, when Carter Finch had covertly visited him—Finch, who had been his chief designer back in the heydays of the 1920s and whom Gregory had never expected to see again, after the man had resigned and gone off to seek a better job. But Finch had come back, and under a veil of heavy secrecy had told him of the superairplane he had designed and shown him the plans.

The man had been cautious and mysterious. He had whispered of spies of powerful nations endeavoring to steal his plans, of even the famous American, Bill Barnes, being in their employ. He said he had come to Gregory because of past associations. If Gregory could provide the backing, they could build the ship together and make a lot of money.

Gregory had studied the plans, had been stunned by their brilliance, by the radical innovations. He had excitedly called in his rich uncle. The royal air force was seeking such a stratosphere ship. If the Preston Airplane Co. could manufacture it, they would all make a fortune. The old financier, who had sworn to put no more money into Gregory's factory, had conferred with Carter Finch. And to Gregory's unbounded joy and amazement, his uncle had agreed to provide the financial backing.

And now, as Gregory and his uncle hurried across the landing field, the months of secret work and tests were forgotten. The ship was finished, was but awaiting her last test—the rocket-propulsed take-off.

Three overalled men were working over the plane. One of them climbed down and came to meet the Prestons. He was Carter Finch.

He shook hands with the millionaire and said, "We've been waiting for you, Mr. Preston. Everything is ready. I'd better get off while the fireworks are at their height."

The financier was visibly shaken with excitement. "I—I sent the town a lot of fireworks, as many as I could buy."

"Good," Finch said. "The plane's rocket exhaust won't be so noticeable. Smart idea of yours, Mr. Preston."

"We can't take any chances," Adam Preston said. "No one must know about this airplane."

"There was another notice in *Sky News*, Finch," Gregory said, "offering a reward for any information of a jet-propulsion plane built or being built."

Finch scowled. "I saw it. That's Bill Barnes' work, like I told you. He's trying to get his hands on my plans. He's hiding behind his reputation. But he'll never know if we're careful."

"Well, all right. I was worried," Gregory said. "If—if everything's O. K., you'll land here about dawn, Finch?"

"About dawn," Finch said. He looked at his watch. "Tell the mechanics to get to the shelter. I'm taking off."

When Gregory had hurried out of earshot, Finch quickly turned to Adam Preston and whispered, "I'll be gone ten days—perhaps two weeks. Don't worry about me. I'll make it."

The millionaire's face had suddenly been transformed. Terror was mirrored there, and something strained and unnatural. "You alone can do it, Finch. You cannot fail!"

Finch saw that Gregory was speaking to the mechanics. He swung back to the financier. "Don't, under any circumstances, tell a soul—not even Gregory. When I don't come back at dawn, let him think I'm dead—cracked up—anything. Just you and I must know, Mr. Preston. Remember—the world depends upon it."

Adam Preston was breathing heavily. His eyes had enlarged and held a wild light. "I know—I know," he said. "I had the knowledge, but I could never have defeated them alone. But now we have a chance."

"A chance—yes," Finch said. "But we can't tell what we'll be up against. It'll take money—all the money we can scrape together. You're still willing to gamble your fortune?"

"Gamble! It's a necessity," Adam Preston said wildly. "I'm turning everything I can into cash. I'll have it by the time you get back. Thank Heaven, I'm wealthy!"

Finch's greenish eyes narrowed. "How much will you have in cash?"

"Not more than five hundred thousand, unless——" The financier's voice fell to an excited whisper. "Finch, I want to tell you a secret. The great Cameroon diamond is owned by a syndicate of three men. I'm one of them. I'm going to try to sell out to my partners for cash. I don't know if they'll do it. But I'll try. If I'm successful, I'll have over a million dollars in cash when you return."

Finch saw Gregory coming back. He said hastily, "Do what you can. Have the money ready—in a bag. And remember—don't talk to anybody."

Finch held out his hand, grasped the millionaire's tightly, then turned and said good-by to Gregory. "Well—here I go," he said.

Without another word he strode to the ramp, climbed up the side to the airplane and lowered himself into the cabin.

Gregory took his uncle by the arm and hurried him into the shelter of a trench. The two mechanics were there.

Beyond a heavy glass porthole in the cabin, Finch could be seen screwing down the turn bolts of the hatchway and strapping himself into the acceleration harness. He was working quickly.

The jet-propulsion ship lay in her chute like a great hulking torpedo, her adjustable cambered wings jutting out like fins. The four-bladed propeller of the power plant hung motionless in the nose, the blades feathered. Nor would they be used. The ship was to be blasted into terrifying flight solely by the rocket motor in the stern.

Now Finch had turned, raised his hand.

"He's ready," Gregory gasped. "Oh, Lord—— Now!"

The four men in the trench held their breath and stared.

Then—a sharp hissing came from inside the great hull as the liquid fuels ignited in the blast chamber. The monoplane quivered. A jet of white, burning gas stabbed from the rocket nozzle. A roar crashed out. The noise swelled, tripled. The exhaust became a great dagger of incandescence.

The monoplane pelted up the ramp at an incredible speed, shot off the end. A curtain of light deluged the field. The plane tore up into the night, riding a trail of blazing whiteness.

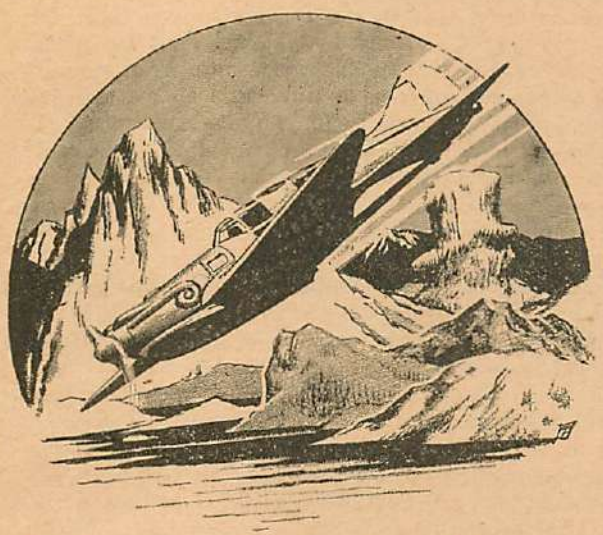
In the space of one quick breath, the monoplane was gone. The rocket exhaust became a pencil of light—an etched line—then, vanished in the blackness of the heavens.

Gregory Preston staggered to his feet. "He made it. He made it. At dawn, he said. At dawn Finch will be back."

But the gray light of dawn arrived, swelled into the brightness of full morning—and still Carter Finch had not returned.

IV—CASTLE FALCON

AT EIGHT O'CLOCK in the evening, exactly ten days later, Adam Preston sat at the end of a long table in Castle Falcon's dining room and sipped his after-dinner coffee.



The plane was sweeping toward one of those mountains—a mammoth shaft of rock——

He put the cup down and said, "You can't go on like this, my boy. You must get sleep. You must eat."

His nephew, Gregory, was standing beside the table, his hat in his hand. His face was haggard. His gaze was on the polished floor. He said nothing.

Adam Preston went on, "Finch may have had a forced landing somewhere. He may be safe—so may the plane."

Gregory shook his head dejectedly. "Everything I dreamed of is gone. If Finch had to make a forced landing, he'd have gotten in touch with us. It's almost two weeks now."

"Brace up, my boy," the millionaire said. "Everything's going to be all right. Don't worry about the money spent. That's all right."

Gregory looked at his uncle curiously. "I can't understand you, Uncle Adam. This doesn't seem to mean anything to you. You seem almost glad."

"Glad!" Adam Preston showed concern and faint alarm. "My goodness, no. I'm just trying to view things sensibly. I—I never had much faith in aviation, you know. As to this rocket thing—it's brand-new, isn't it? Finch is the first to use it on such a scale. Anything could have happened."

Gregory's eyes were still on the older man. He spoke slowly, "There's something wrong all round. I don't like it. I've been doing a lot of thinking. How do I know but that Finch may have stolen the plane."

"Don't be absurd," the financier said. "Just wait. Finch will show up, I'm sure."

"Wait!" Gregory cried. "That's all I've done for almost two weeks. I've followed your advice. Now I'm through with that. Last night I sent an air-mail letter to Bill Barnes."

"Barnes!" Adam Preston said. "But you shouldn't. Finch said not to. He's dangerous. He's in the employ of——"

"That's what Finch said. But how do we know it's true. We've taken Finch's say-so ever since he came up here. Well, I'm going to find out why Barnes is so anxious to get a line on the jet-propulsion ship."

"You wrote him a letter?"

Gregory said viciously, "Yes. And I'm not going to wait for a reply. By Heaven, I'm going to the field and get out my plane. I'm going to fly down to Long Island to see Barnes—right now."

Adam Preston rose quickly from his chair. "Don't do that. Wait a while, Gregory. Just——"

He didn't finish the sentence. His gaze had suddenly swerved past his nephew to the tall windows at the end of the room. Out in the castle's grounds, from behind a screen of heavy evergreens, he saw the glowing circle of a rising full moon.

The financier stood transfixed. His eyes seemed to recede into their sockets, to change color.

But Gregory didn't notice. He was striding across the room and went out the door without another word.

Adam Preston made no restraining gesture. Nor did his gaze shift from the moon. He stood there for minutes.

A servant entered the dining room. He looked at the millionaire, then coughed politely. "You wish anything, sir?" he asked.

With an effort, Adam Preston tore his eyes free. He said, "What—what's that? No. I—I don't feel well. I'm going to my room."

He left the dining room hurriedly and headed across the hall and up the staircase in a stumbling run. Gasping for breath; he reached his bedroom, rushed inside and locked the door.

His activity increased. He took a long garment made of metallic cloth from a wardrobe and donned it. It fitted closely around his neck and hung down to trail on the ground. Sleeves covered his arms. Only his face and hands remained exposed. And over them he rubbed a colorless liquid which he took from a small bottle.

Terror was on his thin, pinched face. Like a man crazed with drug he rushed across the room to a paneled wall. He jabbed a forefinger against a hidden spring. A section of the wall slid noiselessly back, disclosing an opening.

The financier stepped through, closed the panel behind him. Ahead was a narrow passageway, dimly illuminated, leading to a circular staircase. Adam Preston went up the steps.

At the top he pushed a door open and entered a secret observatory in one of Castle Falcon's turrets. A large telescope stood on a base in the center of the domed room.

The millionaire ran to the instrument. He twisted a crank. The telescope rose on its base and a segment of the domed roof slid open to the night, revealing the ball that was the full moon.

A shiver coursed through Preston's body. He looked into the eyepiece of the telescope, adjusted the focus until the moon became a giant sphere with honeycombed surface and great craters.

For over a solid hour he stood there as if hypnotized, staring through the telescope as the moon leisurely climbed into the sky.

The signal light on a wall panel had been gleaming for some time before he noticed it. He hurried to a small table beneath the panel and lifted a telephone from its cradle.

He said weakly, "Hello."

A voice came over the wire. It said, "This is Carter Finch. I have been to the moon!"

V—RETURN

ADAM PRESTON swayed. "Finch!" he gasped. "Finch—it's you. You're back. You made it!"

"Yes. I've just landed," came the reply. "You were right about everything, Mr. Preston. I must see you immediately."

The financier's hand shook. "Where—where are you! At the factory field?"

"No. We still can't risk detection. I'm at a secret field up the river. I'll be at your place in half an hour."

"All right. Come quickly. Don't let any one see you. Use the entrance I showed you." Preston's voice was a whisper. "Hurry, Finch!"

He replaced the phone and waited. A long time seemed to have passed before the door through which Adam Pres-

ton had himself entered swung back. Carter Finch stood in the opening.

"I can't believe you're here," Preston said. "I thought something must have happened." He staggered back into a chair. "Tell me—what did you see?"

Finch remained in the doorway. He wore grimy flying overalls and his thin, sardonic face was streaked with oil. "I'll tell you everything in a minute, Mr. Preston. But first, let me show you something I brought back from the moon. It isn't a pleasant sight. But it will prove that I've been there. It'll prove what an awful menace is threatening our earth. Prepare yourself, Mr. Preston."

"What—what is it?" the millionaire asked.

Finch stepped into the room and half turned. In his right hand he held the end of a chain. The other end was attached to a collar around the neck of a monstrosity of a man.

Adam Preston put his hand to his mouth, stifling a cry of horror.

The creature's body was thin and twisted. He was bent forward, his long skinny hands almost grazing the floor. His head was dome-shaped, devoid of any hair, and pointed ears jutted out from his skull. Great gogglelike glasses covered his eyes. He was naked save for a furlike garment around the center section of his body, and his skin was a glistening, greenish bronze.

Finch jerked the chain and the creature shuffled into the room. His left leg was shorter than the right and he limped.

"What is it?" Adam Preston gasped.

Finch closed the door and stood over the creature. "A citizen of Mars," he said. "I found him on the moon and captured him. I'm going to hold him as a hostage."

"Oh, Lord!" the financier said. "Then it's real. They have taken possession of the moon?"

He pushed his chair farther away from the creature, his eyes filled with terror.

"Yes, it's real—too real. Listen." Then Finch told Adam Preston an amazing story—a story of a five-day flight through space in the rocket plane—of landing upon the surface of the moon.

Finch gave the account hurriedly and without regard for details. "The situation's critical," he went on. "The Martians are planning to take over the moon and use it as a substation for their attack on the earth. Their advance guard was already there when I arrived. They're building tremendous telepathic projectors to focus deadly rays on our world. I hid in caves and tunnels. I spied on them, heard them talking. I stayed as long as the oxygen in my pressure suit lasted. Then I captured this man and took off."

Finch took an envelope from an inside pocket. "But while I was there, I took two photographs of the moon." He extracted two prints from the envelope and handed them to the financier.

One picture had been taken during the day and depicted a strange, rocky landscape, weird and unnatural. In the far distance was a mountain of queer shape, like the head of a man wearing a silk hat. The second picture had been taken at night. A silvery glow illuminated the land. And in the foreground was a lake, dead calm, with the stars overhead reflected clearly by the water.

Adam Preston gave the pictures but a hurried glance, then dropped them to the floor.

"Oh, I knew it. I knew it," he said. "For years I've known of this menace from Mars. I've tried to tell people, but they've just laughed and said I was crazy. The fools! I was the only man on this earth who knew. The Martians have been trying to murder me because of my knowledge. Every time there is a full moon they use its power to direct death rays at me."

The millionaire's voice had risen. "Those rays would have killed me, Finch, if I hadn't worn this insulated gown and put the ointment on my face and hands. Thanks be that you came to me with your rocket plane, Finch—that you listened to me instead of scoffing. Now that you have seen this thing with your own eyes, you also believe. But we are just two men. How can we ever stop them? Is there a chance?"

Finch's face was expressionless. "There is only one way that the Martians can be defeated," he said. "I have learned it. Look."

He took a metal tube from his pocket. It was similar to a small flashlight with a switch button at its base. The other end, however, tapered to a point. Finch held the tube in his hand and aimed the pointed end at the creature by his side. Then he pressed the button.

The effect on the green-skinned man was startling. His whole body shook violently. A moan came from his parted lips. He fell on the floor and lay still.

Adam Preston stumbled to his feet in alarm, staring at the crumpled man. "What—what's happened to him?"

Finch clicked the switch off. "That is the only way the Martians can be defeated," he said. He came closer to the millionaire and his voice fell to a whisper. "There is a certain invisible ray that will destroy these people. They have no defense against it. You saw the effect on this man. He's merely stunned now. But if I'd left the ray on, he would have died."

The millionaire's eyes were shining with excitement and hope. "Then they can be defeated," he said.

"Yes. But it will cost a lot of money—a fortune." Finch held up the metal tube. "This is but a small scale of the weapon that will have to be built to effect a mass defeat of the Martians. The cost of manufacturing such a weapon will be very high. Radium has to be used to produce the ray."

"Money—— Don't consider money," Adam Preston said. He crossed the room and took a large suitcase from a wall safe. "Here's all the cash money I could get—six hundred thousand dollars. Use it, Finch, to build the weapon, to buy the radium. Will it be enough?"

He dragged the suitcase over.

Finch's eyes were guarded. He said quietly, "Yes. I should be able to buy enough radium and build the machinery with that amount. But, unfortunately, it isn't as simple as that." He paused and then added, "You weren't able to sell your share in the Cameroon diamond?"

"No," the financier said. "My partners refused to buy me out."

"Good," Finch said. "That's excellent. We have to have that Cameroon diamond."

"What! But——"

"Look here," Finch said. He extended the metal tube toward Preston and indicated a tiny stone at the tip of the pointed end. "That's a very small lens made from a diamond. For the radium ray to be effective, it must first pass through such a lens. Now, in the giant weapon which we must build it will be necessary to have a lens made from a tremendous diamond—one of some three thousand carats. There's only one diamond that will do the work—the Cameroon."

The millionaire drew in his breath sharply. "The Cameroon! But—but we'll never be able to get it, Finch. I own only a third interest."

Finch dropped his hands to his sides in a gesture of resignation. "Then it's useless to build the weapon."

"No—no!" Adam Preston said. "We can't give up the fight."

"There's no other way out," Finch said. "Surely if you went to your partners and told them. But, no. They'd just laugh at you if you told them of the Martian menace."

"They'd never believe me," Preston said. "A long time ago I tried to tell them——"

"Wait!" Finch interrupted. "There's just one course we can follow. The emergency necessitates it. We'll have to steal the diamond—just borrow it for a time and then return it. Where is it kept?"

The millionaire drew his hand across his wet forehead. "I can't tell you, Finch. The three of us swore each other to secrecy as to its hiding place. I can't go back on my word. I'd be violating a trust—the way Gregory's done."

"What's that?" Finch said. "What's that about Gregory?"

"I meant to tell you before," Preston said. "In the excitement, I forgot. Gregory was worried when you didn't come back. He wrote a letter to Bill Barnes—after you told him not to. To-

night at dinner he told me about it. He said he wasn't going to wait for a reply. He was going to fly down to Long Island to see Barnes."

Finch's eyes glittered. "He was going to-night? Has he left yet?"

"Oh, yes. I heard his plane leave hours ago."

Finch cursed. "The fool! He's going to his death. The Martians will get him. The whole Preston family is on their death list! I'll have to warn him."

Finch shook the chain and the creature lying sprawling at his feet stirred and stood up unsteadily.

"What're you going to do?" Preston asked bewildered. "You aren't going to leave that—that Martian here with me?"

"No. He has to be put in a rarefied air chamber or he'll die," Finch's words clipped out. He picked up the suitcase and started for the door, the creature shambling after him. "I'll put this money in a safe place, Mr. Preston. You stay here in this room. Don't talk to any one."

"Can you save Gregory? My Lord, you have to!" the millionaire pleaded.

"I'll save him," Finch said.

When he was out in the passage and had closed the door, Finch muttered, "Yes, I'll save him——"

VI—NEWS

BILL BARNES sat in his office at ten thirty on the night of June 3rd and looked at a late edition of the New York *Star* that lay on his desk. The paper was folded back to a two-column account of the world exposition which was to open in Stockholm, Sweden, in a few days. The story was under the by-line of Sam Cooper.

Above it were two half tones, one of the curly-headed reporter, the other of Bill Barnes. The caption underneath read:

> Sam Cooper, the *Star's* feature writer, who will cover the Swedish exposition. He is flying to Stockholm with his friend, the famous Bill Barnes, in the latter's Silver Lancer.

Bill's eyes were still on the paper when the phone rang. He answered and heard one of the guards at the airport entrance say, "Mr. Cooper's here, sir."

"Send him in," Bill said.

When the reporter entered the office he was smiling broadly. "Well, here I am, Bill," he said. "Am I looking forward to that hop!"

Bill's face was bleak. He said, "Sam, I hate to tell you this—but—well it looks like I can't go."

"Huh!" the reporter cried. "Say, what is this? You get me to come out here to plan our trip and then you——"

"I know," Bill said. "Something's just come up. I tried to get you on the phone, but you'd left."

The burning airplane swept across the great circle of the parachute——

Cooper sat down.

Bill said quietly, "I guess you remember the Buck Woodland murder over a year ago, Sam."

The reporter's eyes flicked up. "You mean something's broken on that at last?"

"Maybe," Bill said. He pointed to a letter under a paper weight on his desk. The sheet was embossed with an elaborate heading of the Preston Airplane Co., Ltd., of Weston, Ontario, Canada. "That came to-night, air mail—at dinner time. It's from the president of that outfit, Gregory Preston. He says he's learned I'm interested in information concerning a jet-propulsion plane. And get this, Sam—he says a rocket plane was built at his factory—designed by a man named Carter Finch—and now both Finch and ship are missing!"

Cooper whistled.

"I ordered the Lancer tuned up pronto. I was going to take off for Weston," Bill said. "Then a telegram came from this Preston. He said he was flying down here to-night in his own plane—a Booth Ranger. So—I'm waiting. He should be pulling in an hour, maybe less. That Booth job's fast."

The reporter showed his excitement. "A rocket plane! There can't be more than one, Bill. It must have been built from the plans stolen from Buck."

"That's how I figure it," Bill said. "But the whole thing may be just another phony—like the other replies I've

had to my ads. If it's real—if it's——"

Bill's jaw muscles hardened. "When I saw Buck lying in that transport, I swore I'd get his killer. He murdered Buck to get those plans. I've been waiting for him to use them—to build the rocket ship. I've waited over a year. If necessary, I'll wait a lifetime. But, by Heaven, I'll get him!"

The pilot took out his wallet and showed Cooper a police photograph of fingerprints of a right hand. The imprint of the forefinger was marred by a diamond-shaped scar.

"The murderer left his mark," Bill went on. "Maybe it belongs to this Carter Finch. If it does, I'll know what to do when I meet him."

Cooper said nothing, silenced by the coldness of Bill's voice.

"That's why I can't take you, Sam," the pilot said. "But there's one quick way you can get to Stockholm. The dirigible, *Victory*, is making a special trip to the exposition, leaving day after to-morrow."

"Yeah, I know," Cooper said. "I'll fix it with the ed. I'll go on the *Victory*."

The desk telephone rang. It was Tony Lamport, the radio operator. He said, "No report from Sandy since six o'clock, Bill."

Bill cursed. "When the kid contacts you again, order him back here pronto. I should have known better than to let him chase that movie actor all over the map."

Tony said, "O. K." He was laughing.

Bill put down the phone, muttering.

Cooper asked, "Is Sandy still trying for that movie thing? I thought that had died a natural death."

"So did we," Bill said. "The movie company dropped the idea of making that picture. But the thing's been revived. This afternoon Sandy got wind that Tagore was flying East again. So he beat it over to the Municipal Airport, with Alphonso, in the Eaglet. He got there just in time to see Tagore change to a private plane and take off. Sandy tailed the plane up to Toronto and landed."

Cooper laughed. "That kid should get a medal for persistence. Did he finally talk to Tagore?"

Bill shrugged. "I don't know. Tony hasn't heard another word since." The pilot suddenly straightened. "Say—Toronto! Weston's just outside Toronto and that's where this Preston company is."

The reporter frowned. "I don't get you. You think——"

"I just remembered," Bill said. "On the night Buck was killed, Tagore canceled his reservations on the same plane. And now he goes up to Toronto."

"You think this actor's mixed up in this thing?"

"It doesn't make sense," Bill said. "There can't be any connection. But still——"

The office door suddenly banged open and Shorty Hassfurther hurried in. He said, "A plane's coming in, Bill. Maybe it's your guy."

A biplane was directly over the field and circling lower when Bill, Cooper and Shorty reached the concrete apron. In the light from the full moon Bill could see the machine clearly. He recognized the lines of a Booth Ranger.

"That's sure to be Preston," he said to Cooper.

The Lancer was drawn up on the apron and Bill leaned against its outstretched wing, his head thrown back, his eyes on the biplane. The field lights had been switched on and illumination flooded across his tense face.

The biplane was now down to five hundred feet and in front of the moon. The roar of its engine died as the pilot closed the throttle preparatory to landing.

It was only then that the men on the apron heard the distant drone of another engine. It was coming from the north. Bill straightened, twisted around to look.

The drone swelled into a scream of power.

Then Bill saw it—a monoplane of strange design—flying low, heading for the field, coming at a terrific clip.

Shorty yelled, "Bill——"

His words were drowned out. The monoplane pelted over the field. It streaked straight for the Booth biplane, overtook it.

