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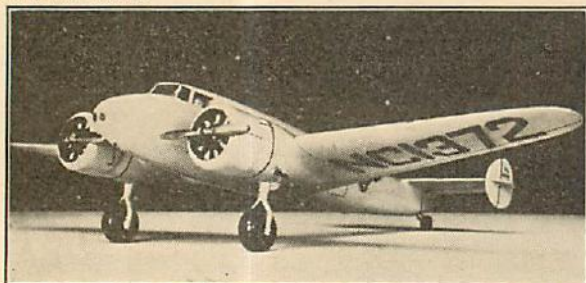
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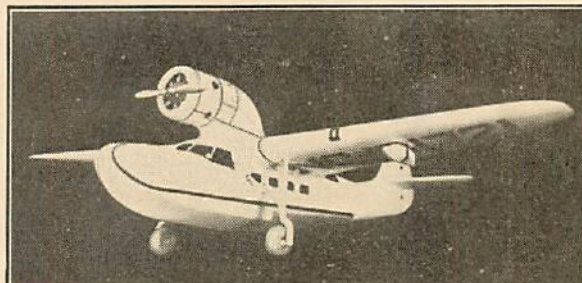
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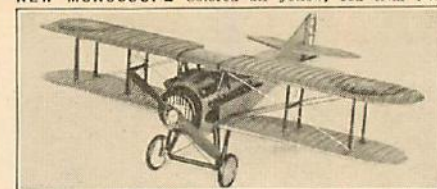
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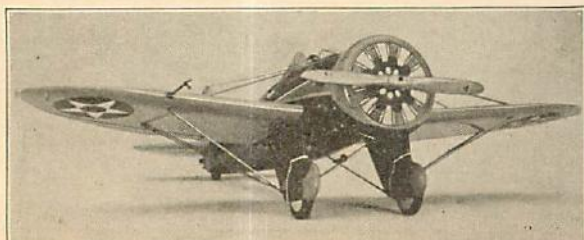
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October
1936

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How Jerry Got His Start in AVIATION

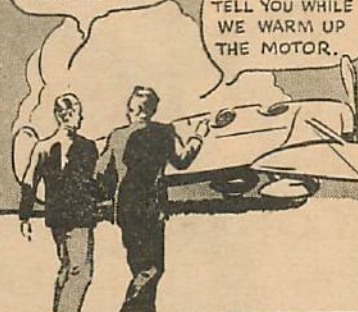
HOW'S THAT FOR A LAIRD TRANSPORT MODEL? WHAT HAVE YOU BEEN DOING LATELY, BILL? BUILT ANY MORE MODELS?



NO, JERRY. I DECIDED AVIATION WAS A BUSINESS TO MAKE MONEY IN—NOT TO FOOL AROUND WITH. I'M WORKING AT THE AIRPORT NOW. COME ON OUT.



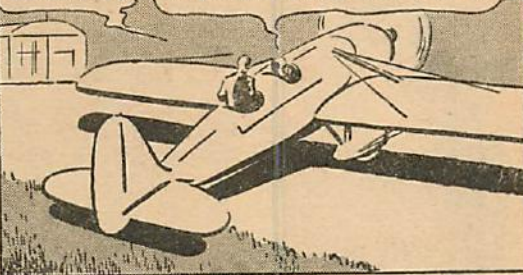
YOU'RE IN AVIATION NOW? AND A LICENSED PILOT ALREADY? HOW COME?



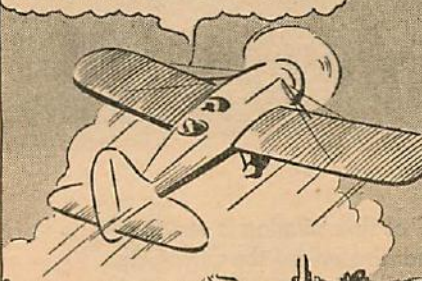
LET'S TAKE A HOP. I'LL TELL YOU WHILE WE WARM UP THE MOTOR.

YOU HAD TO GIVE UP YOUR JOB, DIDN'T YOU, TO GET AVIATION TRAINING?

I DID NOT. WALTER HINTON TRAINED ME AT HOME. THEN I GOT A GROUND JOB AT THIS AIRPORT AND GOT MY FLYING INSTRUCTIONS AT A VERY LOW COST. HINTON TELLS YOU ALL ABOUT HOW TO GET INTO AVIATION IN A FREE BOOK HE'S PUBLISHED.



GEE—THIS IS GREAT. I'LL SEND FOR WALTER HINTON'S BOOK TONIGHT AND LEARN HOW HE TRAINS MEN FOR AVIATION.



WHAT A COURSE. HINTON GIVES ME THE DOPE ON MOTORS, AIR PLANE DESIGN—AIRPORT MANAGEMENT—GIVES ME THE GROUND TRAINING FOR MORE THAN FORTY DIFFERENT TYPES OF AVIATION JOBS. AND HE'S HAD MORE THAN EIGHTEEN YEARS EXPERIENCE TRAINING MEN FOR AVIATION. I'M GOING TO START TRAINING RIGHT NOW.



THIS SHIP HANDLES BETTER THAN EVER SINCE YOU'VE BEEN SERVICING IT.



THANKS BILL. HINTON CERTAINLY KNOWS HIS STUFF. I'M TAKING FLYING LESSONS NOW. I'LL SOLO NEXT WEEK.

I'M SO GLAD YOU GOT INTO AVIATION. WITH THAT NEW JOB AS PILOT FOR THE AIRLINE WE CAN GET MARRIED RIGHT AWAY.



AND THERE'S PLENTY MORE AHEAD FOR US IN AVIATION, DEAR. IT CERTAINLY IS THE INDUSTRY FOR AMBITIOUS WIDE-AWAKE MEN.

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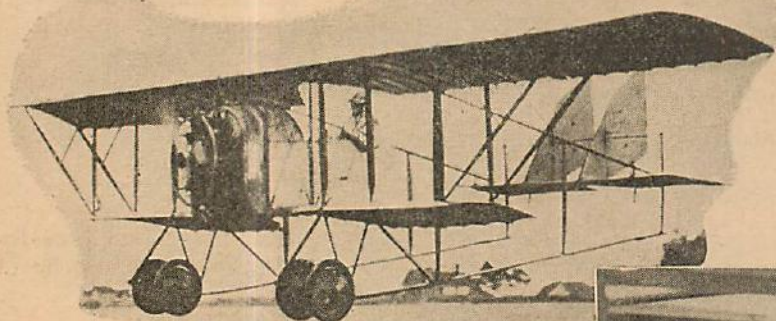
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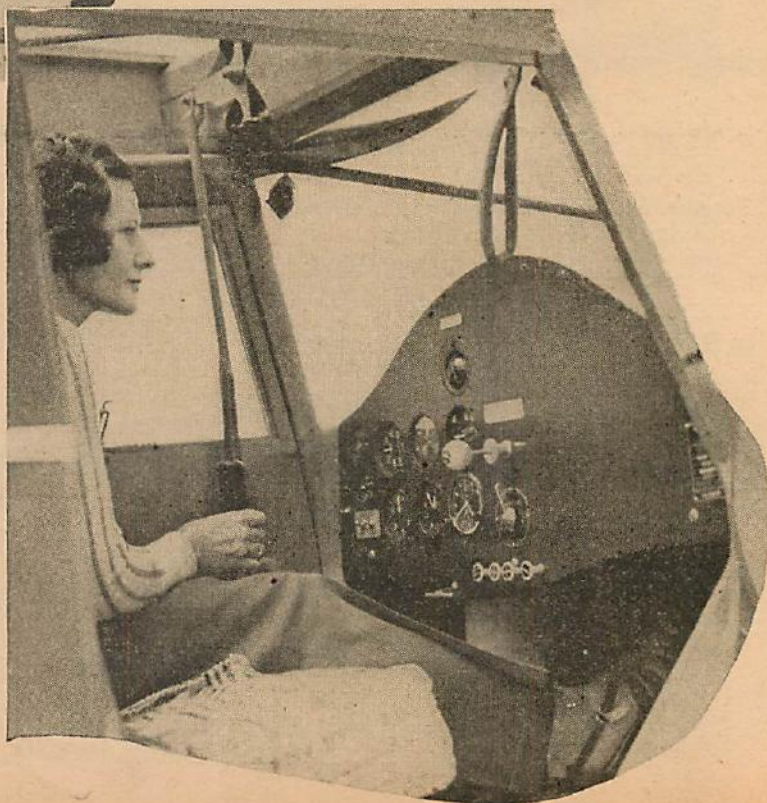


ART of fine piloting is strikingly demonstrated by the smoke designs that these British scout pilots are weaving for their annual R.A.F. display.

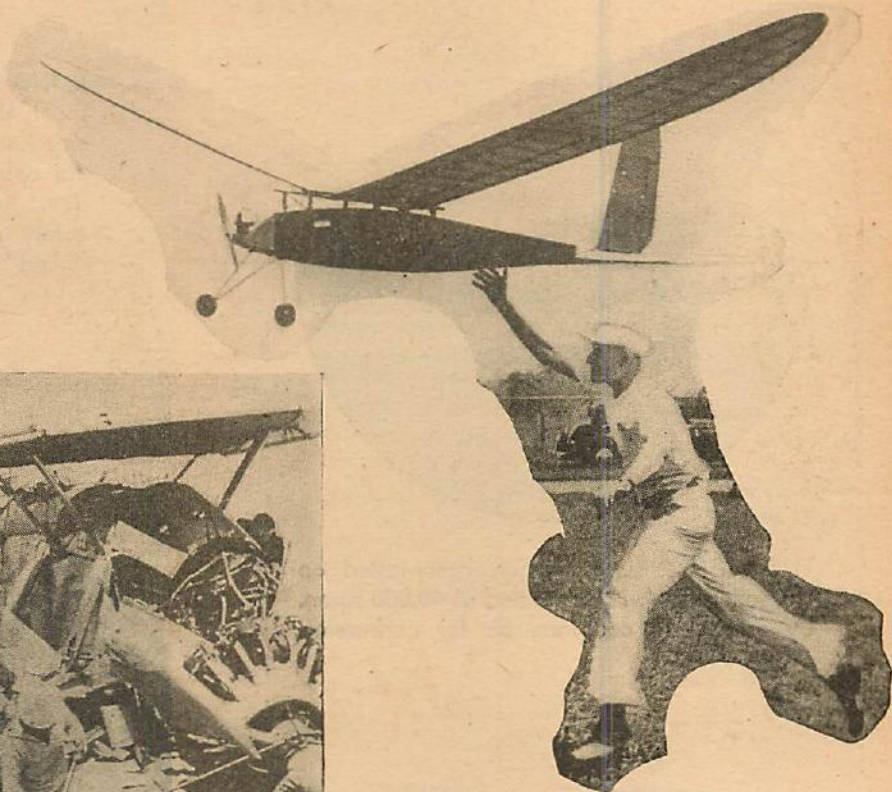
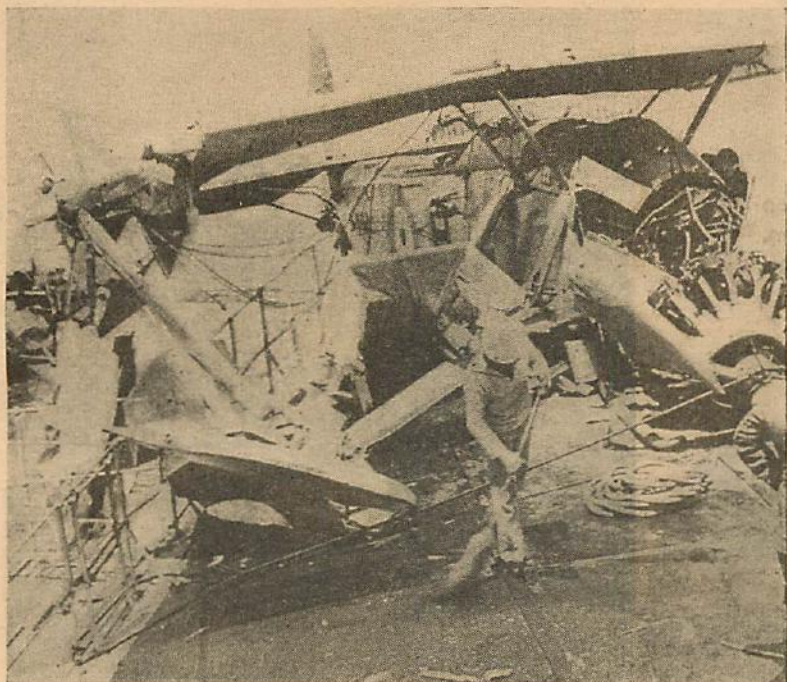


1911 MODEL Caudron takes to the air a quarter of a century later! Flying from Belgium to England, Ken Waller pilots this old-timer to opening of new Brighton airport in a hop that was almost washed out by 40-mile head wind.

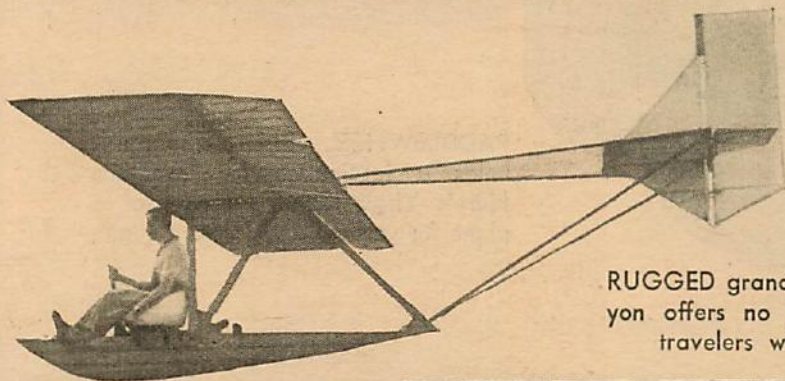
UNUSUAL instrument arrangement is the grouping of dials in the left side of the panel in Annette Gipson's new Monocoupe, making them easier to read—the first time this arrangement has been tried.



SHIPBOARD landing below came when British pilot, flying a torpedo-bomber low over liner "Normandie," struck a mast stay and swung over funnel, where hot, thin air robbed wings of lift and dropped him to deck, shaken but unhurt.



DIZZY DEAN'S delivery had nothing on Vernon Boehle's when it came to pitching heavy 15-foot gas model into a glide at the national contest.



AIRY PERCH on a primary glider like that at left provides real thrills when there's a lot of altitude beneath.

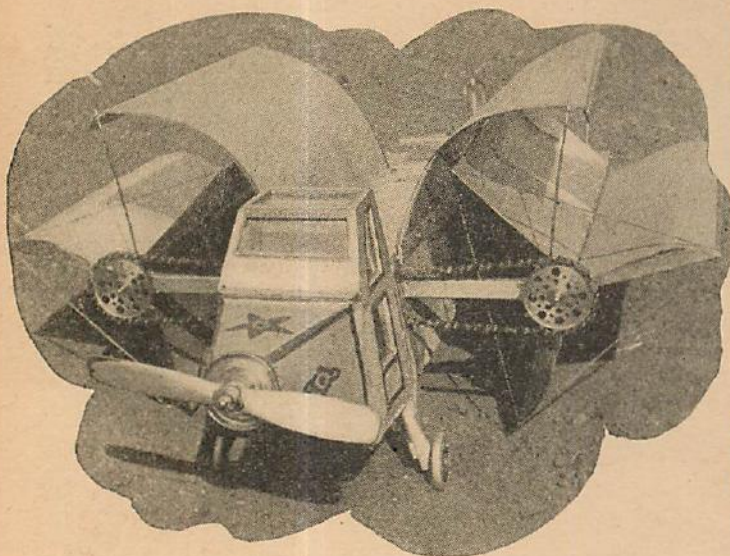
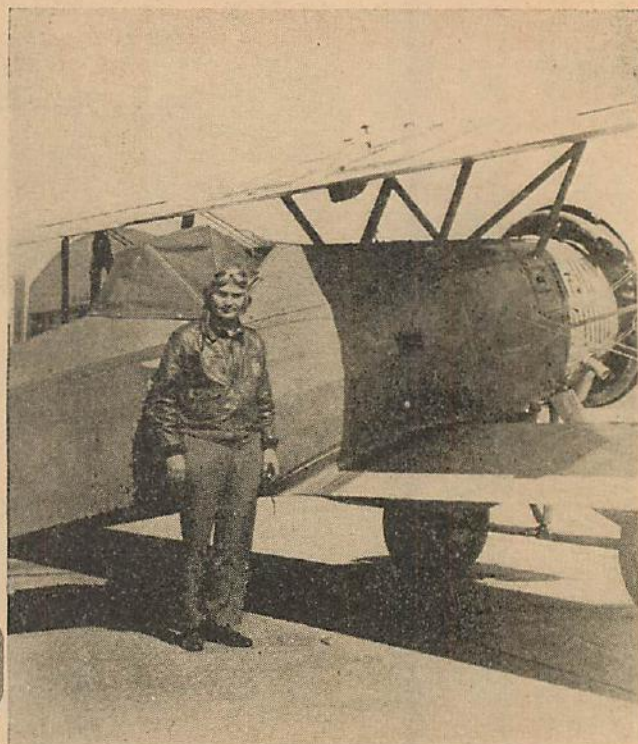
WHAT well-dressed altitude flier will wear is shown by Maryse Hilsz, record holder.





TURBINE F-2 supercharger, army-tested on Consolidated A-11, is whirled at 40,000 r.p.m. by exhaust to compress air for carburetor.

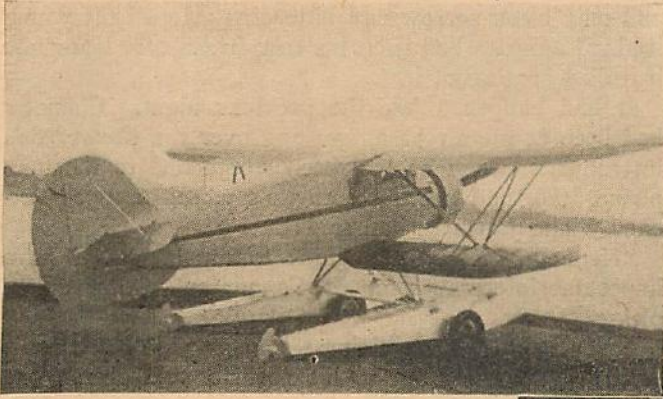
BLIND flight coast to coast is achievement of Major Ira Eaker, standing beside hooded Boeing P-12 which he used. An open plane piloted by Major William Kepner, accompanying him for safety check, occasionally had to let "blind" plane lead way through fogs.



PADDLEWHEEL flight apparently holds a fascination for inventors. Here's Virgil Kutnar's model of a plane for vertical and forward flight.

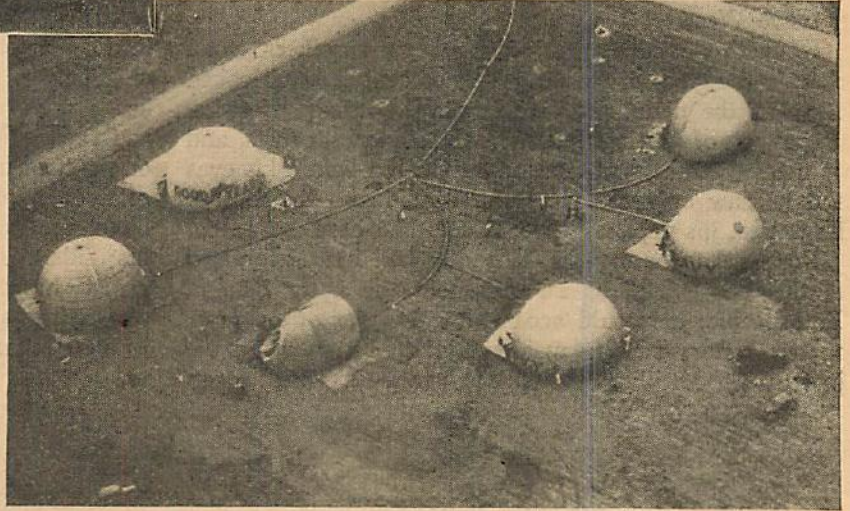
BLACKBOARD and chalk give schoolroom aspect to Le Bourget airport as pilots get flight orders before big air parade over Paris on Bastille Day. Bomber type is Potez 54, observation type Potez 39.A2.





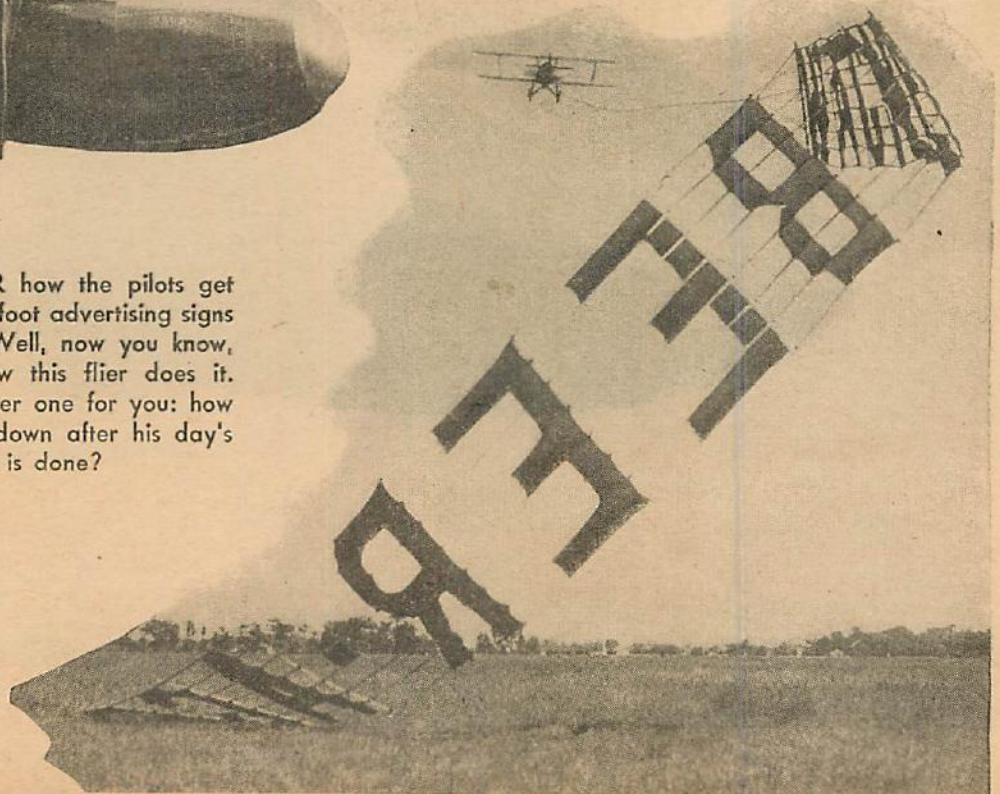
LARGE fin and rudder are needed to exert control with floats. This Waco cabin job recently had Edo floats fitted at North Beach, New York, for shipment with another to Peru, where they will fly mail on rivers and high inland lakes.

GROWING like mushrooms, five of six national balloon race entries get their fill of hydrogen at Denver's mile-high airport. Goodyear bag later won. Detroit entry was ripped by wind flurry, collapsing like—well, like a punctured balloon!



CHAMPION glider pilot Chester Decker rests on wing of his Albatross after climaxing Elmira meet with 146.6-mile hop.

EVER WONDER how the pilots get those big 7x150-foot advertising signs into the air? Well, now you know, after seeing how this flier does it. But here's another one for you: how does he get it down after his day's work is done?



IT was 8 o'clock on the morning of August 2nd when the super-dirigible *Conqueror* floated upward from the thousand-acre base of Transpacific Airways in the outskirts of Tokyo, Japan, and stuck its sleek nose into the bright eastern skies toward San Francisco, five thousand water miles away. The forty passengers were crowded to the windows of the luxurious salon amidships; the fifty trained men of the crew were at their stations; the heavy cargo of mail and freight had been stowed aboard, and the mighty *Conqueror*, five engines booming, had begun the first commercial flight across the Pacific Ocean to link the mystic East with the progressive West.

Kenneth Chandler, the junior navigation officer, stood close to the glass of the dirigible's control car and looked down at the dwindling airdrome with its sea of faces, its pattern of waving Japanese and American flags, and its massed bands. But the scene blurred before his eyes and he saw only the face of a dead man—the face of Kammato, his Japanese friend, who had been murdered.

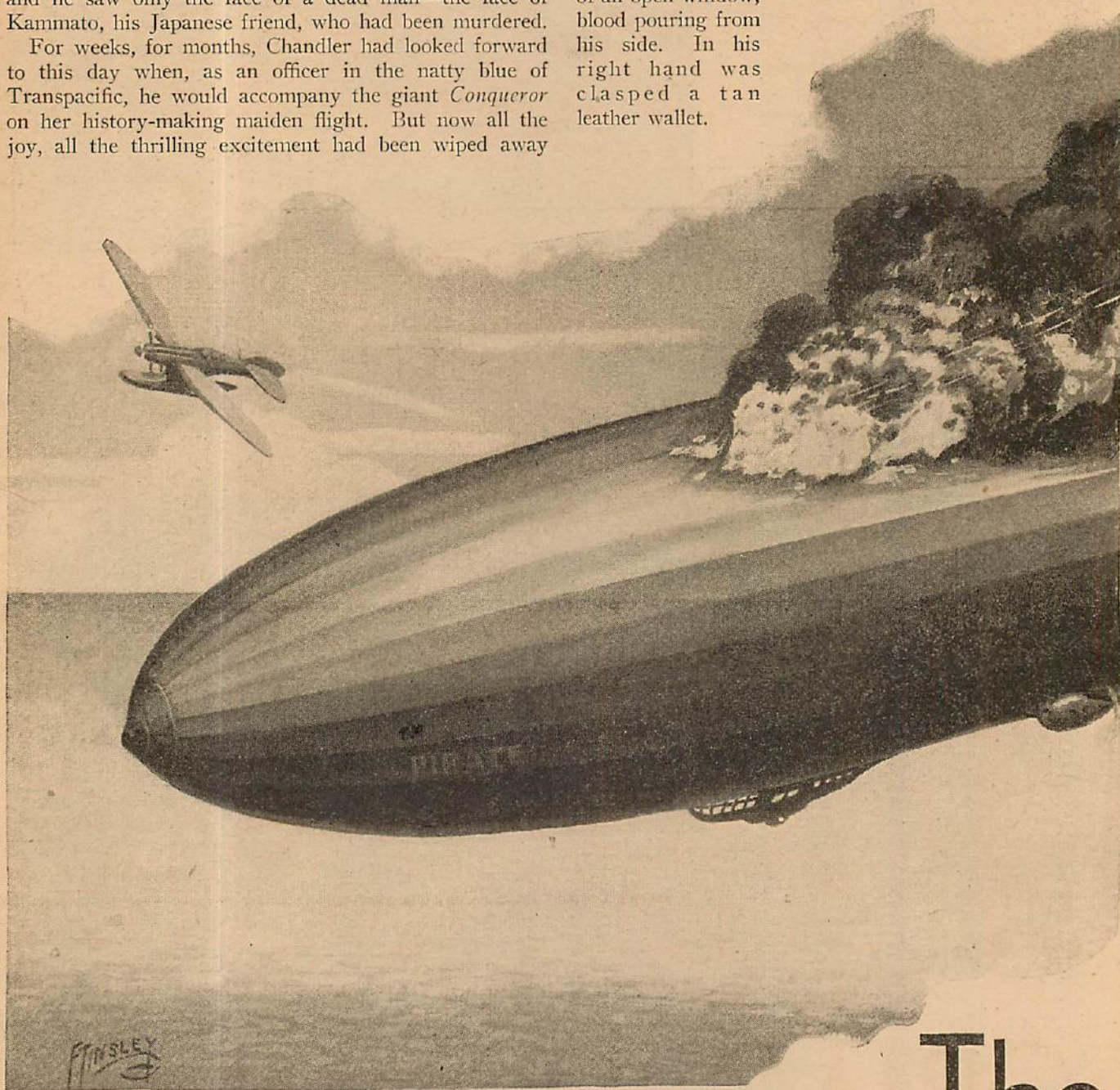
For weeks, for months, Chandler had looked forward to this day when, as an officer in the natty blue of Transpacific, he would accompany the giant *Conqueror* on her history-making maiden flight. But now all the joy, all the thrilling excitement had been wiped away

and only black sorrow and bitterness gripped his young soul. Kammato had been his true friend and Kammato had died because of it.

It had happened late the previous night. Chandler had been at the air base, working over the *Conqueror's* instruments, when he had been summoned to the telephone. He had heard Kammato's voice, strangely excited. The Japanese had said:

"Kenneth. You come quick to my house. I have important information about *Conqueror*. Come quick, please!"

And Chandler, recognizing the urgency in his friend's words, had rushed out to his roadster and driven like mad across the city. As the car had come to a skidding stop in front of Kammato's house, Chandler had heard three crashing reports of a gun. Wild-eyed, he had rushed inside the house and found Kammato lying on the floor in front of an open window, blood pouring from his side. In his right hand was clasped a tan leather wallet.



BILL BARNES DEFENDS

The

*The Greatest Bill Barnes
Air Adventure Novel
Up to Now*

by George
L. Eaton



*The great dirigible was a thing
of murder and it had to be de-
stroyed. The Lancer's cannon
thundered!*

CRIMSON LINE

For one horrible moment Chandler had thought the Japanese already dead, but, as he had dropped down beside him, Kammato had opened his eyes, his lips had moved and he had whispered, "Baron Susuka rides as passenger when *Conqueror* leaves. . . . He will be disguised. . . . They shoot me from window because I know. . . . Quick, Kenneth, get away from here. . . . hurry to your company, please. . . . Leave me. . . . I die. . . . Take wallet . . . picture of Baron Susuka inside. . . . He goes as passenger aboard *Conqueror*. . . . Tell them . . . tell—"

He had died then, in his American friend's arms.

And after that everything had been confusion to Chandler. He had had no idea who Baron Susuka was, yet Kammato's last plea had been for him to carry the news back to Transpacific. But only when he had heard the shouts of approaching people, alarmed by the noise of the shooting, had Chandler acted. Snatching the leather wallet from the lifeless fingers, he had left the room through the open window, raced to his car and driven furiously back to the air base. There he had found Brady, the *Conqueror's* commander, in his office, had shown him the faded photograph that had been in the wallet, and had blurted out the whole story.

Brady had been strangely calm. He had glanced at the photograph of a fat man's face and had handed it back.

"Sit down, Chandler," he had said. "I can't tell you how sorry I am about your friend's death. It is a horrible tragedy. For, you see, we already know that Baron Susuka has booked a passage aboard the *Conqueror* under an alias. We have known for days."

Chandler had stared incredulously. "You knew? You knew all the time? Then Kammato gave up his life for nothing!"

Brady had shaken his head sorrowfully. "Listen to me, Chandler. I'm going to tell you a secret. Baron Susuka is the head of a gigantic drug ring that's been smuggling millions of dollars' worth of illicit narcotics into the States. He's a cunning, slippery crook with a powerful organization. Our secret service has been trying for years to catch him and smash his rotten syndicate. They have always failed. But this time it looks as if they'll get him.

"A few days ago our operatives here in Japan were tipped off that Susuka is planning to go to the U. S. aboard our ship, in disguise and under the name of Maito. We've been ordered to keep everything hushed up and let him think he's getting away with it. Right at this moment Department of Justice operatives—under Special Agent Stephen Drake are waiting at the San Francisco airport. When we land there, Susuka will be arrested the moment he sets foot on American soil.

"We can't afford any leaks. You must say nothing about your friend's death. If Susuka ever learns that Kammato talked and gave you that picture, our scheme will collapse. You understand?"

Chandler had said that he understood. But now, as he rode in the swaying control car of the rising *Conqueror*, his bitterness wiped away all understanding. Just before the take-off the young officer had seen the fat Oriental-looking passenger come aboard the dirigible. An icy calm had gripped Chandler. The resemblance between the passenger and the faded photograph had been slight, but Brady had removed all possible doubts

when he brushed past and whispered, "That's our man." The passenger had gone into the salon and then had come the orders to cast off.

And now Chandler stood looking down as the air-drome swirled away to the rear, but he saw only the face of Kammato, his murdered friend. Brady had said that Baron Susuka would be arrested in San Francisco; that Kammato's murder would then be thoroughly investigated; that all Chandler could do was to wait. Wait—while his whole being writhed with sorrow and with hate—while his fingers itched to close around that fat throat! Wait—for the slippery Baron Susuka to be trapped by the secret service, by the men he had so cunningly evaded in the past!

And wait Chandler did as the *Conqueror*, the early morning sun burnishing her hull to a glistening silver, slid high across the island kingdom toward the Pacific Ocean and toward destruction.

II—WAITING

IF you draw a straight line across a map of the Pacific Ocean between Tokyo and San Francisco and then take a point on it a few degrees west of the international date line, the tip of your pencil will mark the approximate location of Tupper Island. The island is not usually recorded on maps. It is small, just a jagged horn of rock jutting out of the ocean. If you searched long enough through dusty archives, you'd learn that Tupper Island belongs to the United States. Not that any one would care. The rocky spot had been long forgotten and, if remembered, dismissed as of no consequence.

But it was of consequence, tremendous consequence, to a powerful drug ring. On Tupper Island was their secret headquarters, and from this desolate spot emanated their clever operations.

From a passing ship no habitation, no human could be seen. Not so, however, from the air. Looking down from above, an observer would be surprised to see a great canyonlike gash in the rock formation practically dividing the island into two parts. And in this long canyon, with its sheer two-hundred-foot walls, he would discover the ring's secret—a dirigible.

The dirigible, named the *Pirate*, was the nucleus of the whole brilliant smuggling scheme and had been in use for the past three years. Contraband drugs were brought by ship from the Orient, landed in the small rockbound harbor, and then placed aboard the *Pirate*. Stowed away inside the dirigible were five fast biplanes, capable of being dispatched and picked up in mid-air. With her load aboard, the *Pirate* took off and sailed at a tremendous height for the United States. Her sleek hull was painted a mottled blue, which rendered her almost invisible when high in the sky, and her motors were muffled. Each trip was timed so that night shrouded the west coast of the United States when the *Pirate* reached that vicinity. Then the biplanes, loaded with contraband narcotics, were released to make their deliveries at specified points. With the work accomplished, the planes sped back to the mother ship, were drawn aboard, and the *Pirate* raced back to Tupper Island at full speed. The system worked without a hitch.

Modern equipment had been brought to the island, and the place had been turned into an efficient, up-to-date air base. The large force of pilots and mechanics lived



Bill took a deep breath—then he jumped. His finger gripped the metal ripcord ring, but he waited.

in comfortable cavelike quarters that had been carved from the rocky sides of the canyon.

The ring's secret base was perfect, perfect in every respect but one—the unfortunate exposure when viewed from above.

And it was due to this one vulnerable point that all the trouble started.

IT was early on the morning of August 2nd. In far-away Japan, the *Conqueror* was floating upward from her Tokyo airdrome. In San Francisco, a group of United States secret service operatives, under the command of Stephen Drake, grimly awaited the coming of the dirigible and the capture of Baron Susuka. But capture him they never would. For in a rock-walled room on Tupper Island two men were seated, and one of them was Baron Susuka.

He was fat, and his massive face had an Oriental cast. He sat before a desk and watched the other occupant

of the room. The second man was hump-backed. He was crouched over a short-wave radio. He twisted around and said, "Here it is." A switch clicked and instantly a voice boomed through the room.

"—we're right here at the Tokyo air base, friends. The *Conqueror's* growing smaller now, sliding across the sky like a big silver pencil. There she goes on her history-making flight. Transpacific Airways may well be proud of their mighty vessel, and so may the world. She's off for America! Stand by, San Francisco! And luck to you, *Conqueror!*"

Baron Susuka moved his massive bulk in the chair. "Luck! She will need more than luck. . . . Tune in on *Conqueror*, Pete. Chart her position."

nervously at the fat man. "You think everything'll work O. K., boss? We're taking a big chance."

"A big chance, yes, but it is either stop air-line operating or give up base here. They would detect us for a certainty. Transpacific will find it most unfortunate that projected air route passes in vicinity of Tupper Island. My little plan will work. Do not worry, Hansen. Snowy has never failed yet. There is something else about which I wanted to speak, Hansen. I am going to be officially killed."

Hansen stared. "You going to be—what?"

Susuka laughed softly. "I am going to meet most tragic death aboard *Conqueror*. You probably do not realize that at this very minute I am sitting comfortably



Black hoods were over their heads and only their eyes showed. Each man held a gun.

"Yes, boss." Pete slipped earphones over his head. From outside came the whine of elevator machinery. It stopped abruptly and a buzzer sounded. Baron Susuka pressed a button at the side of his desk and a section of rocky wall slid noiselessly back. "Come in," he said.

A tall, slim man strode through the entrance and crossed to the desk. "Plane's all set, boss. And Snowy's primed for the job. We got a strait-jacket on him."

Susuka nodded. "Very well. It will be three hours before he will leave. Sit down, Hansen, I talk."

"Swede" Hansen lowered himself to a chair and looked

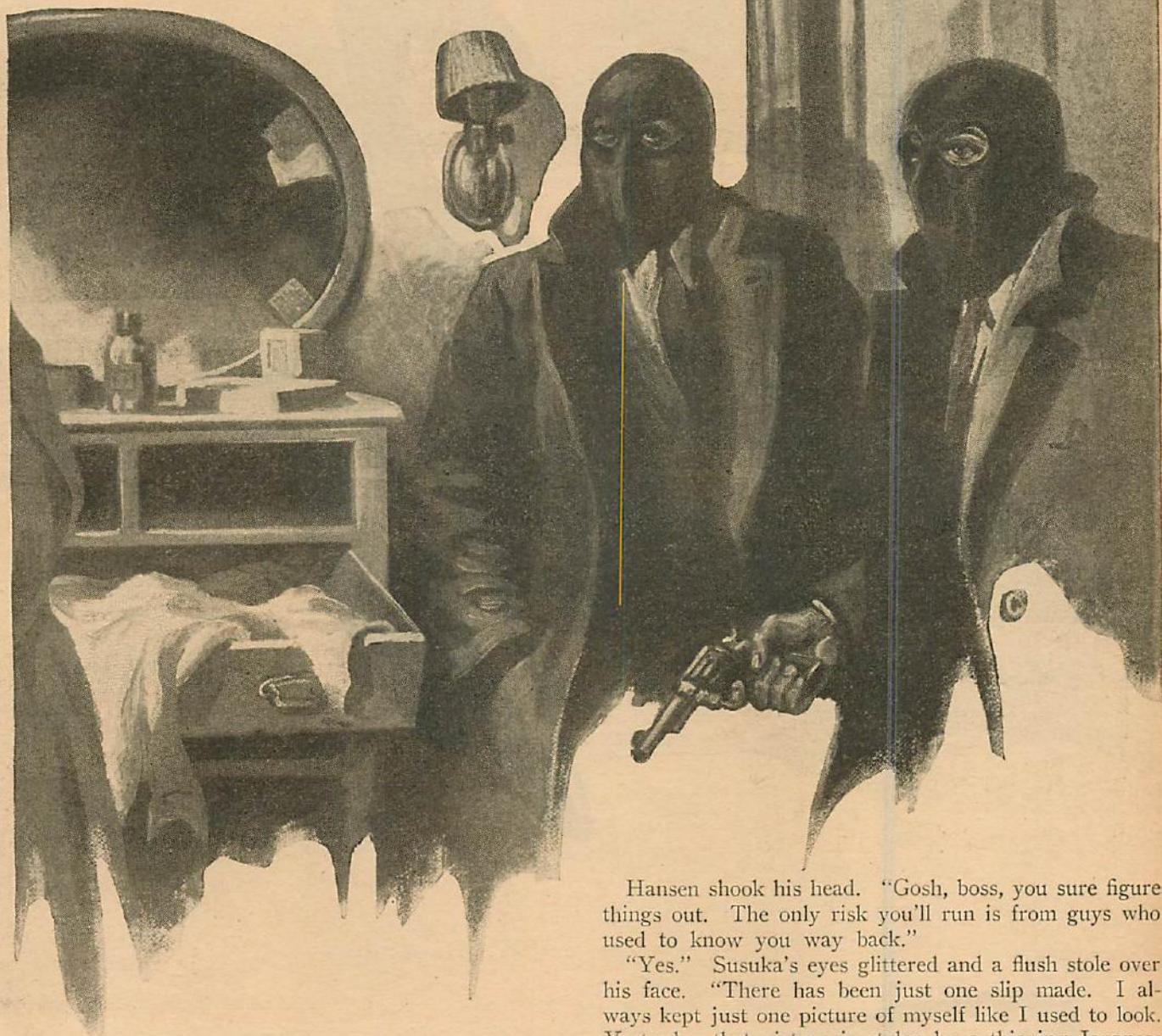
in *Conqueror's* salon, contentedly looking out window."

Hansen drew back in his chair, a strange look in his eyes. "Maybe you've been working too hard, boss. Maybe you need a drink or something."

Susuka threw back his head and laughed. "You think I am crazy, eh, Hansen? Listen, I will tell you about it. American detectives have been getting too

close lately. I do not like it. Then suddenly I see perfect solution." He wet his big lips and leaned across the desk. "It is while I plan to stop Transpacific when I realize that this is the time to stage official disappearance from world. I get idea when I see that one of my men in Tokyo looks greatly like me in build and face. O. K. I have American detectives tipped off that I am going on *Conqueror* under false name and in disguise. They swallow it all like bait. O. K. Then I build up my double into thinking he is just going for nice ride. Right at this moment, Hansen, that poor fool is riding in *Conqueror* and detectives think it is I—Baron Susuka. They plan to arrest me when I land in San Francisco.

see me now. American police, they know me like this, too. O. K. Now, I go back to way I used to look. This slant goes from my eye. I take off my toupee and am bald. I change very much. They will have no chance of recognizing me, especially when they know that Baron Susuka is dead."



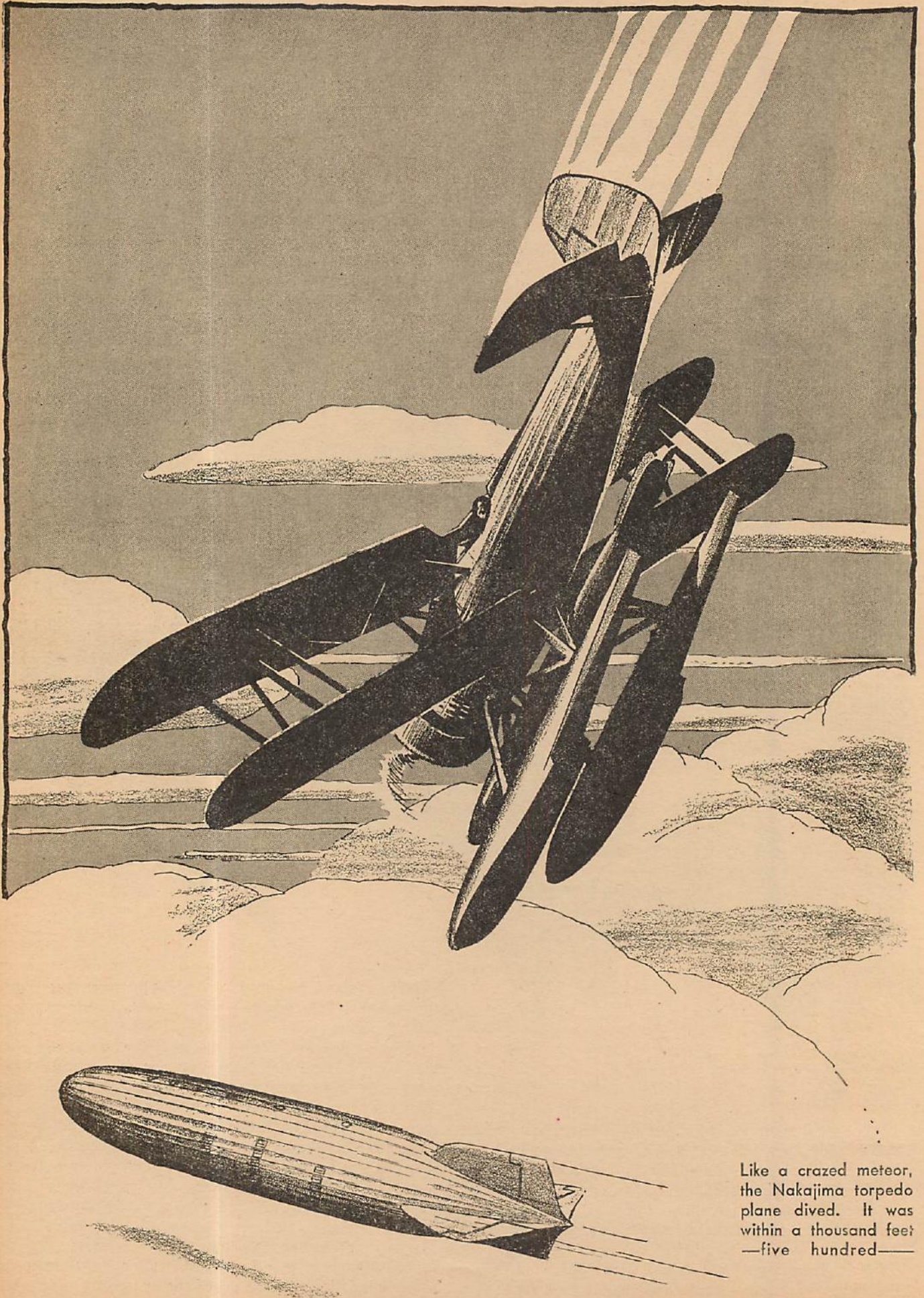
"You see how it works, Hansen? Clever, eh? When Snowy does his job my double will die—and Baron Susuka will die, too. You like it, eh?"

Hansen looked incredulous. "It's a nifty, boss. You mean you'll take on another name and all? But, isn't there danger of the dicks recognizing you sooner or later?"

"No. Years ago I get in bad with Australian police. I change my appearance, make myself look more like Japanese. I keep this way always since then—like you

Hansen shook his head. "Gosh, boss, you sure figure things out. The only risk you'll run is from guys who used to know you way back."

"Yes." Susuka's eyes glittered and a flush stole over his face. "There has been just one slip made. I always kept just one picture of myself like I used to look. Yesterday that picture is stolen by a thieving Japanese named Kammato. He is friend of one of *Conqueror's* officers, Chandler. Right after picture is stolen, I get wise. I send a man after Kammato quick. But Kammato has telephoned Chandler. My man shoots Kammato, then gets scared and runs away when Chandler comes. He does not get photograph. Chandler does. My spy at Transpacific base tells me what happens. Before Kammato dies he tells Chandler story about me riding aboard *Conqueror*. Chandler goes to his commanding officer, Brady, tells him, shows photograph.



Like a crazed meteor,
the Nakajima torpedo
plane dived. It was
within a thousand feet
—five hundred—

Brady already knows, warns Chandler to keep quiet, ignores photograph. Chandler keeps it. He has it on his person aboard *Conqueror* now."

"Wow! That's a lucky break for you, boss," Hansen said. "If Chandler has it on him now, you don't have to worry none."

"It is indeed fortunate," Susuka said. "But none of my men make two blunders like that and live. So be very careful of mistakes, Hansen."

Pete, at the radio, interrupted. "Got the *Conqueror*, O. K."

"Keep on her. Chart positions carefully." Susuka turned back to Hansen. "Go down to Snowy. Do not let him get too far gone. When it is time, I will signal you. Give him heavy injection, then bring him up here."

IT was precisely three hours later when the door of the room opened and Hansen came inside preceded by a thin, blond-headed man. "Snowy" Farr was shaking like a man dying from malaria. His eyes glared out from deep-set sockets. His mouth worked nervously, and his fingers kept picking at his flying clothes as if removing invisible pieces of lint.

Hansen looked frightened and gestured to Susuka from behind Snowy's back.

"Hello, Snowy," Susuka said affably. "It is about time you left on job, eh? You remember what to do?"

Snowy nodded jerkily. "I remember, boss. Damn you. You sent me almost crazy. You had the stuff here all the time. Hansen said you didn't. What's the idea? You might have given me a shot."

"You got it now, eh?" Susuka turned to Pete. "Let me have last radio reading."

The radio operator marked an X on his chart and handed it to Susuka. "There's the whole works. Snowy'd better take it along."

"Yes. Here is *Conqueror's* position and course, Snowy," Susuka said, holding the chart before the drug-crazed man. "When you take off, check on your radio with us here. We will relay *Conqueror's* last position. She will be coming in a straight line. You had better get going now, my friend. And good luck."

Snowy took the chart and shoved it into the pocket of his grimy flying overalls. His body tremors were growing less and less, and a strange, burning light had leaped into his distended eyes. "You say Mercer's on board the *Conqueror*?"

"For certainty," Susuka said.

Snowy's fingers curled into the palms of his hands. "Good. I'll get him. I'll kill him. I'll kill the slimy rat."

Susuka looked at Hansen, the corners of his mouth curling. No one had ever discovered who "Mercer" was. But always, when Snowy became drugged up, his killer instincts were fully aroused, and all he ever wanted was to kill "Mercer." Susuka had made use of this strange mental quirk many times in the past. Whenever Snowy was assigned to do a murder, he was always told that the victim was "Mercer." The system never failed.

"You go get Mercer now, Snowy," Susuka said.

Snowy was standing, legs spread far apart. Strength had seemed to have swept over him. The craven, shaking man was gone, and in his place was a vicious, snarling murderer. His lips were stretched back in a ferocious smile. His voice was a rasp when he spoke. "I'll

go. I'll get that dog. I'll love it. I'll crack that ship wide open and then I'll laugh as Mercer dies. Damn him."

Susuka motioned to Hansen. "You had better hurry, Snowy. He might get away, eh?"

"Get away! He'll never get away!" Snowy turned around and went out. Hansen followed.

Pete, at the radio, took a bottle from a drawer, poured a stiff drink and downed it in one gulp. He coughed and said, "If I ever see that bird again it'll be years too soon, boss."

Susuka chuckled. "You will not see him again." He walked across the room to the window at the end and looked out. Down below was the great canyon with the great cigarlike shape of his dirigible, *Pirate*, moored at the bottom. Far to the left, Susuka saw the island's small harbor with a Nakajima single-seater biplane floating at the end of the short pier. A mechanic was seated in the cockpit, jazzing the engine. Susuka's gaze centered on the sleek torpedo which was locked into position between the floats. Minutes later he caught sight of the dwarfed figures of Hansen and Snowy making their way along the bed of the canyon.

The two men reached the harbor. The mechanic



Baron Susuka

slipped out of the Japanese attack ship and Snowy climbed over to take his place. The powerful engine blasted, amplified by the narrow confines of the canyon.

Pete came over to join Susuka at the window. The biplane moved away from the pier, taxied rapidly from the harbor into the open ocean beyond. It swung around into the wind, picked up speed, and angled up into the sky.

Susuka said quietly, "Baron Susuka is about to vanish from world. You no longer know me as Baron Susuka, Pete. I make big plans. I become even greater than Baron Susuka. I take new name—Nicholas Laznick. You like it, eh?"

THE Nakajima seaplane climbed steeply into the heavens as Snowy Farr crouched motionless over the controls. His burning eyes flicked from the chart clipped to his map board to the instruments, and a sav-

age smile twisted his thin lips. Tupper Island fell away to the rear and was swallowed by the watery horizon.

Radio reports on the *Conqueror's* plotted position came continually to the pilot's ear from the radio operator back at the island. Snowy Farr watched the chart, watched his instruments, but his eyes were mostly directed straight ahead at the overcast sky.

He muttered continually, "I'll kill him! I'll kill him!"

The Jupiter motor thundered evenly as the biplane streaked on and on. Half an hour had passed since he had left Tupper Island when Farr caught his first glimpse of a shimmering needlelike object far, far ahead. He tensed forward in the cockpit and pulled the stick back. The biplane climbed steeply, leveled off at 11,000 feet. A filmy layer of clouds floated below the racing machine. Farr's eyes were blazing with the light of madness. His fingers tightened around the control column. Through holes in the clouds he caught frequent glimpses of the cigar shape that was growing larger and larger—the *Conqueror*.

The pilot was now half crouched forward in his seat. His face had become a contorted mask. He kept saying: "Kill him! Kill him! Kill him!"

The *Conqueror* was flying on an even course, like a great silver cloud. The biplane had now reached a position almost over it. The thin cloud blanket lay in between. Farr watched for an opening in the opaque vapor, found one, and through it he glimpsed the giant dirigible, 7,000 feet below.

With a snarl he threw the stick forward. The biplane dived precipitously.

Farr's eyes blazed down the gunsights until he had his machine plummeting dead on for the center of the *Conqueror's* glistening envelope. The biplane's speed was increasing. The wind was howling, screaming as it tore past. The pilot's face was bright with a demoniacal smile. He began shouting the words: "Kill him! Kill him! Kill him!"

The biplane slashed through the last layer of clouds, went rocketing down—down—down—the altimeter needle whirled around the dial.

"Kill him! Kill him! Kill him!"

Like a crazed meteor, the plane dived. It was within a thousand feet of the top of the giant gas bag—within five hundred—three hundred—

And still Farr held his feet locked on the rudder bar; his hand locked on the control column.

Down—down—down—

"Kill him! Kill him! Kill him!"

The biplane was one hundred feet away—fifty—and then, with its engine shrieking, the hurtling Nakajima plane crashed straight into the dirigible.

The torpedo locked between the pontoons exploded with a terrific detonation. A jagged crack stabbed through the *Conqueror's* sleek metallic hull. A sheet of flame streaked up. A tank of hydrogen exploded—another—another.

And in ten seconds the mammoth three-million-dollar air liner was a mass of twisted wreckage pelting downward in a swirling cloud of black smoke and fire.

And on Tupper Island a fat man laughed.

III—THE VISITOR

Bill Barnes, the world-famous pilot, walked slowly from his bungalow to the administration building, his eyes on the small monoplane that had circled his Long

Island field. The machine was now coming in for a slow, erratic landing. It hit the earth far down toward the northern border, bounced and slowed. The engine boomed. The plane swung around and headed across the field toward the concrete apron.

Bill shrugged, went up the steps of the administration building, strode down the corridor and opened the door of his private office. He stopped suddenly in the entrance.

Inside, "Sandy" Sanders, the boy pilot of the flying organization, was on his knees in the middle of the room, feverishly gathering up a litter of papers that covered the floor around him. Perched on the top of an open filing cabinet was Alphonso, the small African monkey who had become the official mascot of the Barnes air squadron. The animal was chattering excitedly and, as Bill watched, dipped a hairy arm down into an open drawer, jerked out a file holder and held it upside down. Papers cascaded from the folder and fluttered down around Sandy.

The boy leaped to his feet. "Quit it, Alphonso. Golly, the first thing you know, Bill's going to walk right in here and see what you've done. Won't you ever grow up?"

Bill said from the doorway: "He takes after his master."

The boy whipped around, his eyes wide. "Why, uh—yeah. Hello, Bill. How're you—you feeling? Nice day inside, didn't it—wasn't it—I mean, isn't it?"

Bill closed the door. "What's the idea of all this?"

Sandy was stooping down, feverishly stuffing letters back into folders and jamming them into the file cabinet. He said breathlessly: "Well, you see, Bill. I got to thinking about little ol' Alphonso. He's so ignorant. And I figured that perhaps I could maybe educate him—maybe to read and write."

Bill grinned. "You got a big job in that. Now, look, I'm not sore or anything like that, but I want this place cleaned up in a hurry, and I also want you and you"—he jabbed a finger at Sandy and Alphonso—"to get out of here and stay out. If you want to educate that ape, peewee, use your own quarters for the schoolroom."

Alphonso took a flying leap from the top of the filing cabinet, landing on the boy's shoulder, and then jumped from there to Bill's desk. He reached out quickly and picked up a large green automatic pencil lying on the desk blotter.

Bill yelled, "Hey!" and started for him.

Sandy grinned. "See, Bill. He goes right for a pencil. Maybe he's going to start to write."

"He's going to start right out of here," Bill said, and reached for the monkey.

Alphonso darted to the far side of the desk and kept out of reach. His fingers were working at the pencil. Suddenly the bottom section became unscrewed and the spare pieces of red-colored lead scattered over the desk top. The monkey jumped from surprise, dropped the pencil and, with a shrill cry, leaped from the desk and vanished out through the door.

"You, too," Bill said to Sandy.

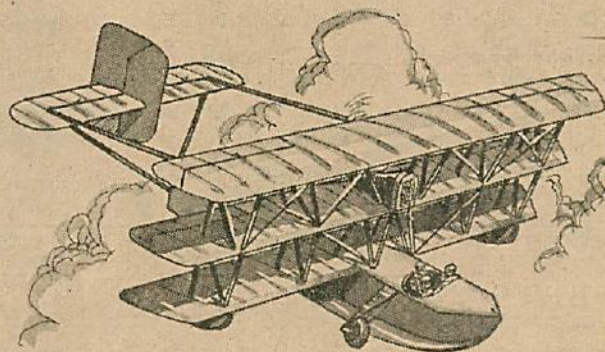
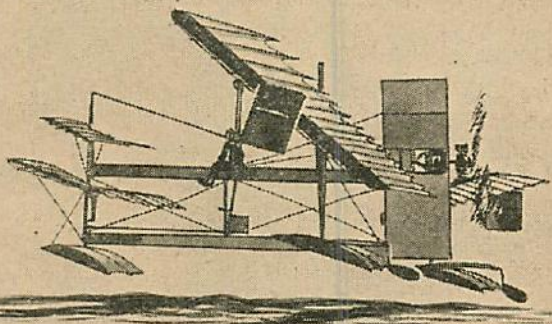
The boy jammed the last file into the cabinet and ran across the room. "Sure. We're going. I'm glad you aren't mad, Bill. You just have to have patience with Alphonso. He's a problem child."

Bill grinned as the door closed. Alphonso and Sandy—what a combination! One was as bad as the other. Yet he would never forget what

(Turn to page 70)

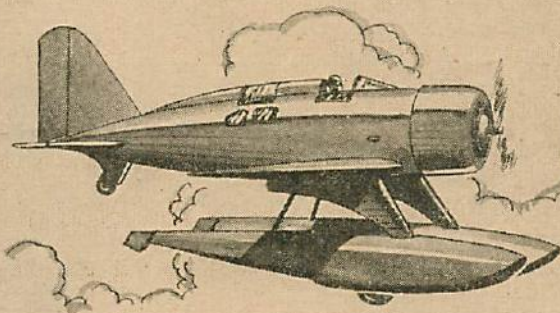
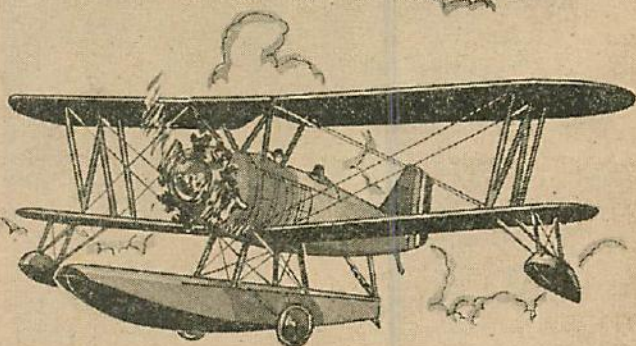
Amphibian Development

HENRI FABRE, FRENCH AIRMAN, BUILT AND FLEW THE FIRST AMPHIBIAN IN 1910. HIS PLANE COULD TAKE OFF FROM THE WATER AND LAND ON THE BEACH ON THE CURVED FLOATS



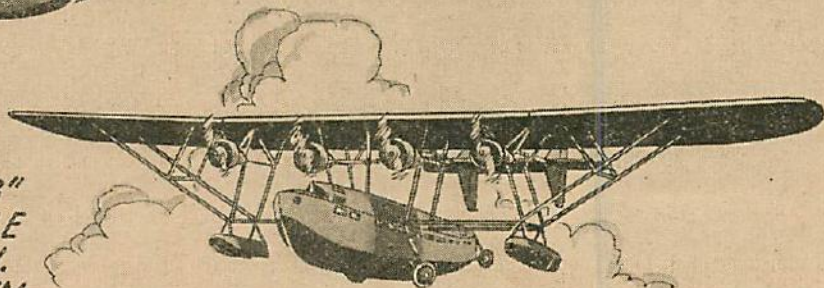
THE SPERRY TRIPLANE AMPHIBIAN OF 1918 WAS THE NEXT STEP. THIS SHIP, POWERED WITH A 370 H.P. LIBERTY, WAS CAPABLE OF 85 M.P.H.

SINGLE PONTOON VOUGHT "CORSAIR" AMPHIBIAN OF 1929 WITH 425 H.P. MOTOR. THIS SHIP DID 150 M.P.H.



THE SEVERSKY SEV 3 OF 1935 HAD TWIN PONTOONS THAT SWUNG UP FOR TAIL SKID TO TOUCH WHEN ON LAND. THIS SHIP DOES 200 M.P.H.

1936 SIKORSKY "AMPHIB" S-40 CARRYING 36 PEOPLE IS CAPABLE OF 120 M.P.H. THE S-40 WEIGHS OVER TEN TONS EMPTY AND CAN CARRY A PAY LOAD OF OVER THREE TONS





A spectacle for crowds at the R.A.F. air show.

IT was not many years after the Wright brothers first flew, back near the beginning of the century, that the airplane became a weapon of war. At first the new machine served only as a far-seeing eye for the land and sea soldiery who had waged all the wars of the world since the beginning of mankind. Then, swiftly, the airplane grew. It took unto itself weapons for self-defense; it found that those weapons could be turned to offensive purposes, and in a comparatively short time it became an attacking force in its own right. It compelled generals and admirals to alter their whole age-old strategy of warfare.

The military importance of the airplane has continued to grow with its rapid improvement in design. To-day air forces are a dominant factor in the strength of nations. While it is not true, as some enthusiasts claim, that rival air forces alone can decide wars—since ground troops must still actually occupy and hold enemy territory—it is probable that fighting planes will play the leading rôle in future international conflicts.

Thus the nation with the biggest and best air force

Britain

*In the international
war power Britain
with many fast*

by Grainger

will have a great advantage. The best air force is the one with the most modern aircraft. And the most modern, completely up-to-date planes are appearing to-day in large numbers in one country especially—Great Britain.

When Germany came into the open with defiant announcement that she was creating an air force specifically forbidden to her by the Versailles Treaty which ended the World War, Britain was disturbed. Germany proclaimed peaceful intentions, but she was apparently preparing for war. Hitler's ultimate aims were eastward, he said, which could mean Poland, Russia, or Czechoslovakia. But then, in a surprise move, Germany reoccupied the Rhineland, the demilitarized zone above France. Britain grew alarmed. She quickly set about strengthening her forces. Hard feelings in the Mediterranean which developed shortly later with Mussolini over the conquest of Ethiopia, and the French-Russian alliance, served to speed up her program.

From a total of about \$88,000,000 for 1934, air-force expenditures for 1935 were increased to \$130,000,000. This was a jump, in one year, of almost 50 per cent. For a dozen years previously, Britain's annual bill for her air force had not changed much one way or the other. The big added expenditure, however, was only a beginning. For 1936 the air force estimate was raised to \$195,000,000, or a total two-year increase of about 120 per cent with further 1936 appropriations likely.

Among the items that form Britain's air-force outlay for 1936, airplanes and engines at \$73,400,000 and guns and ammunition at \$11,415,000 add up to form the largest item—war equipment—of \$92,500,000. Of the first figure, airplanes and spare parts account for \$46,700,000, engines and spares \$26,700,000.

More men and ground accommodations are also provided for. Enlistments in the Royal Air Force in 1934 totalled 28,780 men in all ranks; for 1936 this figure may rise to 50,000. Additional recruiting stations have been opened. Under a new system many pilots will be trained in private schools by special arrangement with the government. As a result, new flying schools are opening up and old ones are booming. Britain's expansion program plans for a total of 2,500 new pilots and 22,000 new "aircraftsmen," or mechanics and ground crews of various duties.

New air stations and bases to the number of 49 are to be constructed. Work is already under way on almost half of them.

In the procurement of new aircraft, speed is the watch-

Rearms

*race for leadership in
swells her air force
new battle planes.*

Summerfield

word. Workers are in demand, and many factories are operating on all shifts to capacity output. In addition, Britain has undertaken to create a "shadow industry" in case of emergency. Automobile plants and other factories are being outfitted to begin the constructing of planes in a moment's notice.

Two years have passed since Britain swung into her swift expansion. Mostly in recent months, and seemingly all at once, the new ships that she has been developing in secret have emerged, to claim the attention of aviation experts everywhere.

All of the new fighting craft are monoplanes, and furthermore, all have retractable landing gear. In these two respects they are following the trend already established by commercial and private-owned planes both in England and in this country.

How far ahead of other European countries Britain's new air equipment will place her remains to be seen when definite news is available from the other nations. It is fairly certain, however, that none of them is surpassing the speed and power of some of the new British designs. Britain's present ranking is placed anywhere from first to third by different observers. Her chief rivals in air strength are France and Russia. But there

seems to be little question that when her expansion program ends its first period, in the spring of 1937, she will top the list with well over 4,000 available service planes of all kinds.

This alone might not make her the leading air power, for counted in the total plane strength of any air force is a considerable number of obsolete craft still doing first-line duty and an even greater number of old planes in reserve. Quality is important as well as quantity.

Space does not allow discussion of the several efficient fighting craft already in service with the R.A.F. These include the Gloster Gladiator, whose 255 m.p.h. was the fastest speed in the service up to 1936, the Hawker Fury, and several other conventional biplanes. The new designs, however, are worthy of attention.

For the most part, they represent two types of air warfare in which Britain is specializing because of her geographical vulnerability to neighboring coast bases compared to her distance from the other nations' capital cities. These are: intercepting attacks on enemy bombing formations before they can reach England's shores, and long-range bombing.

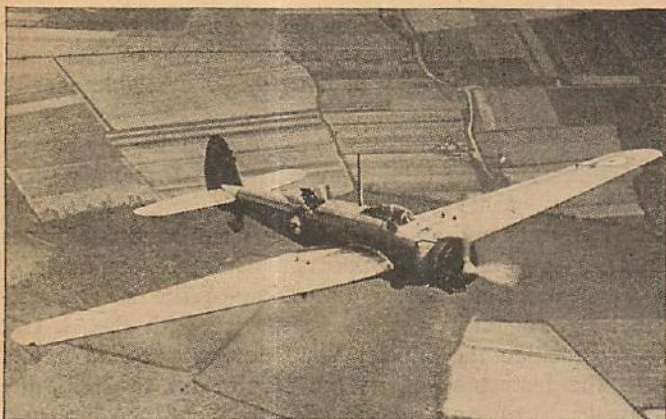
The first strategy demands fighter or "pursuit" planes that can get off within minutes after an alarm and halt the approaching bombers before they can get near enough to do damage. Planes for this purpose must obviously be quick-climbing, extremely fast, maneuverable, and well-armed.

The second tactic requires primarily long-range bombing planes with suitable load capacity. Since most of the distance in R.A.F. bombing flights would be over foreign or enemy soil, they would have to be fast in escape, of high ceiling, and maneuverable and well-defended in combat.

Among recent or newly revealed British service-type planes are three fast low-wing fighters, the Supermarine Spitfire I, the unnamed Hawker single-seater, and an unnamed Vickers single-seater; two reconnaissance bombers, the Avro Anson and the military Airspeed Envoy; two "day" bombers, the Vickers Wellesley and the Fairey Battle; and four heavier two-engined bomb-



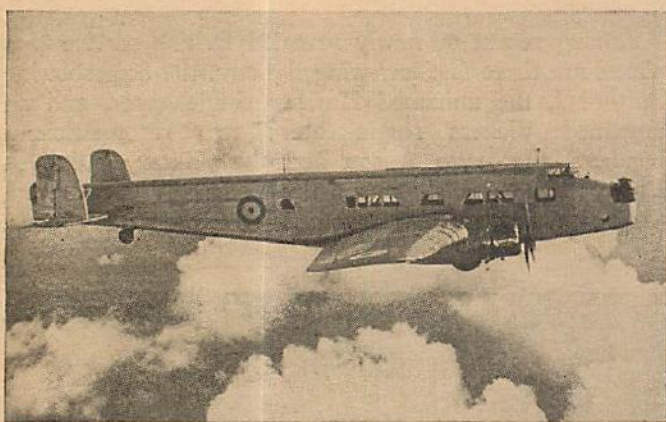
British service types on display at Hendon. The large biplanes in foreground are Handley Page Heyford night bombers.



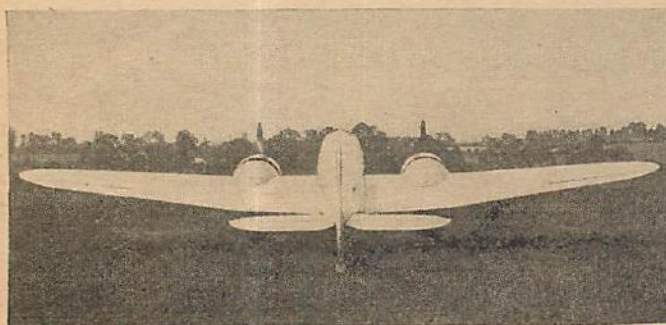
Vickers Wellesley's geodetic construction permits safe high aspect ratio and large load capacity.