The catastrophe happened with incredible swiftness. Before the group on the apron below could recover from their surprise, the monoplane had come and gone and the Booth Ranger was a ball of wreckage.

For in that minute, as the monoplane passed over the biplane, it had zoomed abruptly and, from a round hole in the tail end of the fuselage, a bayonet of incandescence had stabbed out.

The plume of fire had slashed across the biplane, enveloped it. In the twinkling of an eye, the Booth had become an inferno. And with a roar the monoplane had blurred up into the night and vanished.

The biplane now seemed to hang motionless, pawing at the air with its broken wings. Then the wings folded back. The fire gushed over all. The plane lost all shape and form, and, like a meteor, plunged to the ground.

It hit in the middle of the field.

Bill came to life. He whirled, threw himself into the cockpit of the Lancer, started the engines.

His face was imprinted with horror. That funnel of white fire had come from a rocket exhaust! The monoplane must have been the jet-propulsion ship! The plane built from Buck's stolen plans! Buck's murderer was the pilot—had again killed!

Get him! The mad thought pounded into Bill's senses.

The Lancer's Diesels were booming. He released the brakes. He gunned the powerful amphibian across that field. He caught a glimpse of men rushing toward the wreckage of the biplane—of the fire engine racing out.

The Lancer tore away from the ground and into the sky. Higher and higher Bill took his ship, his eyes probing through the night.

But of the rocket plane there was no sign.

It was Tony's excited voice that cleared Bill's mind. The message was a rush of excited words.

"Biplane totally destroyed. Pilot thrown free in crash—dead. Shorty found a scrap of a notebook. Gregory Preston's name was on it."

Bill's grip tightened on the control column. He brought the microphone to his lips and said, "Tony, I'm not going to land. I'm heading straight for Weston, Ontario, Canada!"

Now there was no doubt in Bill's mind. At last he was on the trail of the man who had murdered Buck. Bill took the Lancer higher. He sealed the cabin, switched on the oxygen. Then, with the throttles jammed to the last notch, the Silver Lancer screamed northward toward Canada, at forty thousand feet.

And far ahead raced the rocket ship, with Finch guiding its course.

VII—THE SEARCH

SANDY SANDERS was getting a little annoyed. The day had been one of anticlimaxes.

There at the New York Municipal Field it had been bad enough to miss the great Tagore. But at least after following him to Toronto it had seemed natural to expect that he'd have a personal interview with the famous man—the interview he'd been struggling to get for over a year.

But no. What had the Hindu actor done? He'd jumped out of his plane at Toronto, run, in his characteristic limping way, to an awaiting limousine, climbed in and been driven off.

There had been nothing else for Sandy to do but try to follow. He'd come too far to turn back now. So he'd hurriedly left the Eaglet in charge of men at the field, hired a dilapidated sedan marked "Taxi," hoisted Alphonso and himself inside and told the driver to catch up with the limousine.

That had been at six thirty p. m. By seven o'clock the limousine was still in sight, but the straining taxicab instead of catching up was slowly dropping farther behind.

Sandy pleaded with the driver, "Gosh, pal, give her the gun. Soon as it gets dark we'll be outta luck."

The driver was crouched over the wheel, his visored cap tilted back on his head. He shouted over the tumult of the vehicle's desperate fight for speed, "Got her down to the floor boards now."

Sandy leaned back against the cushions and tried to relax and at the same time keep his eyes on the small black shape of the limousine far ahead. Where they were, he had no idea. The chase had long since left the outskirts of Toronto. They were now bowling along a highway that dipped and turned, making the riding of the rear seat a job fit for a broncbuster.

But Alphonso seemed to be thoroughly enjoying the whole trip, bouncing around the rear seat and taking occasional flying leaps into the front seat, to land with squeals of joy beside the startled driver.

The man stood it up to a point where the monk utterly unnerved him by pouncing on his shoulder and biting the lobe of his ear. It was only by the grace of Heaven that the taxi was stopped before smashing into a telephone pole.

"Keep that animal back there," the driver said in a shaken voice, as he put the car into motion again, "or I quit. He'll kill us all yet."

Sandy grabbed Alphonso, held him tight and breathed shaming words into his ear. "You half-wit! Haven't you any appreciation? What do you think I'm doing all this for—wearing my nerves to the bone? For me, personally? It's your future I'm thinking about. And what do you do? You bite that man in the ear when he's doing his best to take us to the great Tagore. From now on your weekly peanut allowance is cut in half."

Alphonso scratched his head, wrinkled his nose and seemed quite content to lie still for a while and rest.

Sandy looked out of the sedan's windows. They were now rushing through a town.

"Town of Weston," the driver said, in answer to the kid's question.

And the limousine was still visible, far ahead.

The town of Weston was passed. The cab swung left, crossed a concrete bridge high above the Humber River, raced up a hill beyond to a straight stretch of road. Then, suddenly, away ahead Sandy saw the limousine swing off the paved highway and into a narrow dirt road. The car headed along it and disappeared beyond a tree-packed slope.

The taxicab rushed toward the turn and slowed to meet it. Suddenly, Alphonso twisted away from Sandy. He jumped to the top of the front seat, just behind the tense driver. And with a sudden, quick motion of a hairy hand he pushed the driver's visored cap over the man's eyes.

The driver, suddenly blinded, let out a shriek of terror. Instinctively, he jammed on the brakes. The taxi skidded to a stop on the lip of a ditch at the side of the road.

The driver rammed his hat back, stepped out of the car and yanked the rear door open. "Get out!" he cried. "That's enough. Get out, both of you. I'm through. Five dollars."

Sandy argued and pleaded, but to no avail.

Two minutes later the young pilot and the monkey were standing disconsolately in the middle of the road with a wallet denuded of its last cent. And the sedan was high-tailing it back toward Toronto as if the devil were at its heels.

Sandy looked down at Alphonso and shook his head. "This is the end," he said bitterly. "This is the pay-off. You with your smart jacks have ruined everything. How can we ever hope to see Tagore now?"

But with dogged determination, the kid walked to where the dirt road swung off from the highway. A recent rain had made the road muddy and the imprint of the tires of the limousine that had just passed over it were clear. The right tire track was of a distinctive design of diamonds and squares.

Sandy called Alphonso to him. The kid's jaw was set. "There's just one last thing we can try. We'll follow these tire tracks. Perhaps we can find Tagore yet."

But four hours later, at eleven o'clock, they were still following the tracks and they hadn't found Tagore.

It had been grueling work. In the twilight before the full moon had arisen, the tire marks had been difficult to see. Twice, when the roadbed had been covered with crushed rock, the tracks had disappeared entirely. And twice Alphonso and Sandy had swung off onto side roads and not realized it until they'd gone long distances.

Alphonso had wearied quickly and had solved the problem by climbing up on Sandy's shoulder and riding there. The kid hadn't minded that but, as the hours had passed and the tire marks had led on and on, he had become worried. He'd seen no farmhouses, no lights except in a great castlelike building far up on a hill.

There had been no traffic on the road. Around nine thirty Sandy had heard an airplane pass high overhead and disappear into the south. He had had one fleeting glimpse of it and had seen that it had been a monoplane.

Then, at eleven o'clock, when he could scarcely put one foot ahead of the other, he heard an airplane again, this time going north. Sandy thought longingly of the Eaglet and how far Alphonso and he had come and how completely lost they were. How would they ever get back to the Toronto airport if they failed to find Tagore? And what would Bill have to say when he saw them again?

"Alphy," Sandy said, as he sat down at the edge of the road and rested, "we are now on the knees of a dilemma. The great Tagore is obviously on his way to the north pole. Shall we give up and start back for Toronto? Or shall we keep on following those tracks and hope for the best?"

Alphonso was asleep and quietly snoring. So Sandy, after finding a scrap of a chocolate bar in his pocket, slowly munched it and decided to go on.

How much longer it was when he saw lights ahead, he never knew. But the lights were there, two faint glimmers in the darkness away to the right. And when the road came abreast of them, Sandy caught a glimpse of moonlight on the roofs of farm buildings set far back from the road.

An exclamation of joy came from the kid. A lane branched off from the main road and the tire marks swung along it!

"We've found him," Sandy said, shaking Alphonso.

He started down the lane, all his weariness forgotten.

"Tagore's going to be surprised to see us, Alphy," Sandy said. "But he'll be impressed by the way we've trailed him. Now, for goodness' sake, act your age!"

As he approached nearer the buildings, Sandy saw a house and a large barn back of it and beyond that a level meadow. One of the lights was coming from the house; the other from the barn.

Sandy reached the end of the lane and started across the yard toward the house. Then his heart tripled its beat. The shadowy figure of a man had come from the house and was walking toward the barn. And the man was limping.

"Golly," Sandy said. "It must be the great Tagore!"

Impulsively, he broke into a run, heading for the man. He called loudly, "Hey, Mr. Tagore! Mr. Tagore!"

The man had reached the barn, had his hand on the handle of the door. He whipped around.

Sandy, with Alphonso clinging to him, came charging up. "Mr. Tagore," Sandy said, "we've been——"

Then the kid stopped. The man had been standing in the shadows, had moved and a shaft of moonlight had fallen across him. Sandy had a terrified vision of a horrible creature, of a great dome-shaped head, of gogglelike glasses, of skin that glistened green.

Alphonso, with a screech, leaped from Sandy's shoulder. The kid said, "Who—who—are you?"

The creature raised long arms. His voice was like that of one from the grave. He said. "I am a Martian. I come from the moon."

In his shocked state, Sandy didn't hear the barn door creak open and didn't see the face of a man crouched there. A revolver was in Carter Finch's hand. He raised it and, with precision, smashed the butt end down on Sandy's head.

The kid hit the ground unconscious.

Finch said, "Get Kabu out here! Quick!"

The green-skinned man ran to the farmhouse and disappeared inside. Finch lifted Sandy's limp body by the arms and dragged him through the door into the barn. The interior had been converted into a large hangar. On the concrete floor was the rocket plane that had just returned from its murder mission over Long Island.

Finch bent over the kid and searched through his pockets until he found a notebook, across which was printed:

Sandy Sanders
Bill Barnes Airport, Long Island

Kabu, followed by the green man, hurried into the hangar. "What's wrong?" Kabu asked. His eyes darted to the unconscious boy.

"Plenty!" Finch clipped out. "He's one of Bill Barnes' men. Don't know how he ever found this place. But it means trouble. Tie him up, throw him in the plane back of the cabin. Get the ship fueled and put the bag of money in. We may have to make a get-away!"

Kabu was alarmed. "But the diamond——"

"I'm going to get Adam Preston right now," Finch said. "We'll work on him here. We may have to put on the show if he's stubborn. But he'll tell us where that damn diamond is one way or the other."

The wall phone rasped. Kabu answered, listened, then swung around. "It's the gardener at Castle Falcon! He says Bill Barnes has landed at the factory field! That he's at the castle!"

"Barnes! How did he ever——" Finch started for the door. Suddenly, he checked himself, turned. "I have to get Adam Preston away before Barnes talks to him. Quick, Kabu, get me a stick of dynamite—a ten-minute fuse. Hurry!"

"You mean——"

"I mean Bill Barnes is going to die!"

VIII—OBSERVATORY

SINCE his decision to head north, Bill had held the Lancer to a furious speed through the substratosphere. A stiff tail wind had increased his velocity and by twelve, midnight, he had sighted the town of Weston, Ontario.

And the luck that had been with him stayed. For not only did he quickly find illuminated markers leading to the Preston Airplane Co., but when he swooped down over the darkened field floodlights blossomed on.

He found the reason for that upon landing. A watchman was there, an old man who was rendered almost speechless when he learned that his visitor was the world-famous Bill Barnes.

"I thought you was Mr. Gregory," he said. "That's why I put on the lights quick when I heard your engine. I thought you was Mr. Gregory coming back."

Bill didn't tell him that Gregory Preston would never be back. Instead, he said quietly, "I came to see Carter Finch. Is he around?"

"Don't know any one by that name," the watchman said. "But I only got this night job last week. I used to work a long time ago for Mr. Adam."

"Who's Mr. Adam?" Bill asked.

"Mr. Gregory's uncle—Adam Preston," the man said. "Lives up yonder." He pointed toward Castle Falcon far up on the hilltop. Its turrets could be seen vaguely in silhouette.

Upon further questions from Bill, the watchman gave him an account of the eccentric millionaire. So much so, that Bill, as he later swung the watchman's car to a stop under Castle Falcon's porte-cochère, felt he had a clear picture of what to expect. But, he was totally unprepared for what did happen.

He had banged the great knocker on the front door three times before the portal swung open a bare three inches and a voice from inside said, "What do you want?"

Bill said, "I want to see Mr. Adam Preston."

The door opened wider and Bill saw a pair of frightened blue eyes peering out at him. The pilot gently pushed the door. It swung inward and he stepped into a dimly illuminated hall.

A thin old man was there, garbed in a dark business suit. He backed uncertainly away from Bill. "I am Mr. Adam Preston," he said, his voice trembling.

Bill said, "My name's Bill Barnes, and——" But the startling effect on the old financier checked his words.

A muffled cry had come from Adam Preston's thin lips. He cringed, and retreated across the hallway toward the stairs at the rear, his eyes never leaving Bill. His whole body was shaking.

"Go away," he said. "Please go away."

Bill frowned. "Look here, Mr. Preston," he said, "I'm not going to hurt you. But I have some bad news. It concerns your nephew."

The millionaire stopped at the bottom of the staircase. "Oh! Did they get him?"

Bill said softly, "Your nephew, Gregory, has been murdered."

Adam Preston stumbled back, held to the newel post for support. "They killed him!" he mumbled.

"Do you know who did it, Mr. Preston?" Bill asked.

The millionaire's voice was a whisper. "The Martians did it," he said.

"The Martians?"

"Yes. The whole Preston family is on their death list." The financier suddenly emitted a sharp cry. "My Heaven! I took off my magic robe. They'll get me——"

He spun around and started up the staircase on the run.

Bill said, "Wait a minute——"

But Adam Preston didn't. He kept right on going.

And Bill, caught by surprise, momentarily hesitated, then raced up the steps after him. He couldn't let the old man get away. There were too many questions to ask him. The scent of Buck's killer was too strong. Perhaps all this talk was just a ruse to throw him off guard, so that Adam Preston could escape.

The financier reached the top of the staircase, darted along a hall and fled into a bedroom. He ran as if his very life depended upon it.

Bill raced into the bedroom just in time to see Preston disappearing through an opening in the far wall. The old man didn't attempt to close the panel after him.

The strange chase led along a corridor and up a spiral staircase. Bill now had his automatic ready in his hand. He was almost within reach of the financier when Adam Preston gained the top of the stairs and plunged through an open doorway.

Bill entered warily. He had an impression of an observatory, of a big telescope. A segment of the domed roof was open, revealing the black sky beyond. A flash of lightning zigzagged suddenly through the night, followed by a roll of thunder. Bill's gaze whipped back to the millionaire.

The old man had rushed across the observatory, had seized a long coat from a chair and was now donning it. The garment covered his body completely.

"I'm saved," he gasped, and sank down into the chair. "I could feel the rays. They were getting stronger every minute. If I hadn't put on this coat, I would have been dead—like Gregory. Poor Gregory."

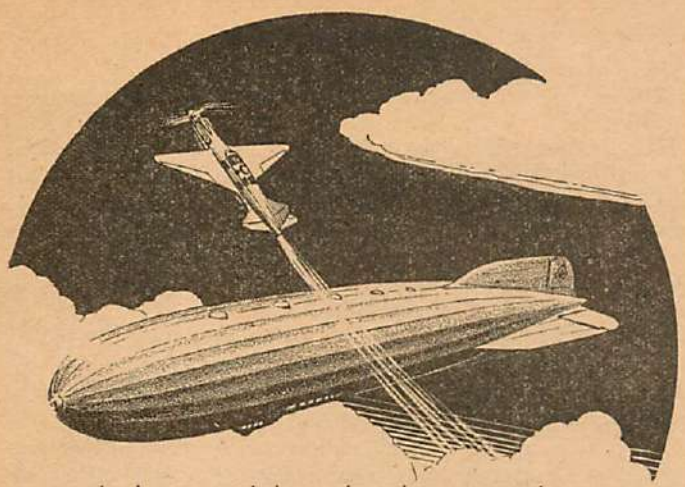
Bill walked slowly across to the millionaire and stopped in front of him. "Carter Finch killed your nephew, Mr. Preston," he said. He watched for the effect of his words.

The financier looked up. "Finch! Oh, no! Finch tried to save Gregory's life." The old man's eyes narrowed. "Are you a Martian?"

Bill caught his breath. Either this was a superb act or Adam Preston was utterly insane.

"I told you my name is Bill Barnes," the pilot said. "I want to ask you some questions, Mr. Preston—about this man, Carter Finch. Gregory wrote me that——"

"Bill Barnes. Yes. Now I remember." A crafty look had come over the millionaire's face. "Finch warned me against you. I know what you want.



In that second the rocket plane zoomed——

You want to steal the plans of his rocket airplane."

Bill's fingers closed tighter around the butt of his automatic, which he had thrust back into his pocket. "Then Carter Finch *has* a rocket plane?"

"Yes. He built it at Gregory's factory," Adam Preston said. "My money built it. It's the only way the world can be saved."

"From what?" Bill asked.

The millionaire's voice was almost drowned out by a boom of thunder. "From the Martians," he said. "They're invading the moon. They're going to attack the earth from the moon."

"You have proof of that?" Bill asked.

"Proof—yes! Carter Finch has flown to the moon in the rocket plane."

Bill started. "There isn't a plane built that will fly to the moon, Mr. Preston."

The financier chuckled. "You're like all the others. You won't believe. You think Finch and I are crazy." He picked up one of the photographs that he had dropped to the floor earlier in the evening. "There. Look at that. Finch took that picture of the moon while he was there."

Bill took the picture and looked at it. He saw a night scene of rugged landscape with a star-reflected lake in the foreground.

Bill said. "This picture was never taken on the moon, couldn't have been. It shows a lake. And it's a known fact that there's no water on the moon."

"But Finch said——" Adam Preston began.

Bill interrupted. "Listen to me, Mr. Preston. I'm convinced that Finch is the man who stole the plans for a rocket plane from a friend of mine. My friend was murdered."

"I don't understand," the millionaire said. "Finch said he designed the plane."

"That's what he said," Bill went on. "He came to you and made a lot of claims—said the plane would go to the moon, didn't he? You financed the building, and now Finch has the plane and he hasn't come back, has he?"

"Oh, yes. He was here to-night," Adam Preston said. "He just got back from the moon to-night. He told me about the way we can beat the Martians by building a big ray machine. I gave him the money."

Bill said, "How much money?"

"Only six hundred thousand dollars," the financier said. "I couldn't get any more."

"And where's Finch now?" Bill asked.

"I'm right behind you," a voice said from the direction of the doorway. "I have you covered, Barnes. Make one move—say one word—and I fire!"

Bill froze. From his position he couldn't see the door unless he turned. And the coldness in that voice backed up the threat.

Adam Preston had come to his feet. "Finch! Gregory's been killed. You didn't save him. You said you would."

"No. I wasn't in time," Finch's voice said. "Before I could get there, this man Barnes had killed him."

The millionaire's eyes went to Bill. "But—but Barnes says that you killed him." His voice was dazed. "He says that you stole the plans, that no airplane could fly to the moon. He says there's no water up there like in one of these pictures."

Finch said, "Don't believe anything he says, Mr. Preston. I told you about him. He's a spy. He's trying to steal the rocket plane."

Adam Preston's voice had a note of uncertainty in it when he spoke. "Did you fool me, Finch? Did you say you had been to the moon when you hadn't?"

Finch said, "I was there. And by Heaven, I'll prove it. I'll fly you to the moon."

Adam Preston gasped.

Bill said quickly, risking a shot from Finch's gun, "It's a trick. Don't go with him, Mr. Preston. Call the police instantly!"

Bill heard the sound of quick steps behind him, of a muffled curse. He half turned, caught a glimpse of a big man charging at him. The man's arm was upraised, swept down. A hard object slashed across Bill's temple. His brain seemed to explode. He felt himself falling. He hit the floor.

He heard Adam Preston cry out, "Don't kill him, Finch!" The voice sounded miles away.

Then Finch said, "All right—we'll tie him up and leave him here. We're taking off for the moon right away!"

Bill didn't hear any more. He was out cold.

Carter Finch lifted the limp pilot into a chair and tied him to it with a section of rope he had found. The storm that had been brewing in the distance was coming closer, and lightning flashed across the open segment in the roof above.

Adam Preston watched Finch. "But—but won't it be dangerous to go to the moon?" he asked.

Finch scowled. "Of course it will be dangerous—but you've asked for it," he said. "The only safe way is to get the Cameroon diamond and build the ray machine. Then we'd be able to wipe out the whole Martian menace. But ——" He shrugged. "That's entirely up to you now, Mr. Preston. *I* don't seem to matter."

A new light had come into the millionaire's eyes. "Fate has ordained me to save the world," he said. "I must therefore go to the moon myself, and see the conditions firsthand. If the situation is as desperate as you described, Finch, if the Cameroon diamond is necessary to bring victory—then we must have it. Even if we have to borrow it by force."

Finch's eyes flicked across the financier. He said, "Very well. We'll take off in the rocket ship immediately."

"And leave Barnes here?" Adam Preston asked.

"Yes. He'll be unconscious for a long time. He won't be able to escape," Finch said. "The police will be trailing him for Gregory's murder. They'll find him. Come on."

He took the millionaire by the arm and together they went out the door and started down the spiral stairs. Halfway to the landing, Finch stopped.

"Wait a minute," he said. "I'd better close the door up there."

He went back up the steps and again entered the observatory. Once out of sight of the financier, Finch worked quickly. He took a stick of dynamite from his pocket. Attached to it was a long fuse.

Finch put the dynamite on the floor, struck a match and applied the flame to the end of the fuse. Just before he went out to rejoin Adam Preston, he made sure that it had caught.

IX—TAKE-OFF

WHEN Sandy Sanders came to his senses it took him a minute to realize that he was lying, tied hand and foot, in a small compartment of an airplane cabin. The room was in darkness, save for a filter of light coming through two portholes in the metal walls.

The kid struggled to sit up, and winced from the pain in his head. In the forward wall of the compartment

a narrow door stood partially open. Beyond it Sandy could see a large cabin with seats for two pilots and four passengers. The cabin was deserted and a round hatchway stood open in the roof. It was apparently the only means of entrance. A short metal ladder angled down from it.

Then, while the kid's eyes were on the open hatch, a small hairy shape came scrambling through and jumped to the cabin floor.

Sandy said, "Alphonso!"

The monkey raced back, darted through the open door and leaped on Sandy. His arms tightly encircled the kid's neck. Alphonso's fur was soaking wet and he was shivering and whimpering. He had obviously eluded capture and had finally located his young master.

Sandy struggled futilely against the ropes that bound his wrists tightly together. He talked quietly to the monkey. "Take it easy, Alphy," he said. "I don't know exactly what's happened, but everything's going to come out all right. The great Tagore must be here somewhere. Maybe this is just a way of testing our courage. Or maybe the great Tagore's been kidnaped. Golly, if that's it, we'll have to rescue him! Sh-h-h!"

Sandy suddenly heard some one climbing up on the plane. Then down through the hatchway came a short, swarthy-faced foreigner. He dropped into one of the pilot's seats and bent over the instrument board.

He hadn't been there more than three minutes before another man came scrambling down the ladder. The foreigner looked up and Sandy saw a gun spring into his right hand.

"It's you, Finch," the foreigner said. He put the gun away. "I didn't expect you so soon. What's the news?"

Finch's voice came clearly, even though he had lowered it. "I've got old Preston out in the car," he said. "He's got stubborn and won't give me the dope on the diamond. Barnes put ideas in his head. We'll have to make the flight and convince him. It's a damn good thing we prepared for this. I'll radio after we get going. Is the plane ready, Kabu?"

"Yes. What about Barnes?" Kabu asked.

"He's taken care of," Finch said. "Is his young torpedo back there?" He inclined his head toward the rear compartment.

Kabu said, "He's there—unconscious."

"O. K. We'll get rid of him when we land. Run the ship outside. I'll get Preston and the Martian." Finch laughed shortly, then climbed up the ladder and disappeared.