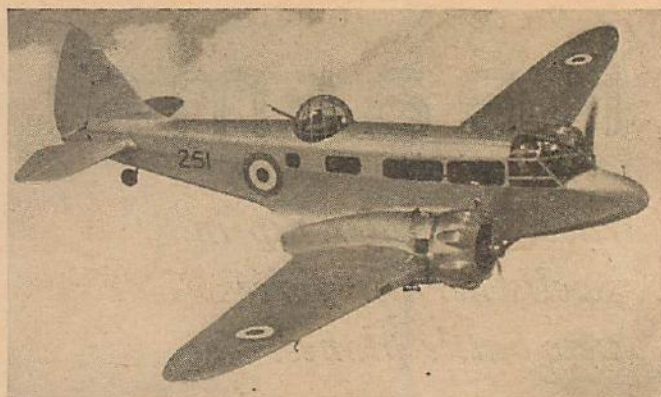
Hawker fighter, powered with Rolls-Royce Merlin, is reported to be just as speedy as it looks.



Armstrong-Whitworth AW23 shown above is prototype of the Whitley bomber and troop carrier.



Bristol Blenheim is among world's fastest bombers. Front view appeared in December, 1935, Gallery.



Airspeed Envoy is a "merchant bomber" easily convertible from comfortable air liner to battle plane.

ers, the Bristol Blenheim, the Armstrong-Whitworth Whitley, an unnamed Vickers, and an unnamed Handley Page. With the exception of the Vickers fighter, all are illustrated in this article, although details are not available on some.

Two unusual new engines share attention with the plane designs. Three of the ships are powered with the Rolls-Royce Merlin, a 12-cylinder steam-cooled V type, details of which are withheld. It has a very small frontal area, small radiator surface, and capacity rumored at around 1,000 h.p. The other is the Bristol Aquila, installed on the Vickers fighter, a 9-cylinder radial air-cooled engine that uses sleeve valves, sliding around the cylinder, instead of the usual tappet valves operated by push rods. Of unrevealed horsepower, it is claimed to be simpler, more economical, cooler, and quieter than the average radial.

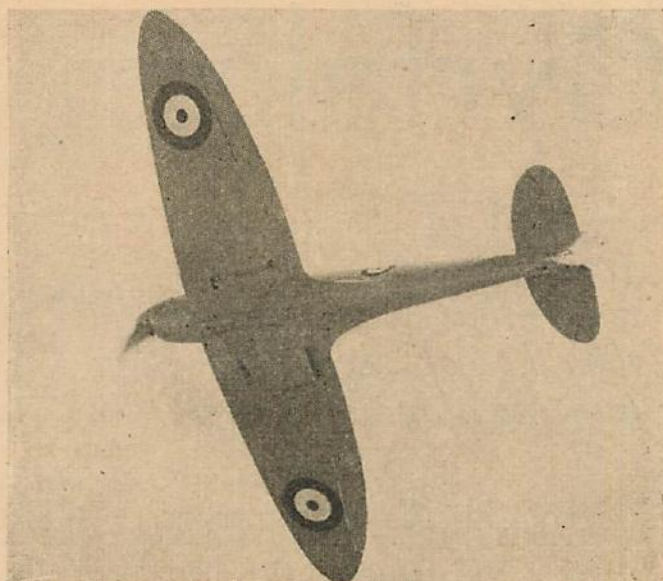
The Supermarine Spitfire I fighter is called the world's fastest military plane, which should definitely place it in the much-talked-of 300 m.p.h. class. It was developed from its manufacturer's Schneider Trophy race designs. Construction is of metal stressed-skin type, with smooth surface and flush rivets. Engine is the Rolls-Royce Merlin.

The Hawker fighter also has the Merlin power plant. In its production form it will have metal wing surfaces. Like the Spitfire, it has slow-speed flaps.

The Vickers unnamed fighter (not shown) temporarily designated PVD-10, is distinguished by square-cut wing and empennage tips, which make it look curiously old-fashioned. The hatched-in pilot's seat has a long, humped fairing behind it that extends the length of the fuselage. Dimensions are: span 32' 9", length 24' 2". The sleeve-valve Aquila engine has a controllably ventilated cowling.

Reconnaissance bombers such as the Anson and the Envoy are of lower performance than the later planes, but useful ships in Britain's air strategy. The Anson is a military version of the Avro 652 small transport, intended for coastal guard duty and observation; construction is wood-built wings with plywood covering and fabric-covered steel tube fuselage. It can take several sizes of radial motors, the 175 Ansons on order for the R.A.F. being fitted with 350 h.p. Siddeley Cheetah IXs, which yield a top speed of 188 m.p.h.

The Airspeed Envoy is one of the first commercial transports frankly intended to be convertible to war purposes. For this reason it is expected to be popular in Britain's colonies, where it can serve adequately in



Supermarine Spitfire I, claimed speediest military plane. Last month's Gallery had side view.

both war and peace. Seven are being built for South Africa. Four mechanics in a few hours can change an Envoy from a luxurious 6-or-8-place air liner to a well-armed, bomb-laden battle plane. The gun turret, for instance, fits in place of the liner's lavatory, a section of the fuselage top being lifted out. Construction is mostly wood and fabric; engines are Cheetah IVs and speed about 200 m.p.h.

The Vickers Wellesley and the same firm's unnamed twin-engine medium bomber are both geodetic metal network structure (described in AIR TRAILS, May, 1936) permitting wide-span wings, heavy loads and long range. Both have the new Bristol Pegasus X series 9-cylinder radial engine of 920 h.p. The Wellesley's dimensions are 73' 6" span, 38' 6" length; with a fully loaded weight of five tons, it does about 180 m.p.h. The R.A.F. has ordered 75. The twin-engined bomber has 85' 10½" span, 18' 9" height, 60' 6" length.

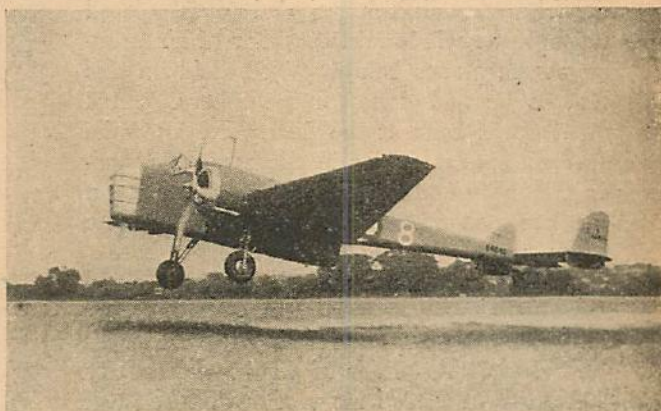
The Fairey Battle, Merlin-powered 2-seat light bomber, is another candidate for the 300 m.p.h. class on which details are secret. It is apparently all metal. A large number are on order.

The Bristol Blenheim bomber is the R.A.F. development of the ship popularized by a gift of its prototype, the Bristol 142, by Lord Rothermere to the government. It is all-metal, and equipped with two 600 h.p. Bristol Mercury radials; its speed is said to be over 250 m.p.h. Two hundred are being produced.

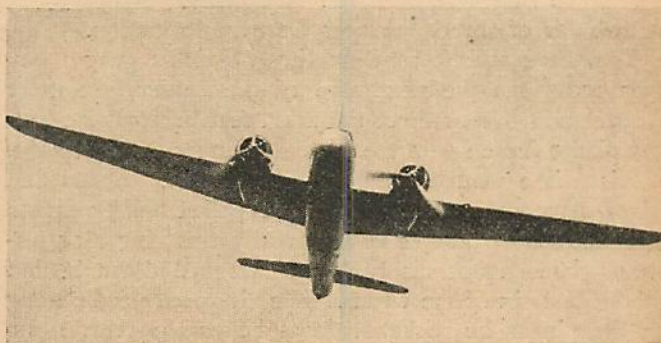
The Armstrong-Whitworth Whitley is the developed version of the AW23 metal bomber transport illustrated herewith. This big plane has a tail turret as well as gun positions halfway and at the nose, and carries a heavy load of bombs or troops. Performance is fast, with two AW Tiger IX 800 h.p. engines.

The Handley-Page twin-engined medium bomber is marked by its unusually narrow fuselage and the square, angular forepart. The tapered wings have the famous Handley-Page automatic slots as well as wing flaps; of metal construction, it is powered with the 920 h.p. Bristol Pegasus.

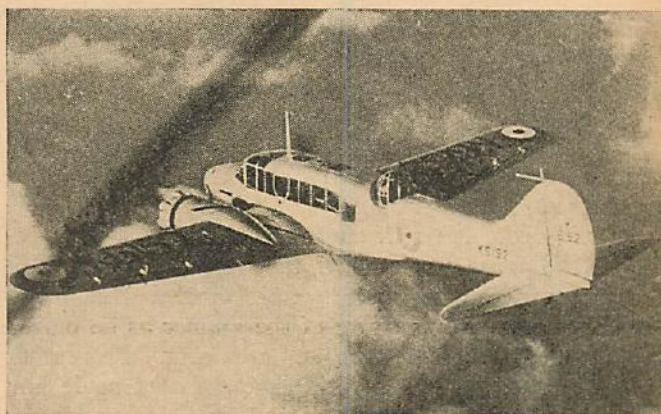
With these new planes, Britain, long boasting her rulership of the sea, appears well on her way to ruling the air.



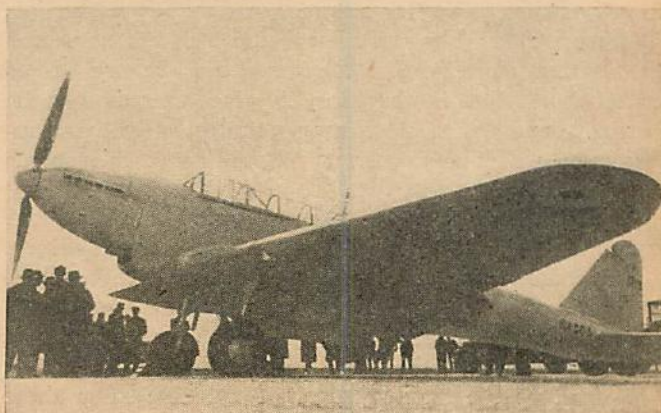
Handley Page's bomber, demonstrating slow-flying and short-landing ability, suggests frying-pan shape.



Vickers twin-engined bomber, geodetic like the Wellesley, has fuselage with odd rounded tail-end.



Avro Anson is much similar to Envoy in design.



Fairey Battle light bomber's speed is secret, but with Merlin engine it can keep ahead of most fighters.

BRICK" BAXTER'S goggled eyes glared through the window in the floor of his cockpit at the planes below. Well, he'd do this job, too, as he had done all the others. He'd show that outfit back at the field. He knew he was the best shot and flier in the escadrille, perhaps in the entire sector, or even the whole front. And he knew that the fools back there at the field knew it, too.

He shoved his stick forward, and his Spad plummeted down what for a less skillful sky fighter would have been the first step of a great ladder of death. A ladder of death, but not for him—the thought tickled his vanity, and the task spurred his conceit.

The first step of the ladder, shining below and slightly ahead of him, were six trim Albatri of the circus of the Baron von Reitmeister, flying in two Vs of three, the new German formation.

Two thousand feet below these, Brick's gray eyes could see the next step of the ladder, six more Albatri, and two or three thousand feet below these convoy planes there swam the Hannoveranner camera plane.

His Hisso wound up to a shrill whine. Struts and wires screamed. He gulped and yelled wild yells to clear his head passages in the swiftly changing air pressure. The sun at his back, he swooped down behind the highest six of the circus. His air-speed needle hung on the pin as he rocketed down below the second six. He never looked upward. He knew well enough that all twelve planes would be down on him shortly—the gaudily decorated dragon planes of the baron's circus.

Now he was below even the Hannoveranner. He eased back on the stick, and the force of his dive squashed him into his seat. The fabric on his wings hummed; the struts and wires shrilled as they sliced the air.

He looked upward, and smiled. He could still see the lower six of the Albatri in silhouette, which meant that they were not yet diving. But he could not see the highest six; they were on their way down. His smile widened. He took another look at the Hannoveranner, still more than a half mile ahead of him. He could now make out the strange biplane tail structure of the craft and the tiny figure of the gunner as he moved in the cockpit, swinging the gun on its ring. This meant that they had all spotted him now, and that made him sure of almost exactly what they would do.

Six of the pursuit planes above would slice down for the Hannoveranner, sure that he would come up almost to it, and then either try to zoom or dive away after one slashing attack. The other six would wait a little behind the camera plane, ready to cut across the arc of his zoom if he shot upward, or to dive after him if he plunged downward. The gunner and pilot of the Hannoveranner, if they were cool, would bank their plane for a wide arc of fire to meet him as he came, or try to drop suddenly and trap him in their ring sights above them, and then they would climb for the high heavens.

Brick fooled them. He was still over five hundred yards away from the Hannoveranner when he pressed his face to the felt-rimmed eyepiece of his telescopic sight and squeezed the trigger grip on his stick.

Instead of the sudden snarl of machine guns there was a dull boom, and the jar of the 37mm. gun checked even the rush of the Spad. A swift puff of acrid powder smoke ripped back into the cockpit.

Gyrfalcon

A bird of prey launched from the mailed fist of war—that was the way he thought of himself—often hunting alone, merciless—

by H. C. Brokmeyer

Brick waited for less than a second, watching the smudge of the tracer ruling a straight line for the Hannoveranner. Right where the cross hairs of his sight intersected, the shell and the plane met. The plane vanished in a puff of smoke and silver flame. A little figure of a man shot out from it, sprawling to the earth in grotesque flight, followed by slower fluttering bits of smoking fabric. Six thousand feet of empty air!

Brick pulled back on his stick, gently at first, then with a yank. At the top of the tight loop he snapped and shot straight back along the invisible path he had followed in his attack. Caught flatfooted, the twelve planes above him buzzed down in angry impotence. Even with the speed of their dives, they could not catch him. Again he had outguessed, outshot, outflown the enemy, and again he had shown the bunch he flew with how it should be done.

He roared triumphantly home through the clear evening air, rolled his wheels on the hangar roof, and then fishtailed cockily in. The insignia on his machine—a savage, spiked, mailed fist, with a hunting falcon swooping from the gauntleted wrist—glowed crimson in the light of the setting sun.

Brick leaped lightly from the Spad and swaggered into headquarters office, saluting casually.

"Well, the confirmation's already been phoned in," Captain Masters informed him.

"Of course," Brick replied shortly, shrugging his shoulders.

Masters returned the sloppy salute with a look of disgust.

Lieutenant Chumleigh, crippled English ace temporarily attached to the American escadrille, leaned on his swagger stick and watched Brick's departure with cool eyes. "Chap got a bit of a swelled head, eh?"

"I'm afraid so."

"Well, you've got to concede that he's not done so poorly. Five balloons and fifteen machines within the last sixty days. Where did he get the Christmas-tree idea, on his machine there?"

Captain Masters smiled slightly. "He's a farm lad from back somewhere in our mid-Western States. He might have known a Plymouth Rock from a sharp-shinned chicken hawk, but he couldn't have told either of them from a gyrfalcon. The Frenchman we had here before you came, told him about hunting with the things,

as they used to do, and as soon as this fellow started a reputation for himself, I guess the idea struck his modest fancy. He's the only one in the outfit that's painted up at all."

Chumleigh shifted his weight on his stick. "Well, captain, I've seen three years of this affair; I've seen 'em come—and go. Things even up, sometimes. There may be some one over there"—he pointed with his stick—"who'll attend to our friend. I think you'll find from his combat report that we have the baron with us again."

Masters frowned. "M-m-m. I'm not bloodthirsty, and I'm not wishing any one any bad luck, but I'd like to see those two come together some way."

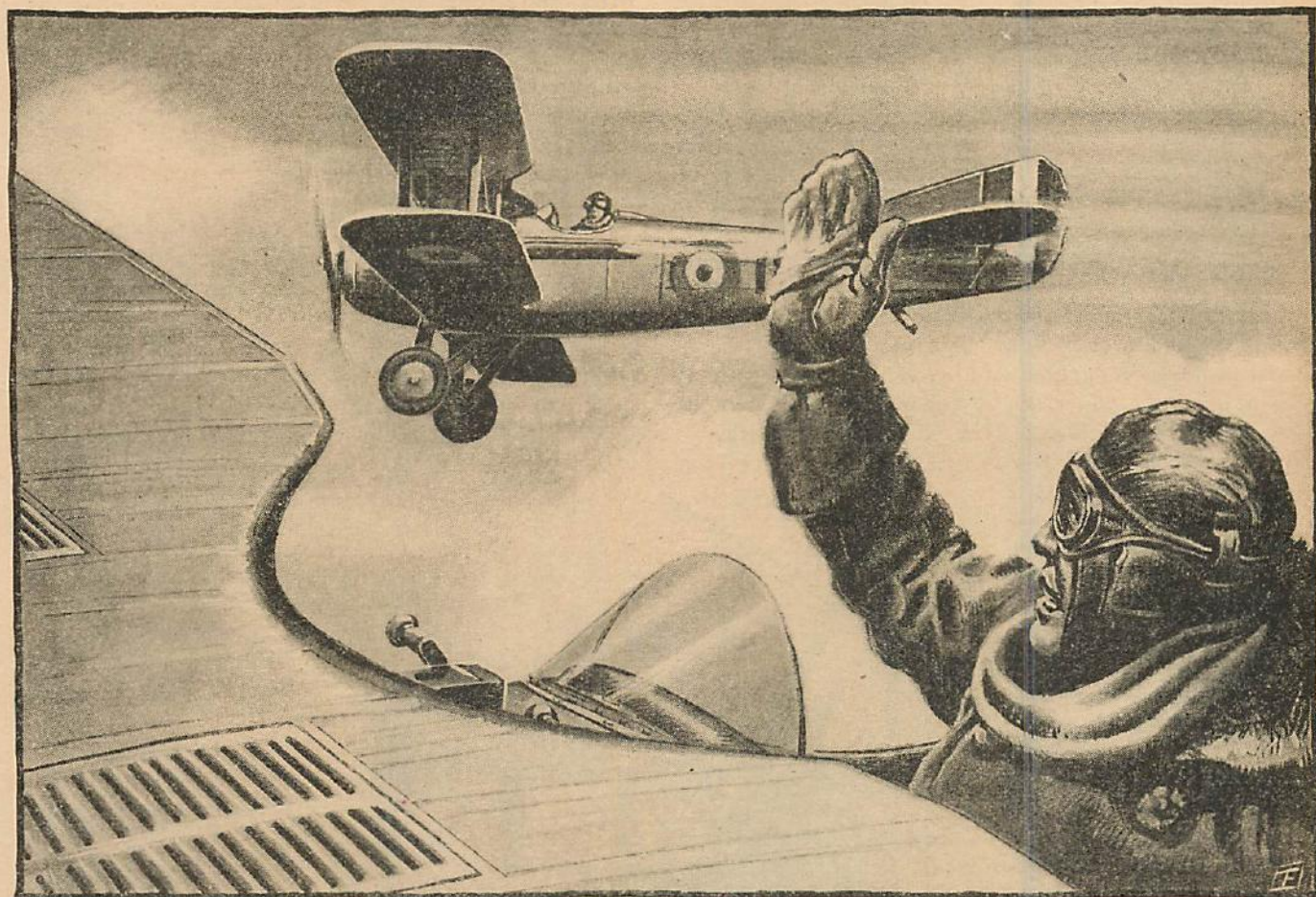
But the captain did not know that Brick and the baron had "come together," on one of Brick's first flights over the lines. He had been absorbed at first with the task of keeping formation, and then had lost himself in gazing at the panorama below him: the trenches and the life-and-death struggle surging under his eyes. Then he had jerked to his senses with a start of dismay. He

zoomed, jauntily, three slid off to the left, to draw the attackers into the sun. Masters' attack was split before it was launched.

Von Reitmeister, discovering but six planes coming down, left them to his aces to handle, confident of their skill. But he was worried. These were Spads of the 57th, he felt sure, that had been opposing him for several weeks. He had come to know the 57th for a competent, hard-working, hard-fighting crew, skillfully led, and therefore he was wary of another plane, or planes.

He stuck a thumb in front of one goggled eye, winking the other, thus blanking out the flaming sun. Ah, there it was! Another plane in the sun, above the fight. He eased back on his stick with one hand and pushed his throttle forward with the other. The Mercedes growled on a heavier note, and the prop chewed deeper bites of air.

The baron was climbing to the attack, to discover whether this menace in the sun was an ace, waiting for a bag shot after a pounce on some straggler from the



The enemy's helmet bobbed; his hand came up in the flip of a salute.

was all alone in a great big empty sky. Still "air blind," he had not seen Captain Masters waggle the wings of his plane, had not seen his flight mates go rocketing down.

But the Baron von Reitmeister had seen them coming, and was ready. With a quick flirt of his plane's wings, he sent his gaudy veterans about their tasks. Like a well-drilled team, they darted to their positions, coolly and smoothly. Bright yellows and reds and blues they shone in the sunshine, with purple-and-green-and-gold dragons streaming along their neat, rounded fuselages, screaming rampant on the wings. Three of them

fight, or a rookie left behind when his flight had dived to the attack. Ace or rookie, the baron did not much care, confident and cool in the knowledge of his skill, calculating wind and sun, looking for possible clouds as he stormed up to the attack.

Brick had just discovered the fight—the brightly darting little specks against the dark carpet of the earth below him—when the fight discovered him. *Tac-tac-tac!* He ducked sharply. But his plane had already shivered; his instrument panel had already splintered. The yellow of his wind screen was splashed with great prismatic blotches, and before his horrified eyes, neat little

holes appeared in his floor boards, not six inches from his feet on the rudder bar.

Open-mouthed and white-faced, he stared at the silver apparition that shot upward from close beside him, standing almost on its tail. This, then, was an enemy plane. He had come three thousand miles to meet one, and had often told or dreamed of what he would do when the great occasion presented itself, and now, here was an enemy plane. And what to do?

He watched, fascinated, as the Albatross shot above him, flipped over, and knifed downward. Then it came to him that this man was trying to kill him. He should do something. But what? Only one thing hammered in his mind; the thin voice of De Constant, his French instructor. "Don't dive, don't dive! My Lord, never dive!"

But it was hard not to cover his eyes and plunge. The sharp beak of the enemy plane pointed at him. *Tac-tac-tac-tac!* Two eyes flamed. *Tac-tac-tac! Flac, flac, flac!*

He ducked as a jagged pattern of holes appeared just above his helmeted head, across his center section. Instinct had made him wobble his plane and saved him. The German veered and winged to the right.

Excitedly, Brick banked and squeezed his trigger grip, *tac-tac-tac!* But the jagged line of tracers spurted wide of the fleet silver wings of his opponent. Then one of his guns jammed—then the other. The cupro-steel of the German Spandau slugs in that last burst had done their work, had bitten into the belt of one gun, into the feed block of the other.

Frantically he rose in his cockpit, and, unconscious of its futility and of the air stream tearing at him, hammered at the useless guns with his fist. Then, regaining a bit of his scattered senses, he grabbed the little hammer from its rack in the side of the pit and set to work.

But his plane just now was no machine shop. Brick looked up, and then, in desperation and despair, hurled the little hammer at the sharp-pointed, silver death streaking back at him. His ears already heard the flat snarl of the other's guns; his eyes already saw the angry little flames at the muzzles; his body was braced for the jerk and smash of bullets tearing through it.

But to his amazement the Albatross banked and floated lightly into alignment alongside him. The pilot pointed one gloved hand at his own Spandaus and bobbed his head. Brick leaned out into the wind, patted one of his own Vickers, pointed at the belt. The dark helmet of the German bobbed again.

Brick could have sworn a smile appeared in the dark, grease-smeared face below the great goggles. A hand

came up in a little flip of a salute, and the silvered, sharp-staggered wings of the Albatross dipped away in a graceful bank.

But Brick had courage and recovered from his scare. His reputation began. He had a gift for flying and a coordination that came to few. Quick-thinking and conceited and clever, he was a natural hunter, a bag hunter. Above all, he was a marvelous shot, blessed with the little trick of coordination, the instinct of timing. Some little voice within him would say, "Now!" His hand would squeeze the trips almost without volition on his part, and another plane would fall. Veering, darting, spinning, he would slash in. "Now!" and an observation sausage would collapse in a gush of flame.

The Croix-de-Guerre appeared on his chest—then one palm, two, three. He got other medals, ribbons. The French papers mentioned his score. He would lie on his cot and try to pick out the words. He received clippings from home papers. He marked his scores on a calendar by his cot.

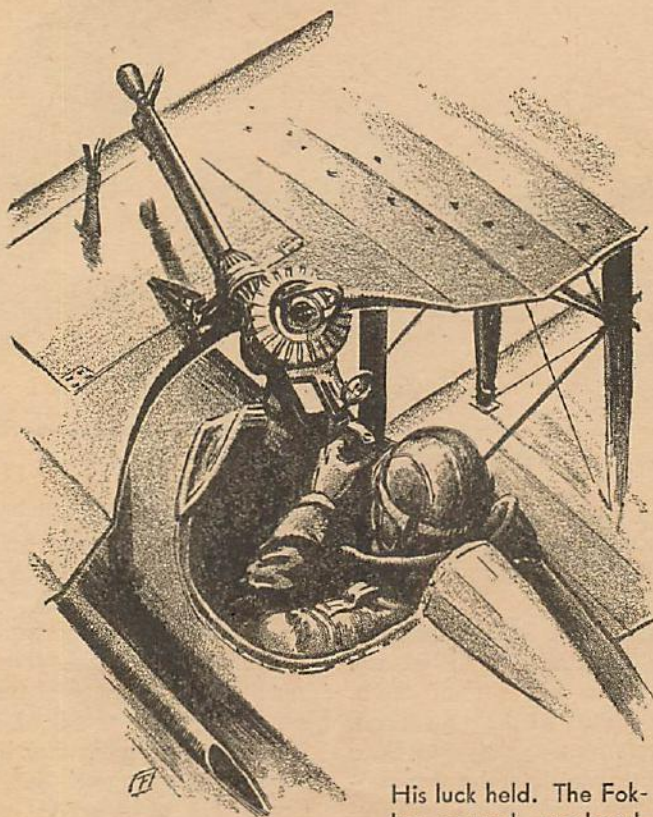
His head grew. And he grew lonely. He made solo hunts, accepted challenges against orders—challenges to sky duels. The little bunkside card games became too small to admit him. Piqued and injured, his vanity expended itself in fighting. He'd show them! And he did!

When not off on his lone hunts, he spent hours diving at the target butts. The mechanics cursed him as the most exacting and fault-finding of all the pilots. Everything had to be right about his plane, guns, ammunition belts. Eight E. A. and two balloons in two weeks was his score at the start. And before rookies went down in the desperate maelstrom of attack and counterattack in that last fall and spring of the war, they passed on to other replacements the legend of a cold snob, a devilish good flier and shot, but a cold snob.

They ceased to call him Brick. But he kept on, morosely and savagely hunting and killing.

Then the first of the experimental 37 mm. mountings came through, and Brick's real parade began. He was the logical man to use it. Captain Masters showed it to him—a large black tube snuggled in the V formed by the Hisso cylinders. The half-pound shell and its cartridge was fed into the breech from the cockpit. They put the bonnet on his Spad; he roared aloft and shot at the target butt. He shot at it from upside down, sliced in at angles and shot. And that night, three Hun sausages reddened the skies of the front—brief and terrible torches.

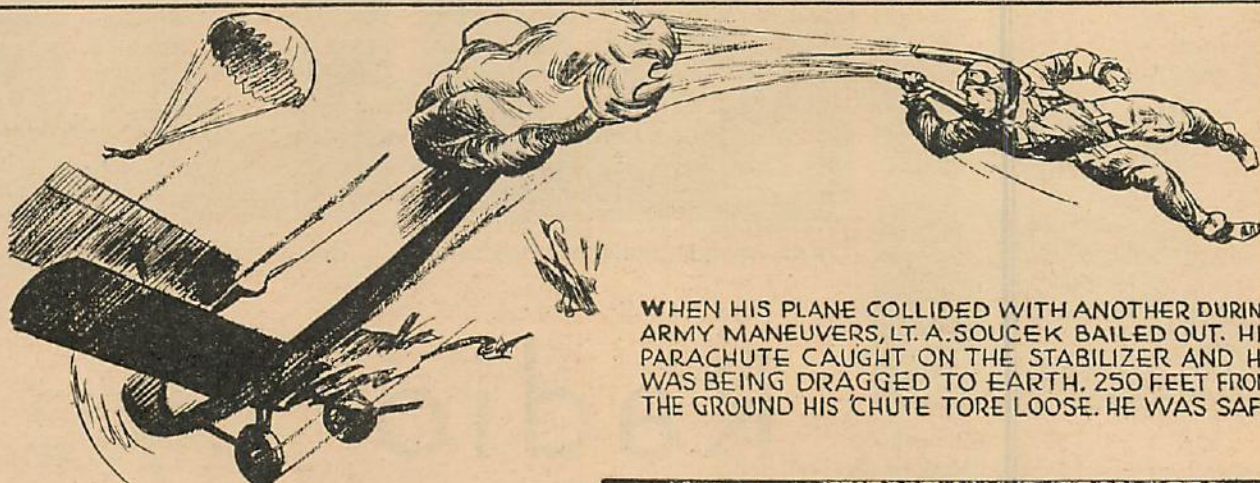
He adopted the gyrfalcon insignia. His fellow fliers sniggered. The mechanics sniggered. (Turn to page 88)



His luck held. The Fokker roared overhead.

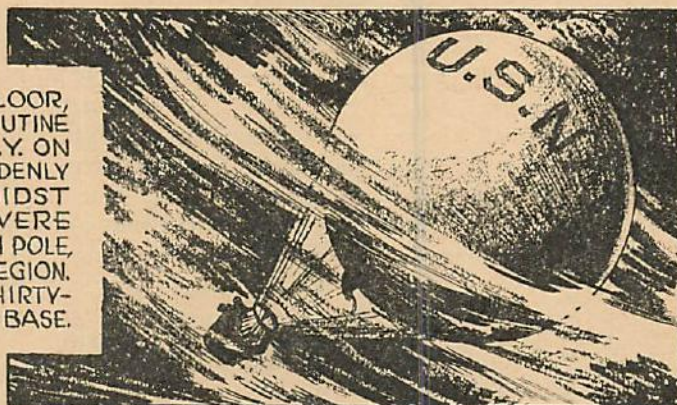
SPLIT-SECOND ACTION

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



WHEN HIS PLANE COLLIDED WITH ANOTHER DURING ARMY MANEUVERS, LT. A. SOUCEK BAILED OUT. HIS PARACHUTE CAUGHT ON THE STABILIZER AND HE WAS BEING DRAGGED TO EARTH. 250 FEET FROM THE GROUND HIS CHUTE TORE LOOSE. HE WAS SAFE

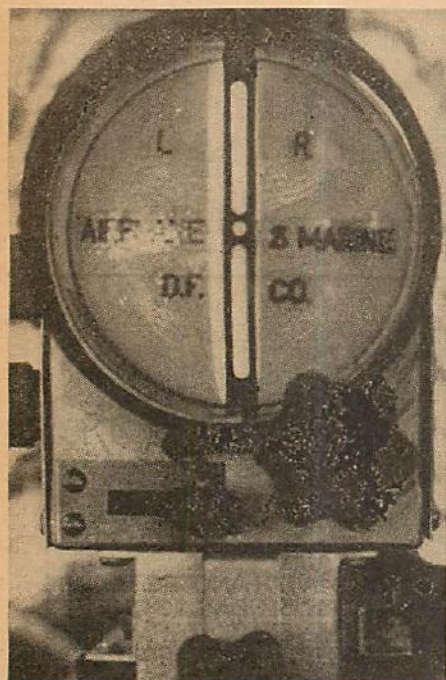
THREE NAVAL OFFICERS, LIEUTENANTS L.A. KLOOR, S.A. FARRELL AND W. HINTON STARTED ON A ROUTINE BALLOON FLIGHT FROM ROCKAWAY POINT, N.Y. ON DECEMBER 12, 1920. THE IDEAL WEATHER SUDDENLY CHANGED. THEY WERE CAUGHT IN THE MIDST OF A HURRICANE. IN INKY DARKNESS THEY WERE BLOWN, IN 25 HOURS, HALF-WAY TO THE NORTH POLE, LANDING IN THE WILDS OF THE HUDSON BAY REGION. LOST, FROZEN AND STARVED THEY WERE THIRTY-ONE DAYS RETURNING TO THEIR NEW YORK BASE.



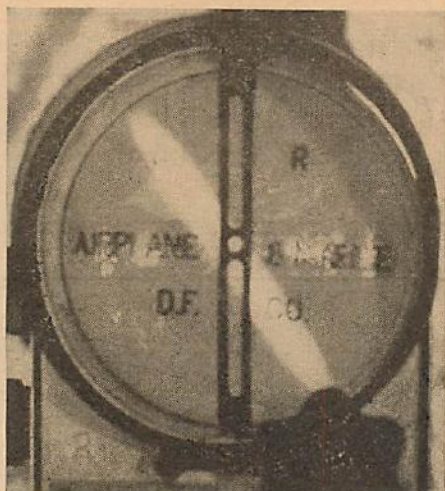
HIS PLANE PLUNGING TO EARTH, OUT OF CONTROL, CAPTAIN F.B. HENNESSY CLIMBED OUT ON THE TAIL. SLOWLY THE PLANE LEVELED OFF AND GLIDED SAFELY DOWN.



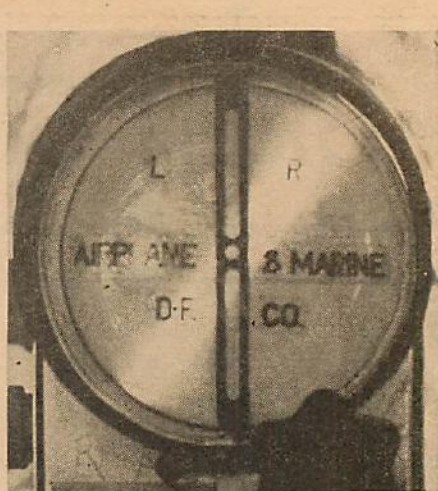
A WHITE RHINOCEROS DISRUPTED THE IMPERIAL AIRWAYS SCHEDULES RECENTLY. THE HUGE BEAST HAD THE MECHANICS AT THE JUBA, AFRICA AIRPORT LITERALLY UP A TREE.



"On course" toward radio station, indicated by light's null position.



Off course right; station shown leftward.



Swinging off course to the left.

Radio Eye

HIGHLY encouraging results have been obtained during recent tests by the United States Coast Guard of a cathode ray radio direction finder which was submitted for test by the Airplane and Marine Direction Finder Corporation, of Lindenhurst, L. I. This new indicator, utilizing a cathode ray projector to unusual advantage, is the invention of Edward Hefe, of that company.

The tests proved that the cathode ray direction finder is one of the greatest advances in the field of aircraft navigation in the last decade.

Radio direction finders in themselves are not "news," but a brief consideration of their use up to the present brings into startling contrast the improvements developed over the old-style finders in the "electric ray gun," or cathode ray type.

The simplest form of radio direction finder consists of a rotatable loop antenna connected to a radio receiver unit. The loop antenna is that big ring you've sometimes seen mounted on top of the wing center section or the fuselage of a plane. When the loop antenna is rotated, a variation of signal strength results, in the signal being received from any particular radio station. When the loop antenna is turned at such an angle that no signal from that station is heard at all, the "line of bearing" is indicated. This is illustrated diagrammatically in drawing #1, on a following page, in which we are looking down on the loop from above.

As the loop antenna of the simple radio direction finder, which incidentally is known as the aural-null type ("aural" meaning by sense of hearing, "null" the silent zone in which nothing is heard), is rotated throughout 360 degrees, the signal strength variation as heard by an observer listening with a set of headphones would be as shown.

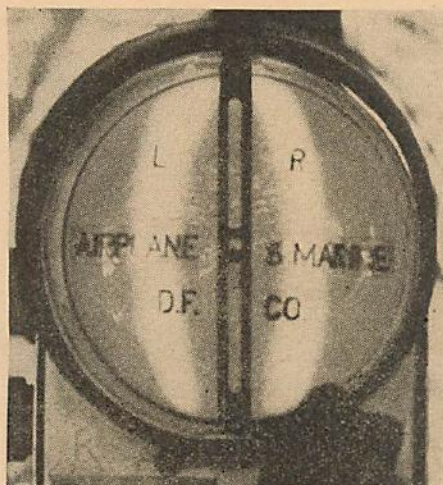
The positions at zero degrees and at 180 degrees indicate the line of bearing. But there remains the problem of determining in which direction lies the source of the radio impulse. All this appears to be quite simple on paper,

but in actual practice it requires considerable ability on the part of the listener to discover quickly which one of the two opposite bearings to regard as the correct one.

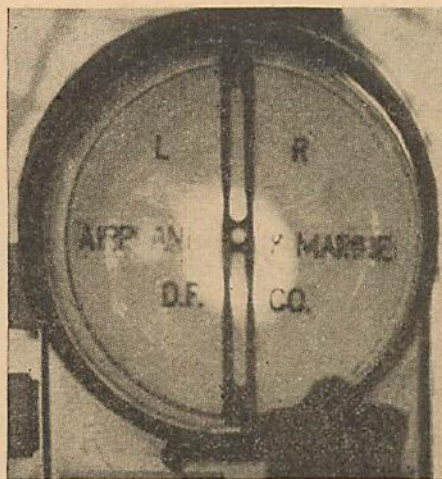
The next step in direction-finding evolution consisted of balancing the energy from the observed signal as received by the rotatable loop antenna against the signal received from a vertical antenna and noting the resultant effect by means of an indicating scale, or pointer, which was arranged to move to the right or to the left of the center of the "no signal" zone. This arrangement, while eliminating the use of earphones as a means of determining the bearing and also furnishing automatic indication of the correct bearing, is susceptible to interference from other signals than the one observed which may occur on the same frequency. The meter also responds too readily to atmospheric electrical disturbances.

In usual direction finding, the line of bearing is obtained by observing the point on the scale when the signal decreases to "zero," instead of the point of maximum value. The former is sharply defined, whereas the latter signal is only vaguely discernible.

If the equipment is well balanced and functioning properly in every respect, the "no signal" zone, around zero, will be confined to a few degrees on the indicator scale, while the "maximum" zones will be spread over considerable arcs. In rotating the loop antenna the aural observer hears two "no signal" and two "maximum" zones of signal intensity as the loop is rotated throughout 360 degrees. The "no signal" zones are diagrammatically opposite from each other, as are the zones of maximum signal. From this, one can readily perceive that while the line of bearing is indicated by the angular position of the opposite "no signal" zones, the direction of the observed signal is not indicated. This is known as the "bilateral" characteristic, and is eliminated in the actual application of the equipment by applying the energy from a simple vertical antenna to one side of the loop antenna, thereby distorting the loop's symmetry. How this seems to the observer is illustrated in drawing #2.



Straight approach to radio station.



Directly over the station—home!

*First news of the
Hefe direction
finder, Coast
Guard tested, that
marks a big
advance
in aviation.*

by Sidney Ross

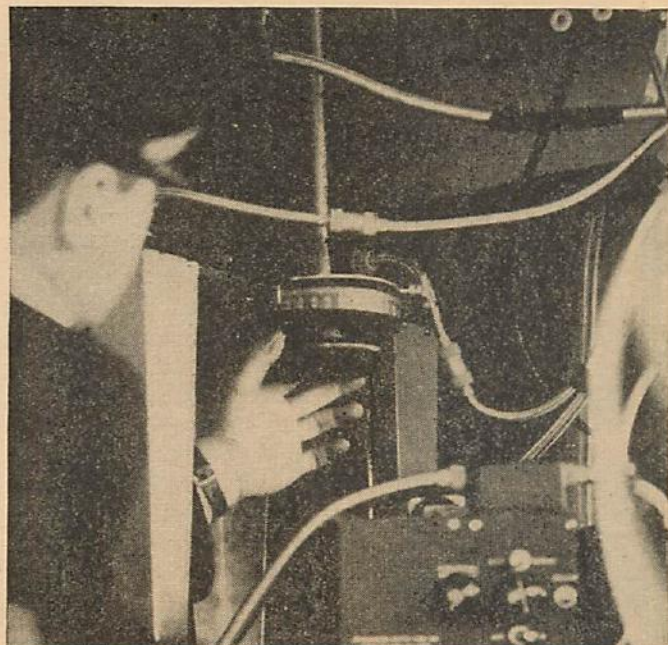
Photos by Rudy Arnold

for the Flier

The cathode ray, or "electric ray gun," visual direction finder operates in an entirely different manner.

The cathode ray gun as well as the deflecting plates consists of an "electron gun" which, when operating, continually projects a stream of electrons against a flat surface which is covered by a substance which becomes luminous under the impact of the electrons. This surface is called a screen.

Intervening between the electron ray gun and the screen are two pairs of plates. The plates of each pair are arranged parallel to each other, and the pairs or sets of plates are at right angles to each other, and are so located that the electron stream passes through the area surrounded by the plates. In each circuit is placed an



Scale on loop rotator, swung until cathode beam is vertical, gives bearing reading.

amplifier. To one set of plates the amplified signal from a simple antenna is connected, and to the other set of plates is connected the amplified signal from a rotatable loop antenna.

The effect of the signal voltage thus applied to these plates is to deflect the electron stream, thereby

causing a variation of the luminous screen image if these voltages are varied.

The cathode ray gun as well as the deflecting plates are contained in a vacuum tube.

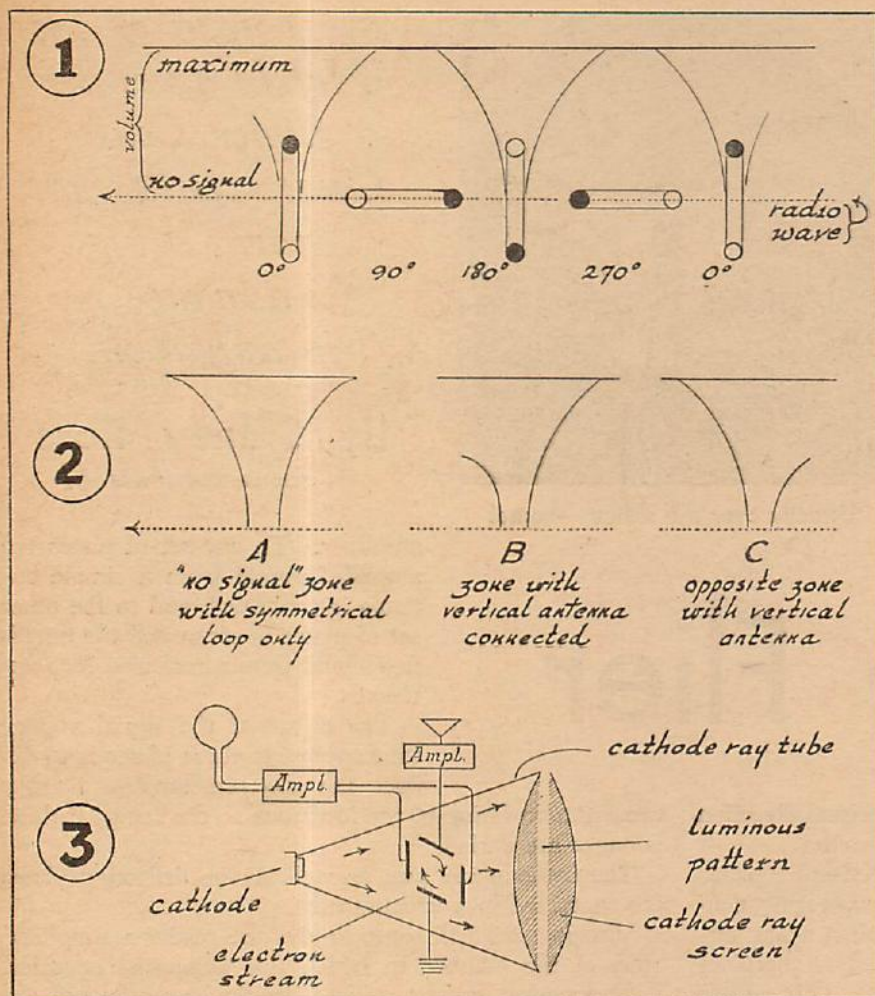
Drawing #3 will serve to give the reader a simplified view of the manner in which this apparatus operates.

The power supply utilized in the operation of the cathode ray tube is derived from a unit which uses a 12-volt direct-current battery supply. This battery is the same one used for starting and lighting purposes in the aircraft. Thus the new direction finder does not require any additional battery weight or bulk.

The actual flight testing of this new device included more than one hundred and fifty hours of actual flying, forty hours of which were conducted during the hours of darkness. These tests were made over land and sea, over rocky and mountainous territory as well as over flat areas, and over shore lines of various curves and configurations.

In actual use of this device, when an aircraft approaches a station being employed for radio guidance, the cathode ray pattern viewed on the screen gradually opens out from a vertical line beam into an ellipse, until finally, when directly over the station being employed for guidance, an almost perfect circle is obtained or the elliptical pattern goes completely off the circle, giving a very definite indication of the station's location. The directional "sense" characteristic is entirely automatic. The approach and departure of the aircraft with regard to any broadcasting or radio range station being employed for guidance is at all times definitely apparent.

The photographic illustrations of the screen reproduced herewith portray typical patterns obtained with the Hefe cathode ray direction finder. As installed in the Coast Guard radio-test Stinson cabin monoplane for testing and experimentation, the sensing of the equipment was arranged so that when utilizing the device for homing purposes and approaching a station, the vertical line beam would incline to the left when the plane was swinging to



the right of the station. With this arrangement, if the beam inclines to the right of the vertical guide lines on the cathode screen, it is an indication that the observed station is to the right of the course flown by the airplane. In other words, the upper part of the pointer indicates the position of the station in relation to the plane's flight path.

The indication of bearing and directional sense is continuous with both telegraph and telephone (code and voice) types of signals. Furthermore, telegraph signals are readable by means of the visual indicator, which is responsive to keyed signals of any speed.

Disturbances, due to interference between stations on the same or neighboring frequencies, which are a considerable hindrance to aural-null finders, are not important to the cathode ray finder.

With the "electric ray gun" indicator, these sources of disturbance, while visible, do not in any way obliterate or seriously impair the accuracy of the equipment. Such disturbances appear on the cathode ray screen as intermittent flashes and at various angular

relationships to the vertical beam of the observed signal.

Another outstanding advantage of the cathode ray type of aircraft direction finder is its ability to take accurate bearings on any atmospheric disturbances associated with electrical storms. The flashes of lightning appear on the cathode ray screen and are observed in the same manner as are radio signals: *i. e.*, the loop antenna is rotated to the position where the flashes are aligned vertically on the cathode screen, whereupon the bearing is read directly from the indicator scale.

The equipment has met all detail specifications as set down by the United States Coast Guard. It has proven itself accurate and dependable, possessing sensitivity and selectivity with stability. The apparatus is compact and weighs but 75 pounds, which compares very favorably with radio direction finders of other types now in general usage.

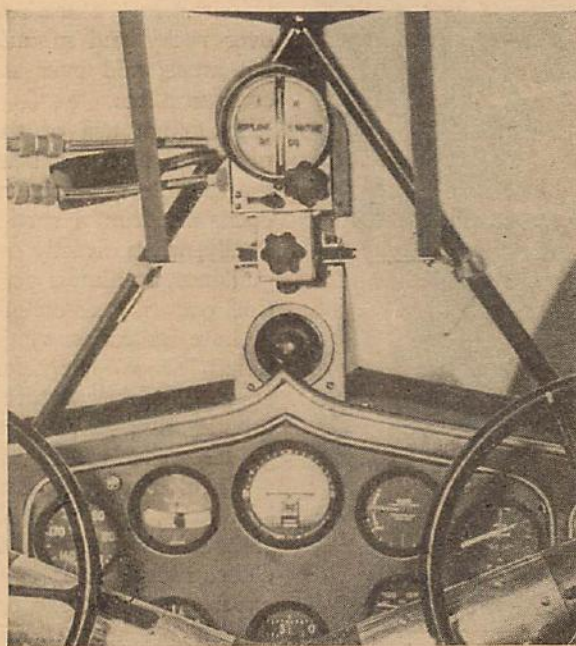
Coast Guard tests of this equipment have shown that a consistently satisfactory distance range of 125 to 200 miles can be obtained on the 50-kilowatt type of radio broadcasting station. It is expected, however, that this range will be greatly improved in a future model now in process of construction.

In addition to functioning as a radio direction finder of the visual type, as a conventional direction finder, receiver, homing device and right and left indicator, and giving accurate line of bearing and directional indication of electrical storms, the cathode ray direction finder affords an excellent means for constantly checking the drift of an aircraft due to wind, according to the report of C. T. Solt, chief radio

electrician, United States Coast Guard, attached to the Communications Division, Coast Guard Headquarters, Washington, D. C., who was in direct supervision of the tests.

Wind-drift check is obtained by coordinating the cathode ray indication with the directional gyro compass setting.

An aircraft utilizing the cathode visual indication could very well drift off its course by the action of cross winds, etc. Eventually the destination would be reached, but time would be lost. If the pilot would set the directional gyro at zero and keep on the "vertical beam" portrayed on the cathode screen, he could note deviations from the straight-line course by checking with the gyro, and could swing the plane around from time to time.



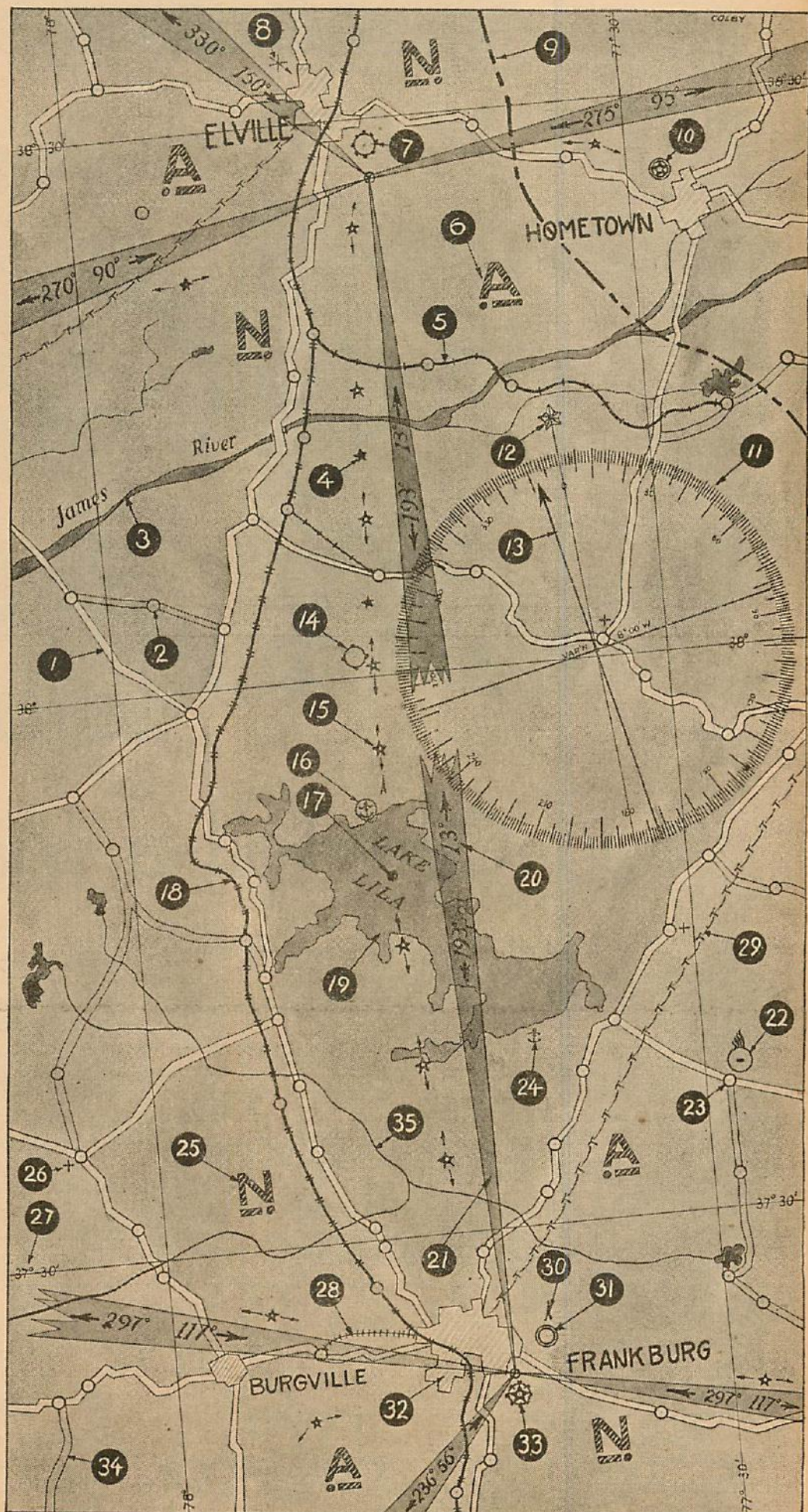
Cathode indicator, with compass, artificial horizon and gyro compass in descending line.

THE FLIER'S DICTIONARY

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

STRIP AIRWAY MAP

- 1 Main Highway, white on green background
- 2 Small Towns, black outline on green
- 3 Rivers, dark blue
- 4 Flashing Auxiliary Airway Beacon, red on green background
- 5 Single Track Railroad, black
- 6 Radio Direction "A" Signal Area, red
- 7 Commercial or Municipal Airport, red
- 8 Landmark Light Beacon, Rotating with Bearing Projector, red
- 9 State Boundary, black
- 10 Army, Navy, or Marine Corps Field with Rotating Beacon, red
- 11 Compass Card, red
- 12 True North, red
- 13 Magnetic North, red
- 14 Dept. of Commerce Intermediate Field, red
- 15 Rotating Airway Beacon with Course Arrows, red
- 16 Seaplane Port or Anchorage Fully Equipped, red
- 17 Lighthouse, red
- 18 Double Track Railroad, black
- 19 Lakes, light blue
- 20 Radio Direction Beam Compass Course, solid red on red beam tint
- 21 Radio Direction Beam, Steady Note Area, red tint on green background
- 22 Ordnance Depot, red
- 23 Town on Main Highway, white
- 24 Seaplane Anchorage, Partially Equipped, red
- 25 Radio Direction "N" Signal Area, red
- 26 Marked Auxiliary Field, red
- 27 Latitude and Longitude Numbers, black
- 28 Trolley, black
- 29 Transmission Line, red
- 30 Obstruction, red
- 31 Army, Navy, or Marine Corps Field without Rotating Beacon, red
- 32 Large Cities, yellow
- 33 Commercial Airport with Rotating Beacon with Code Light, red
- 34 Secondary Roads, black outline on green background
- 35 Creeks and Small Rivers, blue line





Jed knew what to do. And he did it.

"You Can Tell a Man by

TWENTY or thirty people were cluttered around the huge vari-colored globe revolving in the main lobby of the terminal of the International Airways at Miami, Florida.

Three contact clerks were busy behind the traffic counter, explaining routes and schedules and passenger rates to half a dozen customers. Over their heads, three loud-speakers chanted the arrival of a Clipper ship from the south within a few minutes. The lighted time table announced that the ship was due from Rio de Janeiro and Buenos Aires.

The crowd around the slowly spinning globe moved toward the stairs to the upper deck. To the north the skyline of Miami shimmered in the bright sunlight. To the east and south stretched Biscayne Bay and the ocean, melting into the distant horizon.

A speck appeared in the southern sky. The boat grew larger, zoomed overhead in a circle and stuck its nose to the east as the pilot killed his motors and set the huge ship down on the bay like a feather.

As the docking crew began to jockey it toward the southern ramp, a tractor jackass its four-motored sister ship onto the skids on the northern ramp. A handling crew swung it alongside the gangplank as it slid into the water. Trucks were pushed alongside and

the mail was stowed away in the hold.

The loud-speakers inside the terminal building blared again. About twenty passengers filed through the gateway as the gate was thrown open. They went down the canopied runway to the gangplank. The steward met them and assigned them to their seats. There was no more flurry or fuss about the arrival and departure of two of the huge ships than occurs when a railroad train arrives and another departs in a big-city terminal.

Up in the nose of the departing Clipper, Jed Lawry, the skipper, pushed back his ear phones and spoke to the co-pilot, Bill Clark.

"They say we're goin' to get a head wind from Havana to Kingston," he said. "We'll have to step things up."

"O. K.," Bill answered. He jazzed the three thousand horses in the four motors and swept an eye over the instrument panel. "She sounds sweet," he added.

The flight engineer and radio operator came into the big cockpit and slid into their seats behind Lawry and Clark. They grinned as Clark made a wisecrack and settled down to the task before them.

As Clark opened up the throttles, the steward came up the aisle and spoke to Lawry. Lawry's eyes grew

wide. He said, "Keep an eye on 'em, kid. Lemme know how things go."

Young Dannie Meeker, the steward, a youth of twenty who hoped some day to be a pilot, nodded his head and went back to his duties.

"Did you hear what Dannie told me?" Jed said to Clark.

"I can't hear anything with this armor plate over my ears," Bill grumbled. "What'd he say?"

"He said that so-called banker and his pal from Baranquilla are aboard again. You remember 'em—Kennedy and Anderson, they call themselves. They took four thousand dollars away from those two Kingston planters on the trip north two weeks ago."

"The airlines are getting to be as bad as the steamships and railroads," Clark answered. "But mebbe they aren't card sharks. Mebbe they just like a friendly game."

"In a pig's eye!" Lawry exploded. "Listen, did you notice the hands on that guy Kennedy—the one that calls himself a banker? After a while take a walk back and look at 'em. You can always tell a man by his hands. It's the surest way to read his character."

"Why, that guy Kennedy has a pair of hands that would make a musician cut his throat. They're long and slim and—uh—beautiful is what you'd call 'em, I guess. He could slip your watch out of your pocket so easy you wouldn't miss it for a week."

"What about the other one—Anderson? He looks more like a plug-ugly to me. He's got hands like hams," Clark scoffed.

"Sure!" Jed answered. "That's what he is. He's

His Hands"

by Harold Montanye

the strong-arm man. Kennedy is the brains. That's why he poses as a banker. Smooth. Anderson poses as an engineer. Engineers are supposed to be big, broad-chested guys who tear up trees by the roots and push over mountains the way you'd push over a chair. In case that pair get in a jam, Anderson is there to take care of it.

"I knew the card sharpers would begin to ride the airlines as soon as they were developed. They know that most of the people who travel by air have money. It used to be that way on the steamship lines twenty years ago. Prob'ly that pair have been chased off every boat in the Atlantic service. They're a smart pair."

"What're you going to do about it?" Clark said.

"There isn't anything I can do," Jed answered. "They got a right to play cards if they want to. Dannie says there are a couple of little guys that look like Jamaica planters sitting in their compartment with 'em. They'll probably start takin' 'em as soon as we get under way."

"O. K.," Bill Clark said. "The traffic tower is gettin' ready to give us the take-off."

"O. K.," Jed said, and took the controls. He shot

his guns and nodded as young Meeker came up the aisle and gave him the all-clear. He watched for the take-off flash from the traffic tower. When it came, he taxied the big ship out into the bay, poured in the juice and took it off the water in a long, low climb. Five minutes later it was a mere speck in the clear, warm air to the south.

Young Dannie Meeker flashed a light saying the passengers could unfasten their safety belts and that smoking was now permitted. Then he answered a bell from compartment No. 4.

The walls of the compartment were finished in soft, rich fabrics and there were large leather seats for four persons, two riding backward and two forward. There were two fair-sized windows with a small, adjustable ventilator above each of them. The shaded reading lamps were set in the bulkhead above each passenger's deep-cushioned seat, and there were ash trays at their elbows and a rack above their heads for wraps and parcels.

There were four men in compartment 4. Two of the men were Kennedy and Anderson, the men the two pilots had been talking about. They sat by the windows facing one another.

The other two, named Roberts and Hart, were small, sharp-faced men. Their faces were burned to a deep brown by the tropical sun. They were all chatting pleasantly as Dannie Meeker stopped in the aisle and said, "Yes, sir?"

"Bring us a new deck of cards," Kennedy ordered, "and a board, please."

"Yes, sir," Dannie answered, and went back to the steward's storeroom. When he came back with the board and the cards, Anderson had a paper bag open on his lap. After they had adjusted the board on their laps, Anderson emptied the contents of the paper bag. Dannie's eyes widened as he saw that it contained lima beans.

"I'll give us each a hundred," Kennedy said. "Twenty dollars apiece. All right?"

They all nodded their heads.

A few minutes later Dannie went up into the pilot's cockpit and touched Jed Lawry on the arm.

"They're beginning to play," he said. "I got them some cards and they had dried lima beans with them for chips. They each took a hundred at twenty dollars apiece."

"Two thousand bucks!" Jed said and whistled. "Did you hear that?" he said to Clark. Clark nodded his head.

"I'll handle the ship if you want to sit in," Clark grinned.

Jed snorted at him and skimmed his eyes over his instrument panel. Five thousand feet below them, the blue-green water of the Straits of Florida shimmered in the glare of the tropic sun.

*That was the Clipper
pilot's belief, and
when trouble came
he acted on his hunch.*

"They'll take that four thousand away from 'em like Schmeling took Louis," he said. "Just keep an eye on 'em, kid," he said to Dannie. "There's nothing I can do about it."

"You might tell the two planters it isn't safe to gamble with strangers," Bill Clark said, his grin widening on his face again.

"Take the controls," Jed said. "I'm going to walk back through the ship."

He walked back, and he stopped in the aisle at compartment 4. Kennedy looked up and nodded to him pleasantly. He had dropped out of the hand. Hart shoved five dried beans into the center of the board. Anderson and Roberts nodded and each added five. Then Hart dealt them each a card. Jed saw that they were playing stud poker. He also saw that Hart caught another ace on the draw. Both Roberts and Anderson dropped out, and Hart raked the beans into the pile in front of him.

"Do you play stud, pilot?" Kennedy asked.

"Not with strangers," Jed said. They all looked at him with a surprised expression on their faces. He smiled and went on down the aisle.

"Mebbe that will set those two planters to thinking," he said to himself. "But they seem to be doing all right so far."

He went back to the bridge and settled back in his chair and inspected the aquamarine color of the water over the cays and banks below them.

The radio man leaned over and touched him on the shoulder. "Havana says we're going to run into a storm," he said.

Twenty minutes later the tropics suddenly kicked up

one of the storms for which they are famous. The horizon ahead became inky black with hardly any warning. Jed took the wheel and gently eased it back.

"Mebbe we can get above it," he said to Clark.

"An' mebbe not," Bill answered. "They're comin' at us."

The clouds ahead were racing to meet them. Yellow stabs of lightning flashed in the oncoming clouds. As the altimeter read 12,000 feet, the storm lashed at them with all its fury. It was as though they had ridden from daylight into darkness at a given line. Lightning flashed all about them in jagged welts.

Jed could see young Meeker going up and down the aisles reassuring the passengers. He grinned to himself. The kid's smile was certainly infectious.

Rain beat against the windows and pounded overhead on the metal skin like machine-gun bullets. The ship reeled and skidded as it bounced into an air pocket. Jed fought the controls and tried to hold her steady. He opened his throttles wide and tried to get the nose of the big ship up. It wallowed drunkenly under the ferocious force of the wind and rain.

"This is that little head wind they told us about!" he shouted at Clark.

"We'll be out of it in a few minutes," Bill answered.

Jed's face was streaming with perspiration. The interior of the ship was becoming suffocating. Lightning stabbed at them from every side. The heavy artillery of the heavens rumbled and crashed as Dannie Meeker came forward and told them an old man in the last compartment was pretty scared.

"Tell him to close his eyes," Bill Clark said.

Jed eased the wheel forward and stuck the nose of the giant ship down. He watched his altimeter carefully, but the storm seemed to reach all the way to the Great Bahama Bank. At 2,000 feet he peered over the side, trying to find a hole in the bank of clouds. He eased the wheel back and tried to hold the ship steady again.

Then, without any warning, the storm evaporated. One moment they were in the midst of it, and the next moment it was gone.

Miles of matted green jungle and hardwood trees spread out below them as the storm scudded off to the northwest. The island of Cuba spread out like a great symphony in green.

Jed pushed a button to summon young Dannie Meeker, and said to Bill Clark, "I'll bet you five bucks that little disturbance broke up their poker game."

"I'll take it," Bill said, turning in his seat. "I say they're still at it."

"Are those birds still playing poker?" Jed said to Dannie when he entered the bridge.

"They're still going strong," Dannie answered. "And those two slickers from Barranquilla are takin' 'em for a swell ride."

Bill Clark threw back his head and laughed.

"I'll bet you the five you owe me," he said to Jed, "that bullfrogs have no horns. You should never gamble with strangers."

Jed Lawry scowled and his gray eyes were troubled. He gazed anxiously into his rear-view mirror and then turned to Dannie Meeker.

"Keep an eye on 'em, kid, and keep me informed," he said.

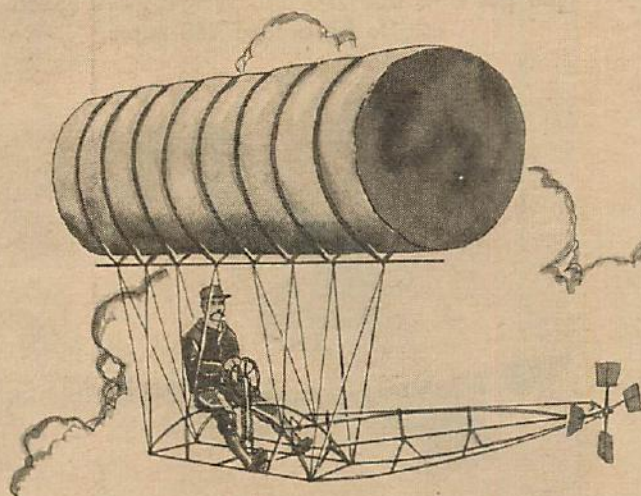
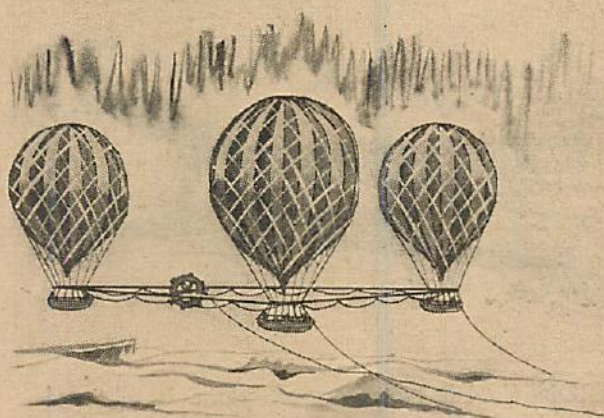
"I've never been up against anything (Turn to page 90)

One moment they
were in the midst
of it. The next mo-
ment—



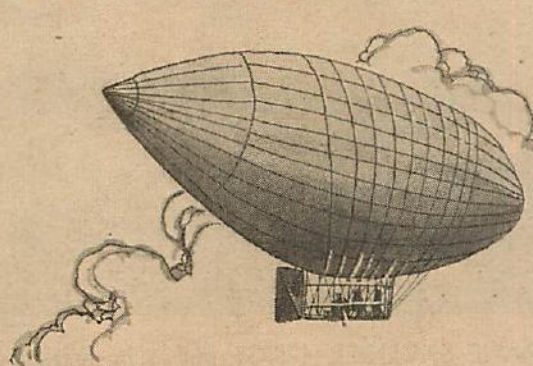
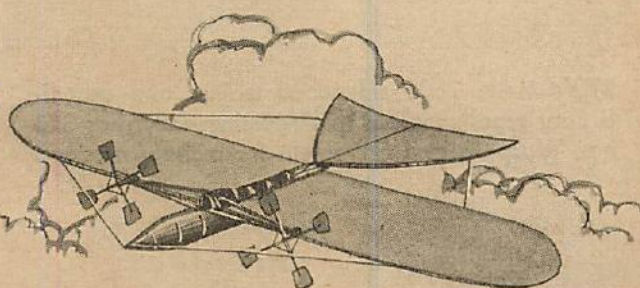
Pictorial History of Man in the Air

1877 COMMODORE CHEYNE, OF THE BRITISH NAVY, PROPOSES TO REACH THE NORTH POLE BY BALLOON. A TRAILING TELEGRAPH WIRE WAS TO KEEP IN TOUCH WITH THEIR SUPPLY SHIP



1878 PROF. RITCHELL, OF HARTFORD, CONN., FLIES OVER HARTFORD FOR AN HOUR OR MORE, JUNE 12TH. IN HIS FOOT POWERED DIRIGIBLE, REACHING AN ALTITUDE OF 200 FEET

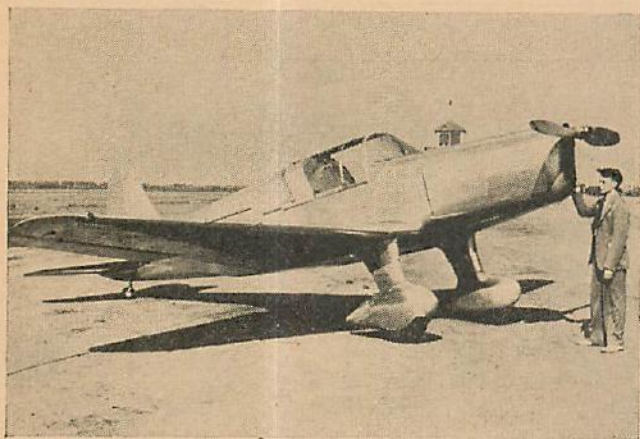
1879 A FRENCH ENGINEER, VICTOR TATIN, FLIES A MODEL OF AN ADVANCE DESIGNED MONOPLANE DRIVEN BY A COMPRESSED AIR ENGINE



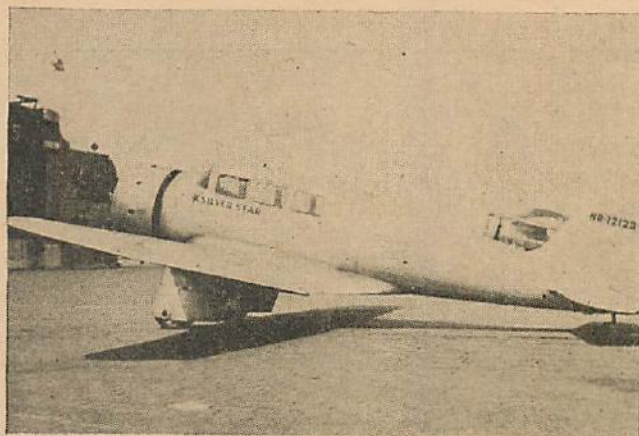
1880 HANS WOLFERT, GERMAN ENGINEER, BUILDS AND FLIES WORLD'S FIRST BENZINE DRIVEN DIRIGIBLE BALLOON. THIS WAS FORERUNNER OF GAS ENGINES

AIR TRAILS GALLERY

A Picture Page of Modern Planes for the Collector



AERONEER 1-B 2-place sport plane is all-metal except for fabric control surfaces. With 125 h.p. Menasco C4, speed is 150, range 700 miles.