Sandy licked his dry lips. "Golly, Alphy," he whispered, "I kinda think we're in a tight fix. I wonder how Bill got mixed up with this?"

From up forward came the whine of a starter. Sandy heard the engine turn over, then catch with a bellow. The roar swelled back through the cabin.

Alphonso buried his head in Sandy's flying suit. The roaring continued. The plane suddenly moved forward.

Sandy managed to raise himself so that he could get a glimpse out one of the portholes. He saw that the ship was moving out of a barnlike hangar and into the open. Rain slashed against the glass and hammered on the metal skin covering.

The plane came to a stop, its engine throttled. There was a wait. Then Sandy saw an elderly man climb down through the hatchway. His face was pale and his hands were shaking as if from the cold.

Kabu was talking to him and pointed to one of the seats. The noise from the engine prohibited Sandy hearing the words.

Suddenly, the kid gasped. Coming down the ladder was the same strange creature who had confronted him just before he had been knocked out. Finch was directly behind, holding the end of a chain. The other end was attached to a collar around the green-skinned man's neck.

Sandy whispered, "The Martian!"

Finch dragged the creature to one of the seats and strapped him in. Then he reached up and pulled the hatch cover shut and twisted the turn bolts tight. Immediately, the sound of the engine was almost completely muffled.

"You'd better strap yourself in, Mr. Preston," Finch said to the elderly man. Sandy could hear him plainly.

The plane was again in motion. Kabu remained at the controls. The speed was increasing and the racing engine could be heard dully. The jolting as the wheels swept across the ground became less noticeable. Then, the ship bounced, settled, and angled up.

Preston turned a frightened face to Finch. "Are we really going?"

"Yes," Finch said. "We're off—off for the moon."

Sandy swallowed his heart.

X—THE FUSE

IT WAS the rain sweeping in through the open segment in the roof and striking his face that brought Bill back to consciousness. The drops were cold and stung his skin. He opened his eyes.

His head was thrown back, his face upturned to the domed ceiling. He caught a glimpse of lightning through the opening above and straightened.

It was only then that vivid memories came jabbing back and he saw that he was tightly bound to a chair. The room was empty. Finch and Adam Preston had gone!

The heavy downpour of rain was dinning loudly against the roof. But through it, Bill heard a hissing sound. It came from across the room.

Then he saw it—a thick yellow stick, a foot long, lying on the floor near the door. A burning cord was attached to it.

Dynamite!

The fuse had been ignited! The flame had already devoured three quarters of it, was only fifteen inches from the detonator cap!

Bill tried to rise, forgetful of the ropes that bound him to the chair. His sudden movement threw him forward, the chair with him. He tried to twist his body as the chair toppled. He crashed to the floor, his left shoulder taking the impact.

Pain stabbed through his injured head. He felt his senses swimming. But he couldn't lose consciousness again. The dynamite would go off in a few minutes. He had to stop that flame before it could reach the cap!

One of the legs of the chair had splintered in the fall. And as Bill again wrenched his body, the ropes gave a little. He managed to roll the chair over. The slack in the rope gave his legs more freedom. He kicked out against the floor, forcing his impeded body nearer the stick of dynamite.

His eyes were riveted on that dot of flame as it hissed nearer and nearer to the end of the fuse. There were now only ten inches of fuse left.

Could he ever reach it in time?

He threw himself across the floor, crashing against it. The structure of the chair was weakening; the ropes were loosening. But he knew he could never win his complete freedom in time.

He watched the remainder of the fuse dwindle. He was nearer now. The dynamite was only a yard away.

The splintered leg of the chair broke completely. It gave Bill a chance to half spring across the remaining distance. He landed beside the dynamite with another thud.

Five inches of fuse were left. He was right over the deadly yellow stick. When it went off, his whole body would take the force of the explosion.

He tried to lift his right arm and bring the elbow down on the sputtering flame. But he missed.

Time was in seconds now.

With a yank, he swung around until his free foot could reach the burning fuse. He saw that the flame was practically at the end of the fuse. Then he ground his foot down——

When he lifted his boot there was no sign of fire.

And then rage swept through him. Finch had done this—Finch, the man

who must have murdered Buck and stolen the plans for the rocket plane——

Finch had told Adam Preston that he would take him to the moon. What had he meant? What was he up to?

The chair Bill had been strapped to had been weakened structurally and now he was able to work the ropes loose.

Within five minutes he was free. Then, as he stepped from the tangle he heard a sound coming from behind the door. His eyes whipped up.

The knob was slowly turning. The door inched open. Bill felt the weight of his automatic in his pocket. His hand dived for it, thankful that Finch hadn't disarmed him.

Then, with the weapon clutched in his hand, he crossed the room and pressed himself against the wall near the hinged side of the door.

He waited, his body tense, his gun ready. Was Carter Finch coming back? Or Adam Preston? But they wouldn't return, knowing about the dynamite.

The door swung farther back toward Bill. The pilot held his breath. He could hear the faint rasp of shoe leather against the floor.

A hand came around the side of the door. Then Bill reached out, grasped the doorknob and yanked. The door flew wide open. A man stumbled into the room, thrown completely off balance.

He fell to one knee; a startled grunt came from his parted lips.

Bill said, "I got you covered."

The man got up and whipped around, his beady eyes wide with terror. Bill saw that he was a little Italian, his back deformed by a large hump. He was wearing grimy work clothes.

He stared at Bill. His mouth opened, but no words came.

Bill said, "Get your hands up! What are you doing here?"

The hunchback quickly raised his hands. "Please, meester," he said. "I do nothing. I am Benito, Meester Preston's gardener. I come up here to see Meester Finch."

"What did you want to see Finch about?" Bill rapped out. "Come on. Spill everything you know!"

The hunchback cowered. "I work for Meester Finch. I tell him who come to see Meester Preston. I tell him you come here. He thank me. He promise to pay me much money before he leave. I come up here to get my money."

Bill scowled. "You won't ever see Finch, or your money again. Do you know where he's gone?"

"Yes. I know." A cunning look crossed the Italian's face. "You pay me some money and I tell."

Bill strode across to the man and grabbed him by his collar and tie. He shook him. "You little rat! If you want to go on living—talk!"

The Italian took one look at Bill's face and talked. In a furious outburst, he told Bill of a secret passage that led from the observatory to outside the castle's grounds, that Finch always came and went that way. He told where Finch's secret airplane base was a few miles to the north. He said if Bill would let him go free he would get a car and drive him there.

Bill said, "O. K. We'll go. But the slightest double cross means this." He lifted the gun.

The Italian shuddered. "I take you. I know the way. I will be good."

Bill's eyes swept over the room. He saw the two photographs that Adam Preston had shown him. They were still lying on the floor. He went over, picked them up and stuffed them in his pocket.

Finch had taken Adam Preston to the rocket plane. Bill had no idea how much time had elapsed since they had left. Maybe there was a chance that he could get to the secret air base before they took off.

But he didn't.

They raced down the passageway to an opening beyond the border of the estate, got into a roadster there and drove like mad for fifteen minutes. Then the Italian said, "Those lights ahead, meester. That is the place."

But in that minute Bill heard the roar of an airplane engine. It swelled in volume. He wasn't close enough to see the machine—but he knew from the sound that the ship was taking off. The noise had dwindled to a faint drone when the car came to a hurried stop in front of a barn.

An inspection of the hangar in the barn removed all possible doubt. The rocket plane was gone. He had missed it by minutes.

Bill made a rapid survey of the farmhouse and then came back to the hangar. Both places were deserted. He was crossing the concrete floor of the barn when he stopped suddenly and looked down. At his feet was a small leather notebook.

He picked it up. The book looked familiar. And then he saw printed across the front of it:

Sandy Sanders,
Bill Barnes Airport, Long Island.

Sandy had been here!

But how? Why?

Suddenly, Bill remembered. Then there *was* some connection between the movie actor, Tagore, and Buck's killer.

Again the pilot searched the buildings. But he found no sign of the kid. Did that mean that Finch had captured Sandy—had taken him away in the rocket plane? Finch had told Preston he was taking him to the moon. But where *had* he gone?

The pictures! Bill took the photographs from his pocket. For a minute he looked at the one showing the star-reflected lake. Then he whipped around to the Italian. "Take me back, as fast as you can, to the Preston Airplane Co.!"

Yes. That was it. Back to the Lancer. He had a plan now. But would it work? Would he ever find where Carter Finch had gone?

XI—ON HIGH

SANDY SANDERS sat numb with fright. Finch had said they were going to the *moon!*

But that was impossible. The moon was something like two hundred thousand miles away. Finch must have been kidding. And yet, that little green guy had said he had come from the moon!

Sandy shot a frightened look at Alphonso, then frantically started to work at the wrist ropes again. No matter what happened, he had to get free.

The monkey watched him, then crept closer and suddenly bit at the knotted hemp.

Sandy's eyes brightened. "That's it, Alphy," he whispered. "Go on—chew 'em."

Alphonso sank his teeth into the rope again and began to gnaw steadily.

The ship was streaking up at a steep angle. Sandy saw Finch take over the controls and heard him tell Kabu to switch on the oxygen. Then Finch turned and said to Preston, "We're going to use the rocket motor. Put your head against the chair rest. It'll soften the acceleration shock. Don't be frightened."

Sandy went rigid. The rocket motor! Then this must be the rocket plane that had been built from Buck's stolen plans! That's why Bill was mixed up with this business. Then was Finch the murderer of Buck Woodland? And what about the great Tagore? Where was he?

The kid had barely time to brace himself and try to hold Alphonso in his bound arms when a roar came from the stern of the ship. The plane was suddenly hurled upward at incredible speed. Sandy felt himself slammed back. A weight pressed against his head and chest. Lights danced before his eyes. He knew he was going to black out. He did.

He lay half stunned as the acceleration continued. He lost all sense of time. The blasting of the rocket motor went on and on and on—endlessly.

Gradually, the pressure on his body grew less as he became accustomed to the speed. His sight began to clear. It seemed as if hours had passed.

Then, as if in answer, the noise of the rocket motor stopped and he heard Finch say, "You'll be all right, Mr. Preston. You've been unconscious. We've shut off the rocket motor. We won't need it now. We're beyond the earth's gravitational influence. From now on we just coast to the moon."

Through a haze Sandy saw Adam Preston in his chair. Across the aisle from him was the green-skinned man. Preston said weakly, "It—it was awful. How far are we?"

"Eighteen hundred miles from the earth," Sandy heard Finch say.

Sandy gasped. Eighteen hundred miles! He must have been dreaming. This wasn't possible.

He looked through the door into the cabin again. Kabu had turned and was pouring a brownish liquid from a thermos jug into a paper cup. He handed the cup to Preston, together with a small white box.

Sandy heard Finch say, "You must have nourishment, Mr. Preston. Drink that coffee and eat one of those concentrated food tablets. Remember, this trip takes five days."

Adam Preston obeyed.

Five days! Sandy shivered. Would his captors think to feed him? Kabu was pouring out another cup of coffee. He took the small box from Preston and started down the cabin toward the rear compartment.

Alphonso, who had been curled up in Sandy's lap, must have sensed the approaching foreigner. The monkey suddenly crept away from Sandy and cowered in a dark corner.

Sandy whispered, "Stay there, Alphy." They mustn't discover that Alphonso was aboard.

Kabu came inside. He bent over Sandy and took a white tablet from the box. "Eat this," he said. "We don't want you to die yet."

Sandy opened his mouth and took the tablet. It was tasteless. Kabu held the cup to his lips and tilted it. Sandy drank all the contents.

Kabu said, "Take it easy. We've got a long way to go. You'd better sleep."

Sandy saw the foreigner go back to his seat. And after that everything became vague and unreal. Energy seemed to have gone from his body. Getting free from the ropes didn't matter now. He tried to keep his eyes open, then fell back and sank into a lethargic sleep.

Some time later he half awakened. He felt the plane still speeding on. Alphonso was stirring. Sandy wondered how much time had passed. It might have been minutes or hours or even days. He didn't seem to care.

Again he lost contact and he seemed to be trailing the great Tagore. The mists that had swallowed Sandy's being parted after a while just long enough for him to hear and distinguish Finch's voice. The man must have been talking to Preston. He was saying, "—been flying thirty hours. You've been asleep for——"

Sandy didn't hear any more. His eyelids had dropped shut again.

He came out of heavy sleep to feel some one forcing liquid into his mouth. He swallowed. He ate something. A voice said, "You need more food. We've been gone a day and a half."

Sandy didn't open his eyes.

It went on like that, a never-ceasing nightmare: sleeping—food and liquid—sleeping again—distant voices. Some one saying, "Two days have passed. Eat this." Then again, "Three days since we left the earth."

The churning fog that had enveloped his brain never lifted.

"Four days," the persistent voice said. "One day more."

Then, gradually, the stupefaction seemed to be dwindling. He was able to hold his eyes open. He saw the people in the front cabin. Kabu came back and gave him something to drink. It wasn't coffee. It was cold and bitter.

Kabu said, "The fifth day. We're almost at the moon." He went away.

It still seemed part dream, part reality. Five days since they had left the earth. Sandy shook his head and sank back again. He saw Alphonso creep out of the shadows and climb up on him. The monkey began chewing at the ropes.

Sandy looked down. The wrist rope had been gnawed almost in two! Alphonso must have done that while Sandy had been asleep. But hadn't the long trip stupefied the monkey, also? And what had he lived on for five days?

Gropingly, Sandy tried to think. Then he heard Finch's far-away voice saying, "Feel better, Mr. Preston? It's been an awful ordeal for you, I know. But the trip's over. We're landing. We've reached the moon!"

XII—JOURNEY'S END

THE words jabbed through Sandy's drugged brain.

Now he could feel the plane angling down. Panic-stricken, Sandy tried to stand up. The angle of the ship and his bound legs made it difficult, but he finally managed to balance himself long enough to snatch a quick look through one of the portholes. Then a sudden movement of the plane threw him again to the floor.

But in that brief minute he had seen that a strange landscape lay below—great jagged mountains, some of them white-crested. The plane had been sweeping toward one of those mountains—a mammoth shaft of rock with almost perpendicular sides and a craterlike top. And in that crater Sandy had seen a lake with steam coming from its waters.

Now the ship had leveled off. The speed was reduced. Sandy waited, numb with fright. He heard the familiar slap of pontoons against water. The plane bounced, veered and then settled.

They were down. They had landed—landed on the moon!

But it couldn't be. Sandy closed his eyes and tried to shake clearness into his head. Then he looked into the cabin. He heard Finch shout out orders. Kabu was helping old Preston into a strange suit, like that of a diver.

Finch's voice sounded again, "It's safe to go outside if you wear that pressure suit, Mr. Preston. You'll be able to hear and speak. There's a microphone and amplifier built into the helmet. Hurry, Kabu. Get out the ray guns."

The plane was now drifting. Sandy saw Finch work the controls. The ship slewed around. He heard the *plop* of a released anchor.

Preston now had a cylindrical helmet over his head. His face could be seen through the transparent sides. Finch and Kabu were hastily climbing into similar pressure suits. Only the green-skinned man remained unadorned.

Sandy heard Preston's voice come through the amplifier of his helmet. "What about—about him?" he asked, gesturing to the green man.

Finch said, "He doesn't need a pressure suit. He thrives in this rarefied air. Here." He took two small tubes from Kabu and handed one to Preston. "Don't use it unless the Martians attack. We'll have to be careful. More of them have come since I was here. I see two of their rocket ships down at the end of the lake. All right, Kabu. Get going."

Frightened, Sandy watched Kabu throw open the hatch cover and climb out. Old Preston followed him, then the green man, then Finch—and the cabin was empty.

Was all this real? Were they actually on the moon?

In a panic, Sandy yanked at his wrist ropes. He had to get free, had to do something. In the rarefied atmosphere of the moon he couldn't hope to live without oxygen. And—oh, Heaven—they had left the hatch open!

He felt the weakened ropes suddenly give. In a minute his hands were free. Without a second's pause he attacked the hemp around his ankles. Unless he could close that hatch and turn on the cabin's oxygen, Alphonso and he would die of suffocation.

The trample of weighted boots on the deck above had gone. The voices of Finch and the others had dwindled. And now, as he worked, Sandy remembered Finch's words: "ray guns" . . . "Martians" . . . "rocket ships." It was all incredible, horrible.

The last knot was loosening when Sandy saw Alphonso slip from the compartment and run gayly down the empty cabin. Then, with horror sealing the kid's lips, he saw the monkey whisk up the ladder and disappear through the open hatchway.

"Alphy!" Sandy forced out. "Alphy! Come back. You'll die!"

The ankle rope fell away. Sandy

surged to his feet, raced into the cabin to the ladder and climbed up it.

But Alphonso hadn't died. Instead, when Sandy poked his head out through the opening, he saw the monkey sitting on the edge of the right wing, scratching himself. And to Sandy's utmost surprise the air outside the ship, instead of making him gasp for breath, was cold and refreshing.

One look showed him that the plane was resting close to the shore of a small lake. A high wall of jagged rock surrounded the lake. And wisps of vapor were arising from the water.

Then, far down at the end of the lake, he saw Finch, Preston, Kabu and the green man. They had skirted the shore and now, suddenly, turned and disappeared into a cavelike opening in the rocky wall.

Sandy clutched the side of the hatchway. Nothing made sense any more. Those men had put on elaborate pressure suits—yet he, Sandy, was still alive without one. Where were they going?

He waited in an agony of indecision and then crawled along the fuselage and stepped to the shore. He crouched down, his eyes searching the land around.

Alphonso hopped off the anchored airplane and leaped up on Sandy's shoulder. The kid held him tightly. "Oh, Alphy," he said, "what can we do?"

But already Sandy had started toward the hole in the rock down which Finch and the others had gone. Curiosity drew him on.

The boy proceeded cautiously along a narrow ledge of slippery rock close to the water.

The disturbing facts only increased his worry and fear. And by the time he had reached the opening in the lava wall, his heart was hammering in his throat.

He risked a look inside. The hole was the entrance to a short, almost pitch-black tunnel. Some two hundred yards beyond was another opening. And standing in that opening Sandy saw the silhouetted figures of Finch and his companions. They were looking out beyond, their backs to the kid.

Sandy drew in his breath and darted into the tunnel. To remain in the entrance would be to invite detection.

When he had crept along more than half the distance, he heard the murmur of the men's voices. He went closer, tense with excitement.

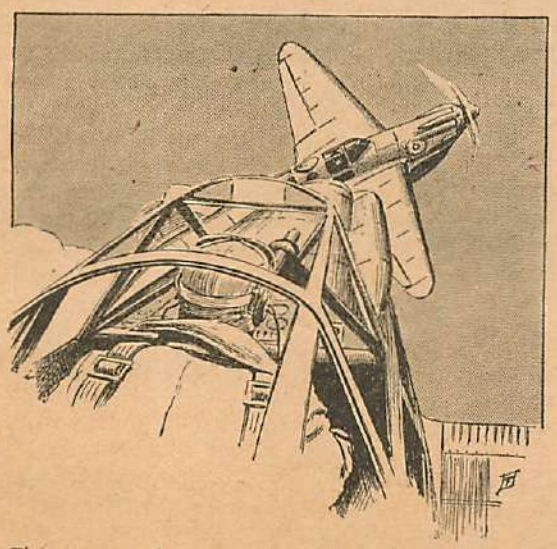
And now he was near enough to distinguish Finch's voice. The man was saying, "The Martians are working on a telepathic ray projector, Mr. Preston. The first time I was here I got near enough to inspect the machine. That's just the top part of the apparatus that we now see. The rest is sunk far down into the volcanic regions of the moon. Another group of Martians is at work down there."

Sandy listened. What was Finch talking about? The boy flattened himself against the tunnel wall and inched nearer. Now he could catch a glimpse of what lay beyond the end of the tunnel. He had thought that the passage would lead to the outside of the mountain. But no. It opened onto a small, valleylike depression, a miniature of the crater where the plane rested. But no water was there, just a sheer polished floor of lava. And in the exact center was a giant metal shaft angling up at forty-five degrees. It resembled a coast-defense gun. Machinery was massed around its base and busily working over it were a half dozen green-skinned men.

Sandy stared, scarcely believing his eyes. The sight was incredible. "Martians!" he whispered. That metal shaft —that must be the ray projector.

Suddenly, Preston's voice came back through the tunnel. He said, "But—but isn't it dangerous to stay here, Finch? What if they should see us?"

Finch said, "If they see us, they might attack. Then we'd have to repulse them with our ray guns. But I think we're safe. Their sight is very poor. That projector they're working on is almost finished, Mr. Preston. If they ever do complete it and focus it on our world—every living soul will be wiped out."



The enemy ship was dead in Bill's sights—he tightened his lips——

"Oh, they can't!" Preston cried. "We have to stop them!"

Finch was speaking again. "We might kill those few Martians out there with our ray guns," he said. "But there's a larger force working down in the depths of the moon. And more are sure to come from Mars in their rocket ships. I've told you the only way we can kill them all and save the world, Mr. Preston. The Cameroon diamond is the answer. If we get that, it will be easy——"

At that moment, Sandy saw the green man who was standing between Finch and Kabu suddenly jerk his chain from Finch's hand and dart away. He ran out into the valley.

Finch shouted in alarm. Sandy saw him fumbling with the metal tube in his right hand.

The green-skinned creatures who had been working around the projector suddenly massed together and came charging across the small valley.

Finch now had the tube raised. He shouted, "Quick! Use your ray guns! The Martians are attacking!"

XIII—ACTION

SANDY GASPED.

The green man who had escaped wheeled around as his fellow creatures joined him and together they raced toward the tunnel.

Sandy, panic-stricken, watched Finch level the metal tube. One of the approaching creatures instantly doubled up, fell to the ground and lay still.

"Got one!" Finch yelled. "Kabu! Mr. Preston! Focus your ray guns!"

Sandy stared. How had that tube stopped the green man? There hadn't been any report—any flash of light. Ray guns, Finch had said, but——

The other creatures were pelting closer, their voices raised in battle cry.

Kabu had his ray gun extended. Another green man stumbled and fell. Finch swung his metal tube. A third attacker went down and then a fourth.

Three were left. They were now within a hundred yards of the tunnel entrance.

Finch roared out, "Shoot, Mr. Preston! Shoot your gun!"

At the same instant, Finch and Kabu simultaneously aimed their guns and the last remaining creatures went down.

"We got them!" Finch's voice cracked out.

Finch said, "Everything's O. K. now, Mr. Preston. Some more Martians may be hiding back of the machinery, but I think we got all of that gang." His voice sharpened. "You see how effective these ray guns are? That's just a sample of what could be done if we had the Cameroon diamond."

"Oh, I see," Preston said. "Yes. We must have the diamond. I'll tell you where it is."

Finch said, "Tell me quickly."

Sandy strained to listen.

"The diamond is now on display at the Stockholm Exposition," Preston said, his voice shaking. "It was secretly taken abroad on the dirigible, *Victory*. The *Victory* left New York last Saturday, June 5th——"

Sandy heard Kabu interrupt with, "June 5th is to-morrow——"

"But we left the earth on June 4th," Preston said. "You told me five days had passed——"

Finch cut in, his voice hard. Sandy saw him jolt roughly against Kabu. "That's right, Mr. Preston," he said. "Kabu forgot. The diamond must be in Stockholm by this time. But wasn't it risky carrying it aboard a dirigible? They must have taken great precautions against robbery and fire."

"Oh, they did," Preston said. "The *Victory* is very safe. It uses helium. Great care was taken anyway. The Cameroon was put in a special casing. In the event of an accident, the casing was to be taken from the safe and thrown overboard. It had a parachute device and it would float on water. But I'm sure nothing happened to it."

Finch said, "I'm sure. We must start back to earth as fast as possible and go to Sweden. We'll plan how to get the diamond on the trip back." He turned suddenly. "You stay here and watch this entrance, Mr. Preston. There may be one or two more Martians still out there. Use your gun if they approach. Kabu and I will scout down the tunnel to see if the way is clear. That other gang of Martians who are working underground may have cut off our retreat to the plane. I'll call you if the passage is clear."

Sandy looked back. Now Kabu and Finch had started down the tunnel, leaving Preston at the entrance. The kid hurried. His groping hand suddenly felt a depression in the wall of the tunnel. It might be better for him to crouch down there and let the two men pass. Perhaps in the darkness Alphonso and he might go undetected.

They did. Holding the monkey tightly and averting his own face, Sandy heard the two men hurry past him. Finch was whispering to Kabu. Sandy heard him say, "You damn fool! You almost wrecked things by that break about the *Victory* leaving to-morrow."

"I forgot about the five days that were supposed to have passed," Kabu's voice said. "This whole act's been a strain. Can we get that diamond, Finch?"

The men had passed on, but the snatch of conversation Sandy had heard had electrified him. Without thought of his personal safety he started after them.

Suddenly, the suspicion that had been filtering into Sandy's brain spread rapidly.

Finch and Kabu had gone out the entrance of the tunnel. Sandy quickened his pace. He could hear them talking and realized that they must have stopped just around the corner. Again Finch's voice came to his ears.

"We'll get the diamond," he said. "The *Victory* leaves New York at dawn to-morrow."

Sandy started. Then five days *hadn't* passed. This wasn't June 8th but June 4th! Good gosh! Then——

Finch's voice went on. "I know the route the *Victory* will follow. By six o'clock it's scheduled to pass over Harbor Grace, Newfoundland. We'll fly directly to Newfoundland now and hide out. When the *Victory* shows up, we'll take off and wreck it with the rocket exhaust. They'll drop the diamond. It's our only chance."

"But everybody aboard will be killed!" Kabu said.

"What of it?" Finch asked. "Remember your Maharaja Nadir Singh will pay two million dollars for the Cameroon. Come on."

Kabu said, "You'll leave Preston and the others here? Even Tagore?"

"Yes, even Tagore," Finch said. "He's served his purpose. He knows too much now. So do those other ham actors. They might talk. This is an easy way of getting rid of them. They'll starve to death here. There's no escape from this mountain except by plane. And no one's going to come flying around this section of the Canadian Arctic. As for that Barnes youngster—I'll finish him off like I did Buck Woodland. Come on!"

Sandy froze. Finch *was* Buck's murderer!

And now—Finch and Kabu were making a get-away!

He had to stop them! Sandy turned and shouted down the length of the tunnel. "Tagore! Preston! Hurry! They're getting away! Finch and Kabu are taking off!"

XIV—DEATH

THE PASSAGEWAY was still ringing with his shout when Sandy dashed through the opening and into the crater. He saw Finch and Kabu down the shore of the lake, halfway to the plane.

The two men must have heard his shout. They had turned. They saw him. Finch bellowed, "It's Barnes' kid! Get to the plane, Kabu! Start the engine!"

They ran, awkward in their voluminous suits. And Sandy raced after them. They couldn't get away!

Alphonso clung to Sandy, chattering.

The kid saw Kabu tear off his helmet and fling it aside. He was making faster time than Finch. The foreigner reached the plane, threw himself up on the fuselage and dropped through the open hatchway.

In a minute Finch had followed him. Sandy forced greater speed into his legs. He heard the whine of the plane's starter.

Sandy had only twenty yards more to go. Suddenly, he saw Finch come back up through the hatchway. He had a heavy revolver in his hand. He aimed it at Sandy.

The kid heard his shouted words over the roar of the engine. "Stay there or I'll blast hell out of you!"

Sandy stopped.

He saw the plane's anchor chain spin up. The anchor broke water, clicked into place in the amphibian landing gear.

From behind him Sandy heard a terrified shriek, the sound of running feet. He looked back. Adam Preston had raced out of the tunnel and was running madly toward the plane.

Then from the tunnel entrance rushed seven green-skinned men. The man in the lead was limping. Tagore!

Sandy realized that they had heard his shouted warning—that they were coming to stop Finch. The kid turned to meet the wild-eyed Preston. "They aren't chasing you! Stay here! You can't do anything."

Preston swerved around Sandy and plunged into the water toward the ship. The plane was slowly moving out into the lake and into a position for a take-off. Finch leaned from the hatchway, his gun ready.

Preston stumbled through the water, half fell. "Finch! Don't leave me on the moon!" he yelled.

Finch swung his gun to cover Preston. Sandy could hear his snarling voice, "Get back, you madman. I got your money! I'm going to get your diamond! Get back or I'll kill you!"

But Preston didn't stop. He plowed through the water.

Suddenly, Kabu gunned the engine. The ship surged forward and veered as the weight on the tail pushed it down. Water swept over Preston.

Sandy saw Finch lean from the hatchway. His gun jabbed out. A spurt of crimson stabbed from it.

Preston's head jolted back as the bullet smashed into his forehead. His hands went limp. He fell into the water.

He was dead! Sandy knew. A half sob came from the kid. He plunged out into the lake.

Sandy reached Preston.

The kid dragged him to shore, to where Tagore and the other actors waited. Sandy's eyes were riveted on the rocket ship. He saw it lift off the water and zoom over the high wall of the crater. And still climbing, the rocket plane roared away into the morning sky, headed east.

XV—SEARCH

AND HEADED WEST at forty thousand feet, with Diesels pounding, hurtled the Silver Lancer, with Bill Barnes at the controls.

Since midnight, when Bill had stood in that empty hangar at Finch's secret air field and gazed at the photograph, he had come far. He had had a plan then.

The plan had been born as he had

intently studied the photograph of that mountain lake with the stars above reflected in its waters. He had recognized the polestar and two stars of the Great Dipper, and suddenly realized that, with the aid of the Lancer's star tables and instruments, he might be able to learn at what latitude the photograph had been taken.

A ride through the stormy night had brought him back to the Preston Airplane Co.'s field. He had arrived only to learn from the watchman that the Lancer had been struck by lightning. A hasty check-up had revealed that little damage had been done except to the radio. But the radio mechanism had been hopelessly wrecked.

But that had not stopped Bill. He had climbed into the cabin and worked over the photograph. With star tables and dividers he had calculated the altitude of the polestar. That had meant the latitude at which the picture had been taken—North Latitude 65 degrees!

Without knowing the time the picture had been made, there had been no way of learning the longitude. Feverishly, Bill had spread maps before him. North Latitude 65 circled the world just below the arctic. Finch's moon might be anywhere on that line. But both photographs had shown mountains. And the only mountains on the North American continent lay in the District of Mackenzie and the Yukon and Alaska.

Somewhere in that stretch Finch had taken Adam Preston. And had he also taken Sandy?

It had been then that Bill had decided to gamble, to fly up to that northwest section, cruise along the 65th parallel and look for a mountain with a lake at its crest.

Through the night he had thundered, heading northwest.

And now another day had come. The Lancer streaked on through the morning skies.

By mid-afternoon he was flying due west along the 65th parallel over the District of Mackenzie. He surged lower. Now the country had become mountainous; now his task had begun.

Bad weather came, blocking his vision of the land below. He took the Lancer down until the machine was barely missing the white-crested peaks. But he saw no mountains similar to the ones in the photographs.

Bill was over the Yukon when the approach of night showed in the sky. He knew that his search would have to be postponed until the next morning and, bitterly disappointed, he swung the ship southward to Dawson City.

There he landed and arranged for the Lancer to be refueled. And there he found two veteran Canadian pilots. He talked to them, showed them the photographs. After long scrutiny, they agreed that the country depicted resembled the wild stretches of the Snider Mountains to the north. And they gave Bill directions.

He followed the directions rigidly when he took to the air the next morning after a night of broken sleep. And by eight a. m., on June 5th, he swung the Lancer west along the 65th parallel and over the Snider Mountains.

Discouraged, Bill's gaze probed ahead of the Lancer. Suddenly, he tensed. Far ahead, coming up from the jagged country, he saw a thin black line. It looked like smoke.

He raced the Lancer toward it. Now he could see. It *was* smoke.

It was coming from a crater-formed mountaintop!

A wild shout burst from Bill's lips. He pushed the stick forward. The Lancer plummeted down. Now Bill was nearer, near enough to see a lake in the crater bowl. Men were standing beside a fire on its shore. They were waving.

Bill leveled off, banked. He looked down into the crater again. Yes. This must be the place!

He sent the Lancer dipping down into that crater, raced over the lake and zoomed up and away at the other end.

In the quick reconnaissance, he had seen six or eight men grouped on the shore line.

Wary of a trap, Bill closed the throttle and glided in. He swung over the towering rim of the crater and settled the silver amphibian down on the waters of the lake. His eyes whipped over to the shore as the Lancer slowed. Among the men standing there, he picked out a small figure. It looked familiar. He saw that a monkey was perched on the figure's shoulder.

And he knew it was Sandy Sanders!

XVI—TIME

SANDY threw himself on Bill when the pilot jockeyed the Lancer to the side of the lake and stepped ashore.

For five minutes Bill listened to a barrage of voices, as Sandy and Tagore and the other actors all tried to tell him at once what had happened.

Bill heard it all. Finch was the self-acknowledged murderer of Buck Woodland. Finch had escaped, was now planning to attack and destroy the dirigible *Victory* when it sailed over Newfoundland that very night.

And then, Bill remembered that Sam Cooper was a passenger on the *Victory*, and that he, himself, had practically put him there.

The famous pilot looked at his watch. The *Victory* was scheduled to be over Harbor Grace, Newfoundland, at six o'clock that night.

With the Lancer's radio wrecked, there was only one thing to do—only one hope. He had to fly across the continent to Newfoundland. He had to get there before six that night.

Bill turned to Sandy. His words clipped out, "Get aboard the Lancer, you and Alphonso! We're taking off!"

Then, after giving Tagore his emergency food rations and telling him that a rescue plane would be sent for the marooned men, Bill swung back into the amphibian.

In three minutes the Lancer was screaming high into the sky.

Sandy's voice came through from the rear seat, "Can we get there in time, Bill?"

Bill didn't answer. The same question had been hammering at him.

The Lancer was straining at top speed, crashing through the substratosphere like a glistening javelin. The mottled map below was briefly Manitoba and became the green wilderness of northern Ontario.

Sandy's excited voice came to Bill's ears at intervals. "The great Tagore didn't mean any harm, Bill," the kid said. "He's Kabu's half brother. That's how he got into the mess. He hadn't made a picture for a long time. He needed money. Finch promised him a lot of dough to play that part. He told him that it was just a big gag."

"I believe he's innocent, kid," Bill replied. "But he'll have to clear himself with the police."

"But, gosh," Sandy went on. "How did Adam Preston ever believe all that stuff? He must have been crazy."

"Yes," Bill said. "He was a paranoiac. He suffered from a delusion that the Martians were going to invade the world. He believed that he alone knew of it. He was crazy all right, kid, but probably only on that one particular thing. Otherwise he was normal."

The Lancer had now pelted across James Bay and was tearing over the province of Quebec. And the hand of the chronometer had flicked around the dial past two o'clock and three and four.

Bill's tension increased as five o'clock approached and passed. Quebec dropped away.

Five thirty and they were over the Gulf of St. Lawrence.

At six the *Victory* would be above Harbor Grace.

Land was ahead. Newfoundland! It was almost six o'clock.

Suddenly, Sandy's voice drummed in his ears. "Bill! Look! Way down to the southeast!"

Bill looked. A long silver shape was there—the size of a needle. It was—it must be the *Victory!*

He slung the Lancer around and nudged the stick forward. The dirigible became larger as the Lancer raced toward her. Bill could see it plainly.

And then, Bill saw something else—an airplane zooming up from the barren country. One quick look was enough. It was the same monoplane that had destroyed Gregory Preston!

The rocket ship was tearing straight up at the *Victory*, far ahead of the Lancer. Finch must not have seen the silver amphibian.

But Finch was going to get to the dirigible first. Bill knew it and could do nothing!

In that second the rocket plane zoomed past the dirigible. Bill saw a tongue of white flame lash out from the rocket-exhaust nozzle.

The dirigible was gone! He was too late!

But no! Finch had miscalculated! The rocket blast had missed the *Victory's* envelope. The explosion of the rocket fuel had shot the monoplane high into the sky.

Now, at the top of its climb it was turning, coming back.

But Finch couldn't have another chance. Bill yanked the amphibian's nose up and the Silver Lancer bulleted to meet the killer.

Then, at the moment Finch must have seen him, the rocket ship swerved in its dive. Now the enemy ship was dead in Bill's sights.

The Lancer's cannon crashed out shell after shell. The stream pelted straight into the tail section of the rocket ship. The empennage vanished; flames leaped up.

Bill had a glimpse of a man struggling through the hatch opening; he saw him leap from it. He wore a parachute and a bag was strapped to his figure. He fell away from the plane.

A second man was struggling to follow. But he never got out. The roaring furnace of the smashed rocket plane engulfed him.

The jumper's parachute suddenly opened, checking his fall. And now pelting down above him was the ball of wreckage that had been the rocket ship.

Then, even as Bill looked, the burning airplane swept across the great circle of the parachute. In the twinkling of an eye the silk had vanished.

Bill took the Lancer lower in a great circular course. He saw the man's figure drop through the treetops of a wooded slope and vanish.

Bill closed the throttle. There was a clear field near by. He put the Lancer down. Then he and Sandy went through the woods.

They found the smashed figure of a man. His body was burned and blackened. Sandy looked at the mutilated face.

"It's Carter Finch," he whispered.

Bill bent down, looked at the dead man's right hand. He saw that the tip of the index finger was marred by a diamond-shaped scar.

Lying near the figure, Bill found a bag packed with bank notes. And when he and Sandy went back to the Lancer he took the bag with him. The money would be returned to Adam Preston's estate.

IT WAS two weeks later when Sandy came rushing into Bill's office late in the afternoon. Alphonso was curled up in a chair across the room. Sandy ignored Bill and raced over to the monkey.

"Alphy!" he shouted. "Alphy—listen! I've just got a letter from the great Tagore. The police have cleared him. . . . Alphy, listen! The great Tagore is going to retire from the movies and go back to India. But first he's going to make one last picture. It's going to be 'The Living Dead.' It's going to be the greatest picture of his career. And Alphy—he's going to star you!"

But Alphonso was busily eating peanuts and didn't seem to care.

OBSERVATION WINGS

(Continued from page 54)

U bend in the end of the wire and push it into the wood and then cement.

A special "S" hook has been designed so that the four-strand rubber motor can be attached "remotely" to the rear hook by holding the nose of the model up while the motor is being dangled into the fuselage. The rear hook is engaged by "fishing" and disengaged by shaking.

If the model is to be used for flying only, numerous coats of dope are not advisable, but the "dressed-up model" will fly with reduced endurance.

FLYING THE MODEL

Glide the model into tall grass until satisfactory adjustments are made and reduced power flights are tried. If you desire a high-climbing model, substitute for the regular prop an 8" or 9" two-blader and add as much power as needed.

DOUGLAS O-46A MATERIAL LIST

Blocks

2 1x2x13¼"
1 2x2x2"
2 1¼x1¼x⅜"
3 ¾x1x3"
3 5/16x½x2¼"

Sheet

2 1/32x2x18"
1 1/16x2x18"
1 ⅛x2x6"
1 3/16x2x8"

Strips

2 1/16x1/16x18"
4 1/16x⅛x18"
2 3/32x3/16x18"

Miscellaneous

1 oz. clear dope
½ oz. cement
1 sheet orange tissue
1 oz. army-blue dope
2x4" sheet celluloid
1 ft. #12 music wire
3 ⅛ washers
Bamboo slivers
48" ⅛" flat rubber
2" copper wire

ARE YOU A NATURAL-BORN FLIER?

(Continued from page 25)

Since flying aptitude is made up of ordinary abilities, it is certain, then, that you do have it. That is, if you are reasonably normal and healthy enough to get by the doctor for a student's flying permit. Flying aptitude, in some degree, is as normal as the ability to walk, dance, or whistle a simple tune.

But what, you ask, about all those young men, selected for health and normalcy, who wash out of the military flying schools?

The answer is that the washouts do have flying aptitude, but not enough for military work. Or else their aptitude is not exercised fully. Military pilots have to be good enough to fly extremely fast and tricky planes, to fly close formation hour after hour, to fly attack missions at two hundred miles per hour at grasshopper altitudes, to perform dizzy acrobatic feats in combat—or be shot down. Their work might be compared to playing in a symphony orchestra or playing on a varsity football team.

Those military students who do not come up to a certain standard within a given limited time are eliminated. But it is recognized that many of them, given more time, would develop into good pilots. Some have done it in private flying, and it is a fact that washouts from one of our military schools have even been known to graduate from the other. No flying school is perfect. A student may be prevented from making full use of his ability by temporary and seemingly trivial physical or emotional upsets, which cause "slumps," or by lack of the best coaching in how to use it. He may be unlucky enough to draw an uncongenial or inexpert instructor. Unfortunately, even army and navy flying instructors are subject to human limitations. And crack pilots are in some cases not gifted with great ability as instructors.

In private flying you will begin in one of the light planes, or in a larger training type with comparably low landing speed, stability, and ease of handling. You will not be required to do the kind of flying military pilots have to do. You can pick your own instructor. You will not be under the pressure of having to be better than the man next to you or give up. You can take your time, and then, as you advance, go on to the faster planes if it seems advisable. You may be a genius, but if you have doubts as to your ability to do more difficult flying safely, you can get the opinion of an expert pilot and instructor. Or the inspector for the Bureau of Air Commerce can ride with you and advise you.

It is generally accepted as a fact that anybody who can pass the physical requirements can learn to fly a modern light plane satisfactorily. Improved safety characteristics of modern planes are bringing the skill required within the ability of more and more people. I say skill, for engineers can never build a plane which will eliminate the need for judgment. Fortunately, judgment is something that can largely be acquired through instruction, experience and thought, that is, through the use of ordinary good sense, whereas pure skill is dependent to a greater extent on some degree of inherent aptitude, plus thoughtful practice.

But even if you never expect to fly any but light planes, that doesn't mean that the matter of your aptitude is something to be forgotten. You can assume, if you wish, that you have a certain amount, fixed by nature and adequate to your needs. But that shouldn't end the matter. Your aptitude won't automatically assert itself to the full the minute you get into your plane. Observation and experience lead me to believe that one must give conscious thought to the matter of enabling his inate ability to operate effectively.

Flying aptitude is like your general intellectual power. You will never know how much you have, for you will never use all of it. Psychologists say that the average person never begins to tap his real brain power. Full use of it is hindered by various emotional states, various attitudes and circumstances that hold it down and prevent its coming into full play. You read of people who have plodded along for years, in a rut, and then suddenly they get a new slant on things and come out of the rut and amaze themselves and everybody else with their achievements. Such a person's mind is like an airplane would be—if you should "rev it up" and then have somebody jerk the chocks from under the wheels. The power which had been merely beating the air and blowing up dust would be permitted to carry the plane up and away.

Even though you never do difficult flying, you naturally will want to fly your plane to the best of your ability. We enjoy most what we do well, and excellence in our sports and avocations is one of the things that make life well worth living.

How can you release your flying aptitude? Well, every personality is different from every other, and each person's problems are individual and unique. But I can give you some pointers which I have picked up from others and from my own experience.

Flying training is an emotional experience, and the way it acts on your

emotions and the way you adjust your emotions is of supreme importance. It can mean the difference between your natural ability being free to assert itself, or being tied up in a knot by all kinds of hampering feelings so that flying is a confusion of false moves and a pain instead of pleasure.

Bad emotional reactions mostly take the form of fears and anxieties. By this I do not mean fear of flying itself, or rather fear of "falling." The first flight or two, it is true, carries the student into an unfamiliar world. But the average person who signs up for flying lessons is past that type of fear. If not, he soon learns that a little bumping around in rough air is nothing to be afraid of.

Recovery from spins is not a requirement for the amateur license (it is for the private and all higher licenses). But I believe every flying student should be taught how to recover from spins very early, and by all means before solo. If his ship is difficult to spin, he should at least have immediately the experience of stalls and recovery from the most abnormal position he can get it into as the result of possible mistakes. It is essential to his peace of mind that he know as soon as possible how control can be lost and regained. Once satisfied in this respect, at a safe altitude, he can forget his fears of danger and concentrate on becoming familiar with the ship. The use of parachutes, required by regulation for acrobatic maneuvers, including spins, is very valuable in wiping out possible fears of danger.

The anxieties most likely to give trouble are due to the fear of failure, of making mistakes. That is quite natural. Anybody starting something new is likely to be a little anxious about his ability to meet the new experience.

This is especially true of flying, which was so long in the popular mind considered an occupation only for people with very special and even exceptional abilities. As pointed out above, people who are most nearly normal make the best pilots. Flying aptitude is normal, and the problem is to achieve a normal mastery over the emotional reactions of anxiety, which are also normal at first.

Anxiety shows itself in tenseness, in halting and uncertain movements begun before you have decided just what you want to do, in excessive and sudden movements, and in general lack of confidence in yourself as master of your ship.

What can you do about it? Relax. If you find your hand gripped tightly on the stick or wheel, take it off. Let the ship fly by itself a bit. If a wing drops, pull it up with one finger. If the nose drops, wind your stabilizer back a bit and pull the stick back to stop the dive, and then turn it loose again.

Play with the controls—all this at a safe altitude, of course—toss the ship about a little, make a few deliberate mistakes. Slip a bit deliberately, and skid, too. Tell your instructor that you want to experiment just to feel out the ship. He'll understand—if he hasn't already told you to do just that. A few deliberate mistakes, just to break the tension of trying to avoid them, will do wonders in correcting an underlying anxiety that you may not even be conscious of.

When you make mistakes, though trying not to, remember that everybody makes them and that you are probably doing as well as anybody else. Don't think of the ship as something which is fighting against you, but think of it rather as something absolutely in your control and willing to obey you and cooperate with you if you will coöperate with it. It will, provided you demand no more of it than it is capable of performing. By free experimenting at safe altitudes you will get the "feel" of your ship and learn its capacities and limitations. The confidence thus gained will also be of great help in mastering the special problems of landing and taking off—when carelessness cannot be indulged in so freely.

Emotional stability is the term often used to designate the capacity to keep calm and relaxed when facing the necessity of meeting and solving problems. Some people are naturally more nervous than others, but even those who are easily upset can consciously cultivate the calmness which is so helpful in enabling one to use his natural ability most effectively.

An airplane, far above the earth and out of immediate danger of hitting anything, is a fine place to cultivate relaxation in action—much better than an automobile. Just be deliberately careless and lazy now and then, and think about how much fun flying is, not about how difficult it is and how easy to make mistakes. An army flying instructor helped me tremendously once when I was worried over a fancied or real lack of progress, by saying simply, "Flying is a lazy man's job. Don't work so hard at it." That was the key to the fundamental change in attitude I needed most right then.

But simply being calm and free from anxieties is not enough. That merely unties your flying aptitude. It is up to you then to use it most effectively. There is a method which I believe essential to doing this.

Many flying students have heard all about how pilots have to make split-second decisions, and act! So they figure that they are as good as the next fellow and will be able to make those decisions and act when the time comes. But it is a very bad policy to depend on your ability to make decisions in split seconds. In fact, they can't be made that way, and made right.

A good pilot doesn't ordinarily *make* a decision as to a course of action in an emergency. He merely *selects* the proper course of action out of a whole collection of such courses of action which he has carefully thought out beforehand and stored away in his head.

A good pilot has a plan of action for practically every emergency he has ever heard of or imagined. He knows, for instance, what he would do if his engine stopped under almost any condition of flight. He has thought out the various situations with respect to altitude, wind direction, his own direction, and the position of the best available landing place. If his engine stops he will not have time to do much thinking, and he must have his various plans so well in mind that he chooses the right one automatically.

That is a fair illustration of the method which is most useful in utilizing your flying aptitude. It boils down to "using your head," but you must know how to use it. The secret of the "how" might be summed up in three words: use it beforehand.

One of the greatest violinists is reported to have said that he did some of his most effective practicing sitting calmly in his chair, with his eyes closed and his hands folded. In the same way, you can get in a lot of valuable flying experience on the ground. Of course, you can't learn to fly without flying, but the importance of thinking through every maneuver before getting into the cockpit can hardly be overemphasized. It is what the psychologist calls "rehearsal thinking."

This applies not only to the development of good judgment in emergency maneuvers, but also to every part of flying, including the cultivation of skill. Use your imagination to get a clear image in your mind of the pattern the ship should follow in a given maneuver. Think out how an approach and landing should be made, how turns and chandelles and all the other maneuvers should be done.