STINSON M is little-seen cantilever low-wing metal job powered with 200 h.p. Wright J-5. Speed is said to be around 140 m.p.h.



STEARMAN 76D1 advanced trainer and expeditionary type, supplied to Argentine navy, has 320 h.p. Wasp Jr. and armament for military missions.



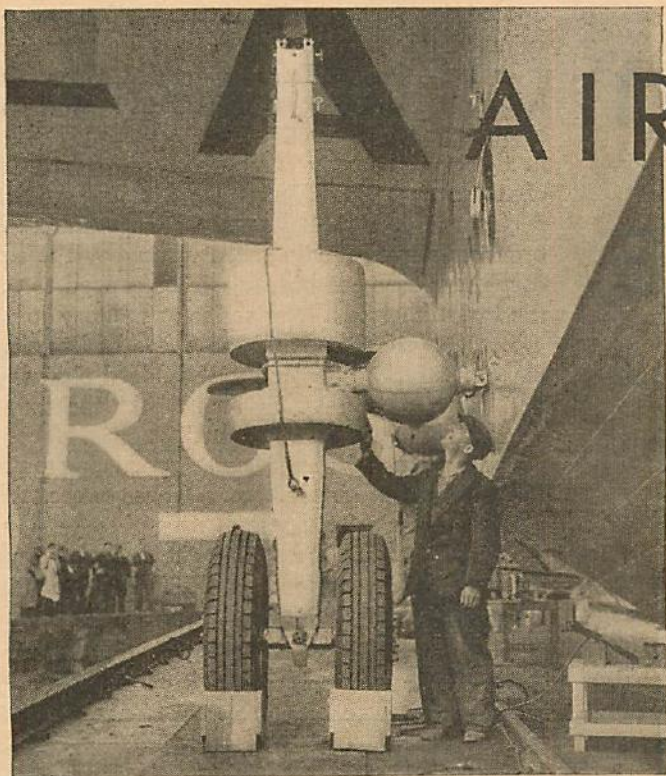
SHORT Empire flying boat is Britain's Atlantic challenger. Complete in itself, it can also launch smaller long-range seaplane from its back.



CONSOLIDATED A-11 air corps plane, of type also designated P-30 and PB-2A, has 700 h.p. Curtiss Conqueror engine and speed of about 240 m.p.h.



MORANE SAULNIER 405.C1 makes its first appearance; French army ship, with claimed 295-mile speed, carries cannon shooting through prop hub.



Beaching gear attached to new Short Empire boat.

AIR Progress

A summary of aviation news

jointly. The U. S. terminal will be New York in good weather, a Southern port in bad.

Britain is starting construction of a new home base for Atlantic and other routes at Portsmouth costing \$6,000,000 and expected to be the world's largest marine terminal.

Germany, whose dirigible *Hindenburg* continues its ocean sky voyages—arousing British protests by sailing over secret military areas in England—is enlarging the Zep's Frankfurt field into an important airplane hub.

Science

The ultimate in autogiro design—a rotor with only two blades—is reported by James Ray, American Autogiro Co. official, as undergoing tests in England. He says the rotor, under power, yields truly vertical "jump" take-offs to 40 feet. . . . Seeking stratospheric secrets, a radio balloon launched by Russian scientists reached a record height of 154,000 feet or over 29 miles. . . . A considerable advance in piloting is credited to the new Hefe visual radio direction finder which guides the flier by a light beam on a dial (see page 26). . . . A return to hot air for balloons is seen in the successful use by Dr. Piccard of a gas burner ring in the balloon neck, fed from a cylinder.

Transport

Pan American has speeded schedules so that Argentina is now 4½ days from New York and other cities east of Chicago via South America's west coast; Chile is 4, Peru 2½, Canal Zone 1. On the east coast, services were increased from one to two trips weekly and Rio de Janeiro brought within 4½ days. New Clippers, improved S-42Bs, are partly responsible. All-expense pleasure flights of 14 or 21 days, similar to steamship cruises, have been started from Miami to Rio.

TWA is planning for September the first non-passenger, all-freight transcontinental air service. Ford trimotors will be the "flying freight cars," accommodating 3,500 lbs. of cargo.

Traffic officials, seeing travel increasing, predict that 1936 will be the country's first million-passenger year.

Private ownership of air space has been legally decided to be non-existent, in a suit brought by a Burbank, California land-owner to prevent transports flying over his ground. The judge stated property-holders own only as much air as they use; the rest belongs to everybody.

Air Force

The army has awarded a \$1,259,235 contract to Curtiss for an unspecified number of new mid-wing, bi-motored, all-metal attack planes. Powered with Wright Cyclones and designated Y1A-18, they will be the first twin-engined attacks for the air corps.

Performance

Summer weather brings new records. Heading the list are 8 international seaplane speed marks set by an Italian tri-motored ship of unreported make over 1,000 kms. (621.37 miles) and 2,000 kms. (1,242.74 miles) empty and with 500, 1,000 and 2,000 kg. payloads (1,102, 2,204.6, 4,409 lbs.) Course speeds were 194.48 and 190.66 m.p.h. respectively, well above previous records, held by U. S. of 165 and 157.3.

Flying in the Denver meet in his Menasco Keith-Ryder racer, Rudy Kling set a new international speed mark over 100 kms. (62.1 miles) for second-category light planes (less than 992 lbs. empty) of 228 m.p.h. Previous record was Art Chester's 222.86.

Flying a Ryan S-T, 20-year-old Peter Dana made a San Diego-New York trip in 22h 5m flying time, a record for 1,200-lb. planes. Louise Thaden piloted her 90 h.p. Monocoupe over a 100 km. course in Virginia in 34 minutes at 109.58 m.p.h., a women's record.

Record altitude with 500 kg. payload of some 36,000 feet was achieved by the Russian flier Vladimir Kokinaki in a small Soviet two-seater. A long-distance hop of three Russian fliers in a single-motored plane across Siberia ended at the Amur River after 5,460 miles, only 193 miles short of France's world record. They had hoped to do 7,000 miles.

A new American Airlines Douglas DC-3 set an inter-city Newark-Boston record of 56 minutes, an average speed for the 218 miles of 233.5 m.p.h.

Transatlantic

Autumn will see the inauguration of a weekly flying-boat service between the U. S. and Bermuda, according to British announcement, as the first link in transatlantic operation via the Azores. Imperial Airways with the *Cavalier*, third Short Empire boat, and Pan-American Airways, probably with a Sikorsky S-42B, will operate

Sleeping in the Clouds

*About the new Douglas DST—
the plane on the cover.*

by Frank Tinsley

THE Douglas Aircraft Company, creator of the giant aerial-Pullman which speeds across the night sky on the cover of this issue, is one of the largest and most progressive manufacturers of military and civil aircraft in the world. Founded in 1920 by the talented designer Donald W. Douglas, the company has steadily grown in size and importance. During the intervening years, Douglas airplanes have been successfully demonstrating their strength and efficiency under the most stringent and grueling service requirements of Uncle Sam's army and navy. Many of the older models are still remembered fondly by the veteran military and naval pilots who flew them.

The first of the long line was the DT-2, a powerful two-place naval torpedo-plane fitted with floats and a 400 h.p. Liberty engine. Several variations of this staunch old ship were built, including the DT-4, a land-plane bomber, and the famous "World Cruisers," a fleet of naval seaplanes which carried the Stars and Stripes

around the globe on this old world's first circumnavigation by aircraft.

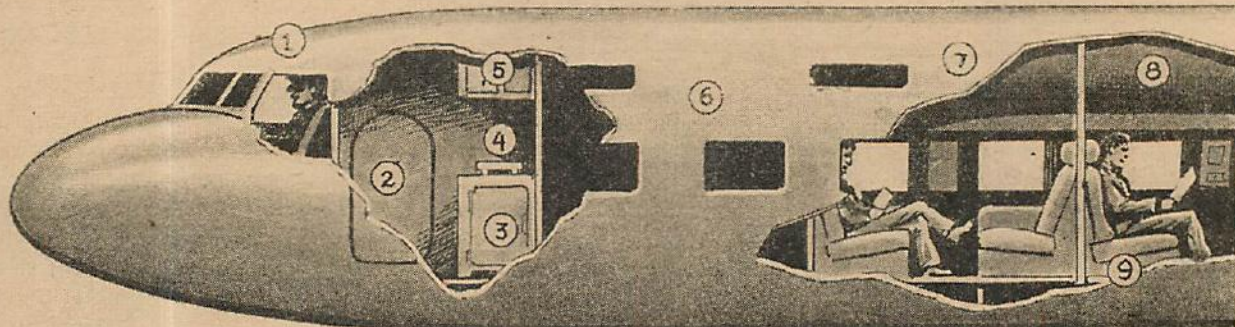
In 1924 Donald Douglas decided to try his luck in the highly competitive field of military aviation. He entered a newly designed ship in the current army competition for improved observation types. The plane, designated XO, performed very well indeed and a substantial order was placed with the company by the air corps procurement bureau. This proved to be the forerunner of a long series of military jobs.

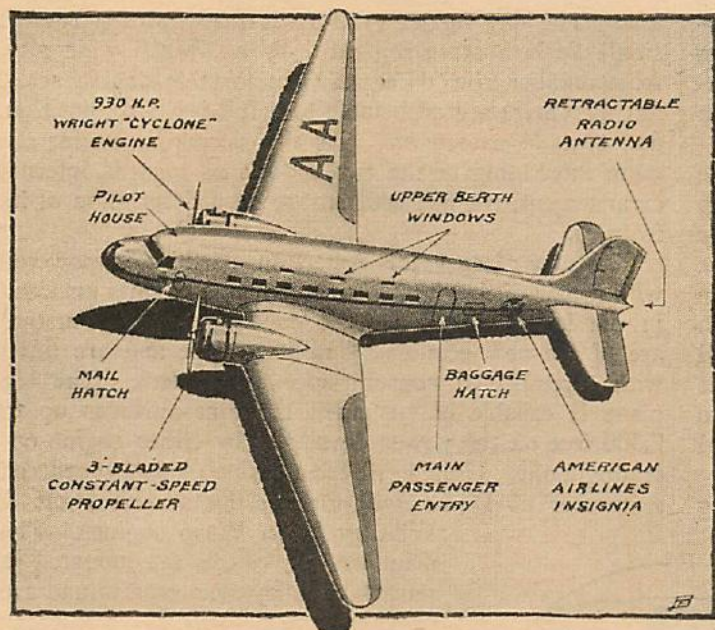
By 1927 the O2-C and the O2-H of Douglas manufacture had become the standard observation ships of the U. S. army. At the same time, a number of large twin-engined three-purpose land and sea planes were being built for the naval air service. These were the T2D-1 torpedo-bombers.

In 1928 it was found that the press of government orders was taxing the facilities of the Douglas organization to their very limits. The company paused to reorganize and refinance, in order to permit the manufacture of aircraft on a still greater

DOUGLAS DST

Engines: Wright Cyclone G, 930 h.p. (at take-off)	
Span, main wing	95 ft.
Span, tail	26 ft. 8 in.
Length over all	64 ft. 5½ in.
Height, including fin	23 ft. 6 13/16 in.
Wheel tread	18 ft. 6 in.
Dihedral	5 degrees
Empty weight	15,750 lbs.
Gross weight	24,000 lbs.
Maximum speed	221 m.p.h.
Cruising speed (12,000 ft., 70% power)	190 m.p.h.
Landing speed	65 m.p.h.
Ceiling, two engines	23,800 ft.
Ceiling, one engine	7,300 ft.
Cruising range	1,400 miles
Take-off run	910 ft.





h.p. liquid-cooled Curtiss Conqueror engine. A further development of the veteran T2D-1 was also produced. This was the PD-1, a patrol plane fitted with either wheels or floats and powered with two 525 h.p. Wright Cyclones. During 1930 the Douglas company entered the commercial flying-boat field with its Dolphin amphibian. This twin-engined monoplane is still rated as one of the cleanest and most efficient designs of its type. The civil model was later adapted for service as a naval transport and designated RD-3.

The year 1931 saw the birth of another new observation plane. This one was called the O-38B and was a descendant of the earlier O-25-A. It was followed almost immediately by a further refinement of the design which received the title O-38S and which boasted one of the first of the sliding cockpit enclosures now so popular with designers.

In 1932 the Douglas engineers began experimenting with monoplane designs and turned out two gull-winged jobs. They were the B-7, a twin-engined bomber, and the YO-31, a two-place observation ship which I personally have always considered to be the most beautiful military airplane ever produced in this country. Both these models were built around the 600 h.p. Curtiss Conqueror equipped with the then new Prestone cooling system.

In 1932 development work was started on the first of the series of high-speed commercial passenger transports that have since carried the name of Donald Douglas to the four corners of the earth. This two-motored, low-wing, cantilever monoplane of metal construction was designed to meet the specifications drawn up by the

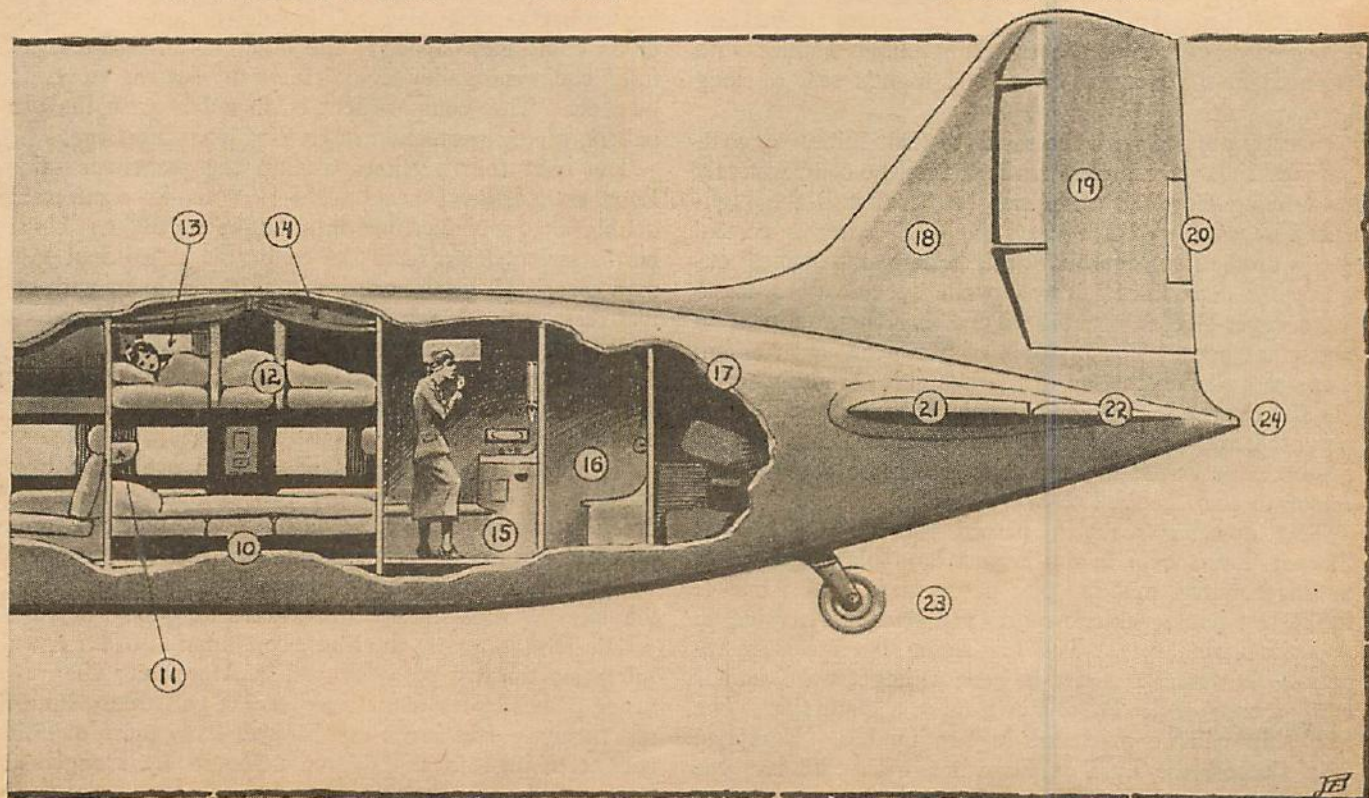
scale. The plant was enlarged and reequipped with tools and machinery of the latest and most efficient design. It has since grown steadily in size and productivity until it now covers no less than eight acres of ground at Santa Monica, Calif., with a working floor space of 350,000 square feet. The buildings of the Douglas factory are grouped around the company airport, an excellent all-paved-surface flying field.

Following its reorganization, the concern undertook the production in quantity of two new models, the O-22 and the O-25-A. These were improved observation planes for army use, the latter being fitted with a 600

- 1—Pilot house
- 2—Mail hatch
- 3—Electric ice box
- 4—Electric stove
- 5—Food locker
- 6—Passenger compartment
- 7—Passenger compartment
- 8—Upper berth folded up for day travel

- 9—Seat adjusted for day travel
- 10—Seats made up into lower berth
- 11—Head-rest folded down to form shelf
- 12—Upper berth made up for sleeping
- 13—Upper berth window
- 14—Curtain (drawn up to show berth)
- 15—Dressing room
- 16—Lavatory

- 17—Baggage and cargo space
- 18—Fin
- 19—Balanced rudder
- 20—Trimming tab
- 21—Stabilizer
- 22—Elevator
- 23—Tail wheel
- 24—Retractable radio antenna



T.W.A. system engineers and was christened the Air-liner. Having triumphantly passed the stringent tests imposed on it, the new transport was placed in production in 1933 and the first of the fleet was delivered to T.W.A. early in 1934.

Anthony Fokker, although a rival designer in the same field, immediately perceived the value of the new ship and promptly contracted with the Douglas concern for exclusive European manufacturing and sales rights. The Robertson London-to-Australia race, which took place soon afterward, provided a dramatic proof of the high quality of this Douglas baby. Flown by the experienced and route-wise pilots of the Dutch K.L.M. air line, the American-built plane came in second, bowing only to the superior speed of a racing job especially designed for the contest.

As a result of the Air-liner's performance in this long and grueling race, orders for duplicates of the ship began pouring in from all sides, until by September of 1935 no less than 110 of the big, expensive luxury liners had been contracted for. Needless to say, the canny "Flying Dutchman" of war-time fame made a nice financial clean-up.

To-day the DC-2, as the present model of the ship is designated, is still considered by competent judges to be "tops" among the world's medium-sized transports. It is standard equipment on many foreign and most domestic air lines.

As part of its constant effort toward the improvement of the safety and comfort of passengers, American Airlines, now one of the largest air transport systems in the United States, pioneered in the use of the sleeper plane. Their first attempt at an aerial-Pullman was a converted Curtiss Condor. The experiment proved unexpectedly successful, the traveling public hailing with enthusiasm the comfort of a good night's rest on long hops.

Greatly pleased with the result of their initiative, company officials nevertheless realized that the comparatively slow-flying Condors could not be fitted into the high-speed schedules of the line's DC-2s. After a careful study of the problems involved, American Airlines' engineering department drew up the specifications for a huge super-sleeper capable of crossing the continent in two giant hops. The problem of producing such a ship was dropped into the lap of the Douglas designing force. As if to prove to the world their unwillingness to rest on past laurels, the aerial brain-trusters of Santa Monica promptly produced a plane that is a more worthy successor to the famous DC-2.

This amazing aircraft, named the DST (Douglas Sleeper Transport) is the largest land plane ever built in this country, and in spite of its bulk is also one of the fastest passenger transports yet placed in service on America's air lanes. The big flying hotel closely resembles her smaller sister in general appearance, and is really a copy of the DC-2 blown up to a giant size. The new ship will be produced in two models. Equipped as a sleeper, the DST is furnished with Pullman-type berths accommodating 16 passengers in luxurious com-

fort. The day model (DC-3) is fitted with a row of single 24-inch seats separated by a 17-inch wide aisle from another row of equally comfortable double seats. All the chairs are adjustable to a full reclining position, and seat 24 passengers. As the sleeper is by far the more interesting of the two models as regards internal arrangement, we will concentrate on a description of its features.

The new sleeper for American Airlines is powered with a pair of 930 h.p. Wright Cyclone engines enclosed in the latest type N.A.C.A. cowlings. These motors are of the new economical military type and are fitted with three-bladed constant-speed propellers. The big plane is capable of sustained flight at altitudes up to 7,300 feet on the power developed by either engine operating alone. United Air Lines, which has also ordered a number of DSTs, will furnish theirs with Pratt & Whitney Twin Wasp engines. The main landing wheels are mounted in retractable alloy-steel cradles and are provided with special soft-action shock absorbers guaranteed not to disturb even the lightest sleeper during night landings. The spacious fuselage and the 95-foot wing are built up almost entirely of high-strength aluminum alloy, coated with pure aluminum as a protection against corrosion. The wings are equipped with air brakes of the split-flap type which reduce the landing speed of the DST to the minimum.

The fuselage of the big ship is divided into nine separate sections. In the extreme nose is located the pilot house. The control system is fitted

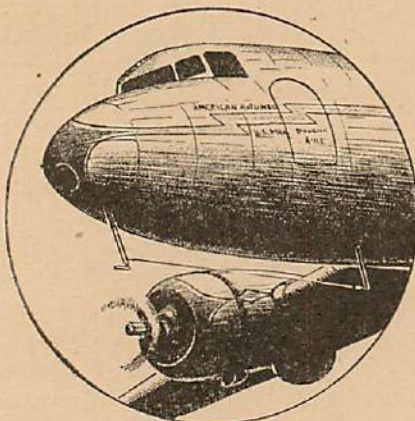
with an automatic gyro-pilot to follow any course. There are four separate radio sets.

Aft of the pilot house is a large compartment divided in two by the main aisle. One side contains a mail cage of 35 cubic feet capacity; the other is fitted up with a fully equipped galley complete with electric stove, ice box, etc. This compartment is on a line with the propellers, giving protection in case of prop breakage.

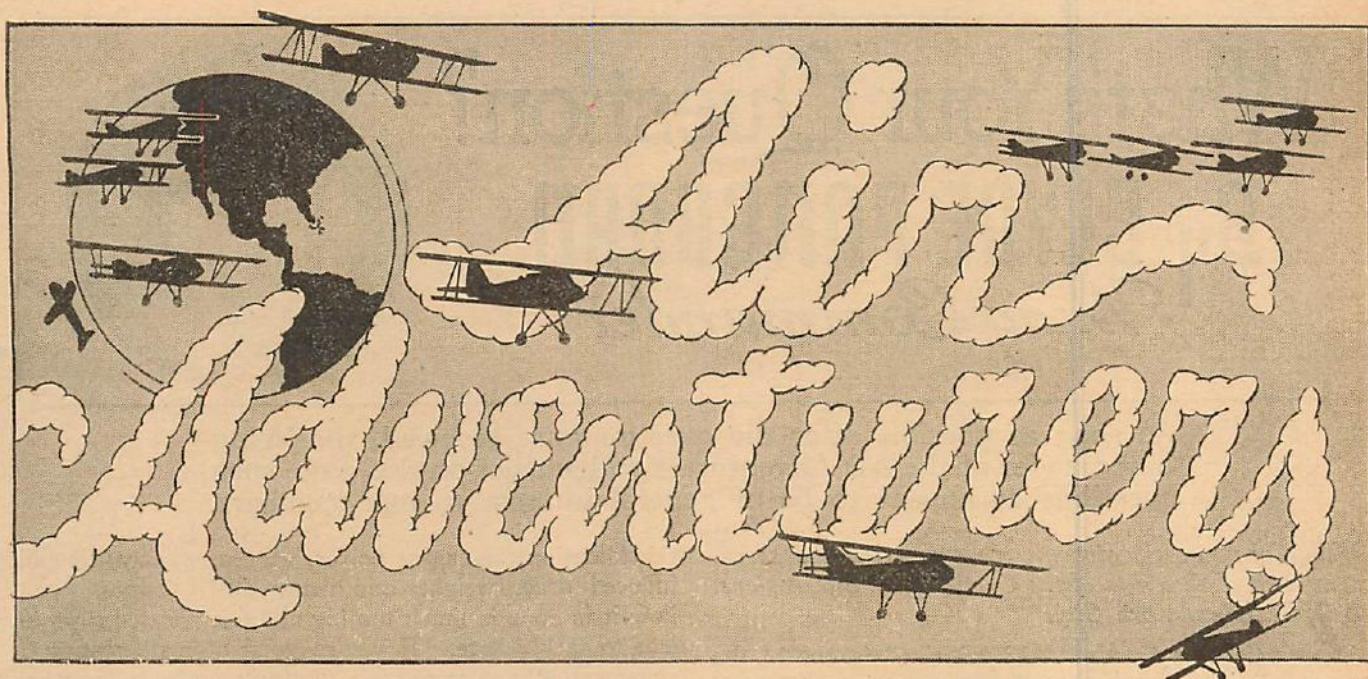
The next four sections contain the passenger salon. Each compartment seats eight persons in comfortable double chairs convertible into bunks at night. Upper berths swing down from the ceiling as in railroad Pullman cars. All berths are 6 feet 5 inches long, with coil mattresses; the lower berth is 36 inches wide, and the upper 34. The seat head-rests fold down as handy shelves at night. Apparel nets are provided, and each upper berth has a small individual window. Heavy curtains give privacy.

To the rear of the passenger salon are three more sections. The first contains two completely equipped dressing rooms. The DST is the first American transport to furnish these separate facilities for men and women. The second has two lavatories connecting with the dressing rooms. The third holds baggage and cargo.

The DST is easily the finest combination of air speed, safety and luxury yet produced in America. There are faster planes, safer planes, air yachts with more luxurious fittings. But in no one aircraft have these qualities been combined in the degree achieved by Douglas in the new Sleeper Transport.



Nose view, showing directional beam radio antenna.



It's All Flying

AW, gee, I want to go up." So I overheard Billy Taylor say in a tone of disgust at a certain aviation field on Long Island recently. Billy, who is known as "Wings" to the other fellows, had just been watching a pilot take off down the runway. Now I happen to know that Wings' parents won't give the necessary consent to let him go aloft—yet. I also know something else. I turned to him and put it into words. "Cut it! You're up there every day and don't realize it!"

I meant exactly that. For Wings Taylor is a member of Air Adventurers, and he's interested in everything connected with flying. He knows plenty about aviation—and still doesn't think he knows it all. He follows all the latest developments; he already has the habit of using his noodle as well as his five senses. So I say he's flying now, even if he is on the short end of his training course. But sand-blast his soul if he's on to the fact, to hear him talk sometimes!

And I'll lay you a propeller to a razor blade there are others of you Air Adventurers who get into the same moods occasionally as Wings Taylor. "What's the use?" "I'm not flying, am I?" "Aw, this is only a model." If all the gentlemen who ever spoke like that will kindly form in a single line I'll stretch my arms and crack their heads together.

Every single thing you do to further your interest in and knowledge of aviation is *THE GAME*. Every article you read, model you construct, big ship you examine, story you follow, record you keep and air-minded thought you have, are all Flying. You may not be a full-fledged stick artist yet, but if you let that in itself worry you, you haven't any business being one. A fellow who wants to become a doctor must spend years in training, give his attention to a hundred different matters that may not at first sight seem directly related to diagnosing a case.

Here's another angle, another reason why everything you Air Adventurers do is important. You are the sky-men of to-morrow. But your job—and your joy—won't be a mere matter of taxiing through the ether. More of

the world's future than you or I realize will rest on flying. Each day commerce, science, good-will and worthwhile adventure are depending in rapidly increasing degree on aviation. This responsibility makes it absolutely necessary for the coming pilots to be above the average. They must know more, think faster, be better prepared than the pilots of yesterday. Craft like the *China Clipper* are the present proof of this.

Yes, sir, the whole grand, grim and glorious business of flying has its eye on those who are willing to learn, who are preparing themselves in every way possible, who observe our seven-point Creed—Self-Reliance, Courage, Initiative, Independence, Loyalty, Integrity, Obedience.

If you are a new reader and can honestly pledge yourself to uphold this Creed, send me the application blank printed below. If your application meets with official approval here at Headquarters, you will be sent a membership certificate as well as the winged badge of the Club.

Happy landings!

Your Flight Commander,

Albert J. Carlson

(MEMBERSHIP COUPON)

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

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

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

Name Age

Address

☐ Check here if interested in model building.

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

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: Please give me the armament and speed, ceiling and service load of the Curtiss A-12 attack plane. A. G. M., New York City.

Answer: The Curtiss A-12 "Shrike" is one of the army air corps' standard attack planes. It's an all-metal two-seater with 750 h.p. Wright Cyclone engine. Its armament consists of four fixed Browning machine guns, two set into each landing-gear fairing, these guns having a total of 2,400 rounds of ammunition. For the rear cockpit there is a flexible gun on a track, with 600 rounds. Inside and beneath the fuselage are racks for 488 lbs. of bombs.

Maximum speed at best altitude is 192½ m.p.h., at sea level 163½. Service ceiling is 21,500 feet, absolute ceiling 22,800. The service load is a little less than 2,000 lbs.

Questions: Whether physical handicaps and disabilities of various sorts can prevent one from getting a pilot license is the subject of several inquiries. Here's the dope, in brief:

Securing a pilot license of any grade except for non-commercial glider-flying requires passing a physical examination. This examination is performed by an authorized doctor, and costs \$10, which is the doctor's fee; there is no license charge made by the government. The doctor carefully examines your vision, hearing, and general physical condition. Certain normal standards of condition must be met in each respect for the various license grades. The doctor sends his report to Washington, where issuance of the license is O. K'd.

Physical defects are allowed for to a limited extent. Poor eyesight, for instance, which is the most common, may be passed if wearing glasses restores your vision, in which case you will be required to wear them while piloting. Limb injuries and other disabilities may be passed if your doctor and the medical director at Washington, the latter reviewing your report, decide that your disability will not hinder you from operating a plane safely. Information about specific limitations may be obtained from the Medical Director, Bureau of Air Commerce, Washington, D. C.

Question: Can the top and cruising speed of a plane be found "on paper"? If so, how? R. G., Houston, Tex.

Answer: Speeds of any plane, including one not yet built, can be calculated pretty accurately by taking into

consideration the engine power, wing area, parasitic and induced drag, weight, and many other factors. Just how it is done is much too big and complicated a problem to tackle here. If you're good at mathematics, I suggest that you consult a textbook on aerodynamics.

Questions: The Flying Flea has brought many inquiries as to performance, airworthiness, home building, etc. My experience with the Flea has been small, but I'll try to pass on a few points about it:

Henry Mignet's Flea is different from conventional planes in two main features: the method of control and the arrangement of the sustaining surfaces. Control is horizontal through the rudder, vertical through the setting of the front wing. As rigged in the Flea that I flew at Roosevelt Field, the controls have a much different "feel" from those of the usual plane. They were not as responsive, and control of the wing, in particular, required pretty strong effort on the stick. This may have been true only in the particular job that I tried, but I'll risk a guess that it's inherent in most Fleas.

Whether this can be regarded as a defect I would rather not say on the basis of my single flight. It is significant to note, however, that Flea-flying was recently officially banned in France until the plane undergoes further research and development, in which the government is assisting. I think this can be taken as an answer to the Flea's present desirability as a plane for amateur flying.

Fleas cannot be licensed here under present regulations, and flying time on Fleas does not count toward pilot licenses.

In the meantime, there's nothing to stop you from home-building your Flea, although you may run into legal difficulties in flying it—to leave aside its possible operating difficulties. Among available plans and specifications the most authentic and trustworthy should be Monsieur Mignet's own, set forth in his book "The Flying Flea—How to Build and Fly It," not yet published in this country, but available from the English publishers, Sampson, Low & Co., Southwark St., London, for 7 shillings and 6 pence, which, I think, amounts to about \$2, plus postage.