By that I don't mean to rehearse in your mind every movement of stick and rudder. If you have only a little aptitude you will soon forget about the stick and rudder and develop the feeling that you are moving the whole ship, not the controls. Think about what you want the ship to do, and then, when you are in the air, simply move the controls any way necessary to make the ship follow the pattern.

There are some conditions under which you will have to move the controls deliberately in a different way or refrain from moving them the way your ordinary "feel" may dictate. For instance, one develops the feeling that the stick must be pulled back when the

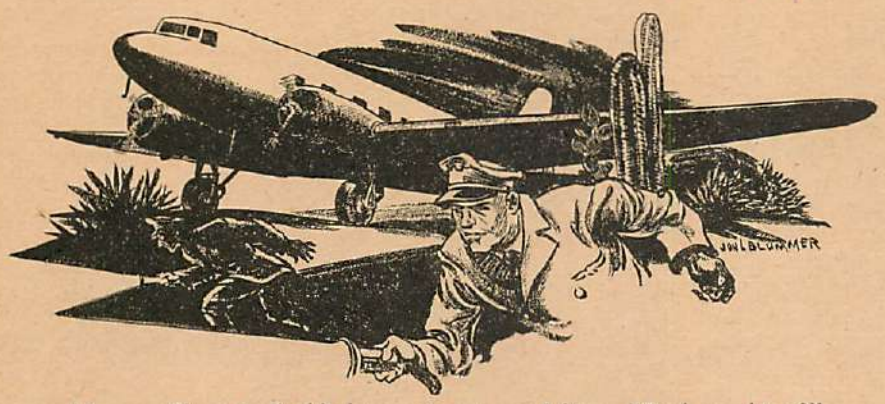
nose drops, or the stick pushed over when a wing drops. But if the ship is stalling the stick must be pushed forward and violent movement of the ailerons avoided. And some planes have special characteristics which require thought with regard to correcting for bumps and wind puffs on the take-off. That simply means that through rehearsal thinking, supplemented by practice, you must develop the ability to respond quickly with the right action in these special situations. You must develop a "feel" that prompts you correctly under the various conditions which may arise. In any case, it is most important that you think it out beforehand, and then your natural capacity for skill in action will be enabled to operate at its best.

A good book on flight training can be of great value in learning to fly. Flying cannot be learned without practice, but a book can be a great help. Barrett Studley's "Practical Flight Training," based on the navy system of training, is a good one.

The problems you will face will be distinctly your own. Working out a solution is a fascinating adventure. It involves mastery of yourself as well as mastery of the airplane.

SKIES APART

(Continued from page 14)



He saw Shorty's flashlight coming toward him—"Find anything?"

him, "Hold it, Jay!" he warned. "Two late palookas. But they've got their tickets. They didn't cancel."

Jay looked past Shorty and the right observation window and saw two men running toward the ship through the floodlight.

"Any baggage, Frank?"

"No baggage."

Jay signaled to Shorty. "Let 'em on."

Shorty let them on and came forward banging the pilots' door behind him.

"What about it now, Frank?" Jay asked irritably. "Do I get this flight going or not?"

"It's still all yours, Jay," Frank said.

"Be hearing from you, Frank," said Jay.

As he climbed the ship carefully through the choppy soup, he took a look through the peep slot into the passenger compartment.

Felix Wendt was talking to Don Beresford across the aisle and over a large, unfolded piece of thin paper with lines on it. Kay was sitting upright looking out the window at nowhere. The two late arrivals in the rear seats had not taken their hats off, nor their coats.

Jay glanced at the passenger-compartment temperature gauge. It registered seventy-two degrees. There wasn't any need for them to keep their coats on.

Jay pulled his right ear phone down on his cheek. "The two late birds—what do you make of 'em?"

Shorty squinted. "Plenty meat," he admitted. "Look like a couple of giants out of a circus."

"Or else they're sitting on something," Jay said.

Shorty glanced up at Jay sharply. "What's on your mind, skipper?"

"N-nothing." But Jay slipped his right ear phone back in place and contacted Frank at the airport. "What about those last two birds, Frank?"

"What do you mean—what about 'em?" answered Frank. "Just as I said—had booked this morning—didn't cancel—didn't show until you were pulling out. Names are"—there was a silence—"Gregory Henderson and Willard Northrup, if that tells you something."

Jay frowned. The names didn't mean anything to him, nor did they seem to fit. "See if you can get any line on them," said Jay. "You know where. Call you later."

"O. K."

Shorty was still watching Jay curiously. "Want me to go back and look 'em over, skipper?"

"I will," said Jay, "as soon as we're clear of the mountains. Where do you put us now?"

Shorty took instrument readings and figured with a stub of pencil.

"We ought to be right over the ridge," he said.

Jay nodded. As he eased into one bump and out of it, feeling for the next, he thought of Kay.

Kay—— She contradicted herself! She was afraid to fly, and here she was flying. She wasn't in love with Beresford, and yet she was engaged to him—practically.

He flew silent a while; then he said abruptly, pulling his ear phones off, "Shorty, take over. Keep her in this upper weather the way she's set now. We're well over the mountains. I'm going aft."

In the passenger cabin everything seemed all right. The two men forward were dozing. Even the woman was, in spite of herself, because of the altitude. Felix Wendt and Don Beresford still had their heads together across the aisle and Beresford was explaining something in the mechanical drawing that Wendt was arguing about. They separated to let Jay pass.

He stopped at Kay's seat.

She must have sensed him there, for she glanced up quickly and tried a smile. The smile was a dismal failure.

He said, "Comfortable?"

She nodded, preoccupied.

"Anything I can do for you?"

She shook her head.

"Why did you come?" he asked.

She looked at him a moment as though from a distance, then the expression in her eyes came closer and brought concern. "Jay," she said, low-voiced, suggesting caution, "who are those two men in the rear seats?"

His glance started in that direction, but he stopped it. "What about them?"

"One seems familiar to me," she said. "The shorter one. I haven't been able to see him clearly, but I think he's a man who used to be with Atlas when I was."

"So what?" he said.

A concerned look crept back into her eyes. "You don't know that Atlas crowd as I do." Her voice trailed off. "I just thought I'd tell you, that's all."

Jay knew it wasn't all.

The insistent tugging at his sleeve turned Jay to Felix Wendt. Wendt had the drawing open over the arm of his seat. "For the transatlantic," he said importantly. "What is your opinion, Jay, of fuel storage?"

Jay studied the scaled drawing. It was of a huge monoplane, four-motored, with very thick wings and a broad, streamlined belly. Jay squinted thoughtfully at the areas marked: "Fuel or Baggage." They were in the wings and in the chest of the ship. Jay looked at Beresford.

"Baggage is a constant load. Fuel isn't. I'd rather have the constant load under me."

Beresford smiled appreciatively and nodded. "That's my argument. We can extend the two tanks——"

Jay's hand on his arm stopped him. "Your voice carries, Beresford, more than you realize in this cabin. You can't tell who is listening or what they might do about it."

Beresford's glance at Jay was quick. It went to the passengers forward and then he turned. He noticed, apparently for the first time, the two men aft. Suddenly, his face blanched. "Atlas!" was all he said.

But Felix Wendt got it. He sat upright, gripping his chair arms.

Jay shrugged off his action. "If you'd only air-mailed those sketches, as you should have done, they would be under Federal protection. It might be well now to put them out of sight."

Beresford refolded the sketch and placed it, with the others, in the black portfolio he carried.

Jay moved along the aisle slowly. Under the two turned-down hat brims, eyes were watching him. The shorter of the two men switched his light on and began examining Universal's flying pamphlet with the strip maps of the terrain below.

The other man was still watching.

"Cold?" Jay asked him, eyeing the bulky topcoat buttoned around the neck, with the collar up.

The man nodded.

"Hey," the shorter one said, "where are we?" He referred to the strip map.

"There." Jay indicated a spot on the map with his finger. Then something hit him over the right eye and he went down—not out, but dizzy.

When he got to his feet he felt something hard jammed into the small of his back and a low, commanding voice near his ear, "Take it easy, skipper, and you won't get hurt."

As Jay's hand went to his hip he realized it was a useless movement. The holster was empty. The man behind him laughed. "This is yours, skipper." He gave him a jab with the gun. "I got my own, too, just in case."

Then Jay saw that the shorter man's seat was vacant. Kay was on her feet, looking at him penetratingly. She was white, but the question in her eyes was unmistakable. Jay winked at her reassuringly. Beyond her Felix Wendt and Don Beresford were staring at him. They could not see the gun in the tall man's hand at his back, but they had guessed at least part of the truth.

Jay winked at them, too. He didn't know what the truth was himself, what these two birds in the topcoats thought they were doing, but he was convinced they couldn't get away with it. By the time the ship landed, he would have an armed gang waiting. Nothing would happen if Wendt, Beresford, Kay and the others didn't make any false moves. Fortunately, the three passengers in the front seats weren't aware yet that anything was wrong. But Kay——

Jay sent her a hard look, a telling look.

She got the look. She sat down reluctantly. But she kept watching.

The voice behind him said, "Use the bean, skipper, and you'll have it to use to-morrow. Go forward just like nothing was going on and stand with your back to the pilots' compartment."

Jay went forward. As he did he could see the other man in the pilots' compartment busy with the radio. When he turned and backed up against the wall he saw the tall man's gun directly on him, just over the back of a seat. The shorter man came out of the pilots' cab and started down the aisle. Jay saw the man's back clearly for the first time. Then he knew the reason for those loose topcoats: the two men were wearing parachutes.

The big man aft made a sign to his pal. Jay, glancing into the pilots' cab, caught Shorty's eye, looked up at the lights and blinked once, hard. Jay glanced down the aisle again and saw the short man take the black portfolio from Beresford and toss it to the other. Beresford rose frantically, clutching. A gun roared deafeningly in the sealed compartment.

Beresford spun and crumpled. The lights went out.

Jay remembered where the shorter man had stood. He leaped for him. His leap was broken as he hit some one. He careened against a seat. He righted himself, felt his way down the aisle, stumbled again. He was aware of a cold blast and then the ship's door slammed. He reached it just as it opened again. He swung with his right. His fist connected with something hard, like a neck just under the base of the brain. The cold blast came at him briefly. Then the door slammed once more.

"Lights! Shorty," he shouted, "lights!" His shouts were drowned in others. The lights flashed on.

In the hubbub forward, Jay saw Beresford limp in his seat. Kay was busy over him. Felix Wendt, half standing, was ashen, totally incredulous. The two men forward were trying to silence the stout lady, who was rubbing her arm and screaming that she had been shot. Jay knew it was she who got in his way when he lunged. As he hurried forward, he touched Kay's shoulder. She looked up from Beresford.

Jay asked, "Any pulse?"

She nodded. "Got it in the forearm. Shock, I imagine."

"First-aid kit in the wash room."

He stopped beside the stout lady. "Sorry I bumped you with my elbow and——"

"Elbow!" she sputtered indignantly. "Young man, I've been hit by a cannon ball!"

In the pilots' compartment, Shorty was stooped over the controls, taut, peering into the black distance ahead.

"What about the radio?" asked Jay anxiously.

Shorty grunted. "Deader than a doornail."

"I'll take over," said Jay.

Shorty relaxed and rubbed the back of his neck where it was tight. "What the hell was it all about?" he asked, still dazed. "First thing I knew one guy was up here with a gun on me, tellin' me to keep on flying. I did. He got my phone first. An' you should have seen him yank those radio wires out by the roots! Knew damned well what he was doing, too. What became of those two birds?" he added suddenly.

"Bailed out," said Jay.

Shorty stared at him incredulously. "Bailed out?"

Jay switched on the landing lights and curved the ship down around a huge cloud. "Sure. They had parachutes on when they boarded. That's what they were sitting on."

Shorty was silent a moment, disbelieving. Then he looked out still doubtful and watched the landing lights swinging through clear darkness like outstretched feelers. They swung past something resembling the top of a mushroom drifting down in the black, clear space. Jay tightened the spiral through the haze. "What are you doing?" asked Shorty, puzzled.

"We're going down after him. He's got our transatlantic ship. It was in the black portfolio they lifted from Beresford."

Shorty squinted at Jay suspiciously. "They didn't lift your brains, too, by any chance, did they?"

"The detailed sketches, dummy!" said Jay.

The ship swung down out of the haze. There was a moon above somewhere in the clear. Its light made strange shadows on the walls of tall, congealing clouds. Jay found the parachute again, below on the right. A dive brought the ship close to it, under it a little. Something hanging from it, swaying like a pendulum, sent spits of flame at them —three times. Something hit the metal fuselage just behind Shorty's seat.

"Hey!" Shorty howled. "That bird's sitting there taking pot shots at us!" He started getting up. "Let me have your gun, skipper!"

"He's got it," said Jay.

Shorty turned to Jay round-eyed. "He's got your *gun*?"

Jay nodded. "He and his pal have all the guns."

Shorty, sitting down quickly, said, "Let's go home!"

Jay banked away, but came around again and kept dropping.

"What's the good, skipper?" Shorty growled. "Even if we could land right where he is, he's got the arsenal."

"Ever lay an egg?" said Jay, starting to climb the ship.

"Me?" Shorty snorted indignantly. "I'm a co-pilot."

"You're going to be a bomber now."

Shorty scratched his head. "Sure," he said dryly. "And where is it I find my bombs?"

"One will do," said Jay. "The emergency transmitter."

"This?" Shorty tapped a long, narrow metallic box at his feet. It had dials on it.

"Get it loose and hold it out your window parallel to the ship as far aft as you can. When I say 'Go,' let go."

Jay opened the pilots' door. "Seats!" he shouted. "And fasten your safety belts!"

Shorty had the window open and the heavy transmitter as far up as his knee.

"Get ready," Jay warned him.

Jay spotted the parachute about a thousand feet ahead and below, swinging downward. He squared into the wind and dived. He kept the nose of the ship just a shade above the parachute.

Shorty shouted something that sounded like, "Can't hold—longer."

Jay squinted down along the nose of the ship at the parachute which seemed to be rushing up at them.

"Let her—*go!*" Then he pulled the nose up, quickly.

Shorty, catlike, held on with his toes locked under his seat and the instrument board. He pulled himself into the compartment and gripped the window frame. But his head and shoulders stayed out. He was looking down beyond the ship's tail. In the faint light from a hiding moon he saw the parachute dent, rip from the dent outward, and then slip downward like a dropped plume.

Shorty pulled his head and shoulders in and grinned at Jay. "Bull's-eye!"

Jay nodded, but didn't say anything. He was studying the terrain below, what he could see of it with the aid of his landing lights. He banked suddenly and came around again, settling. He made a short landing on sandy soil.

"Bring your electric torch," he said to Shorty.

Outside the air was cool and still. "Look for the other one," Jay said to Shorty. "I'll see about this one—and the drawing."

"But he's armed!"

"He won't give you any trouble," Jay said definitely.

Jay found the portfolio twenty feet from where the ripped parachute landed. The portfolio seemed intact.

He saw Shorty's flashlight coming toward him. "Find anything?"

"Yeah." Shorty's voice sounded hollow.

They walked toward the ship in silence. Finally, Shorty said, "Why do you suppose that one guy didn't even try to open his 'chute?"

Jay didn't answer. He thought he knew the reason. "Let's get out of here," he said, increasing his pace.

He took the ship off and circled upward into clearing weather. Below he saw the headlights of a motor car racing toward the scene they had just left. Shorty was watching the car, too.

Shorty said, awed, "They had it figured out pretty well—even to time." He was mum a moment, then, "Serves 'em right, the rats!"

Jay flew silently by compass and put the ship's nose on the course. Presently, he picked up a beacon ahead.

The call buzzer indicated something was wanted in the passenger compartment. Shorty went aft. A minute later Kay was standing beside Jay in the pilots' cabin.

"Passengers aren't allowed up here," Jay said.

"Air hostesses are, though," she answered.

"We don't have air hostesses on Universal Air Lines," he reminded her.

"Beginning now you have." There was a laugh in her voice. "Mr. Wendt just decided, and I'm Universal's Air Hostess No. 1."

He glanced up at her quickly, noncommittally. "Did Wendt work that out all by himself?"

"What difference?" Her eyes sparkled. "It gives me the flagship, doesn't it?"

He frowned. "I might have something to say about that."

"You might," she conceded.

"And—Don Beresford might."

"I think not," she said decisively. "I've convinced Don that the place for him is on the ground, and he agrees with me. I've convinced him, too, that my place is in the air. He agreed with me. You see, he and I are—skies apart. As we've always been," she added significantly.

Jay was grim, thoughtful. "But, you, as senior air hostess of this line, and me, as senior pilot—we'd be like this——" He held up two fingers together. "Is that it?"

"Something like that."

"What do you expect to get out of that?" he asked flatly.

"The transatlantic—with you."

"And if I refuse to take you on—as air hostess?"

"I'll go as passenger."

He looked up at her with a locked face. "Got me topped either way, haven't you?"

"Either way," she agreed, triumphantly.

"O. K.," he said, giving in to the grin he had been fighting. And there was that intimate inflection in his voice as of old. "O. K., hostess."

THE GREAT AIRWAYS

(Continued from page 11)

United originated swivel chairs.

quantity enough to satisfy the most omnivorous gourmand. Should you prefer to sleep for the most part of a night journey, commodious berths and even private sections are available, comparing favorably with the most de luxe Pullman equipment of the railroads. For an extra fare you may demand day accommodations the equal, if not superior, to that of a railroad club car, private sections, swivel chairs, every creature comfort except cocktails and highballs. Drinking and flying don't mix.

Such variety of equipment necessarily means different types of airplanes. Boasting the de luxe accommodations are the Douglas DC-3s or DSTs—the standard type of the former accommodating twenty-one passengers besides the crew of two pilots and steward or stewardess. Elder sister of the DC-3s is the Douglas DC-2, carrying fourteen passengers besides the crew. Comparing in speed, but with accommodations for but ten passengers, are the Electra 12s. Other equipment used on lines operating out of Newark are the Stinson As, compact, trimotored monoplanes serving what air transport personnel call, with good-natured contempt, "the milk routes"—comparatively short routes of two or three hundred miles, with frequent stops scheduled. Marked by the same cozy comfort as that of yacht cabin and without steward service, the Stinsons fly at something better than one hundred fifty miles an hour against the one hundred eighty to two-hundred-mile-an-hour average of the Douglases and Lockheeds.

But Newark does not provide a complete picture of this amazing miracle called American Air Transport. In only lesser degree may one observe similar passenger air-line activity at airports in Chicago, Washington, St. Louis, Omaha, Los Angeles, San Francisco, Atlanta, Kansas City, Dallas, and other principal cities, from coast to coast and from the Mexican to the Canadian border.

On the airports of each of those cities the same type of planes, indeed the identical planes for the most part as we have seen at Newark, together with the famous Boeing transport, arrive and depart with lesser frequency but with the same safety and reliability of schedule through fair weather and foul. It is a mark of the high efficiency of operations that the total of air-transport planes in operation is roughly but three hundred. Back in 1930 there were six hundred transport planes in operation, but that was because the seating capacity ranged from only four to a maximum of twelve seats. Many were single-motored jobs. To-day every plane is at least a twin-motored design—a safety requirement of the bureau of air commerce—and all are capable of flying, and some of taking off, on a single engine.

With that increase in passenger capacity has gone forward breathless advances in average speed, so that to-day no part of the United States—for instance, Miami and Seattle—is more than twenty-four hours by air distant from its farthest neighbor. In all, there are ninety-two approved domestic air routes in the United States, operated on exact schedule by twenty-two different companies. Their planes fly over 31,194 miles of organized airways, with the daily average of miles flown in air transport alone reaching the staggering total of 202,804 miles.

And that is merely domestic air transport!

American leadership is no less to be marked in operations over foreign routes. The truth is that measured in miles alone air routes to foreign countries operated by American companies exceed in length, by a thousand miles, the total mileage of domestic air lines. To the 32,100 miles of foreign airways operated by Americans, soon will be added two transatlantic routes to Europe, one by way of Newfoundland on the Great Circle Course, the other by way of Bermuda, the Azores and Portugal. The first leg of the latter route is already in operation. Should it be your ambition to fly to Bermuda, which Mark Twain once described as "heaven—but hell to get to," you may embark on a Clipper ship leaving Manhasset Bay twice weekly and five hours and thirty minutes later debark under the British Flag at Hamilton, six hundred miles out in the Atlantic.

While foreign airway mileage exceeds domestic, the total average of operations is less than one-tenth that of domestic flying. The daily average for foreign flying operations is the yet substantial total of 20,687 miles. The same modern types of land planes as are in use on domestic routes fly the foreign overland routes; the sea routes are traversed by giant Sikorsky and Martin Clipper ships of various types, most of which are four-engined jobs. The total of ships of all types in foreign operations is in excess of one hundred.

And where do these foreign airways reach? A better question is, where don't they reach?

Of course, you are familiar with the once-a-week, five-day schedule across the Pacific from San Francisco to Hongkong. That operation celebrated its first anniversary, and a million miles of safe flight across the greatest ocean, some weeks ago. But did you know that the same experienced group of Americans direct the China National Aviation Corp., by which one may fly from Canton to Peiping, with stops at Shanghai and Nanking, or far into the interior to Chengtu? Perhaps Alaska is more to your taste for a hot-weather aerial journey. You may travel by scheduled air lines from Juneau in southern Alaska to Fairbanks, distant Nome, or Bethel. Mexico City may be

The interior of a Pan-American Clipper is spacious.

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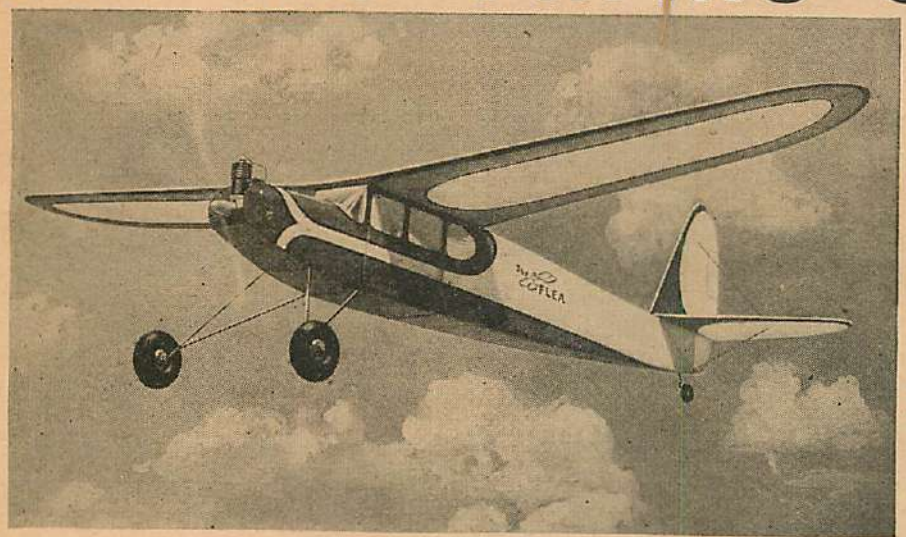

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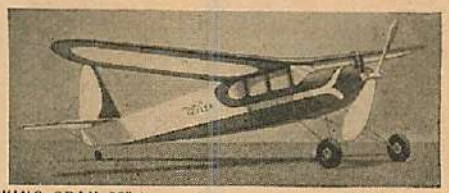

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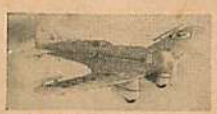
and Full Size TRU-SCALE Drawings
Kits are Complete with Everything Needed
The World's Greatest Model Airplane Values at

50¢ each

POSTPAID Or At Your Dealer

These "HI-FLYER" Kits offer the best values in authentic scale models of popular ships to be found on the market today. Kits contain everything to build the models illustrated at the left—and that means EVERYTHING. All ribs, bulkheads, fairings, etc., are clearly printed on sheet Balsa; ready to be cut out. New machine-cut, six inch Balsa propellers are included in all kits. Many kits contain finished turned Balsa cowls, others have correct size Balsa blocks. Liberal quantities of cement, rubber, tissue are included in all kits. All wire fittings are finished ready for mounting; insignia and wing lettering printed in colors on gummed paper. All strip wood is finest quality, straight grained and accurately cut to size. Full size detailed drawings give every bit of information needed for building and flying every model; many of them illustrating both halves of wing, thus simplifying and speeding up construction. Don't forget that absolutely everything to build a flying model airplane is included in these kits—make your selection from the large assortment of popular ships illustrated at the left and get started now!

22" 25" and 50" Wingspan Kits — BIG VALUES



NORTHROP GAMMA

22" Wingspan. Weight 1½ oz. Complete Kit, full size plans. Ready made Balsa Cowling and Wheels..$1.00

Ben Howard's Mr. Mulligan

25" Wingspan, movable controls, bridge type landing gear. A trophy winning model. Complete Kit..$1.50

MONOCOUPE 90-A

50" Wingspan, weight 10 oz. Beautiful white, green and silver colors. Many parts fully finished..$5.00

Complete line of "HI-FLYER" MODELS Illustrated and Described in our Big Catalog—Send 5c for your copy today.

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reached from either the east or west coasts of the United States with equal directness. There is a daily schedule between Miami and Havana, and other schedules, twice, three or four times a week will speed you to almost any part of Central or South America, to such intriguing strangely named cities as Port au Prince, San Pedro, San Juan, Port of Spain, Paramaribo, Sao Luiz, Natal, Recife, Porto Alegre, Rio Branco, Baracoa, La Paz, Cordoba, Barranquilla, and more than a score of other Spanish-Indian cities in the Banana Republics.

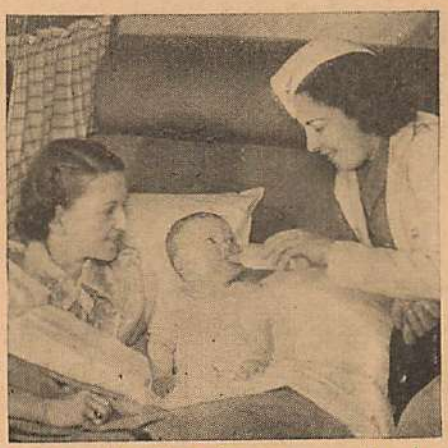
These services are supplementary to the major routes to the south, connecting great capitals of South America, Buenos Aires, Bogota, Lima, Montevideo, Rio de Janeiro. Of twenty-five foreign routes, three days' flying is the longest South American schedule—to Buenos Aires—recently shortened by a whole day. That is because night flying is not yet considered safe over the jungles, lofty mountains, and long over-water jumps of the continent to our south.

Yes, the legend of the magic carpet is now reality!

The marvel is that it has been achieved within a single decade, when the inspiring performance of an obscure air-mail pilot hailed as "Slim" Lindbergh opened a treasure-trove of capital, making it possible for a vast army of dreamers and doers to accomplish the miracle.

The total of air passengers carried in 1927 was exactly 8,697. Of that total a mere eighteen persons flew on a foreign route, for the network of to-day's foreign routes was not projected at the time. Passenger traffic on domestic air lines for 1936, the last complete year for which figures are available, totaled 1,020,931; on foreign routes 127,038—a grand total of 1,147,969. Average passenger traffic for two days at the present time—some 4,000 air travelers daily—will all but equal the total of air passengers for the entire year of 1927. And that will be in addition to a daily average of twelve tons of express and twenty-five tons of mail.

That great volume of mail and express indicates a significant fact. Air transportation now is accepted as both safe and punctual by American business leaders. Most regular air travelers are also business men. But the number of persons, particularly women and family groups, traveling by air shows an almost equal increase. Once air travel is tried, the average person will journey in no other way. A promising innovation in traffic departments of the air lines is the offering of all-expense air cruises, similar to all-expense voyages offered by steamship lines. Traffic gains for such aerial sojourning at the present time is chiefly to be marked on the foreign routes.



Air travel spells safe transportation for all ages.

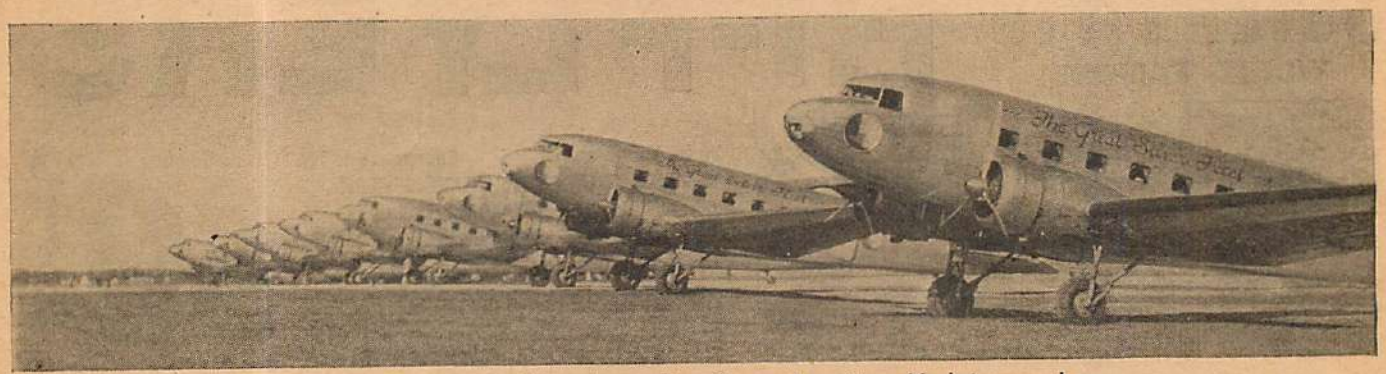
With the strides in volume of travel has attended a reduction in passenger fares. From a high average of twelve cents a mile, to-day's average is between five and six cents a mile, exclusive of ground transportation costs to and from airports.

To summarize proper credit for leadership in accomplishing this magic in transportation, we may list outstanding contributions by the "big five" who lead the way for all American air lines.

United Air Lines took over the crude air fields of the first transcontinental airway—that of the United States Air Mail—and led in modern air-transport developments. They made flying both safe and reliable through such aids as two-way radio communication, the radio beam, a careful dispatching system. They pioneered safe passenger flying over the theretofore dangerous Allegheny Mountains, paving the way for through transcontinental flying service. The Boeing was the first air transport to make three-miles-a-minute flying speed a reality, together with introducing such comforts as silent cabins, adequate heat, individual ventilation control. United was first to introduce stewardess service, girls of personality and charm who also are graduate nurses, and who have done as much as any group to "sell" air transportation to the public. They, also, were first to introduce de luxe accommodations, deliberately cutting down plane pay loads one third, to provide greater comforts and luxury in air travel. All in all, a notable record of achievement.

Transcontinental & Western Air—TWA—"the Lindbergh line," pioneered train-plane service from coast to coast. With the valued technical advice of Colonel Charles A. Lindbergh, it laid out a direct air route from New York to Los Angeles, together with many advances in flying equipment and improved safety in operations. Notable is the part it played in the development and perfection of the Douglas transport DC-2, speeding up air travel to make New York and Los Angeles a mere overnight journey. TWA made the first Douglas transport standard equipment on the airways of the entire world. Now they are sponsoring development of a forty-passenger plane at the Boeing plant, at the same time pioneering in "overweather" flying. For more than a year TWA's star pilot, Tommy Tomlinson, has been investigating the subject of flight in the substratosphere, where skies are always clear and high winds add greatly to the flying speed of ships. If five or ten years from now Los Angeles, or Europe, is a mere five- or six-hour flight through the thin air five miles above the earth and sea, TWA will have shown the way.

American Airlines was the first company to put sleeper planes in operation for the greater comfort of air travelers



Just the Eastern Air Line planes that fly north to New York in one day.

on long journeys. It was only three years ago that the Curtiss-Condor planes, with twelve comfortable berths, were first introduced on the New York-Chicago route. Shortly after they were put into a unique combination service on the first route to be established between New York and Los Angeles through the Southwest. Day travel was in the then new Douglas, night travel in the sleeper planes. American Airlines also sponsored the development of the DC-3 from the DC-2, and they were first to introduce to the public the twenty-one-passenger ship of that type. In the field of selling air transportation American Airlines also pioneered the "scrip-book" plan, which, patterned after railroad mileage books, reduced the cost of air travel to regular patrons by 15 per cent. This was a most noteworthy step.

Eastern Airlines, succeeding to the Ludington lines, which pioneered frequency of air schedules with the first "on-the-hour-every-hour" service between New York and Washington, has expanded in operations to cover most of the South and far into the Southwest, in addition inaugurating direct service between Chicago and Florida. But chief feather in the executive's helmet of Eddie Rickenbacker, America's War "ace of aces," is the safety record of that line which carries daily the nation's wealthiest patrons and leaders in government, commuting between New York, Washington and Florida. *Since Eastern Airlines was organized not one single passenger fatality has occurred.* This is a tribute to fine equipment and personnel.

The accomplishments of Pan-American Airways are so many and varied it is difficult to list them all. The system pioneered long-distance over-water flying. Through its interest and coöperation were developed and perfected the progressively better Clipper ships designed by Sikorsky and Martin. Discipline of pilots, use of stewards, development of new safety navigational aids, particularly in the field of short-wave radio and radio directional finders, all went forward at the same time new routes were being projected and organized. The marvel of Pan-American transpacific operation is now matched by new routes—to New Zealand way "down under," and across the Atlantic to Europe.

Behind the marvel of all this flying service is a vast personnel exceeding in numbers the total of air passengers in 1927, young men and women who unquestionably possess the greatest *esprit de corps* of any American industry. At the end of 1936—and the number has since increased substantially—9,972 people found employment in the air-transport industry. Pilots numbered 690, co-pilots 543, stewardesses and stewards 390. Serving such flying personnel were mechanics and ground helpers totaling 2,864, other hangar and field personnel numbering 1,764. In more prosaic departments, traffic, engineering, cost accounting, and so forth, yet another 3,721 other men and women found employment.

Maybe there's a job for you in this wonderful expanding industry of travel by air. But if you don't want a job, at least you can try the marvel of the magic carpet, as a passenger, on your next journey.

GLIDING AND SOARING

(Continued from page 19)

flights were made by Pyragius, Riedel, and Tubbs. The meet officially closed at 2 p. m., to give the officials, pilots, crews, and guests time to prepare for the farewell banquet to be held at the Mark Twain Hotel.

THE BANQUET

Guest speakers at the banquet included a varied list of officials connected with air activities. Major Sanford Willets, supervisor for the Bureau of Air Commerce, stressed the necessity of having new regulations to govern gliding and soaring, and his conclusions will be given separate space farther on. Lieutenant Von Boetticher, German air and military attaché, paid tribute to Warren Eaton and Jack O'Meara, pioneers of the sport in this country. The development of American soaring technique was discussed by Dr. Karl Lanze, director of the contest board, who pointed out the gains made at the present meet—in spite of weather handicaps. Other speakers included C. B. Allen of the New York *Herald-Tribune* and Larry Lawrence, Secretary of the S. S. A. The latter reminded contestants of the new rules for scoring: minimum credit points this year being a flight of seven miles and an altitude of 1,000 feet above take-off point.

Acting in behalf of his father, Felix duPont, Richard C. duPont then introduced the foreign pilots as well as those who took an active part in making the meet a success. The foreign pilots were presented with albums of pictures commemorating their participation, and a similar memento was given Paul duPont, designer of the winch used for this year's launchings.

TROPHIES AND AWARDS

Presentation of prizes was as follows:

Edward S. Evans Trophy for the American championship: Richard C. duPont (third-time winner). . . . A. Felix duPont Trophy for altitude: gold trophy and $500 cash—R. C. duPont; silver—Peter Riedel; bronze—Lewin Barringer. . . . Bendix Glider Trophy for greatest distance: gold trophy and $500 cash—Peter Riedel; silver—Harland Ross; bronze—Emil Lehecka. . . . Lieutenant Harris Trophy for New England champion: Charles Tubbs. . . . Mrs. Warren E. Eaton contest for new gliders: first prize for a glider with highest rating, $700—Arthur Schultz (A. B. C. sailplane); second prize, $500—Harland Ross and Harvey Stephens (Ross-Stephens sailplane), third prize, $300, available if the first prize winner does not obtain an A. T. C. within six months—Paul and Ernest Schweizer (Schweizer all-metal utility). . . . Air Trails Trophy for a new "C" pilot making most notable flight: Harland Ross (121 miles). . . . Sherman Fairchild Trophy for group compiling most number of credit points: Southern California Soaring Association (451 points). . . . The Wightman Trophy for longest aggregate distance in utility glider: first prize, $30—Robert Auburn; second prize, $15—Charles Tubbs.

Edward S. Evans Barograph Awards to groups whose ships compile the highest awards: Airhoppers Glider Club of New York, Southern California Soaring Association, Wings Gliding and Soaring Club of Philadelphia, and M. I. T. Club. . . . Marine Midland Bank Trophy and $100 cash to first pilot reaching the Allegheny Mountains: Chester Decker. . . . Eastern Air Lines trip for two, New York City to Miami, for longest distance flown in a utility ship: Robert Auburn. . . . Western Air Lines trip for one, New York City to Chicago, to first Silver "C" pilot qualified: Harland Ross. . . . American Airlines trip for two, New York City to Buffalo, to second Silver "C" pilot qualified: Arthur Schultz. . . . America-La France Corporation Trophy and $100 cash for longest soaring flight with passenger: Fred Barnes. . . . Elmira precision tool division of Remington-Rand, typewriter to most successful woman pilot of meet: Mrs. Laura May Brunton. . . . Columbia Rope Co. awards, six 500-feet lengths of tow rope to groups whose ships compiled highest number of points: Airhoppers, Southern California Soaring Association, Wings Gliding and Soaring Club of Philadelphia, University of Michigan Club, Elmira Association of Commerce, and M. I. T. . . . The Cellulose Corporation of America prize for special sheets of Lumarith cockpit hood covers, to the two groups compiling greatest number of points: N. Y. Airhoppers and Southern California Soaring Association.

The contestants at the 8th Annual Soaring Meet.

PRIZE MONEY

Prize money based on credit points for both pilot and ship performance was also awarded. Each point was worth 54 cents, and altogether 89 checks were distributed. Those benefiting most from such prize money were: Riedel—196 points; duPont—182 points; Decker—178 points; Lehecka—178 points; Ross—172 points; Barringer—171 points; Auburn—152 points.

NEW "C" AND SILVER "C" PILOTS

Altogether nineteen pilots gained their "C" licenses at the contest, and this large number was considered one of the meet's outstanding accomplishments. Those qualifying for the license must make a soaring flight of over 5 minutes' duration and attain an altitude above their release point in the air. "C" winners this year include Harvey Stephens, of Hollywood, Cal.; Douglas Hugill, Inglewood, Cal.; Harland Ross, Montebello, Cal.; Robert Eikenberry, Ann Arbor, Mich.; Robert Newcomb, Blissfield, Mich.; Albert Rosse, Brooklyn, N. Y.; Arthur M. Hoffman, New York City; John Ford, Brockton, Mass.; John Noyes, Clayton, Mass.; Mrs. Laura May Brunton, Trenton, N. J.; Donald Lawrence, Newark, N. J.; S. Orban, Hillside, N. J.; Welcome Bender, Elizabeth, N. J.; T. Wistar Brown, Overbrook, Pa.; L. Dubois, Edward Replogle, A. Donovan, Harry Martin, L. D. Montgomery.

Two "Silver C" licenses also were awarded. For this rating, the highest obtainable in American soaring, the requirements are a distance of at least 32 miles, an altitude not less than 3,280 feet, and a minimum duration of 5 hours' flying. This year's winners of the "Silver C": Harland Ross, Montebello, Cal., and Arthur Schultz, Berkley, Mich. The former gained his "C" and "Silver C" within the same week.

NEW AMERICAN-BUILT GLIDERS

Of the 4 ships entered in the Mrs. Warren E. Eaton contest for new gliders, 3 qualified, and these represent the best in construction and performance so far developed in America.

The A. B. C. sailplane designed and built by Arthur Schultz of Berkley, Mich., which won first prize, may be considered as an intermediary sailplane, a stepping stone from a utility to a high-performance soarer, and therefore very useful to clubs and individuals who want to acquire a soaring technique. It has a welded steel fuselage with internal wing construction of wood, and tail surfaces fabric-covered. Dimensions:

Span—48.5 ft.
Length—19 ft.
Wing area—175 sq. ft.
Weight, empty—300 lbs.
Sinking speed—2.8 ft. per sec.
Gliding angle—1:18.

The second prize winner, the Ross-Stephens sailplane, designed by Harland Ross and built by Ross-Stephens Aircraft of Montebello, Cal., for Harvey Stephens, motion-picture actor, is the last word in streamline design and compares with the best ships imported from Germany. The R-S1 is a midwing full cantilever monoplane with gull-shape wing and a sharp taper. It has a full monocoque plywood fuselage with a cockpit hood of plexiglass, so constructed that it follows the lines of the fuselage, giving the whole body extremely clean lines. The tail surfaces are full cantilever. This ship is equipped with spoilers, a type of wing flap to facilitate landings in small fields. Dimensions:

Span—46 ft.
Length 20.5 ft.
Wing area—125 ft.
Weight, empty—280 lbs.
Sinking speed—2.5 ft. per sec.
Gliding angle—1:23.

The Schweizer all-metal SGU1, built by Schweizer Bros., of Peekskill, N. Y., and winner of the third prize, is strictly a utility ship but demonstrated good soaring characteristics during the contest. Internal construction is entirely of metal, though tail surfaces, part of wing and rear portion of fuselage are fabric-covered. Dimensions:

Span—38 ft.
Length—20 ft.
Wing area—170 sq. ft.
Weight, empty—293 lbs.
Sinking speed—3 ft. per sec.
Gliding angle—1:17.

With the exception of the last-named, none of these ships was ready to go into production at the time of the contest, hence it is difficult to predict what their cost will be. However, so great was the enthusiasm with which they were received at the meet that their constructors promised to make final preparations and put them on the market as soon as possible. No doubt by next year the public will be buying many of these excellent craft.

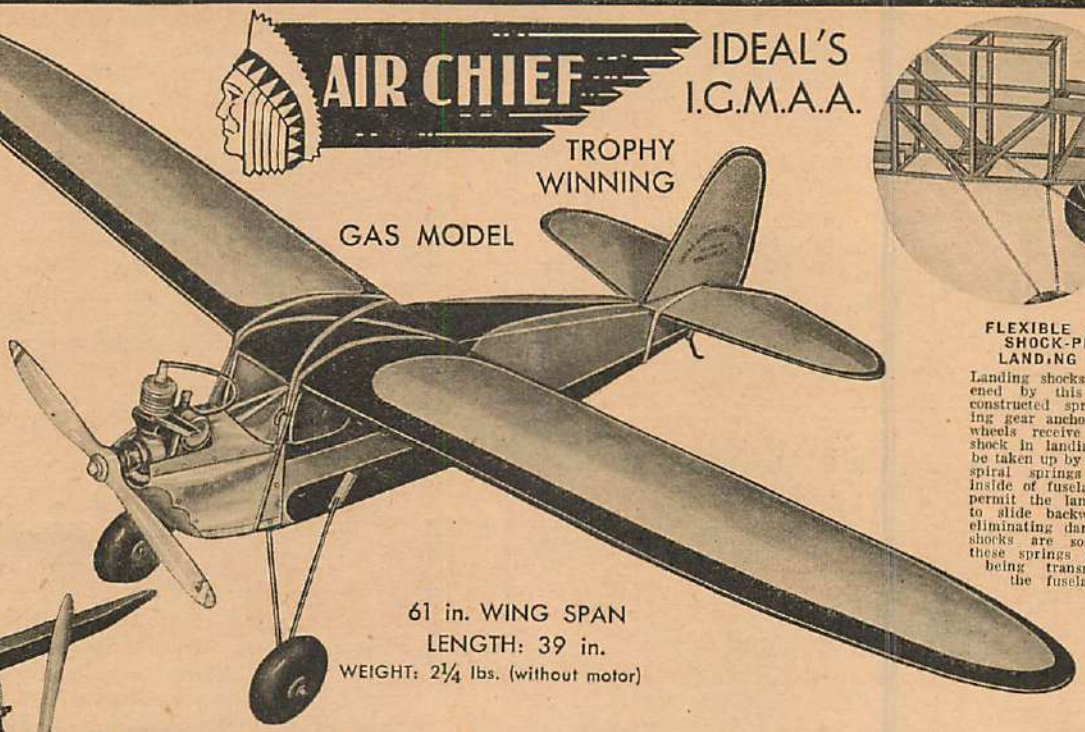
NEW REGULATIONS

Keen interest greeted the remarks of Major Willets, of the Bureau of Air Commerce, who spoke on the necessity for revising present Department of Commerce regulations in regard to gliding and soaring. Major Willets pointed out that existing rules were inadequate because of the progress made in powerless flying, and for safety's sake all around, should be changed. This is especially true, he said, concerning the licensing of pilots, regulations for which are so simple now as to permit even an inexperienced pilot to acquire a commercial pilot license and give instruction. In the major's opinion a candidate for a "commercial" should be able to show in his log book a minimum of 250 flights, of which at least 100 were 360° turns. He suggested that all interested in the future of gliding and soaring submit their ideas on what the new regulations should be.

The editors of this magazine expressed

AIR CHIEF

IDEAL'S I.G.M.A.A. TROPHY WINNING GAS MODEL



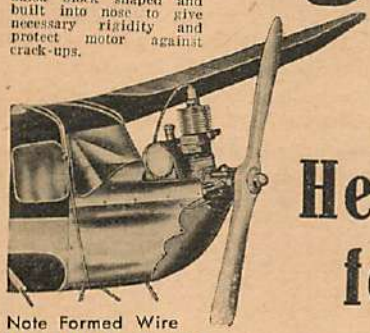
61 in. WING SPAN
LENGTH: 39 in.
WEIGHT: 2¼ lbs. (without motor)

DOUBLE DIHEDRAL OF WING INCREASES FLYING STABILITY

Wing is constructed in three sections—center section and two end sections. Center section frame work constructed of hard, strong Bass wood; ends and tips of Balsa. Dihedral is constructed between center and end, and additional dihedral designed into extreme tips of wing, thus securing the double dihedral which all builders agree is necessary in large models.
Note engine mounting with high thrust line. Solid balsa block shaped and built into nose to give necessary rigidity and protect motor against crack-ups.

FLEXIBLE SPRING SHOCK-PROOF LANDING GEAR

Landing shocks are softened by this specially constructed spring landing gear anchor. Should wheels receive a severe shock in landing it will be taken up by the special spiral springs anchored inside of fuselage, which permit the landing gear to slide backward, thus eliminating damage. All shocks are softened by these springs instead of being transmitted to the fuselage itself.



Note Formed Wire Hooks Holding Rubber Strands Over Wing.

Here's the Gas Model You'll Want for Sport and Contest Flying!!

WHETHER you want a gas model for general sport flying in your own way, or for keen competition against all comers—this is the model you should have! This is a reliable, consistent flyer which can be powered with any standard engine, and will give you the thrills which come only with powered flight. At the same time it will hold its own in official contests. Is easy to build and has many exclusive IDEAL features found in no other model. Read the following list and compare this gas model with all others—then you will decide this is a model you want!

THESE DISTINCTIVE FEATURES MAKE THIS MODEL THE BEST BUY OF THE YEAR!

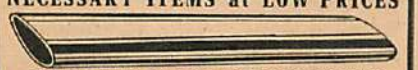
Double Dihedral Built into Wing Increases Flight Stability and Rate of Climb
Bass Wood Fuselage Framework Gives Greater Strength
Special Bass Wood Center Wing Section Adds Strength Where Most Required
25 Die-Cut Balsa Ribs Fully Finished and Notched
Ready Made Battery Case With Soldered Terminals and Tension Coil Spring
3½" Pneumatic Air Wheels. Wood Screws and Model Nails Included in Kit
Parts for Tail Assembly Including Ribs, Edges and Tips Clearly Printed on Balsa
Rudder Position Adjustable. Angle of Incidence Variable. High Thrust Line.
Plans Include Diagrams and Instructions for Installing Any Popular Make of Gas Engine
Plans Include Patterns for Both Halves of Wing
Special Landing Gear Struts (3/32") Fully Formed, Threaded and Complete with Nuts
Special Shock Absorbing Spring Landing Gear Mounted Inside Fuselage
Wire Hooks for Holding Wing Anchoring Rubber Supplied Ready Formed—Rigid Yet Flexible
Wing and Tail Assembly Detachable for Transportation
Removable Metal Cowl Permits Easy Accessibility to Motor and Connections

PRIZE WINNING MODEL BY STEPHEN KOWALIK

Winner of Junior Motors Trophy for Consistency in Flight.