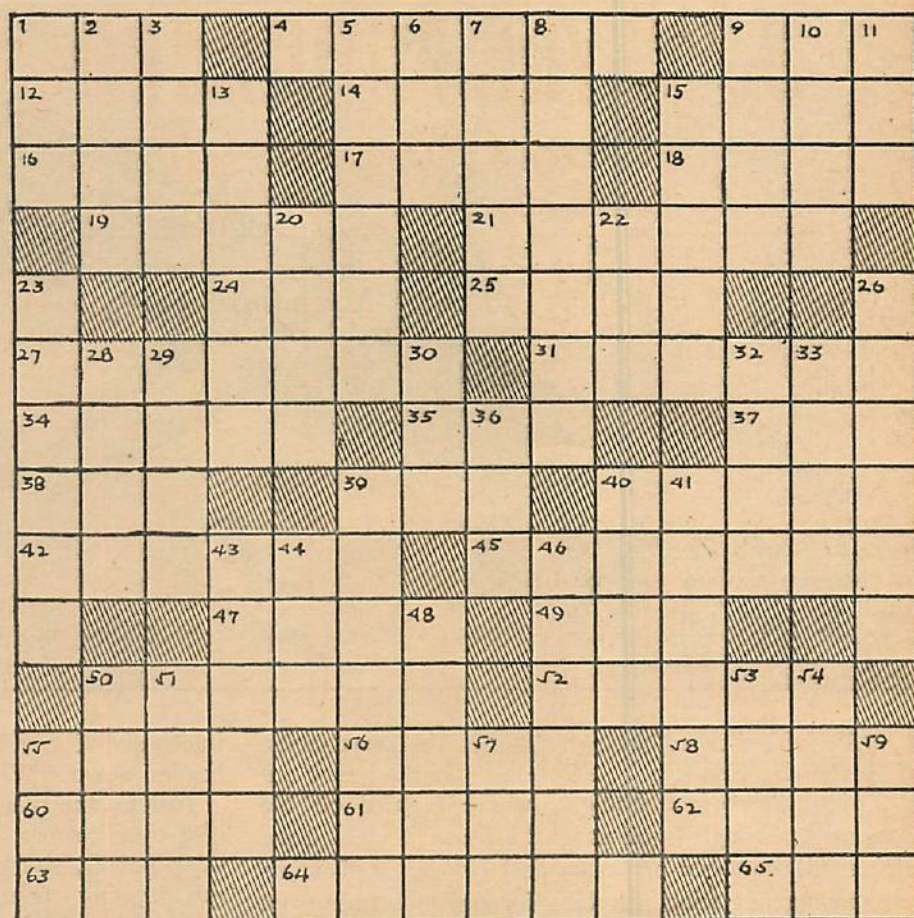
All of which may be taken as bad news by those who hoped that the Flea was the long-awaited safe, cheap, light plane that would get all of us into the air. I share in such hopes for good, simple aircraft. Maybe the Flea will oblige us yet, when it has lost its "bugs."

CROSS WINDS

*Can you answer
the aeronautical
definitions in
this puzzle?*

Across

- 1—Unit of energy
- 4—Hawker reconnaissance-fighter for carriers
- 9—Fliers' worst weather
- 12—Most important
- 14—Concentric loops of electric wire
- 15—Group of three
- 16—Make of British "London" flying boats
- 17—What motors do when running at minimum throttle
- 18—Grasped
- 19—Small non-rigid airship
- 21—Reverberations
- 24—Italian plane firm, as known by initials
- 25—Agitate
- 27—Stepped-back line plane formation
- 31—Make of Belgian aero engines
- 34—Not tight
- 35—Exclamation of surprise
- 37—A youth
- 38—Measure of cloth
- 39—Initials of international aeronautic regulating group
- 40—Any aircraft instrument
- 42—Inventor of the autogiro
- 45—Fighting plane of Bill Barnes' pilots
- 47—Jerk
- 49—Kind of potato
- 50—Famous pilot on Byrd's Atlantic hop
- 52—Lumps of earth
- 55—Horse's gait

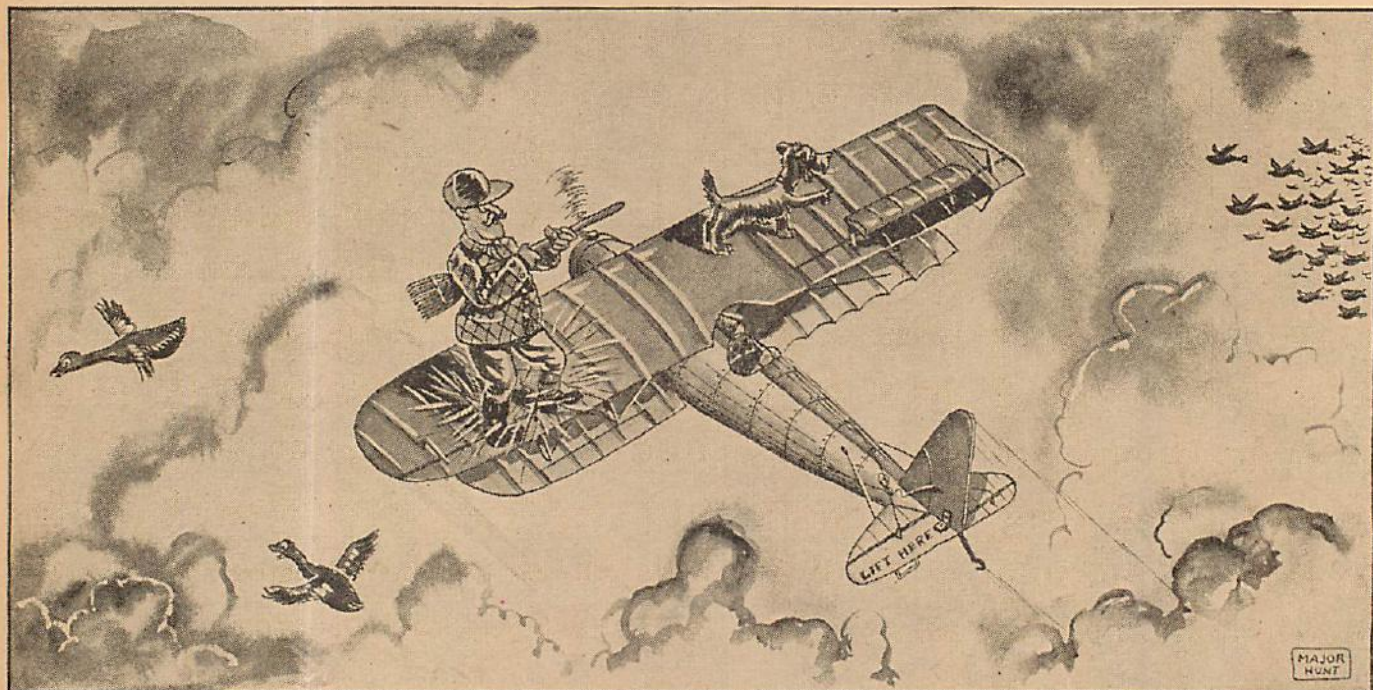


- 56—Type of shock-absorbing landing strut
- 58—Maker of popular ST sport plane
- 60—Female chickens
- 61—Prefix meaning middle
- 62—University in New Haven
- 63—Hardwood tree
- 64—Maker of C-34 cabin plane
- 65—Condensed atmospheric moisture

Down

- 1—Measure of type space
- 2—Make of Austrian air-force plane
- 3—Female child
- 5—Four-engined Short flying boat
- 6—Seed vessel
- 7—Vexes
- 8—Best-known Lockheed type
- 9—Unrestrained
- 10—Lubricates
- 11—A deity
- 13—Disagreeable sounds
- 15—Sharp spine on plant
- 20—Masculine
- 22—Hasten
- 23—To choose
- 26—Kinds of snakes
- 28—French Atlantic flier with Nungesser
- 29—An opening
- 30—Initials of U. S. aeronautic governing body
- 32—An astringent salt
- 33—Anger
- 36—Belonging to him
- 39—Fairey biplane fighter
- 40—Final purpose
- 41—Place where armament is stored
- 43—East Indian farmers
- 44—Duct in body
- 46—Military governor in Japan
- 48—Varieties of cabbage
- 50—Amount of wing surface
- 51—Air slang for accidental engine stoppage
- 53—A pair
- 54—Act of selling
- 55—Short form of "though"
- 57—Suffix denoting femininity
- 59—Recent

GULLIBLE'S TRAVELS—Major Hunt



HAVING escaped the lightening in the heart of the thunder cloud as I related last month, I flew out into the bright sunlight, where I dried off the plane with a rough towel and a blow-torch. I held the stick rigidly between my knees as I clambered about its great monoplane wing searching for signs of strain from its battle with the elements. In spite of the brilliant sunlight, I found but six ribs missing and three spars gone. Replacing these was a task of only a few moments, but by the time I had screwed the last rubber rib into place it had grown strangely dark once more.

Fearing another thunderstorm, I glanced about me. Imagine my surprise to find that the darkness was not caused by a dark stormcloud, but by countless millions of wild ducks migrating southward! On they came, a great flapping blanket of birds between me and my destination to the south.

Soon I was completely surrounded by a dense fog of ducks of all shapes, kinds, and sizes, squawking, cooing and warbling to each other. My Blatt and Whinny motor began to run more and more slowly as the propeller carved a path through the curtain of ducks. The wings became loaded with dead ducks several layers

thick, and I could see I was in danger of becoming bogged down. What to do?

Just as the plane was sinking for the last time, an idea came to me. When ever or where ever you see a duck hunter, you never see any ducks, so I hurried to my dressing room, donned my duck-hunting costume and, seizing a broom in place of a gun, I dashed up on deck. Spreading a bit of straw for a blind, I released my airplane dog as a retriever. Being part AIRdale and part PLAIN, "Goofy," as I call him, is right at home in the air, and took to the thing as a good AIR-PLANE dog should.

Again holding the stick with my knees and racing the motor with the choke held out to make it backfire for gunfire from the broom, I leaped up into plain sight and swung the broomstick about me. Seeing me dressed as a hunter, complete with a retriever and straw blind, the vast herd of ducks broke formation and disappeared over the nearest horizon in a flash. Reversing the broom, I swept away all but a few dozen of the dead ducks, which I kept for lunch, and then returned to my cockpit, where I again pulled the choke back to its original position and replaced the rudder bar in its socket.

Once more quick thinking had saved the day as well as the ducks.

Prizes for Mistakes!

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

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

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

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

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

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

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

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

8—No entries will be returned.

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

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

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



The MODEL WORK- SHOP



Conducted by

Gordon S. Light

THE summer season of model flying is practically over. What a season it was—new champions, new records, and, best of all, substantial progress in the science of model aviation. Model activities always reach a high point during the summer, and any changes or developments that have been under way during the winter are certain to come to the front during the summer. Let's consider some of the results of this season.

The results of the international meet at Detroit proved that outdoor models must be made heavier for contest flying. Most contestants have developed models so they gain several hundred feet of altitude by climbing steeply during the first minute of flight. Then the glide on the average model is so flat that only the slightest thermal current is needed to lengthen the flight into a half hour or even longer. The usual result is that outdoor contests are determined by air currents rather than the flying ability of the contestants' models.

Increasing the weight of the model is the best way of reducing the luck element. The English are seriously considering raising the weight requirements for the Wakefield competition from 4 ounces to 10 ounces for a 200-square-inch model. This ruling would make fly-away flights a rarity. In this country the N.A.A. will probably boost the weight requirements to 1 ounce per 25 square inches, twice the present weight requirement.

Another outcome of the summer activities was the formation of the American Academy for Model Aeronautics. This organization will direct and supervise the contests and research activities of the many expert model builders throughout the country. In many respects the work of the Academy will parallel that of the Soaring Society of America, which is the directing or-

ganization in this country for gliding and soaring. Memberships to the Academy will be based on demonstrated model-building ability. We'll publish more about this later.

Since the leaders in the Academy are all N.A.A. members, there will be close cooperation between the Academy and the National Aeronautical Association. This tie-up insures national and international recognition for any records that Academy members may establish.

The formation of the Academy represents a definite step toward better organization of model activities and will lift model building to a higher scientific level. Other countries seem to realize the value of modeling. In this country modeling still suffers from the stigma that models are child's toys. The Academy is the organization which should soon earn us scientific standing.

Another result of the summer model season has been the growing tendency to give cash prizes to contest winners. The announcement by the *Detroit Times* that it would put up \$1,000 for prizes if allowed to hold the national meet in Detroit again in 1937 came as a shock to modelers.

The Dayton contest in 1931 was the last at which cash was given. We think cash awards are good if the first prizes do not exceed \$25 or \$50. Flying models for high stakes—such as a first prize of several hundred dollars—takes away the sporting angle.

We don't think small cash prizes would destroy the fine spirit shown by the contestants. A few dollars would go a long way toward helping to pay one's expense of getting to the contest. Large cash awards would attract new talent, but the real progress in modeling will always be made by those who build and fly models solely for the love of it.

The Contest Calendar

METROPOLITAN MODEL LEAGUE gas-model contest, date set tentatively during September, site not decided at time of writing. Each model will be allowed a 45-second gas supply and winner will be determined by his ability to control the flight of his model. Contest applications and additional information from Metropolitan Model League headquarters, 421 7th Ave., New York City, or 263 Halsey St., Newark, N. J.

NEW YORK STATE FAIR Annual Model Airplane Contest, Syracuse, Sept. 9. Conducted by Syracuse Model Airplane Club and the Exchange Club. Outdoor events include stick, fuselage, gasoline, and glider contests. Over forty prizes to be awarded. N.A.A. rules. Information: Syracuse Model Airplane Club, Y. M. C. A., Syracuse, N. Y.

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



The victor and the prize.

COMPETITION in the international Wakefield contest at the N. A. A. national meet at Detroit this year was plenty stiff. There was a long list of models from the United States, Canada, New Zealand, England, and France. Each of the entrants had only one idea—to take the Wakefield Trophy back to his country. The model that won it had to be good.

We feel privileged to publish the plans for the winning model, with the assistance of its builder and flier, Albert A. Judge of London. He was a member of the British team of six which came to Detroit for the contest.

Aided by perfect weather for models, Judge was able to turn in the splendid time of 4 minutes 9 seconds—his average for three official flights. This was only 7 seconds above the average of Ray Wriston of Tulsa, Okla. But a 7-second advantage was enough to send the Wakefield back to England.

American builders should enjoy making this English model. It follows the same general construction methods that we use here, plus several new features. Outstanding of these is the slack-rubber device which enabled Judge to use 33 inches of slack! Think of the turns he could store in this length of motor! The purpose of the slack-rubber device is to keep enough turns remaining in the motor to take up the slack. In this way the rubber is kept from sliding back and forth inside the fuselage and changing the balance of the model during the glide.

This idea is carried out by a piano-wire spring mounted inside the nose plug. This spring pushes the propeller shaft forward when the rubber tension diminishes. In its forward position the shaft is no longer free to revolve and the rubber is prevented from unwinding past a certain point.

Another interesting feature of Judge's ship is the method of free-wheeling. The entire mechanism is concealed inside the propeller hub which is gouged out to

The 1936

*AIR TRAILS presents plans
the leading contest*

prepared by

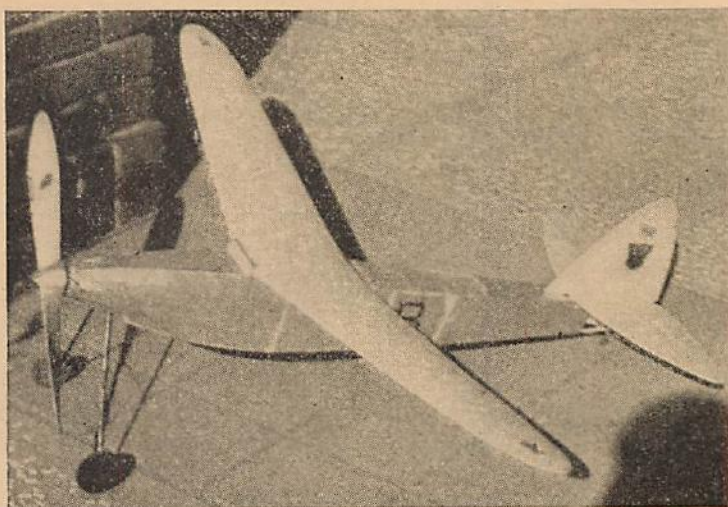
Gordon S. Light

1935 winner

accommodate the wire fittings. The ends of a U-shaped piece of wire are soldered to the propeller shaft. When the shaft is driving, the U piece engages a wire hook fastened to the propeller. The propeller spins free, after the shaft is stopped by the slack-rubber device.

The tail attachment is carried out in interesting style. A unique method is used to secure the demountable rudder and elevator to the fuselage.

Judge's model follows the American ideas of design. The 15½" propeller is about the diameter of our favorite props. However, its 14" of pitch is rather low compared to our usual practice of making propeller pitch about one and a half times the propeller diameter. The air-foil shape is a slightly modified Clark Y. This feature is certain to find favor in our modeling circles. The use of a lifting tail is interesting. We recall seeing British models a few years ago with flat single-surfaced elevators when American builders were using double-surfaced lift tails. It seems that they have come around to our way of thinking.



Considering both design and construction, Judge's model is a nice piece of work, and any expert builder would feel privileged to own it.

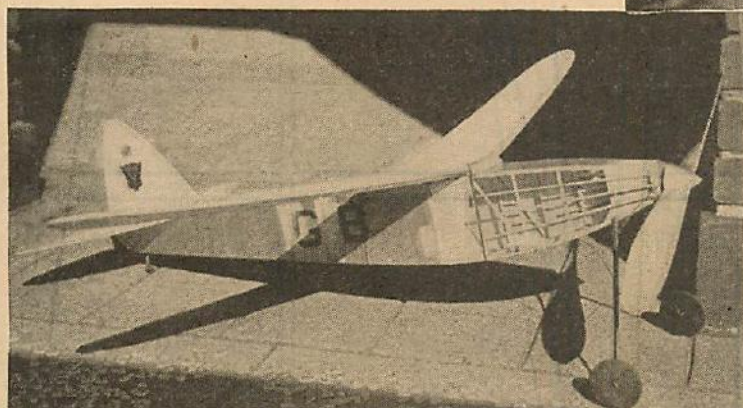
There is one difference between English models and American models that I've never failed to observe when the two were compared. English models are made more painstakingly and methodically than ours. Their models

Wakefield Winner

*and instructions for building
model of the year—*

in collaboration with
Albert A. Judge
1936 winner

seem to be built with the intention of flying over a period of several years. Consequently the parts are made durable and lasting. The American temperament is evidently different. Good flying weather in this country has taught us the folly of putting too many hours of work on one contest model. Too many times we've watched carefully built models soar out of sight, never to be seen again. American boys usually spend less time on their individual models, for even if our contest models are incapable of flying away, we'd soon discard them, anyway. The next model that we're planning always seems more attractive.



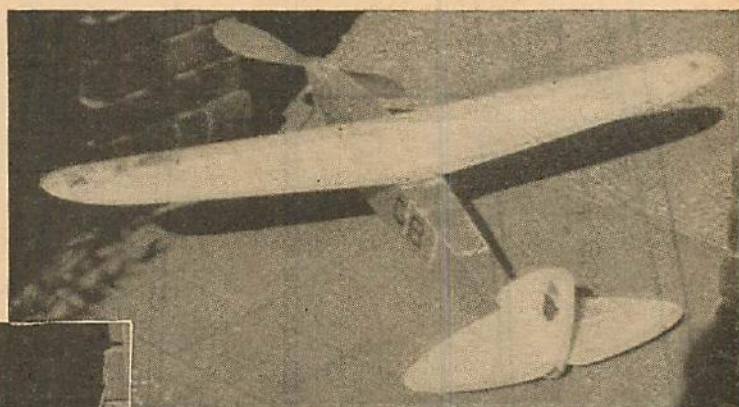
CONSTRUCTION

The fuselage has been drawn full size. Balsa longerons $\frac{1}{8}$ " square are used. Likewise the upright and cross braces are cut from $\frac{1}{8}$ " stock. The curved front of the fuselage is rounded out by 8 stringer $\frac{1}{16} \times \frac{1}{8}$ ". These are evenly spaced around the circumference of the nosing. These stringers extend only 8" back along the fuselage to the front of the wing. They are cemented edgewise, because this offers more resistance to the shrinking of the tissue.

The nosing is made of $\frac{3}{16}$ " three-ply hardwood, and the nose plug and the rear of the fuselage of the same material. The edges of the longerons are rounded after the fuselage has been assembled. In assembling the rear part, the section of plywood is put in place first and cemented firmly. Then the rear hook is added by

inserting it through the plywood. Next the wire support for the tail wheel is soldered to the rear hook. And finally the balsa tip is added to the extreme rear of the fuselage to fair out the shape.

The landing gear is made of bamboo struts braced with wire. The size of the bamboo and the method of wire bracing is illustrated in drawing #6. The ends of the struts are fitted with wire pieces which fit into brass tubes cemented inside the fuselage. The position is indicated in drawing #1. The wheels are hardwood



$\frac{2}{8}$ " in diameter and $\frac{1}{8}$ " thick. The tail wheel is $\frac{1}{2}$ " in diameter.

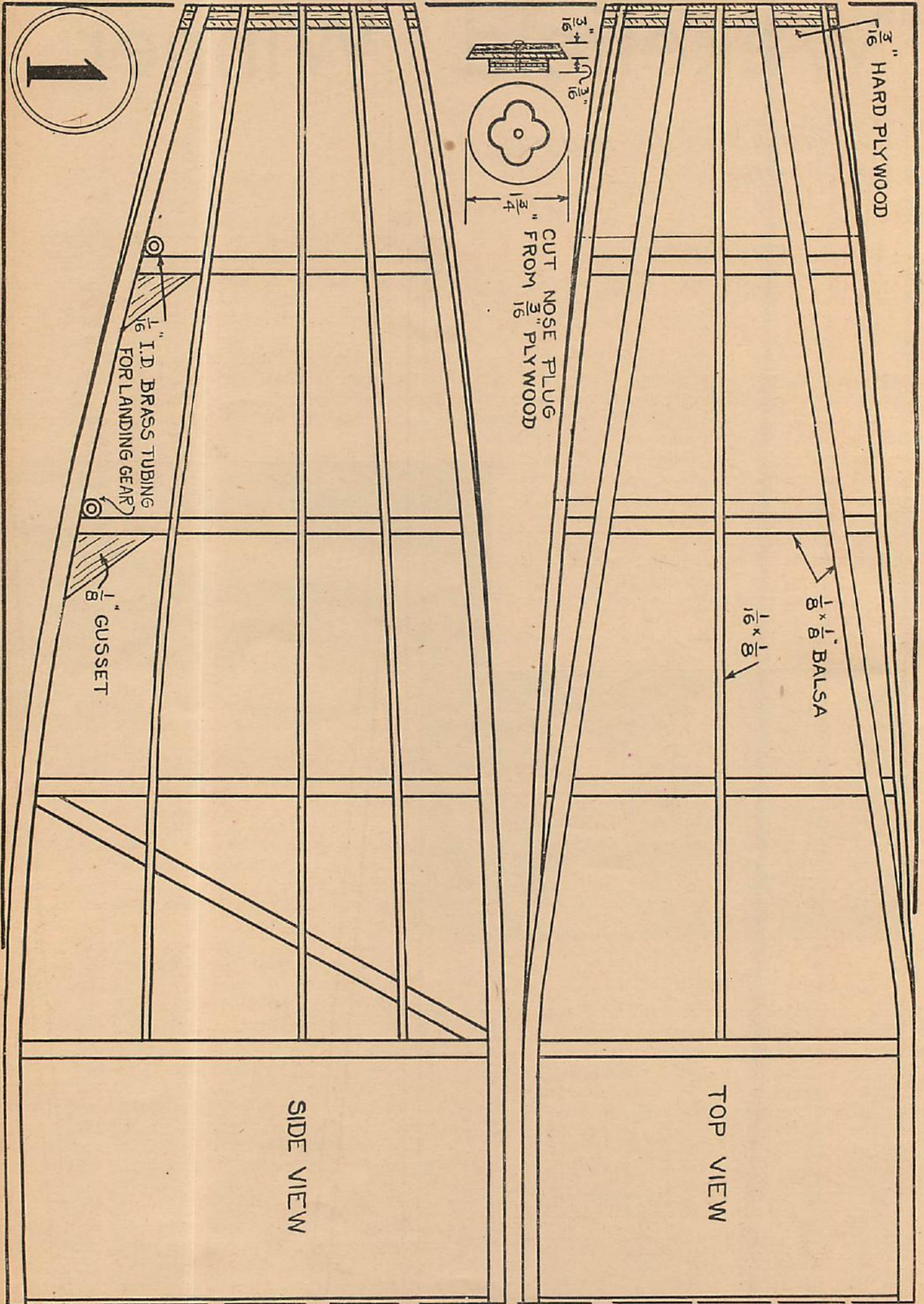
PROPELLER

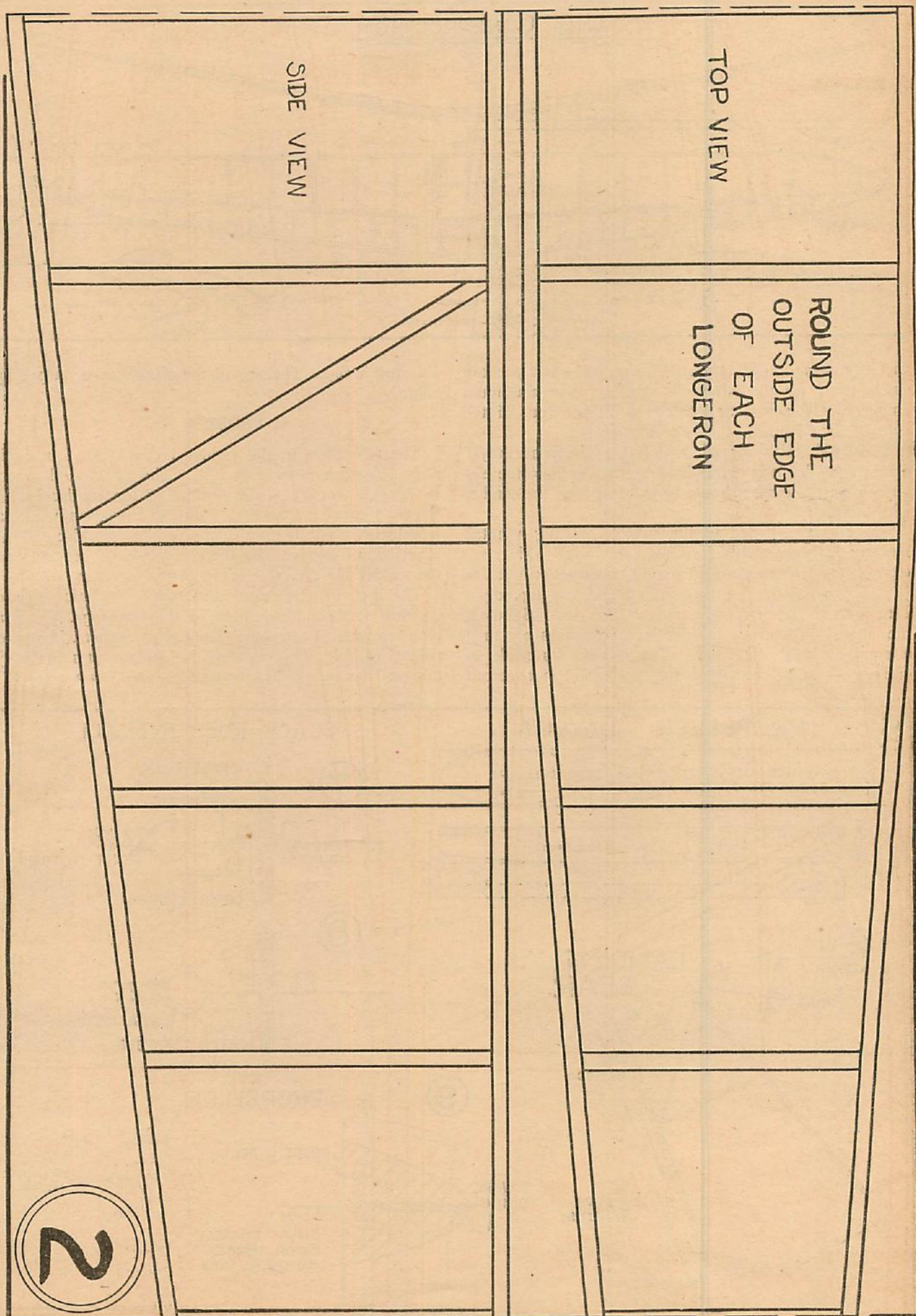
The propeller block is balsa $1 \times 1\frac{13}{16} \times 15\frac{1}{2}$ ". The spinner is cut from a separate block and fitted on to the propeller. The inside of the propeller hub is gouged out to $\frac{1}{4}$ " depth as shown in drawing #9.

The method of shaping the block before cutting the blades is the usual one. The ends of the block are tapered from 1" to $\frac{1}{2}$ ". Next the full-size pattern given in drawing #5 is laid on the block and the shape traced out. Cut away the excess. This will give you the shape of the finished propeller without any additional shaping of the blades. Next angle the blades in typical style. The blades of Judge's propeller are not cut so thin as American builders would make them. The thickness ranges from $\frac{1}{4}$ " at the center to a little more than $\frac{1}{16}$ " at the tips. The center hole of the propeller is strengthened by a piece of brass tubing.

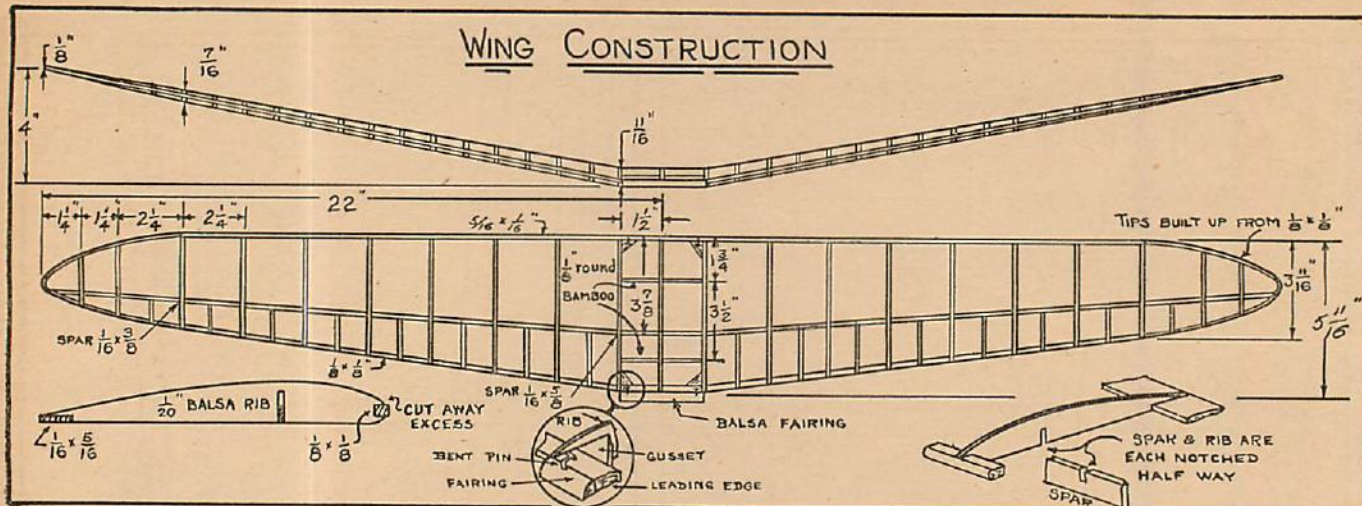
ELEVATOR

A lift tail is used on this model. It seems that all winning models of the past several years have used lifting tails. This once-debatable item of design seems to have gained almost universal acceptance. Only half of the elevator is shown in full scale. The center rib is





WING CONSTRUCTION



the only elevator rib shown (drawing #3) but you can easily draw up the other rib shapes. The maximum camber is 10 per cent, located at 30 per cent of the chord. The bottom of all the ribs is flat.

Use $\frac{1}{20}$ " balsa for rib material. The spar is $\frac{1}{16}$ " wide. The depth is determined by the depth of the elevator ribs. The spar should be $\frac{1}{32}$ " less than the camber of the rib.

The ribs are joined to the spar by cutting a notch halfway in both. This forms a "lap-joint" which, reinforced with cement, makes solid construction. Balsa $\frac{1}{8}$ " square is used for the leading and trailing edges. Butt-joint it directly to the ends of the ribs. Build up the curved outline out of sections of balsa rather than attempt to bend the balsa. The elevator is made in one piece (insufficient drawing space did not permit

showing it so). The tips of the elevator are warped up slightly.

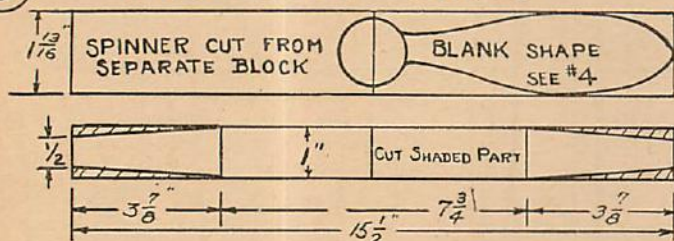
RUDDER

The rib shape in the rudder is flat. That is, ordinary $\frac{1}{8}$ " stock is used as ribs. The main rudder post is $\frac{1}{16}$ " x $\frac{1}{8}$ " oversize. The outline of the rudder is $\frac{1}{8}$ " thick. Cement sections of balsa so the grain will run lengthwise. The bottom of the rudder is a piece of $\frac{1}{8}$ " sheet balsa. Notice how the sheet balsa is cut away so the rudder fits directly on top of the elevator.