This is the actual model, designed by Stephen Kowalik, which took first place in the I.G.M.A.A. Contest, May 9th, 1936, for greatest consistency of flight with the greatest time for any three official flights—average six minutes for each of three flights using 5/16 oz. gas. Nearest competitor averaged three minutes per flight. This same design took 5th, 6th, 7th and 9th places in the same contest. Stephen Kowalik has designed this duplicate of his Trophy Winning Model so you can build an exact duplicate for yourself!

GAS MODEL EQUIPMENT NECESSARY ITEMS at LOW PRICES



STREAMLINE TUBING FOR GAS MODELS

Perfectly and Accurately shaped. Just right for landing gear struts, wing struts and motor exhaust stacks. Made in Brass and Duralium in five Sizes as Listed Below.

Sold in Lengths up to three feet.

	Brass	Dural
¼" Size, per 6" Pce.	$0.12	$0.16
5/16" Size, per 6" Pce.	.13	.18
⅜" Size, per 6" Pce.	.14	.21
7/16" Size, per 6" Pce.	.17	.24
½" Size, per 6" Pce.	.18	.26

(Add 10% extra for postage)

IDEAL TRU CUT KNIFE

Razor edge blade securely fastened in long, easy-grip handle. Sharp point cuts Balsa like butter; follows intricate curves easily, fine for any cutting purpose. Each—15c Postpaid. Extra Blades—three for 10c

Gas Model Battery Case

Most convenient holder for round flashlight batteries. 6 in. long, 1½ in. diameter; metal screw caps on ends with terminal fittings for connecting wires securely soldered in place. Coil spring included for inside of case. Weight 2¼ oz. Each 35c. Postage 5c extra.

Efficient Flight Timer

Adjustable from 0 to 45 seconds. Not affected by dampness. Easily installed and positive operation. Size 1½"x3¾" 11/16". Weight 1 5/16 oz. Vibration-proof, accurate. Price $2.00. Postage 5c extra.

LANDING GEAR STRUTS

Build This 24 Inch Model Ship CUTTY SARK

The celebrated sailing ship with an unequalled record for speed. Building it is easy and real sport for all model airplane builders. Construction Kit contains Fully Carved Wood Hull, Balsa Decks, Life Boats, Anchors, Bitts, Chocks, Steering Wheel (all of Cast Metal) Chains, Masts and Spars, Sail Cloth Rigging, Colored Lacquer, Sand Paper and Full Size Plans with instructions. Complete Kit **$2.00**

Postage 15c extra

Kit contains all the above special features which can be incorporated into this model, including selected Bass wood strips for fuselage and wing center section, all necessary hardware, rubber strands, gas model cement, bamboo covering paper, etc. 2 sheets are included reproducing every detail of the Model in Full Size Pattern-Plans with detailed instructions for building the entire model, so easy anyone can follow them. This Kit is absolutely complete with every feature mentioned above. Compare with any Kit on the market and convince yourself of its dollar for dollar value. Price .....

COMPLETE KIT FOR ENTIRE MODEL

$6.00 WITHOUT MOTOR

Ask Your Dealer or Order Direct Postpaid

Send for Catalog of Model Airplanes and Boats . . . 10c

MODEL AIRPLANE DEALERS:—We have delayed bringing out a Gas Model until absolutely sure the model kit we presented would represent the utmost value possible to produce for the money. Here it is! Write for dealer discounts and get full particulars on this opportunity for profit!

IDEAL AEROPLANE & SUPPLY CO., INC.

17 West 18th Street, New York, N. Y.

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Model Boat and Aircraft Co., 1356—5th Ave., San Diego, Calif.

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City Book Agency, 70 Von Brandis, Johannesburg, S. A.

their willingness to coöperate in this respect, and will be glad to tabulate and submit such ideas to the proper authorities. Address all communications to Gliding and Soaring Department, Air Trails, 79 Seventh Ave., New York City.

SIDELIGHTS OF THE MEET

"Parachute Pete," our unofficial reporter, was also among those present, and he submits the following items:

A farmer in the valley got the surprise of his life when 11 gliders, the air lift having given out on them, suddenly landed in his oat field.

The Mutt and Jeff of the meet were the two Lithuanian pilots, Pyragius and Oskinis. All were agreed that Fred Barnes took the title of the biggest pilot of any. He stands 6 feet 3 inches in his stocking feet.

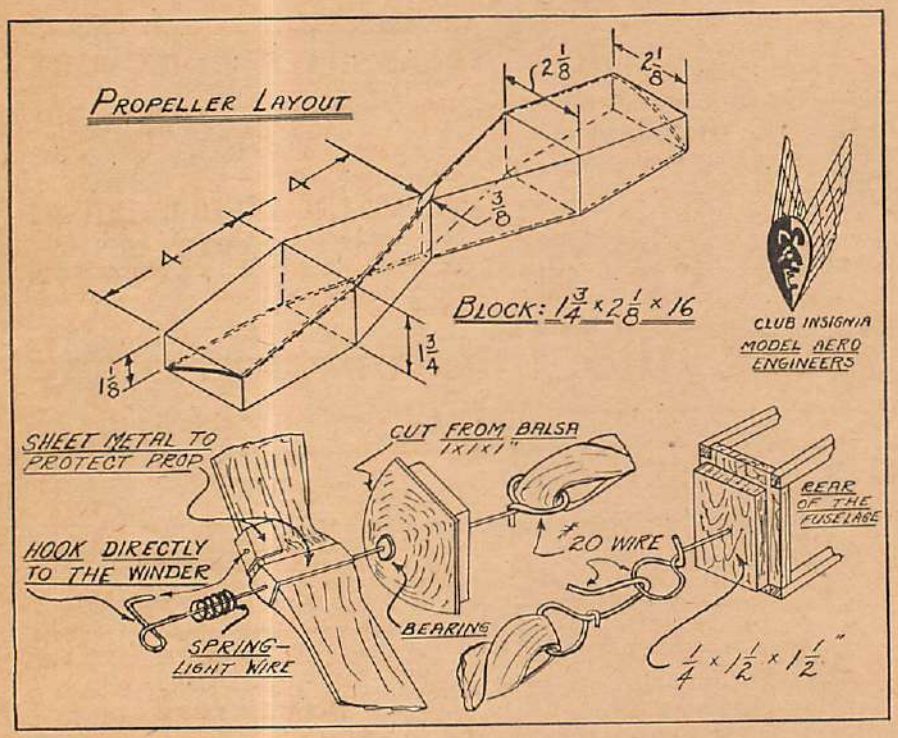
If you want your glider tested for spins get in touch with Charlie Tubbs of West Warwick, R. I. Charlie acted as test pilot for Mrs. Eaton's design contest.

Bill Rodenberg was elected the Walter Winchell of Harris Hill; Hans Groenhoff and Louis Mehmel of the Airhoppers, the official song leaders.

It was Emil Lehecka who proved to Peter Riedel that it's a small world after all. Riedel had just entered a restaurant at Pulaski after a distance flight of 113 miles, and ordered a cup of coffee. "Make it two," said the voice of Emil Lehecka from the doorway. Seems Emil had landed only 3 miles from the other ship.

THE DIAMOND

(Continued from page 48)



About 2 degrees downthrust and 1 degree right thrust are used on the Diamond. The rudder is given a slight turn to the right and the model flys in right circles. The model hops off in about 3 or 4 inches and pulls up into a fast, steep climb for about the first 40 seconds of flight. After this the model gradually levels off and a short time later goes into its glide. Immediately after the take-off the model starts a right circle and continues through the flight and glide. For maximum flights, about 650 turns can be stored in a motor with 2 inches slack.

DISCUSSION OF DESIGN

The model was designed almost entirely for good glide characteristics. The greater portion of a long flight is spent gliding. And all records have been turned in by models capable of stretching a few hundred feet of altitude into a long, slow glide. Most of the time Roy spends adjusting his models is devoted to developing a glide.

The model is rugged and serviceable. It is easy to handle and proves ideal for contest work. The tail boom is removable, making it easier to change motors or tie strands of torn rubber.

The tail surfaces fare into the fuselage in pleasing style. And, too, the Diamond-shape fuselage offers a convenient way of mounting the wing above the fuselage without using bulky clips or an unsightly center section. It's also the nearest approach to the ideal streamline fuselage shape. However, it doesn't have any of the construction difficulties that accompany an oval cross-section fuselage.

LIST OF MATERIAL

Fuselage

10 pcs. 1/8x1/8x32" for longerons and cross braces
1 pc. 1x1x1" for nosing
1 pc. 1/4x1 1/2x1 1/2" for rear plug
3 ft. #20 wire for landing gear, shaft, rear hook
2 ft. #12 wire for landing gear

Wing

8 pcs. 1/8x1/8x20" for leading edge and spars
2 pcs. 1/8x1/4x20" for trailing edge
4 pcs. 1/32x3/4x24" for ribs
2 1/2 ft. #20 wire for wing saddle
Small pc. bamboo for wing tips

Elevator and Rudder

3 pcs. 1/8x1/4x10" for trailing edges
3 pcs. 1/8x1/8x10" for leading edges
1 pc. 1/8x1/8x20" for elevator spar
4 pcs. 1/32x3/4x12" for ribs
Small pc. bamboo for tips

Additional Items

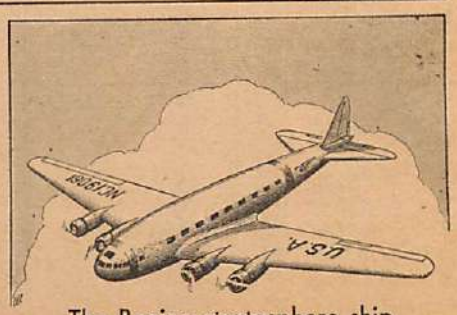
3 large sheets of tissue; 2 ounces thinned nitrate dope; 2 ounces cement; 1 ounce banana oil; propeller block 1 3/4x2 1/8x16"; 1 pr. 1 7/8" diameter wheels; 35 ft. 1/8" flat brown rubber; 1/2 ft. piano wire (fine), for free-wheeling spring.

Super Transports

(Continued from page 29)

side-by-side seats extending ten deep down the length of the cabin and separated by a wide aisle. Seats are readily convertible into berths for twenty night travelers. A complete kitchen and a lavishly appointed ladies' lounge occupy the space between the control room and the cabin. In the tail of the ship is a men's lounge and a private stateroom. A crew of five ministers to the safety and comfort of the passengers.

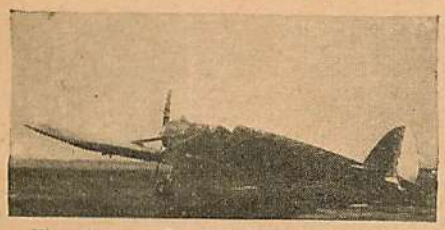
Both the DC-4 and the Boeing-307 will be flight-tested early this fall. The first of them should be in service before the end of 1937. They are magnificent ships, designed in friendly concert with our major air lines and they furnish us with new and more glorious wings to carry on America's peaceful conquest of the air.



The Boeing stratosphere ship.

LIGHT PLANE FLYING CLUBS

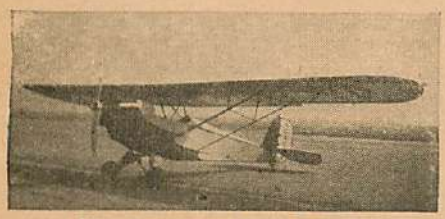
(Continued from page 23)



The Arrow, Ford V-8, sport plane.

which have been added parts of Chevrolet and Plymouth motors. The department of commerce has already placed an order for a similar ship for their own use.

The Taylor Aircraft Co. has moved to its new factory in Lockhaven, Pennsylvania. Once under way, they expect to produce one hundred planes a week, a substantial increase over their former output. The Taylor plane, called the "Cub," is a high-wing cabin monoplane powered by a 40 h.p. Continental motor, and costs about twelve hundred dollars. A novel addition to the new factory will be a "ferris wheel" arrangement to handle wings and fuselages during their doping and finishing processes. A full day's schedule of wings and fuselages will revolve on the wheel. While the wings are at the top of the wheel, they will be drying, while those at the bottom will be doped and finished.



The American Eaglet 231.

A mass airplane flight from Hornell, New York, to Bombay, India, has been planned for this summer by pilots of "Cub" planes under the guidance of Major Merrill Riddick. They will hop by easy stages to California, thence to Alaska, across the Bering Strait to China, and then southwest across China and India to Bombay.

I would appreciate it very much if our readers would write in any suggestions as to how this department can be improved. Also, I would like to hear from flying clubs throughout the country, telling of their activities.—THE EDITOR.

THE NATIONAL CONTEST

(Continued from page 44)

lack of time in developing suitable models for the new contest rules. Modelers in this part of the world must ship their models about two months before the contest.

But with old-master Cahill in action we can't help but feel that New Zealand would have had a difficult time keeping the Moffett regardless of how much time they had to prepare for it. Jim is an expert model builder. And he has a flying technique that's one of the best. The Moffett will be a handsome addition to his well-stocked trophy case and we're glad that Jimmy won the old trophy.

Wayne County Airport proved ideal for model flying. At least there were no natural obstacles. However, the farmer living alongside the airport wasn't air-minded. We think he must have tried to build a model and was unsuccessful. He insisted on charging ten cents for the return of each model that landed in his fields. The southwest wind blew models into his field throughout the duration of the contest. The farmer called in his relatives and proclaimed "bank day" recovering the hapless models.

Contest arrangements were not as thoroughly worked out as they usually are at a national meet. Modelers missed their usual box lunches the first two days. They didn't mind slighting their stomachs, but the lack of timers and officials proved annoying. Because of a misunderstanding, the soldiers from Selfridge Field, who served as officials and timers, didn't arrive at the airport until late afternoon. Contest Director Irwin Polk worked hard in overcoming the difficulties that naturally arise when contests are arranged at the last minute. He did a good job in the face of many difficulties.

The outstanding rubber-model flight from the viewpoint of duration was turned in by Richard Korda, of Cleveland. He turned in a fine flight of 54:13, to win the open-class Cabin Event. Korda is a veteran modeler. And we weren't surprised to see him win this event. But we were surprised at the

FINAL WAKEFIELD RESULTS

Results are the average in seconds of three flights.

1.	Fillon, France	253.23
2.	Bullock, England	194.53
3.	Howse, England	193.00
4.	Chabot, France	157.6
5.	Clasens, Belgium	156.83
6.	Anderson, Sweden	155.73

Herbert Fish, America, won the Bowden Trophy.

Wallace Simmers, Stout indoor winner, added to his fine record.

length of the flight. The increase in weight didn't cramp his model's flight.

At last year's meet Alvie Dague won second place in the Mulvihill Trophy contest. This year he really proved his ability and took the Mulvihill Trophy back to Tulsa with a flight of 33:02. Tulsa isn't a strange place for the Mulvihill. It went there last year in the care of Bruce Luckett. Tulsa builders set a pace in model building that makes us dizzy—not to mention many of the other entrants.

Roy Stoner, of Rockford, Illinois, won the Stout Outdoor Trophy contest. Roy is a newcomer to the ranks of national winners. But he knows models; 12:52.2 is evidence of his ability. We sort of suspect that we'll hear more of builders in Rockford, Illinois. There is considerable model interest in that city and Roy's victory should stimulate activities.

Bernarr Anderson, of Akron, Ohio, proved that records in the open class are coming up to the fast pace set by the junior and senior divisions. He headed the open-class Stick Event with a flight of 12:52.

Indoor flying was done in the Gross Island blimp hangar. The 90-100-foot ceiling was free from obstructions—a pleasant relief from the obstructions met last year in the Coliseum. Thermals developed in the upper part of the hangar during early Friday afternoon. The temperature hovered near 100 degrees. As the models flew near the ceiling or the walls of the hangar, they frequently collected streamers of cobwebs and then rolled over and spun into the waiting hands of their builders.

Wallace Simmers won first in the Stout Trophy contest with 20:30—a new record. Simmers is an exceptional contest flier both indoors and outdoors.

The Springfield Trophy contest for indoor stick models was an interesting contest. Carl Goldberg was picked to win the event. Goldberg has won this trophy 3 times before. Throughout the contest, his time of 20:05.8 was thought to be the highest. Only after the results had been carefully tabulated at the end of the contest was it learned that Carl's time was 32 seconds below that of Thomas Harris of Toronto. Had Carl been able to stretch his flight just a little longer he would have retained permanent possession of the Springfield Trophy by winning it 4 consecutive times.

John Ginnetti, of Atlantic City, won the indoor-cabin Open Class Event with 17:48.6. John has been doing some mighty fine contest flying for the past 5 years and he deserves winning.

Tulsa seems to be producing a second Carl Goldberg in the person of Alvie Dague. For the second consecutive year he won the Bloomingdale Trophy for indoor cabin fuselage models. His winning time was 15:41—36 seconds less than his flight last year.

On Saturday, the 10th, modelers moved outdoors again for the duPont Gas Model Contest, Berry Brothers model finish contest, finals in the Moffett, and the flying-scale model events. The weather was ideal. However, the "ill wind" continued to blow models into the "irate" farmer's field.

The duPont 32nd power, shut-off event proved interesting and promises to develop into an outstanding contest feature. There was a slight misunderstanding of the rules used in calculating pay load and awarding points. All the entrants good-naturedly worked out their differences and had an interesting time. Albert F. Dillon, Jackson, Michigan, led the field with 114 points.

The gas models entered in the Berryloid Finish Contest were lined up on the apron in front of the hangar. The models were all beautifully finished and the job of awarding first prize was a hard task for the judges. Alvin Anderson's beautiful model finally took the prize.

Saturday night the Bureau of Air Commerce officials were invited to a special meeting of the gas-model enthusiasts. They discussed the present criticism of the gas model. The B. A. C. men were anxious to see how gas-model contests were conducted. They were invited to attend the gas-model contest scheduled for the next day.

Outstanding gas-model flight of 70:02 was turned in by Maxwell Bassett of Philadelphia. Maxwell has been winning gas-model contests ever since 1933. He's now flying in the open class. Back in 1935, at the St. Louis national meet, Maxwell told us that he was going to retire from gas modeling. One month later he won an important Eastern contest and has been winning contests regularly since then. Maxwell modestly says he didn't expect to do very well at Detroit. But we knew better. The contest results proved our judgment to be correct.

Fiske Hanley, of Fort Worth, took the Texaco Trophy with 50:29. A modeler with enough enthusiasm to make a long trip from Fort Worth to Detroit deserves a victory and he certainly did turn in a swell flight.

Chester Lanzo, of Cleveland, Ohio, won the prize for the best radio-controlled model. Chester originated the idea of radio control and has been the first to work out a successful application for models. His apparatus worked successfully and he demonstrated that he was able to control the flight of his gas model.

There were few entrants in the radio-control event. The problems of building such a model seem to be too complicated for the average builder. Radio control is still in its infancy, but holds great promise. Next year we should see some close competition in this event.

On Monday, July 12th, contestants packed away their models and settled down to the pleasant business of sightseeing and entertainment at amusement parks. They made a tour of Detroit and wound up the day's activities with a banquet given by the Ford Motor Co. in the Ford Administration Building. After the banquet the trophies and prizes were awarded. Announcement was made that the contest would be in Detroit again next year. And with a whole year to work out the details, the mistakes of this year's meet will be avoided. We hope these plans are carried out. We had a swell time in Detroit and look forward to next year's meet.

SCALE MODEL RESULTS

1.	Max Sokol	Hamtramck, Mich.	Stinson Reliant
2.	Peter Zaleski	Cleveland	Macon F9C2
3.	M. B. Kleckner	Akron	Time Flies
4.	Katherine Clark	Waterbury, Conn.	Mr. Mulligan
5.	Kenneth Diget	Battle Creek, Mich.	Aeronca
6.	Robert Briggs	Brighton, Mass.	Sikorsky
7.	Tirey Vickers	St. Louis, Mo.	Laird
8.	Harry Copeland	Syracuse, N. Y.	Boeing
9.	Harry Copeland	Syracuse, N. Y.	Mr. Mulligan
10.	Robert Barrows	Kalamazoo, Mich.	Fokker
11.	Harry Copeland	Syracuse, N. Y.	Mr. Mulligan

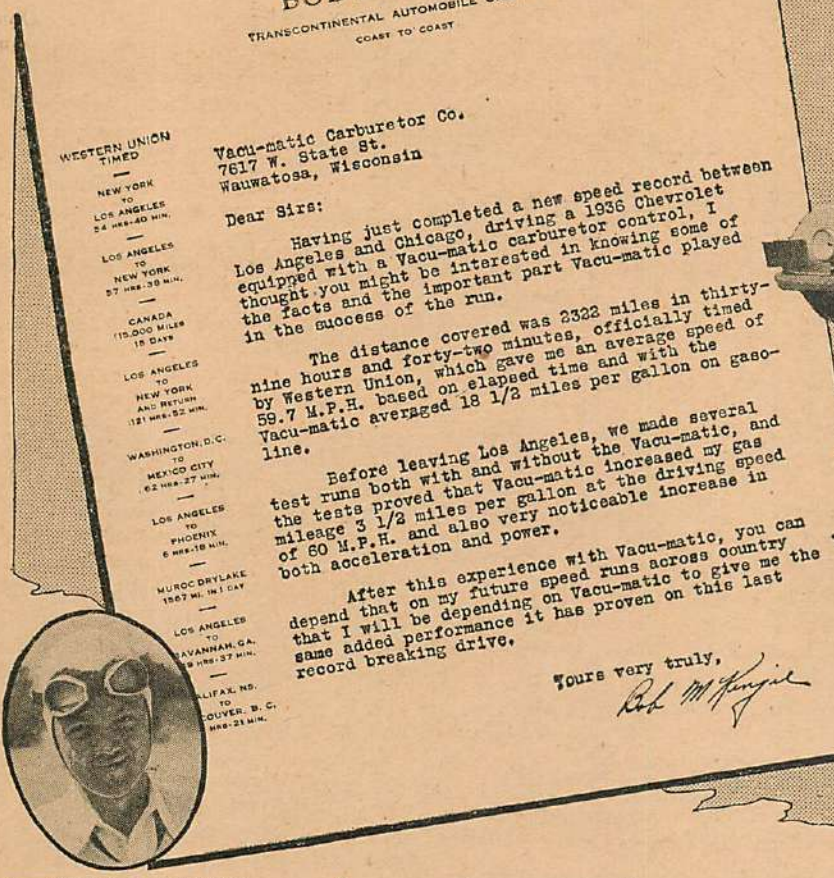
OUTDOOR OPEN CLASS CABIN EVENT

1.	R. Korda	Cleveland	54:13
2.	C. Sholes	Pittsburgh	2:39.8
3.	R. Wriston	Tulsa	2:10.6
4.	R. Bodle	Akron	1:51
5.	F. Zaic	New York	1:46
6.	H. Fish	Akron	1:45
7.	R. Gable	Reading, Pa.	1:27
8.	H. Walker	Cleveland	1:18
9.	C. Lanzo	Cleveland	1:17.6
10.	B. Marchi	Medford, Mass.	1:12.6
11.	J. Romanowski	Jersey City, N. J.	1:02.5

OUTDOOR SENIOR CLASS CABIN EVENT

1.	R. Stoner	Rockford, Ill.	12:52.2
2.	M. Arnold	Columbus, Ohio	10:30.5
3.	K. Carpenter	Akron	8:13
4.	M. Karlak	Cleveland	5:19.2
5.	J. Zimmer	Syracuse, N. Y.	4:47.6
6.	H. Dolfi	Chicago	4:20.4
7.	A. Schilperott		3:21
8.	J. Kubilis	Chicago	3:04.8
9.	L. Eisinger	Staten Island, N. Y.	2:51.4
10.	L. Bailey	Akron	2:47
11.	H. LaClaire	Detroit	2:45
12.	A. Dague	Tulsa	2:38
13.	W. Jackson	Detroit	2:33.2
14.	F. Dewey	Grosse Point, Mich.	2:33
15.	R. Apgar	Minneapolis	2:32.8
16.	J. Houbalt	McHenry, Ill.	2:32.4
17.	E. Stahl	Johnstown, Pa.	2:32
18.	B. Luckett	Tulsa	2:31.8
19.	I. Kovnat	Chicago	2:30
20.	E. Naudzius	Detroit	2:24.8

VACU-MATIC SCORES AGAIN!