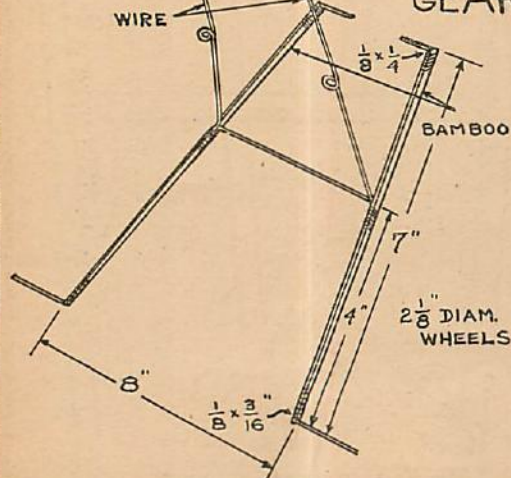
The method of elevator and rudder fastening should be clear from a little study of the drawings. It is a clean method of attaching, having no exposed hooks or rubber bands. The demountable rudder was probably designed because of the cramped

(Turn to page 92)

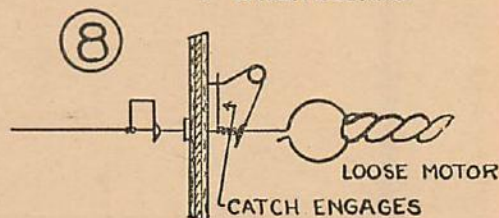
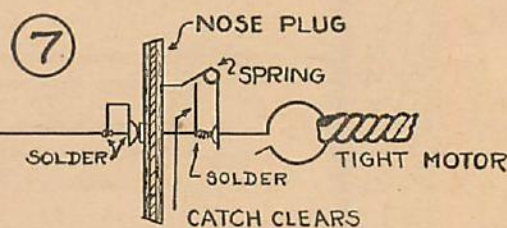
5 PROPELLER LAYOUT



6 LANDING GEAR

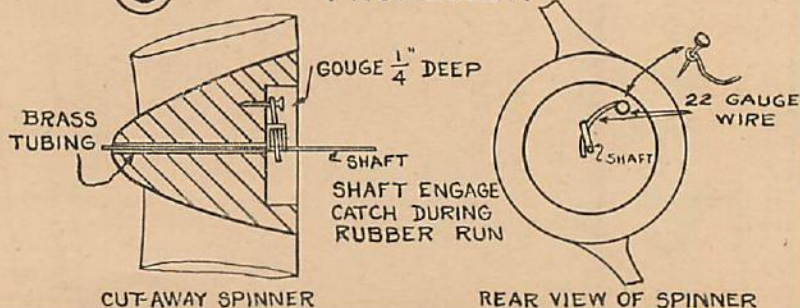


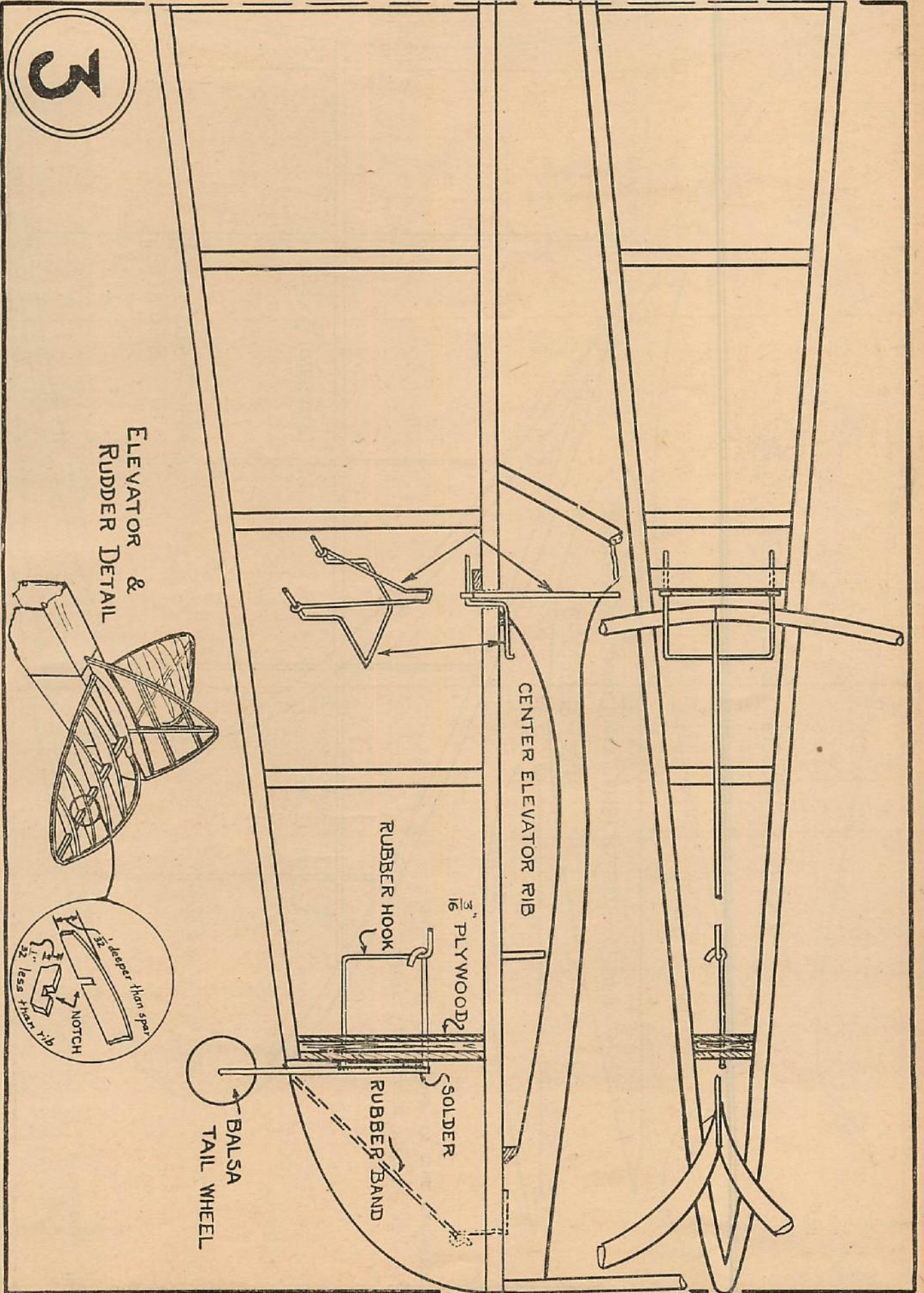
SLACK-RUBBER DEVICE

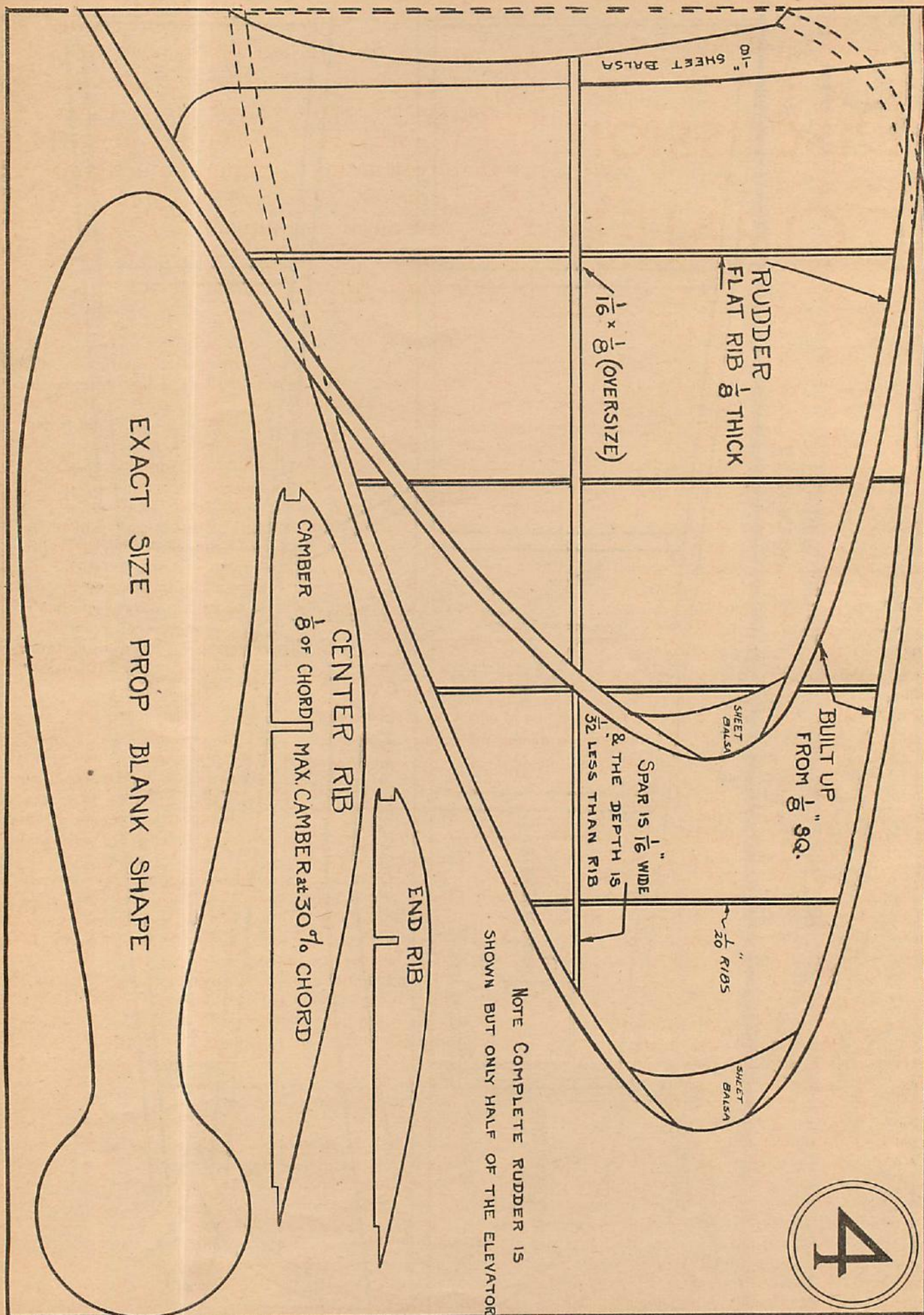


9

PROPELLER







The Discussion CORNER

The model art progresses through exchange of ideas. The Discussion Corner is a monthly sounding board for your opinions. This month readers discuss motor sticks. For November, the subject is the greatest difficulty in model building and in flying. 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.

I CONSIDER the motor stick a better method of attaching the rubber than mounting it directly to the fuselage. First, a fuselage may be built lightly. While the motor stick will partly offset this saving in weight, the increased safety is worth while. A fuselage with direct attachment of motor stands a great chance of serious damage under the terrific strain of many strands of rubber. Even if the motor stick buckles, there is little danger of the fuselage being damaged.

Second, with a demountable motor stick, the line of thrust may be changed more easily than with direct attachment, giving either a positive or negative thrust.—
BILL KIBLER, Morganton, N. C.

The one feature which exponents of the motor stick keep talking about is saving the fuselage when the rubber breaks. Perhaps it is best for the slipshod model flier who doesn't put tubing on his hooks and allows his poorly lubricated motor to lie out in the sun at contests. But do not forget you can always use a winding hook and wind the motor outside the fuselage even if you don't use a stick. If you take the stick out and add its weight in rubber, adding several strands and putting more slack in it, it will give more power and unwind longer than when using a stick. Why not put weight where it's useful?—JIM CAHILL, Indianapolis, Ind.

Using a motor stick saves wear and tear on your model. Builders who don't use the stick claim the winding hook is the cure-all for their troubles. Winding the rubber outside the fuselage, pulling it through, hooking, etc., is a three-man job. Compare it to the simplicity of the stick in which the winding operation can be completed in a fraction of the time.

Winding with a motor hook is such a difficult operation that most modelers lapse into the habit of winding through the fuselage. Frequent model breakage does not speak well for this method. The prize boner occurs after they've used a winding hook. They find the rubber isn't as tight as they thought, so they add a few last power turns by hand—exposing their model to the very danger the winding hook was supposed to prevent.—
WALTER J. CAKE, Paterson, N. J.

This Month's Topic

Do you prefer to attach the propeller and rubber to a demountable motor stick, or to fasten the motor directly to the fuselage?

The rubber attached directly to the fuselage is better than a demountable motor stick. The main reasons for having a demountable motor stick are to prevent the breaking rubber from damaging the fuselage and to prevent torque on the fuselage. To avoid breaking the rubber, put rubber or cambric tubing on fittings, make sure there are no cuts in the rubber, and use lubricant. In order to lessen twisting effect, give the tissue one or more water sprayings and two coats of dope or banana oil.

Some additional reasons for attaching the rubber directly to the fuselage are: no motor stick to work loose and fall out; the propeller angle can be changed by slivers of wood under the nose plug; the fuselage less bulky than when a stick is used; no fear of the thrust bearing bending back.—JACOB KOSOFKY, Philadelphia, Pa.

On all large outdoor models I prefer a demountable motor stick. The added strength is worth the increase in weight. A motor stick takes the strain

off the fuselage, which has enough with the wing and landing gear alone.

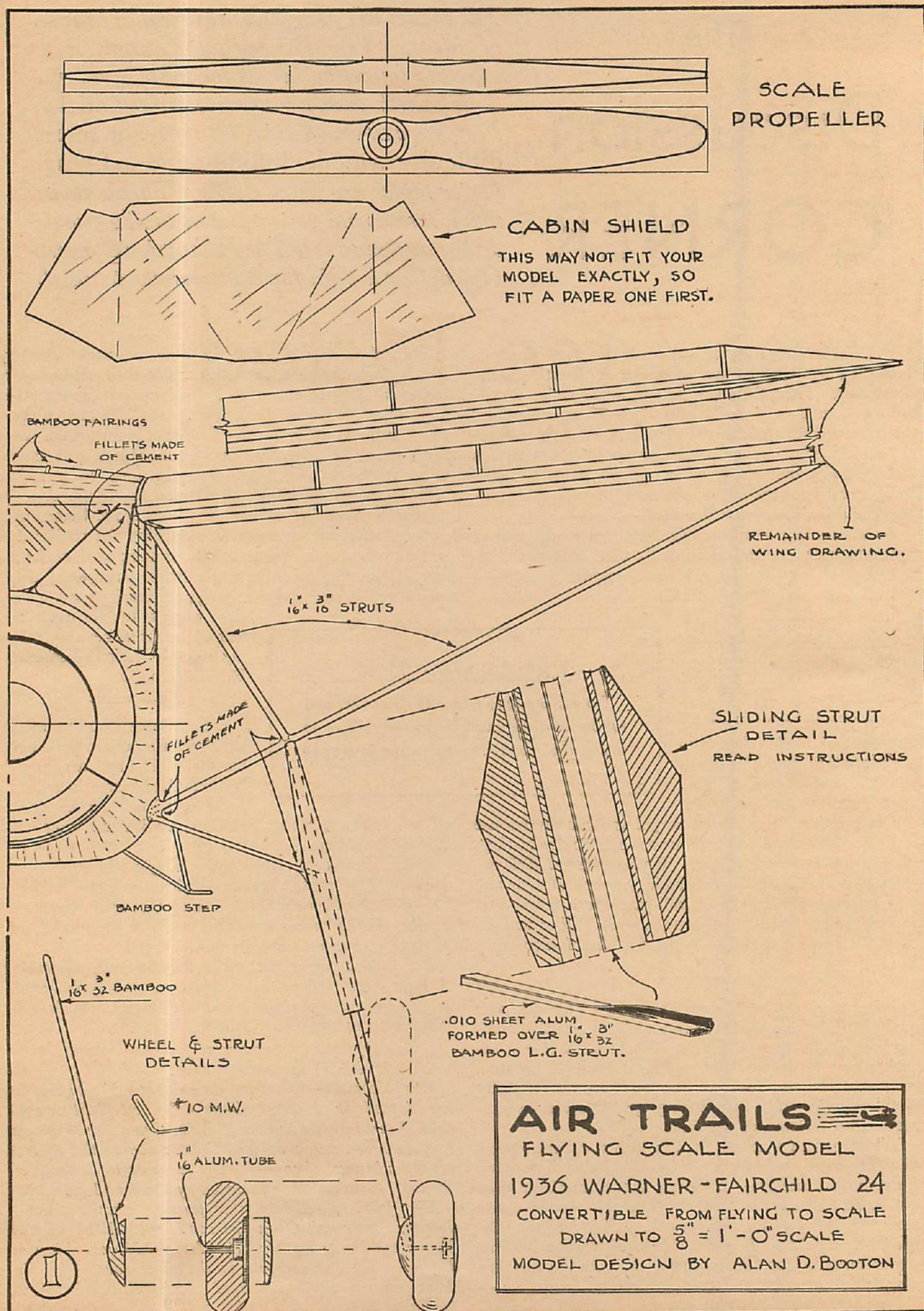
It is a great deal easier when using a winder to have a stick. If the rubber is attached directly to the fuselage the model would easily break if the motor was wound too tightly. If the rubber did break while in the model, the fuselage would undoubtedly be damaged.

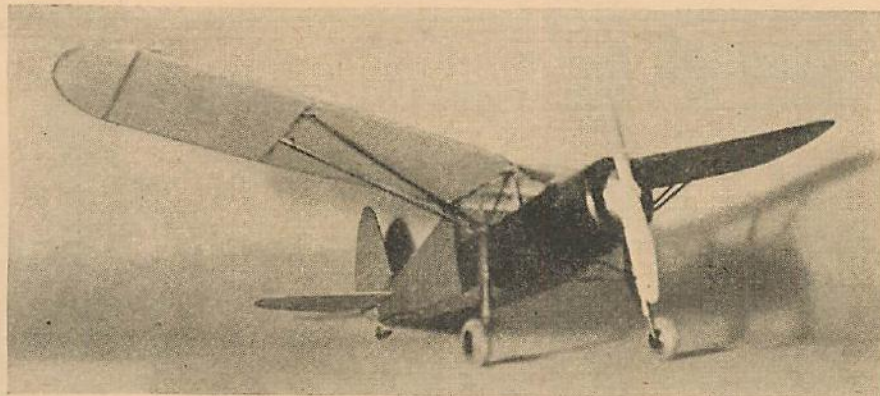
For indoor use motor sticks do not seem advisable. A lightweight indoor cabin fuselage would be handicapped by the unnecessary weight of a motor stick.—
ROBERT BURGHER, New Britain, Conn.

COMING UP are these topics:

For December—*What weight rules would you like to see adopted for contests? Should the best flight or average of three flights be taken? Would you like to see an organized discussion on modeling as one of the contest activities instead of confining the program to competitive flying?* Answers must reach us by October 1st.

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





Among pilots' favorite light planes is this old reliable, newly improved and slicked up for 1936, and offered in a clever convertible flying and scale-model version.

THREE years of development have advanced the Fairchild 24 to a position as one of America's foremost light planes. The 1936 model has a pleasing new symmetry and many improvements, such as the smooth N.

A. C. A. cowl that fairs over the Warner engine, cleaner landing gear with more oleo travel, and generally greater strength. The cantilever stabilizer omits tail wires, which goes to make a better scale and flying model. Improved aileron and flap design, along with the new trim tabs, make the Fairchild* even more maneuverable than last year's model.

Versatility has been carried out in the design of our model to the extent that it may be used as a flying model or, in three operations, changed to a scale model to place on display. Note while studying the drawings that the landing gear struts can be adjusted to scale or lengthened to flying model proportions, that the tail surfaces for scale are removable to make way for larger flying surfaces, and finally that the scale prop is just as easily replaced with a fine flying prop.

FUSELAGE

Place waxed paper over the drawing. Build two sides of the fuselage by cutting pieces to fit the ones on the side view of the model. Use plenty of pins to hold the parts, but do not push pins through the material. Note that the $\frac{1}{16}$ " special ribs are part of the fuselage frame. Use only model airplane cement to assemble with, unless you wish to get into difficulties.

To assemble the two sides, cement the tail posts together and hold with a paper clip while the succeeding formers to the front are cemented in place as per drawings. Scraps of balsa with notches cut to the former widths will help to hold the sides against the formers and keep the cross section squared up. When the front is reached, note that former 2t is slanted to the windshield angle and that $\frac{1}{16}$ " square spacers are used at

Time-Tested

by Alan D. Booton

FAIRCHILD 24

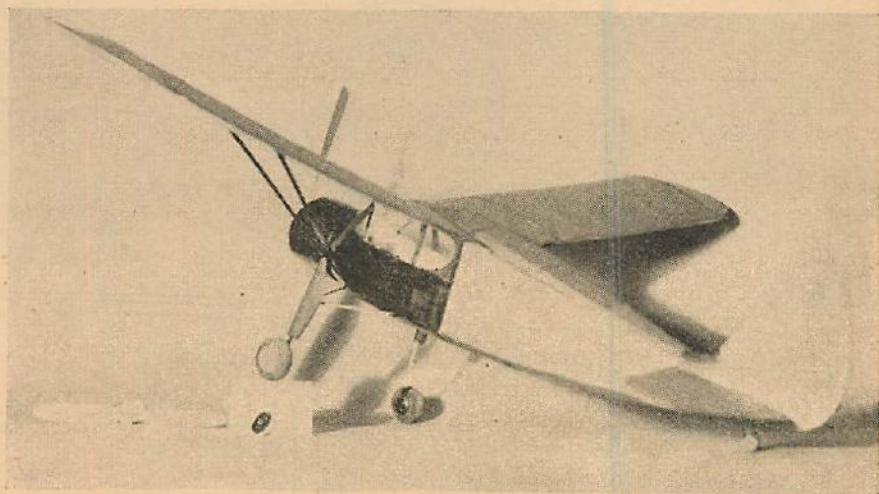
right and on the bottom to #2b former. Leave a surplus of the $\frac{1}{32}$ " sheet on the space under the windshield, in order that the accurate outline be cut according to the top view. After cutting the outline, cement the four bamboo supports in and apply cement fanwise to form small fillets.

Select evenly cut $\frac{1}{32}$ " square bamboo fairing strips and cement them to the fuselage as indicated on the drawing. Fit and cement the windshield and cabin windows. Use model celluloid, not cellophane.

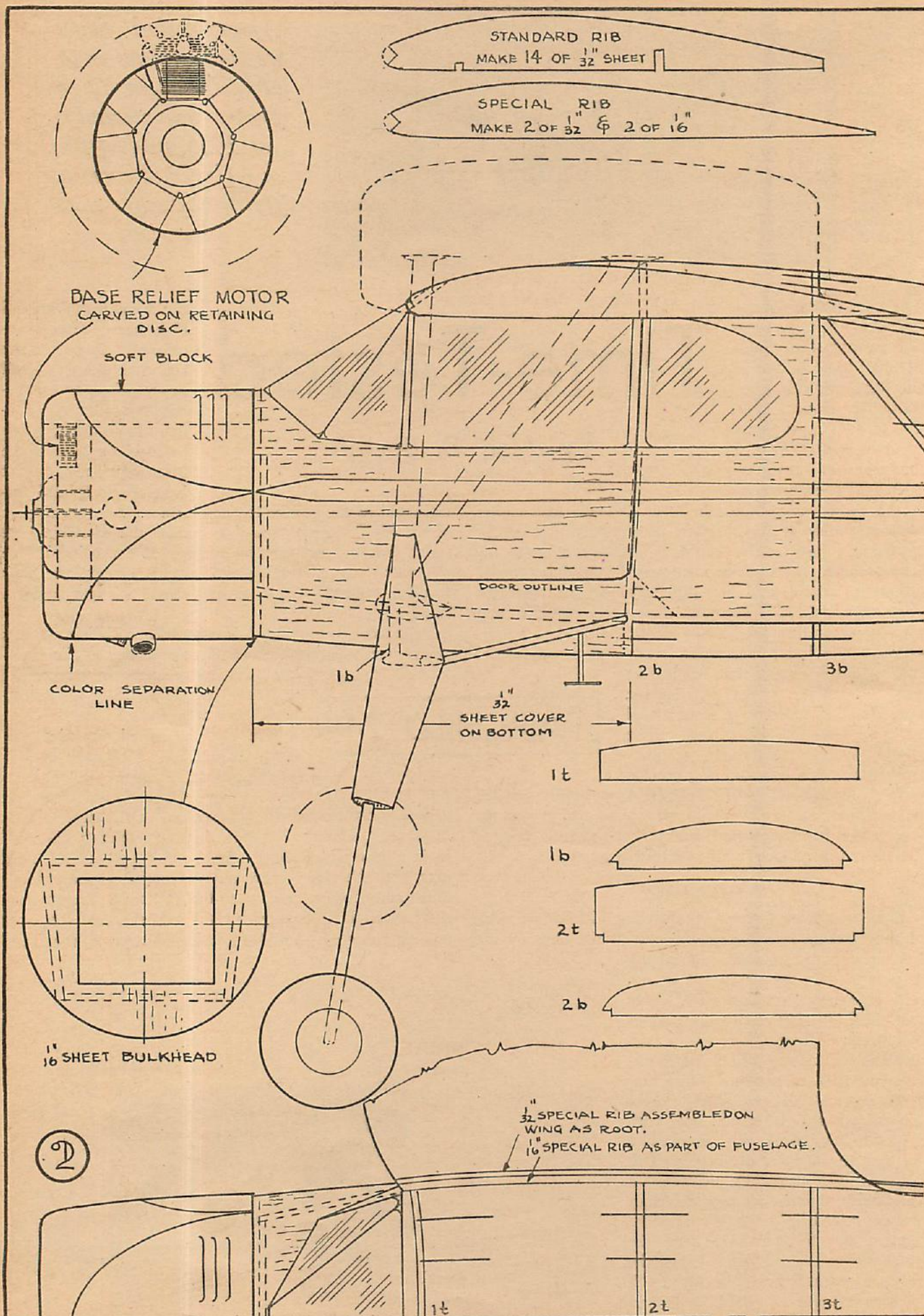
The cowl is carved out of a soft block $2 \times 2 \times 1\frac{9}{16}$ ". Hollow it to $\frac{1}{4}$ " wall thickness. A plain $\frac{1}{4}$ " soft sheet retainer disc may be used, but if the seven base-relief cylinders are carved, the appearance of the nose will be improved. Cut a $\frac{5}{16}$ " hole in the retaining disc and carve a nose plug to fit it. Sand and dope the cowl, nose plug and the sheet balsa on the fuselage to a smooth finish and cement the cowl to the bulkhead. Insert prop shaft through nose plug, several washers, and the shaft hole in the prop, and bend the end over in the usual

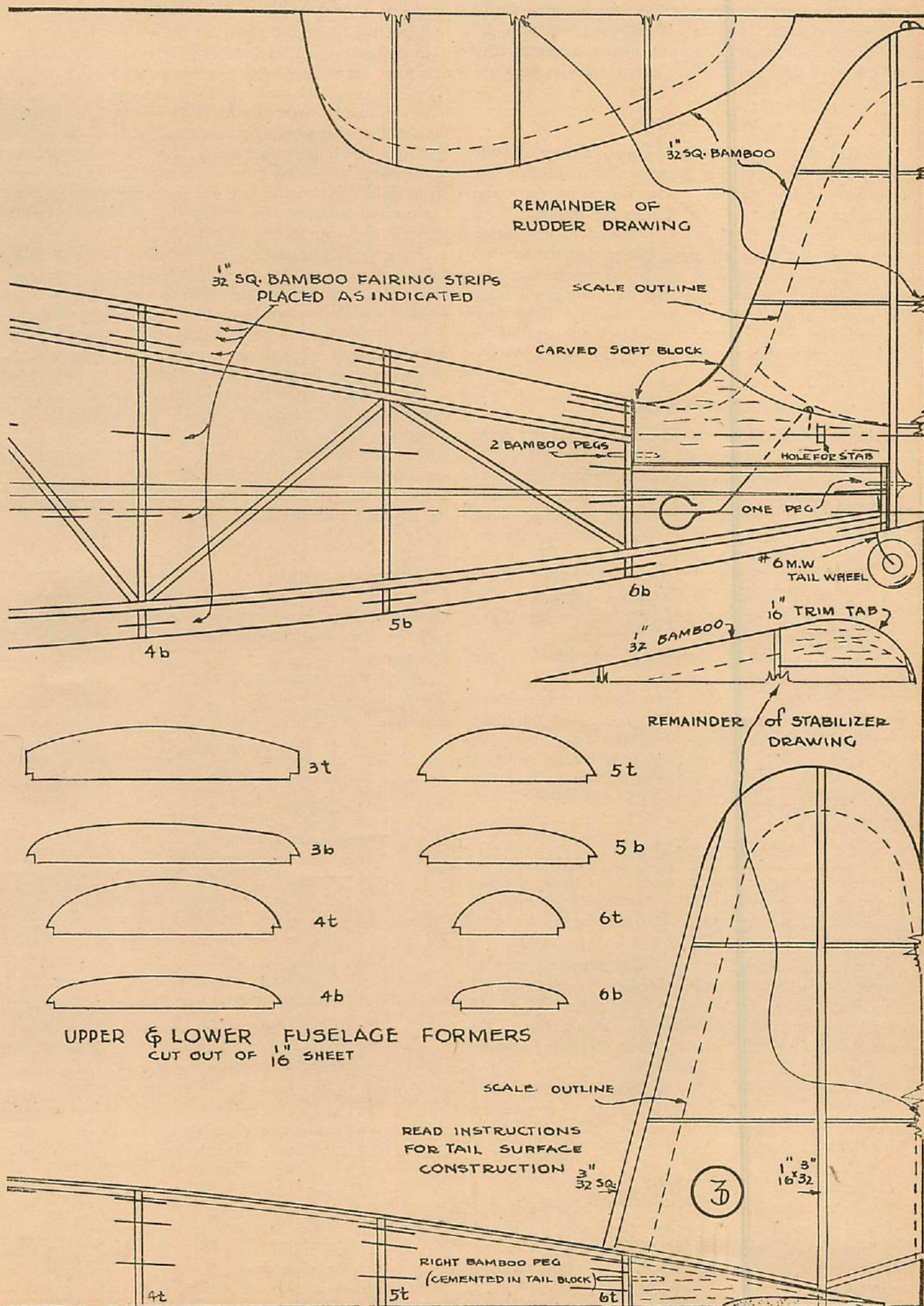
the very front, instead of formers. It was necessary to do this so the round bulkhead could be attached more accurately after the formers have dried.

Cover the sides of the fuselage with $\frac{1}{32}$ " sheet balsa back to #3 up-



A pose showing the strut that slides from flying to scale position.





manner and cement thoroughly. A free-wheeling device may be attached at this stage, if preferred. Bend a $\frac{1}{16}$ " wide piece of aluminum sheet in a loop and cement it to the bottom of the cowl for the dummy exhaust stack.

WING FRAMES

To get a left wing panel drawing, place a sheet of white paper under the right-wing drawing and a sheet of carbon paper, carbon face up, under the white sheet and trace over the lines of the right-panel drawing. An accurate left-panel drawing will result. No instruction is needed on the wing structure, except that the bamboo tips should be cemented on while the frames are still fastened to the drawings. When the wing frames are dry, cement them to the fuselage ribs that have been provided just for this step, then block the tips up to $1\frac{1}{2}$ " dihedral to dry.

LANDING GEAR

Note that the L. G. struts can be moved up and down in the fairing. This movement permits the use of the same L. G. for scale or flying. Each fairing is made of two $\frac{1}{8}$ " sheet patterns and each half is grooved to retain the sheet aluminum guide. The guide is made by folding a predetermined .010 sheet aluminum pattern over the $\frac{1}{16} \times \frac{3}{32}$ " bamboo strut so the ends overlap. The resulting guide is then cemented between the halves of the strut fairing. Make two sets of struts and fairings. The aluminum guides stand more shock than the bare balsa grooves and provide a firm fit on the bamboo struts, so they will stay in the position placed, whether for scale or flying.

Make the wheels as shown on the drawing. Pains have been taken to include them in detail. Carefully streamline all struts (except the ones that fit in the guides) and cement the landing gear and wing struts in place while the dihedral of the wing frames is $1\frac{1}{2}$ ". Attach tail wheel to the tail post with #6 wire.

TAIL SURFACES

There are two sets of tail surfaces to be made, one for flying and one for scale. The scale surfaces are made of $\frac{1}{16}$ " sheet balsa to the outlines provided on the drawing. The flying surfaces are built up, and they are larger.

Carve the tail block from soft balsa, dope and sand it. Cement the tail surface parts together "in the square," or in other words, cut the rib lengths out of $\frac{1}{32} \times \frac{3}{32}$ " strips and do not shape them as ribs until the assemblies are taken off the board, then sand them carefully to shape.

Cement the rear hook and the bamboo pegs to the tail block, and then the rudder. When dry, punch holes, one in the tail post and two in former 6t to receive the three pegs tightly fitted.

PROPELLERS

The flying propeller is larger than usual for this size and type of model. You may use an 8" prop design of your own or the one shown in the drawing. The one provided has a slight design toward scale, but is efficient for consistent flights over a minute.

A scale propeller design is provided in the drawing.

COVERING AND DOPING

Select the tissue for your favorite color scheme.

Cover one section between formers, on top and bottom, at a time. It is impossible to get a good covering job by trying to cover the full length all at once. The sides, however, can be covered with one piece each. The sections of the wing panels between the first two ribs should be covered with individual pieces. On the under surfaces of the wings, cover from the second ribs to the ribs where struts join, then to the last ribs and finally to the tips. On the top surfaces, cover from the second ribs to the last ribs, and then to the tips.

Cover the rudder and the two stabilizer halves on both sides, and then cement the stabilizer halves to the tail block. Be sure they line up perfectly and are set at zero incidence while the tail block is resting on the fuselage. Spray all the tissue surfaces lightly with water and they will tighten up when dry. If preferred, a light coat of glossy dope can be applied to the tissue.

The wooden surfaces should be doped with glossy colored dope to correspond with the tissue selected. The cylinders, wheels, and struts are black. The big ship is striped as indicated by the color lines on the drawing, and probably should be yellow or cream. Use colored beads for the lights and fair them with cement. Rule the flap and aileron outlines on with black ink.

FLYING

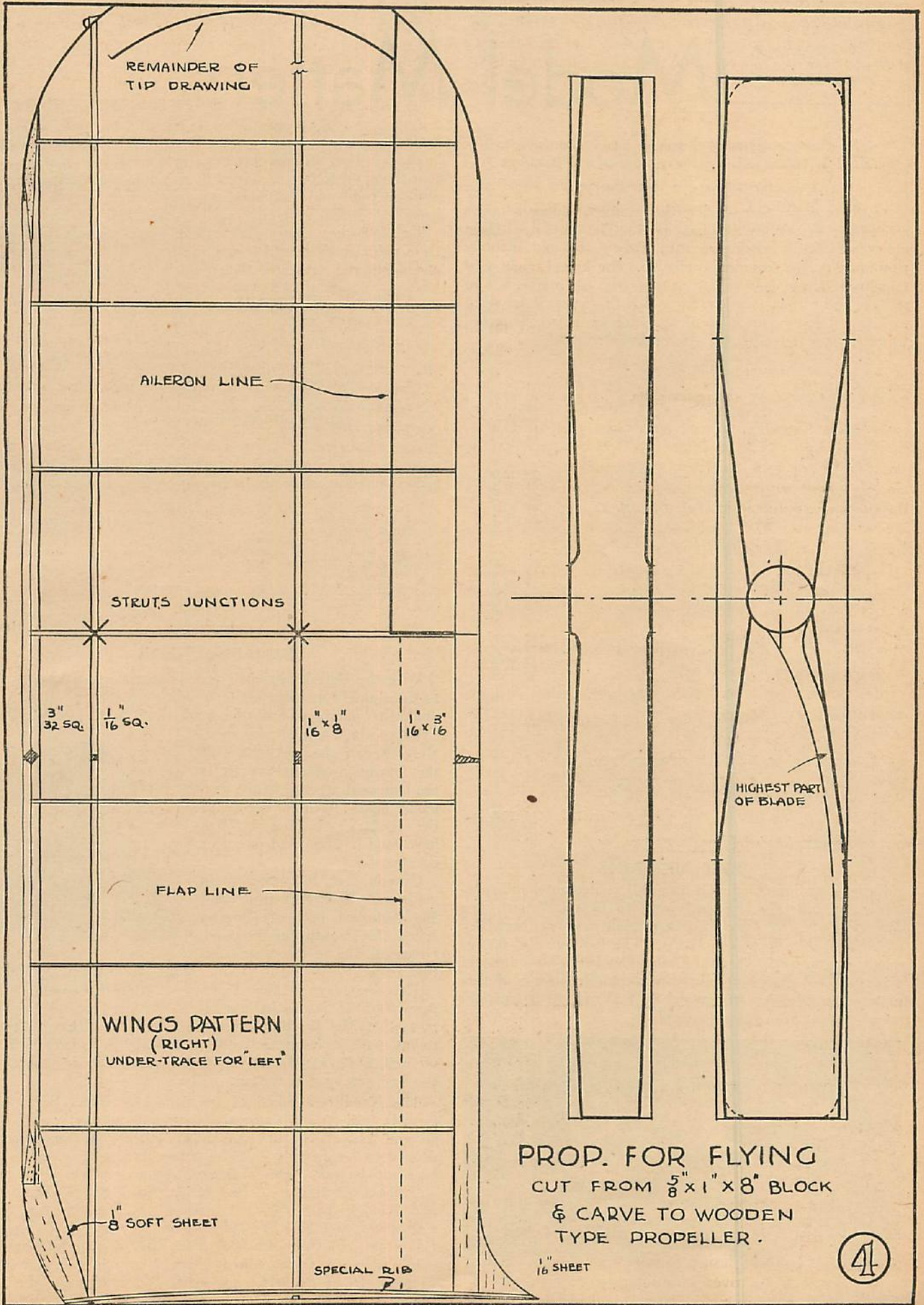
Remove the tail assembly and hook on the end of a 72" motor of six strands and lubricate it. Wipe off excess lubricant to prevent splattering the tissue, then pull the other end through the fuselage and attach the flying prop.