Sets New Coast-to-Chicago Record

New Supercharge Principle SAVES GAS

MORE POWER - MORE SPEED
FASTER PICK-UP - - NEW LIFE

ESTABLISHING new mileage records on cars in all sections of the country, the Vacu-matic again scores in a new speed record established by Bob McKenzie transcontinental automobile champion. Los Angeles to Chicago — 2,322 miles in 39 hours and 42 minutes— driving 75 and 80 to maintain a speed average of 59.7 miles per hour!

Here is speed—a gruelling grind—where quick accelaration, greater top speed — and less stops for gasoline mean those precious moments saved that make new speed records possible.

The same Vacu-matic that helped Bob McKenzie establish this speed record and gave him such fine gas savings is now available for all car owners. It is positively automatic—simple to install—inexpensive—and pays for itself many times over in gas savings.

Automatic - - Nothing Like It!

Vacu-matic is *entirely different!* It operates on the supercharge principle by automatically adding a charge of extra oxygen, drawn free from the outer air, into the heart of the gas mixture. It is entirely AUTOMATIC and allows the motor to "breathe" at the correct time, opening and closing automatically as required. No idling troubles—no carburetor adjustments necessary. It is so simple it will amaze you—so practical it will save you many dollars on gas costs.

Agents and Salesmen

VACU-MATIC offers a splendid opportunity for unusual sales and profits. Valuable territories now being assigned. Check and mail coupon.

Fits All Cars

VACU-MATIC is constructed of six parts, assembled and fused into one unit, correctly adjusted and *sealed at the factory.* Nothing to regulate. Easily attached in ten minutes.

The VACU-MATIC Co. Wauwatosa, Wis.

Guaranteed Gas Savings

VACU-MATIC must prove itself on every car. It is guaranteed to give worthwhile gas savings, quicker pick-up and more power, or it costs you nothing. "On my V-8 Ford it works miracles", says Ralph Fields. James Seeley —"On an International Truck on a round trip to Cleveland, 385 miles, it saved 19 gallons of gas." A. V. Grove —"On the Buick it showed 5 miles more per gallon." F. S. Peck—"I average 22 miles per gal. on my Plymouth, an increase of 7 miles, for a saving of $15.00 a month, or $180.00 a year." Wm. Lyons—"Averaged 25 miles on a gal. with a Model A Ford at 40 miles per hour."

Free Details

You owe it to yourself to know all about this remarkable discovery. Mail the coupon below. Start saving gas with VACU-MATIC and enjoy a new driving thrill! There's no obligation—so get the facts now! Write today!

—FREE OFFER COUPON—

THE VACU-MATIC COMPANY
7617-330 W. State St., Wauwatosa, Wis.

Gentlemen: Please send me full particulars concerning the Vacu-matic and details of your Free Offer. This of course does not obligate me in any way.

Name .....

Address .....

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

☐ Check here if interested in selling proposition.

SENIOR MULVIHILL EVENT

1. A. Dague	Tulsa	33:02
2. H. Falkowski	Buffalo	20:11
3. G. Driscoll	Staten Island, N. Y.	9:20
4. M. Dikovitsky	Cleveland	6:03.4
5. B. Luckett	Tulsa	4:36
6. E. Stahl	Johnstown, Pa.	4:31
7. D. Everett	Elm Grove, W. Va.	4:25.4
8. W. Simmers	Chicago	3:06.8
9. J. Palikaritus	Rockford, Ill.	3:06
10. B. Hatterman	Coroapolis, Pa.	3:02.2
11. H. Gleryn	Detroit	3:00
12. R. Guilfoy	St. Louis, Mo.	2:57
13. J. Noonan	Milwaukee	2:53
14. R. Obarski	Chicago	2:47
15. E. Naudzius	Detroit	2:43
16. R. Hoffman	Tulsa	2:41.4
17. A. Wagner	Ardmore, Pa.	2:35.6
18. E. Swort	Chicago	2:35.5
19. K. Lane	Milwaukee	2:32.4
20. M. Roll	Dearborn	2:28.4
21. W. Ying	Staten Island, N. Y.	2:28
22. C. Janke	Sheboygan, Wis.	2:25.6
23. R. Chatelain	Findlay, Ohio	2:25
24. A. Kaslouskas	Akron	2:17
25. J. Houbolt	McHenry, Ill.	2:16
26. W. Hewitt Phillips	Belmont, Mass.	2:12.6
27. B. Jeffry	Findlay, Ohio	2:07.2
28. J. Cahill	Indianapolis	2:06
29. B. Fitzgerald	Denver	2:05
30. T. Just	Johnstown, Pa.	2:04
31. C. Turansky	Ambridge, Pa.	2:03.8

OUTDOOR STICK OPEN CLASS EVENT

1. B. Anderson	Akron	12:52
2. C. Lanzo	Cleveland	7:55
3. C. Janke	Sheyboygan, Wis.	2:25.6
4. S. Patrick	Wyandotte, Mich.	2:05
5. R. Wriston	Tulsa	2:04.4
6. F. Nekimken	Chicago	1:53
7. J. Dilly	Galt, Ont.	1:40
8. D. Seltzer	St. Louis, Mo.	1:38
9. M. Bardsley	St. Catherine, Ont.	1:35
10. C. Sholes	Pittsburgh	1:34.8
11. F. Zaic	New York City	1:34
12. H. Fish	Akron	1:33.4
13. J. Ginnetti	Atlantic City	1:33
14. J. Michaels	Crawfordsville, Ind.	1:31.4
15. F. Haynes	New York City	1:29
16. J. Romanski	Jersey City, N. J.	1:24.8

STOUT INDOOR STICK MODEL EVENT (SR.)

1. W. Simmers	Chicago	21:30
2. A. Koslow	Philadelphia	20:16.5
3. M. Hugelet	Chicago	20:02.2
4. R. Jacobsen	Philadelphia	19:12
5. H. Dolfi	Chicago	18:57.5
6. Hewitt Phillips	Belmont, Mass.	18:13
7. F. Falkowski	Buffalo	17:25.8
8. E. Lashner	Philadelphia	16:53.7
9. M. Malley	Atlantic City	16:40
10. A. Dague	Tulsa	16:02
11. R. Hammer	New York City	15:31.6
12. S. Axelrod	Chicago	15:28
13. W. Tyler	Everett, Mass.	15:23.8
14. H. LaClair	Detroit	15:19
15. J. Houbolt	McHenry, Ill.	15:10
16. W. Erback	Sheboygan, Wis.	15:09.8
17. R. Obarski	Chicago	15:01
18. T. Petrides	New York City	15:00
19. C. Belsky	Chicago	14:56.8
20. T. Cunningham	Chicago	14:52.5

INDOOR STICK MODEL OPEN CLASS EVENT

1. T. Harris	Toronto	20:37
2. C. Goldberg	Chicago	20:05.8
3. F. Haynes	New York City	18:37
4. B. Marchi	Medford, Mass.	17:57
5. W. Brown	Arlington, Mass.	17:37
6. W. Good	Kalamazoo, Mich.	16:48.6
7. H. Greenberg	Newark	15:55
8. J. Matulis	Chicago	15:54
9. G. Johnstone	Detroit	14:53.6
10. R. Wriston	Tulsa	14:34
11. E. Fulmer	McKeesrock, Pa.	14:25
12. B. Insana	Buffalo	13:21
13. R. Lyszczarz	Buffalo	11:12
14. J. Dilly	Galt, Ont.	8:43
15. O. Corfield	Port Dalhousie, Ont.	8:03

INDOOR CABIN BLOOMINGDALE EVENT (SR.)

1. A. Dague	Tulsa	15:41
2. J. Cahill	Indianapolis	13:58.4
3. E. Barrie	Galt, Ont.	13:46
4. M. Huguelet	Chicago	12:55
5. D. Clini	Springfield, Mass.	12:05.4
6. W. Erbach	Sheboygan, Wis.	12:00
7. M. Malley	Atlantic City	11:08.1
8. W. Simmers	Chicago	11:05
9. T. Capo	Quincy, Mass.	9:59
10. E. Swort	Chicago	9:54
11. J. Chadwick	Syracuse	9:44
12. E. Leshner	Philadelphia	7:27.6
13. J. Conradi	St. Louis, Mo.	6:40.4
14. R. Marquardt	Arlington, Iowa	5:35.8
15. R. Carlson	Springfield, Mass.	4:17.2
16. A. Anderson	Chicago	3:44

INDOOR CABIN EVENT (OPEN) CLASS

1. J. Ginnetti	Atlantic City	17:48.6
2. R. Wriston	Tulsa	13:36
3. D. Donahue	Highland Park, Cal.	12:49
4. T. Harris	Toronto	10:31
5. W. Brown	Arlington, Mass.	10:12
6. B. Marchi	Medford, Mass	10:16.1
7. F. Haynes	New York City	8:55
8. J. Matulis	Chicago	8:49
9. W. Good	Kalamazoo, Mich.	7:50
10. E. Fulmer	McKeesrock, Pa.	7:10.1

DU PONT GAS COMPETITIONS

The Rate—18.8c per point

1. A. Dillon	Jackson, Mich.	114	Points
2. C. Ellis	Detroit	106	"
3. M. Anderson	Staten Island, N. Y.	104.9	"
4. H. Stofer	Indianapolis	90.2	"
5. DeW. Ross, Jr.	Tulsa	83	"
6. B. Anderson	Akron	80.2	"
7. F. Smith	Denver	72.5	"
8. M. Bassett	Philadelphia	67.8	"
9. R. Heit	Brooklyn	61	"
10. J. Beckelman	Fort Worth	60.2	"
11. L. Klesman	Chicago	60	"
12. C. Green	Fort Worth	57	"
13. P. Pickard	Detroit	56.6	"
14. R. Marquardt	Burlington, Iowa	54.2	"
15. B. Apgar	Indianapolis	53.1	"
16. L. Rosenson	Pittsburgh	52	"
17. W. Effinger, Jr.	Brooklyn	51.2	"
		1323.9	"

BERRYLOID GAS FINISH WINNER

A. Anderson	Chicago	Berryloid Trophy

GAS MODEL EVENT—OPEN

1. M. Bassett	Philadelphia	70:02
2. C. Goldberg	Chicago	52:45
3. B. Anderson	Akron	52:10
4. M. Roll	Dearborn	49:07.1
5. Dr. G. Covington	Chicago	47:12.6
6. M. Kostick	Akron	42:31
7. W. Mott	Staten Island, N. Y.	29:22.6
8. R. Korda	Cleveland	25:45
9. J. Konefes	Chicago	17:55
10. B. Kiewiez	Detroit	15:58
11. B. File	Columbus	15:50.4
12. P. Tlush	Lyndhurst, N. J.	13:31
13. E. Guth	Liverpool, N. Y.	12:25.3
14. J. Trefny	Chicago	10:34
15. H. Stofer	Indianapolis	9:20.4
16. C. Ellis	Detroit	9:05
17. E. Fulmer	McKees Rock, Pa.	7:46
18. J. Romanowski	Jersey City	7:39
19. R. Gable	Reading, Pa.	6:39

GAS MODEL EVENT—SENIOR

1. F. Hanley	Ft. Worth	50:29
2. M. Malley	Atlantic City	47:10.4
3. C. Krupp	Akron	45:47
4. K. Patterson	Detroit	37:52
5. E. Konefes	Chicago	36:47
6. F. Kiewiez	Detroit	36:40
7. S. Axelrod	Chicago	31:26
8. C. Thomas	Buffalo	25:40.5
9. E. Naudius	Detroit	22:38
10. J. Houbolt	McHenry	22:32.4
11. B. Long	Reading	22:15
12. R. Jacobsen	Philadelphia	21:46
13. C. Tracy	Toledo	19:15
14. R. Kruck	Detroit	19:01
15. M. Granieri	Newark	17:23
16. J. Beckelman	Fort Worth	16:26
17. R. Dittman	Denver	15:45
18. D. Lodge	Indianapolis	15:09
19. F. Casterline	Northville, Mich.	14:05
20. I. Gochel	Chicago	13:52.4
21. L. Klesman	Chicago	13:30
22. A. Pow	Toronto	12:17.2
23. V. Krehbiel	Williamsville, N. Y.	12:17
24. E. Miller	Detroit	12:14
25. R. Schumacher	Oakland, Cal.	12:04
26. Hewitt Phillips	Belmont, Mass.	12:03
27. F. Ross	Media, Pa.	12:00
28. DeW. Ross	Tulsa	11:47

WAKEFIELD INTERNATIONAL EVENT

1. H. Fish	Akron	8:26.1
2. A. Dague	Tulsa	8:25.4
3. R. Korda	Cleveland	6:00
4. R. Bodle	Akron	5:50 2/5
5. J. Cahill	Indianapolis	5:33.4
6. C. Lanzo	Cleveland	3:01 2/5

MOFFETT INTERNATIONAL EVENT

1. J. Cahill	Indianapolis	15:45.1
2. C. Lanzo	Cleveland	7:35.4
3. A. Dague	Tulsa	6:13.5
4. H. Fish	Akron	2:44.5
5. R. Korda	Cleveland	2:01.6
6. D. Kennedy	New Zealand	1:35
7. W. Mackley	New Zealand	1:28.2
8. A. Gee	Galt, Ont.	1:17.1
9. E. Barrie	Galt, Ont.	:51.5
10. McGuire	New Zealand	:50.6
11. Rightner	New Zealand	:45
12. R. Bodle	Akron	Elim. Team
13. R. Smith	Toronto	Elim. Team
14. H. Dolson	Preston, Ont.	Elim. Team
15. F. Bauer	Toronto	Elim. Team
16. R. Milligan	Toronto	Elim. Team

RADIO CONTROLLED GAS MODEL EVENT

1. C. Lanzo	Cleveland
2. P. Sweeney	Chicago
3. E. Wasman	Jacksonville
4. W. Good	Brooklyn
5. L. Weiss	Brooklyn
6. B. Schiffman	New York City

MOST ACTIVE GIRL CONTESTANT

Mary Roll	Dearborn, Mich.

FLYING SCALE MODEL EVENT

1. L. Bailey	Akron
2. F. Franz	Detroit

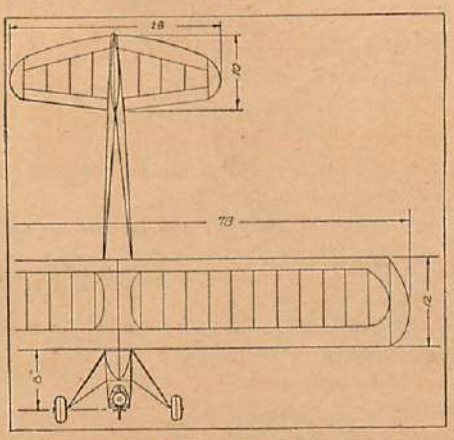
INSPIRER

(Continued from page 51)

cheaper. And if finances are troubling you, it really isn't necessary to spend the additional money for silk.

Cut pieces of silk or paper to the approximate shape of the fuselage. First cement the silk along the entire length of the main longerons. The silk should be stretched as tight as possible lengthwise. After the cement has dried, the silk is stretched crosswise and cemented to the main stringer. This same procedure is used in covering both the sides as well as the top and bottom surfaces.

When covering with paper it's not possible to stretch the paper. Therefore, it is necessary to spray it with water to remove wrinkles.



NEXT MONTH

We'll finish the construction of the Inspirer next month, with full instructions for building the wing and tail surfaces, assembling the model, and flying.

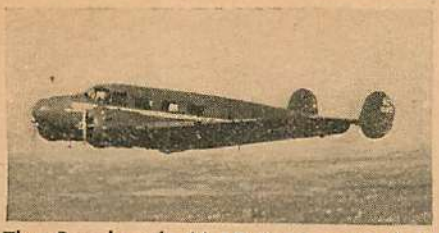
MATERIAL

Fuselage

3 pcs. 3/8x3/8x52" spruce or bass
1 pc. 1/8x8x8" birch or poplar plywood
12 pcs. 3/8x3/8x24" balsa
2 sheets balsa 1/8x3x36"
1 pc. 1½x2x10" for tail block
1 pc. 3x3½x4" soft balsa for front cowl
1 pc. 3x3½x8" for top cowl and cabin front
Cellophane for windows, 1/8" diameter music wire, 1 pr. 3½" air wheels, 1 short length of ½" diameter hardwood dowel, cement, dope, silk or bamboo paper.

LOW-WINGED EFFICIENCY

(Continued from page 60)



The Beechcraft M-18 is a marvel in performance.

holes in the butt ends of each panel to fit the pointed dowels installed in the fuselage. Work each panel into position and check for incidence and dihedral.

Cut the stabilizer and rudders from 1/8" and 1/16" sheet balsa respectively. Sand each surface to a streamlined cross section and smooth finish. The fins are cemented to the squared stabilizer ends; the stabilizer to the flattened fuselage top. Fillet with plastic wood.

The landing-gear forks are assembled from 1/16" dowels or reed, slotted to fit the soft-wire axles. The axles are bent with the wheel in position. The axle ends are forced into the strut slot and cemented. Point the upper ends of the struts and force each assembly into position beneath the nacelles. The tail wheel is mounted on a light wire axle.

Score the outlines of the control surfaces with a partly dulled point. Half-round dummy cylinders may be inserted into the recessed cowl fronts to simulate motors.

PAINTING AND FINISHING

Blow off the sanded dust from the surface of the model and coat with clear varnish or dope to fill the pores. Sand lightly and repeat the process. Colors are optional with the builder, but use as many coats as considered desirable for best results.

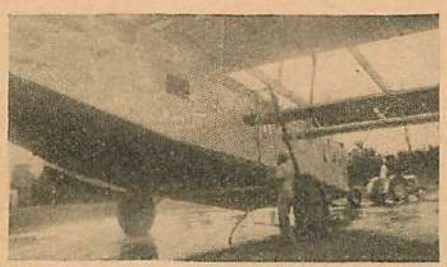
Cut the two propellers from scrap balsa, paint each aluminium and mount on a pin, free to turn.

BILL OF MATERIAL

1 12x3x1/2" soft balsa
1 9x1 1/4x1/2" soft balsa
1 5 1/2x1 1/8" sq. soft balsa
1 1/8x2x5" sheet balsa
1 1/16x2" sq. sheet balsa
1 1/8" dowel
1 1/16" dowel or reed
1 pr. 1/2" wheels
1 1/4" wheel
1 vial cement
Clear dope or clear varnish and paints as required.

THE AIR ADVENTURERS

(Continued from page 39)

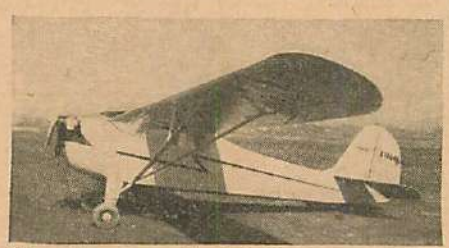


The American Clipper being washed.
Picture by William Kip, Coconut Grove, Fla.

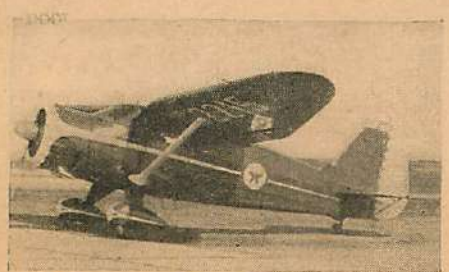
has to keep the motors ticking over. Roy is determined to become a really skilled mechanic, both for his own good and for the future of aviation.

Thomas Clohosey of East Orange, New Jersey, is also out for a mechanic's ticket, because he honestly believes the engine is the heart of aviation.

Miss Franny Loomis of Merrill, Oregon, has sent in her papers for craftsman awards as photographer and engine mechanic; and for a flight lieutenancy, which shows you how far girls will go once they start. Miss Loomis, however, has a few things to say about Air Trails which are perhaps worth mentioning.

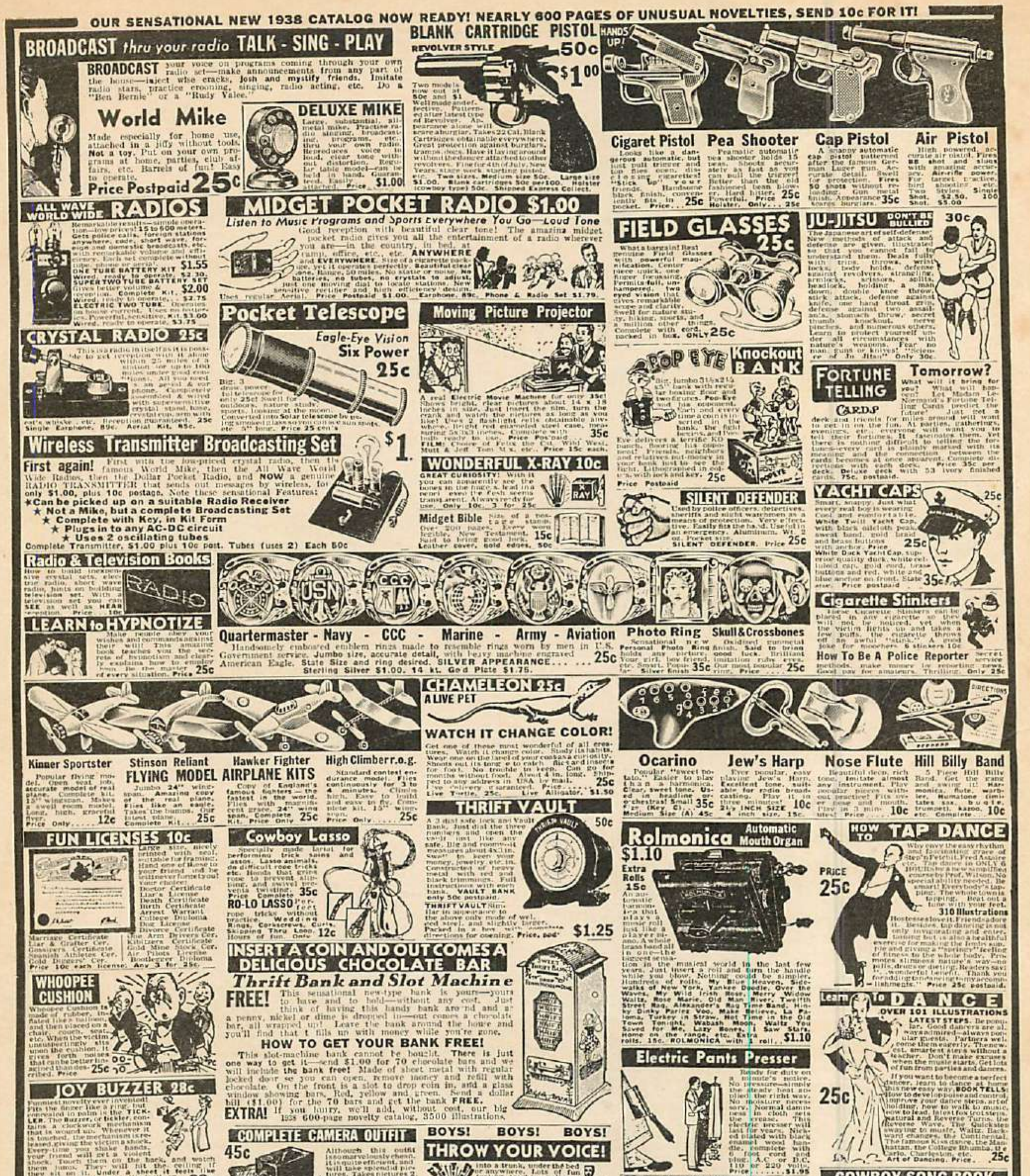


The Aeronca Model K is typical of America's light planes.



The Stinson "Reliant" is representative of the medium-priced airplanes.

She objects to the model-making departments taking up so much valuable space, which puts some of you model makers in your place, eh? She wants more data on engines and the real planes themselves. She has another idea, too. She thinks the editor ought to put in a box of questions on aviation for the readers to answer. Miss Loomis adds a swell picture of a Stinson "Reliant."



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