Glide the model to determine the adjustments needed, if any, and then gradually increase rubber winds between powered flights for the final check-up.

LIST OF MATERIALS

Balsa

- 1 2x2x2" for tail blocks, etc.
- 1 2x2x1 $\frac{9}{16}$ " nose block
- 1 $\frac{5}{8} \times 1 \times 8$ " prop block
- 1 $\frac{1}{4} \times 1\frac{1}{2} \times 5$ " prop block
- 1 $1\frac{1}{16} \times 1\frac{1}{16} \times 1$ " wheels block
- 1 $\frac{1}{4}$ " sheet, $1\frac{3}{8}$ " sq., retaining disc
- 12 $\frac{1}{16}$ sq. x 18" hard balsa strips
- 3 $\frac{3}{32}$ sq. x 18" balsa
- 3 $\frac{1}{32} \times 2 \times 18$ " balsa
- 2 $\frac{1}{16} \times 2 \times 18$ " balsa
- 1 $\frac{1}{8} \times 2 \times 6$ " balsa
- 14 $\frac{1}{32}$ sq. x 12" bamboo
- 2 $\frac{1}{32} \times 1\frac{1}{8} \times 12$ " bamboo
- 1x2 $\frac{1}{16}$ " pc. .010 sheet alum.
- 3 $\frac{1}{2} \times 4$ " sheet celluloid
- 12" #4 music wire
- 4" #8 music wire
- 4" #6 music wire
- 2" $\frac{1}{16}$ alum. tube
- 2 $\frac{1}{4}$ " washers
- 2 $\frac{1}{8}$ " washers
- 2 sheets col. tis.
- 1 oz. cement
- $\frac{1}{2}$ oz. clear dope
- Black and choice of colored dopes
- 72" $\frac{1}{8}$ " flat rubber



*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 the left of colon), seconds, and fractions.

NEW INDOOR RECORDS

As often as possible during the summer, indoor contests are held in the air dock at Lakehurst. The purpose of these meets is to break existing records. Any model and anybody who is an N.A.A. member is eligible. On Aug. 1, eight new times were made, substantially raising the old marks, but in spite of the perfect weather, for which thanks must be given to Lieut. Alden's knowledge of meteorology, no major record was set. New record times are marked *:

Stick H. L.

Class B	
1-Hyman Oslick, 17, Philadelphia, Pa.	19:46.4
2-Ernest A. Walen, open, Springfield, Mass.	*18:46.5
3-Arnold Cohen, 16, Philadelphia, Pa.	18:19.2
4-John S. Stokes, Jr., 15, Huntington Valley, Pa.	*18:12.2
5-Edwin Oates, open, Thompsonville, Conn.	14:45.0

Class C

1-Robert Jacobsen, 16, Philadelphia, Pa.	22:28.0
2-John Haw, 20, Philadelphia, Pa.	21:29.8
3-Ed Maulkin, 18, Philadelphia, Pa.	21:28.8
4-Lawrence Smithline, 19, New York, N. Y.	18:55.0
5-Mayhew Webster, 19, Philadelphia, Pa.	13:49.2

Stick R. O. G.

Class A	
1-Ervin Leshner, 17, Philadelphia, Pa.	*11:50.8
2-Hyman Oslick, 17, Philadelphia, Pa.	11:38.8
3-Arnold Cohen, 16, Philadelphia, Pa.	9:30.2
4-Roy A. Carlson, 16, Springfield, Mass.	9:19.8

Class B

1-Ernest A. Walen, open, Springfield, Mass.	*17:42.8
2-John S. Stokes, Jr., 15, Huntington Valley, Pa.	*17:19.3
3-Hyman Oslick, 17, Philadelphia, Pa.	*17:03.8
4-Arnold Cohen, 16, Philadelphia, Pa.	13:41.2

Stick R. O. W.

Class A	
1-Colman Zola, 19, Brooklyn, N. Y.	*7:41.1

Class B

1-John S. Stokes, Jr., 15, Huntington Valley, Pa.	7:42.8
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Fuselage R. O. G.

Class B	
1-John S. Stokes, Jr., 15, Huntington Valley, Pa.	*14:15.3
2-Ervin Leshner, 17, Philadelphia, Pa.	13:07.0
3-Jesse Bieberman, open, Philadelphia, Pa.	7:26.4

MIDGET AIR RACES

Enthusiasm for gas models drew 131 contestants, and spectators estimated in the thousands, to Gotch Airport, Los Angeles, Calif., on June 7 for a gas-job meet sponsored by the Midget Air Race Association. The first prize of \$50 in cash was won by 12-year-old David Fletcher, whose 6-pound plane of 74" wing span piled up a sizeable margin of performance points over the model of V. V. Hiatt, 36-year-old model builder who placed second.



At "midget races": kneeling, left to right, V. V. Hiatt, G. H. Gotch, David Fletcher.

Quality of the models and their two take-offs, flights and landings within an area measured in concentric circles of up to a thousand feet were graded by a group of 12 judges from airplane companies, air lines and government air offices. A long list of cash and merchandise prizes was distributed.

The following listing of the first seven winners includes their point score out of a possible total of 180, name, age, and name and details of their models and engines:

- 1-159-David Fletcher, 12. Fletcher high-wing cabin, 74", 6 lbs.; Brown Junior 1/2 h.p.
- 2-153-V. V. Hiatt, 36. Fokker D-7 of Bunch design, 52", 3 1/2 lbs.; Gwin Aero 1/2 h.p.
- 3-151-Howard Broughton, 20. Scorpion Major of Bunch design, 77", 4 lbs.; Brown Junior 1/2 h.p.
- 4-150-I. V. Hassad, 21. Cabin monoplane of own design, 60", 3 lbs.; Brown Junior 1/2 h.p.
- 5-148-Bob Hollingsworth, 15. Ohlsson high-wing cabin, 60", 3 1/4 lbs.; Gwin Aero 1/2 h.p.
- 6-147-Ray Smith, 28. High-wing monoplane of own design, 60", 4 lbs.; Gwin Aero 1/2 h.p.
- 7-145-Jim Stevenson, 17. High-wing cabin of own design, 60", 3 lbs.; Baby Cyclone 1/2 h.p.

Some interesting statistics compiled by G. H. Gotch, the contest director, show the following performance averages:

Take-off time.....	4 seconds
Take-off distance.....	40 ft.
Motor running time.....	18 to 33 seconds
Altitude during motor run.....	105 ft.
Spot landing.....	within 400 ft. from center of area
Take-off altitude.....	80.9% perfect
Flight.....	75.7% "
Landing.....	57.6% "
Appearance, workmanship, design, engineering.....	58% "

CANADIAN NEWS

With the Detroit nationals past history, Canadians turned to the annual Canadian nationals with high hopes. Although unable to obtain any of the major awards at Detroit, the Canucks won a total of nine medals. Sharing the spotlight with the Canadian championships is the increased activity in the gas-model field. At least twenty of the country's leading builders have models completed or under construction.

Canada has lost two more modelers. Jack Greenwill and Bill Campbell, both of Toronto, sailed this month for England. Greenwill was on this year's Detroit team.

The secretary of the Aqua-Aero Club of St. Catharines reports that Mel Bardsley, flying in a building with a 40-foot ceiling made four consecutive Class A R. O. G. (adult) flights of 8:00, 8:43, 11:00, and 11:57 minutes. This is probably the best yet by a Canadian.

The Hamilton branch of the Model Aircraft League of Canada held its sixth annual indoor and outdoor meet July 10 and 11. With the temperature at 110 degrees, flying proved to be difficult, but the turn-out of competitors was very satisfactory. The winners: indoors—commercial, John T. Dilly, Galt; tractor (class C), Clarence Dunn of Hamilton and John T. Dilly; R. O. G. (class A), Mel Bardsley, St. Catharines, and John T. Dilly; semi-scale, Clinton Conway, Hamilton, and Owen Corfield, Port Hallowise. Outdoors—stick, Clarence Dunn, Owen Corfield; commercial, Clinton Conway, Owen Corfield; semi-scale, Ted Liddycoat, Hamilton, and Jack Masher, Hamilton.



Ted Booth, secretary of the Canadian Model Aircraft League.

(Turn to page 96)

A SUCCESSFUL indoor model must be light. In order to obtain lightness, indoor builders have resorted to making hollow whatever parts they can. Obviously the motor stick and the boom are the first to fall under the model builders' axe, as the cross sections of these parts are sufficiently large so that weight may easily be saved by making them hollow. Some ambitious and painstaking model builders have even tried using hollow wing spars, but their success has been rather indifferent so far, perhaps because hollow spars have not received sufficient experimentation. Not only is it possible to save weight by using hollow booms and motor sticks, but these parts actually become stronger, resisting bending and erosion to a much greater extent than do solid parts.

There are two schools of thought in indoor building—those modelers who believe that drag is an inconsequential thing and therefore are not averse to building braced wings and motor sticks, and those who think drag in an indoor model is something to be reckoned with and therefore are staunch believers in cantilever parts. In either case, the dimensions of both cantilever and braced parts are rather standardized; they are both built in the same way, but the braced sticks have a smaller cross-sectional area and the necessary strength is acquired by using tungsten wire for braces.

CANTILEVER MOTOR STICK

Hollow motor sticks are made by bending sheet balsa around a hardwood stick of definite dimensions, called a "former." The standard dimensions for this type of former is 15" long by $\frac{3}{8}$ " at the center, tapered to $\frac{1}{4}$ " at the ends and $\frac{1}{8}$ " of an inch wide throughout. The cross section of this former should be oval. The blank—the sheet wood which is bent around the former—should be of what is called quarter-grained cut wood. Quarter-grained wood is merely ordinary light balsa cut in such a way so that the grain looks speckled or scaly. A quarter-grained stick is much stronger than a stick made of the ordinary cut. The dimensions of the blank, usually of $\frac{1}{2}$ " sheet, are 15" by $1\frac{1}{8}$ " tapered to $\frac{13}{16}$ " at the ends.

Soak this blank in hot water until the wood is pliable and then "persuade"—that is, bend in easy stages—the blank around the former, starting at the middle and working toward the ends. Be very careful when doing this, as quarter-grained wood splits easily. After the wood has been bent in what may be called the "trial" bending, it must be bent again, bound, and dried. This is done in the following manner:

Start at one of the ends this time, bend the blank about $\frac{1}{4}$ " from the end and bind it with $\frac{1}{2}$ " bandage. Then advance in $\frac{1}{2}$ " steps and bind progressively as you go along. Make sure that the seam is in a straight

Hollow Sticks

*Expert instructions
for building some
important parts of
indoor models.*

by

Lawrence N. Smithline

line and that the stick is perfectly straight. The resistance to buckling under the compression of the rubber depends on the straightness of the stick. After the blank is bound, soak it in water and put it in a heated oven. Leave it in the oven until the bandage with which it is bound just begins to turn brown. Now remove the bandage and lightly sand the blank with ten-nought sandpaper. Remove the blank from the former and cement the seam, starting at the center and working out to both ends. Be careful to keep the seam straight when cementing. When the seam has dried, sand it lightly, bevel one end—to which the thrust bearing will be cemented—and cement the "caps." A cap is merely a piece of sheet balsa cemented on the ends of the stick and trimmed to fit.

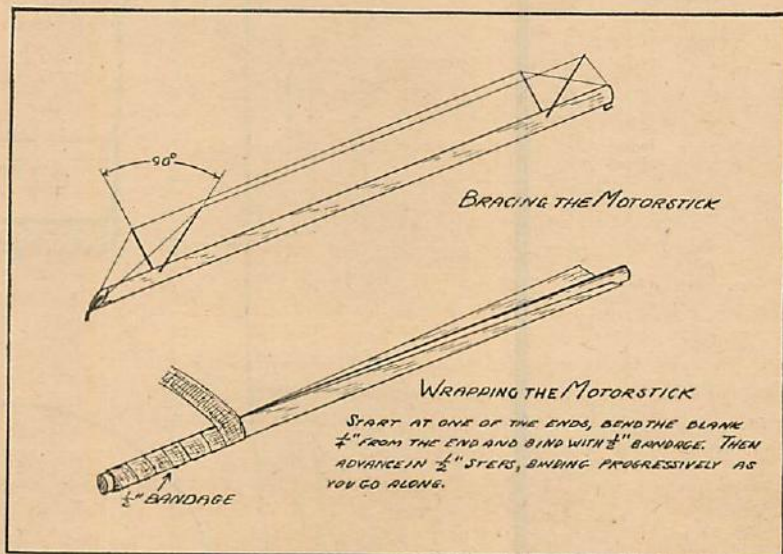
This finishes up the motor stick.

The average motor stick of this type strong enough to take a loop of $\frac{7}{64}$ " rubber should weigh about .018 ounces.

BRACED MOTOR STICK

Braced sticks are made in exactly the same manner as the cantilever sticks, except that they are bent around a $\frac{3}{16}$ " drill rod of the proper length.

One and a half inches in from each end of the stick, and 90 degrees apart, cement two uprights $1/20 \times \frac{1}{2} \times 1\frac{1}{2}$ " as shown in the drawing. Then cement two 18" lengths of #4 tungsten wire at the front end of the stick and



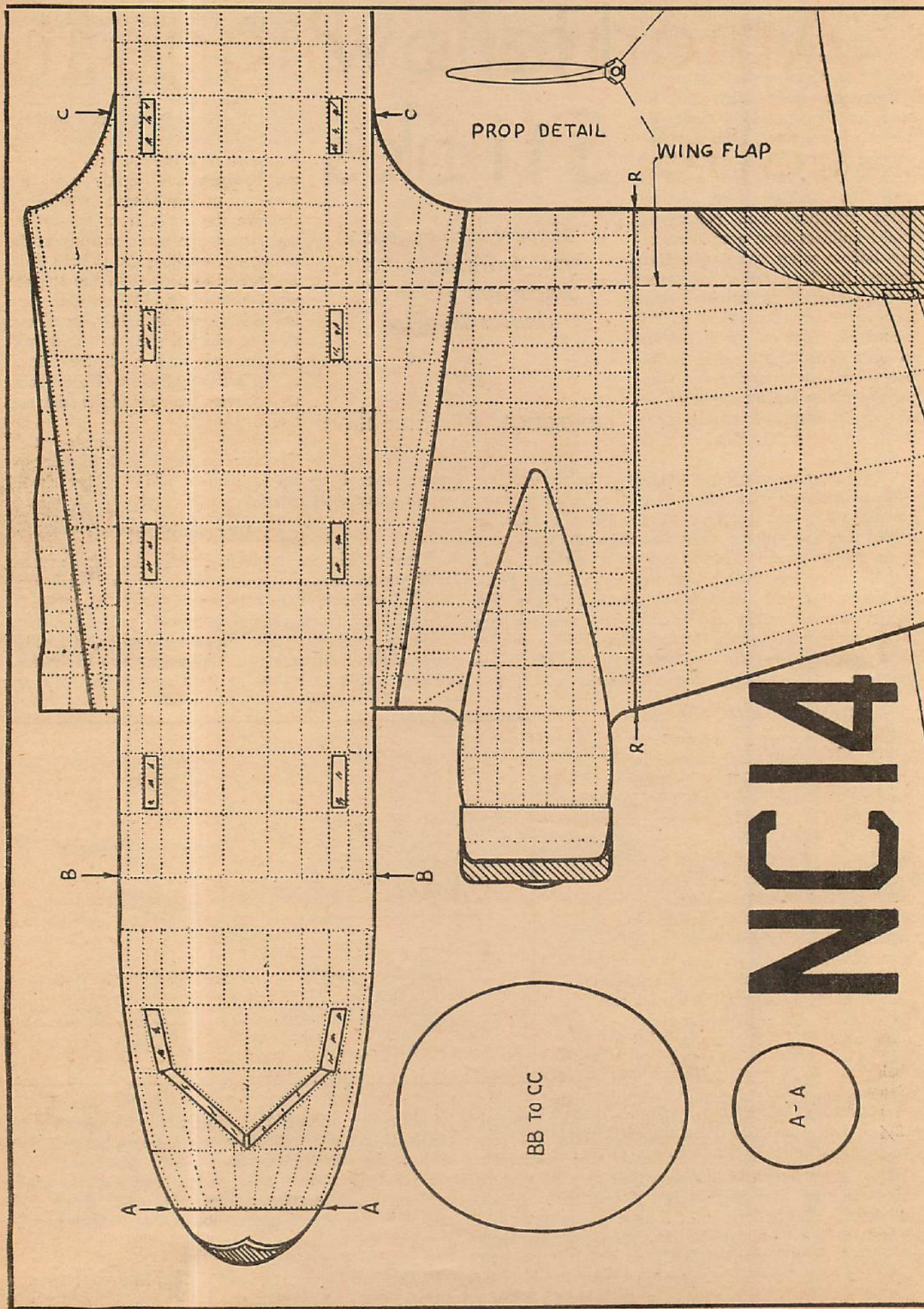
let them dry. Draw the wires along the uprights to the back end and pull them taut. Some builders like to bow the stick upward about $\frac{1}{16}$ ". Make sure that you pull both wires equally, or you may bend the stick.

Motor sticks of this type should weigh about .015 ounces if they are to take a loop of $\frac{7}{64}$ " rubber.

BOOMS

Booms are the next thing which can be made hollow to save weight. A former

(Turn to page 94)



America's Biggest Land Plane

The new liner that out-bulks the great Boeing bomber, pictured on the cover, described by Frank Tinsley, and here presented in solid-model form in AIR TRAILS' quarter-inch scale series.

by

Nicholas E. D'Apuzzo



The DST, as it first appeared, looming over a new Cord auto.

THE Douglas DST was first announced a little less than a year ago. Within that time plans and articles have been published in various magazines, but as this ship has undergone severe experimentation within this short time, numerous changes which have improved performance have been made. These changes did not appear in the other articles, so AIR TRAILS now presents the sleeper transport *Flagship Texas* as it is today—the first of American Airlines' flagship fleet.

A study of the $\frac{1}{4}$ " scale model drawings will show these changes:

1. The addition of a small fin in front of the original fin, made necessary by the robot pitot.
2. The removal of the first two cabin windows on the left side of the ship.
3. The single pitot tube changed to a double pitot tube and moved slightly back.
4. Motor cowl with a small flat shield on the front face at the top.
5. Balanced elevators changed to the unbalanced type.

In making a model of this ship, either hard woods or balsa may be used. If balsa, choose a clear semi-soft grade.

It is advisable to start with the fuselage. A block $2\frac{1}{2} \times 2 \times 17$ " is needed. First lay out the side view on it and carefully cut it to shape. A jig or coping saw should be used. Now lay out the top view and cut to shape. The fuselage is now roughed out. Work it to the proper shape with either a sharp knife or a wood plane, followed by plenty of sandpaper. Check often with the templates at the various sections. Notice, in this connection, that section A—A is *not* quite a perfect circle.

The wing is made next. This should be made in

three parts—the center section or stub wings, and the two outer panels which are later joined to form one unit. Trace the outline of the center section on a piece of stock $4 \times 6 \times \frac{5}{8}$ " and shape to the airfoil section R—R. Cut a groove in the top center of this center section so that the fuselage rests in its correct position. This may be neatly done with a sharp chisel. The grooves for the motor nacelles may now be cut in their proper places. These nacelles are explained later. Trace the outline of the outer wing panels on two blocks each $4 \times 9 \times \frac{5}{8}$ " and work to the proper shape. Finish as before with sandpaper.

For the tail unit, both horizontal and vertical surfaces are made from $\frac{3}{8}$ " stock. Trace the respective parts—fin, rudder, etc.—on a sufficiently

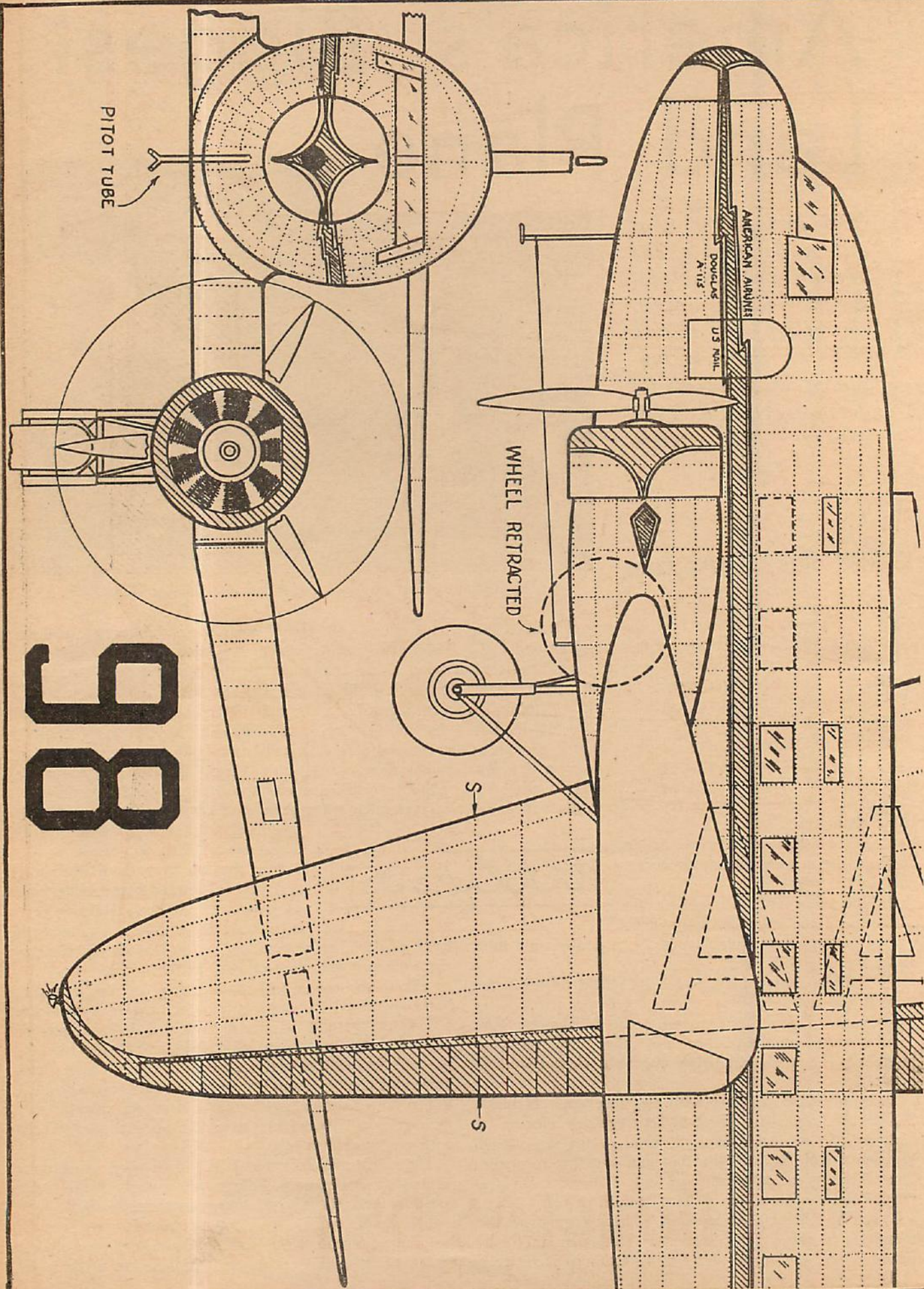
large piece of wood and cut to outline shape, working them down in the same manner as the wing.

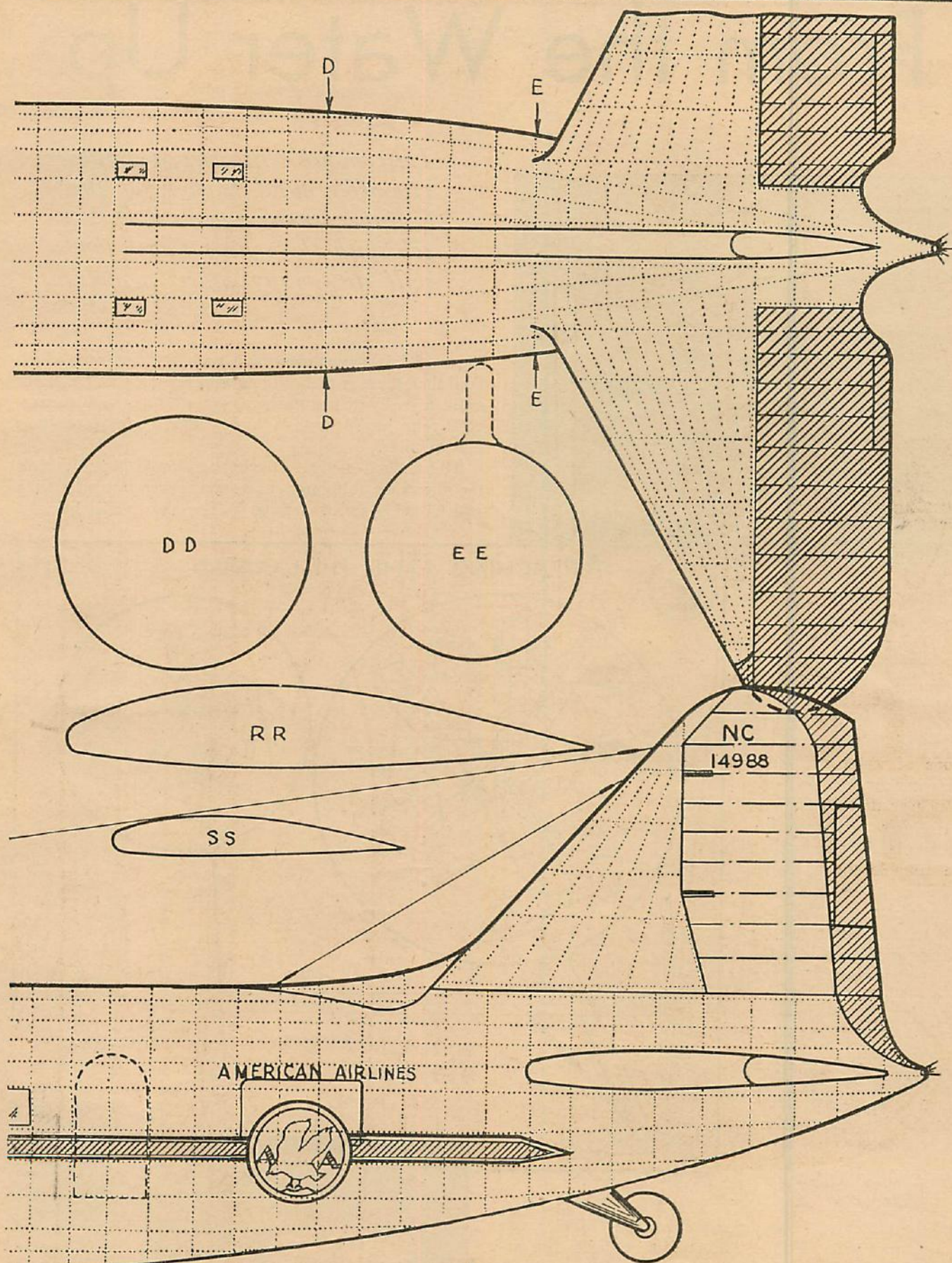
The motor cowl and nacelles may either be cut by hand or turned to shape on a lathe. Select two blocks $1\frac{1}{4} \times 1\frac{1}{4} \times 2\frac{3}{4}$ " and inscribe a circle $1\frac{3}{16}$ " diameter on one end. With this end as a guide, work the block to the nacelle shape shown on the drawings. Use a sharp knife and plenty of sandpaper to secure a smooth finish. When both nacelles are done, they may be inserted into their respective slots in the center section and secured with plenty of cement.

The cowls may be made in the same way. If dummy motors are to be used, hollow out enough of the cowls to allow the motors to fit snugly in them.

The motors, which are Wright Cyclones, may be made by piling alternate large and small washers on a nail to represent the finned cylinders. Make nine of these for each motor and fasten them in their (Turn to page 92)

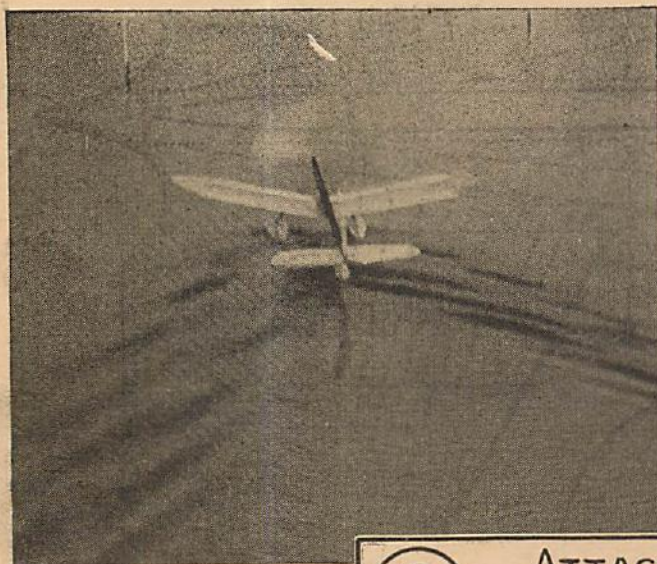
DOUGLAS DST





From the Water Up

Last month's Buzzer, a simple rise-off-ground tractor for the beginner, turns into an R.O.W. job with these neat floats that will fit many other models.



the model is flown over land with the floats attached. And then there is the all-important feature that the floats must be easily demountable, as you oftentimes want to convert your model from a hydro into a landplane in a few minutes.

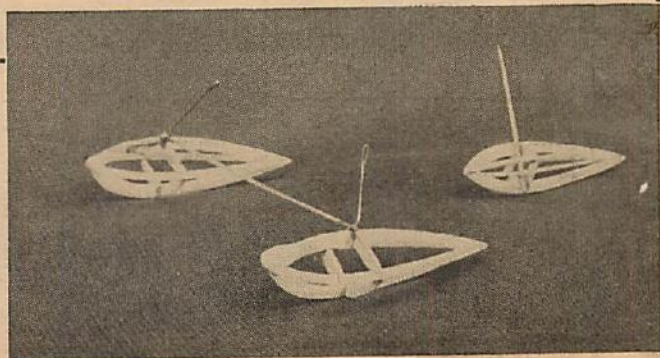
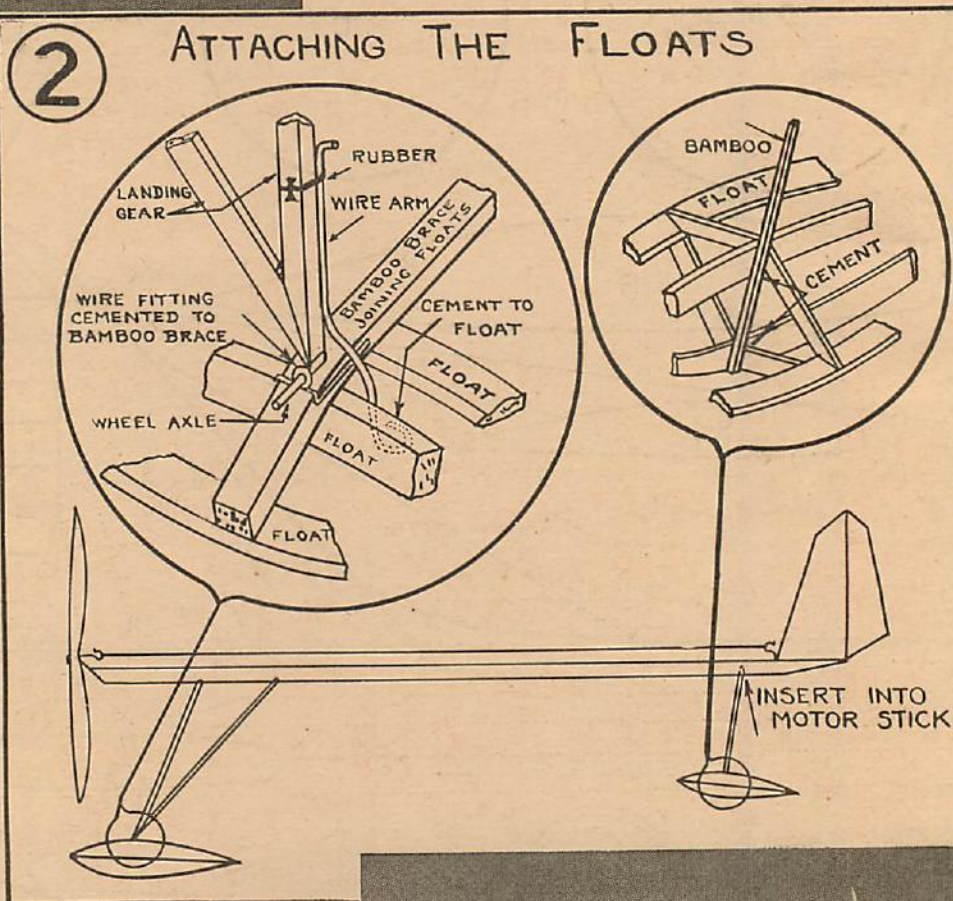
The method of float attachment should be clear from the drawings, although there are several main points which can stand repetition. The two main forward

THE summer season of model flying is not complete without hydro flights. Watching a model taxi over the water, quickly getting flying speed, and then pointing its nose into the clouds as drops of water fall from the pontoons is a thrilling branch of model building.

In this article we've included plans for floats that are suitable for a model weighing up to 2 ounces. In the photos the floats are shown attached to the Buzzer model. Plans for this model appeared in the September issue. However, these floats will work equally well on any other type of model—twin pushers and twin tractors, along with fuselage models, all being adaptable for water flying.

Drawing #1 gives the full-size float shapes. The framework of the floats is built up of $\frac{1}{16}$ " sheet balsa. Cut the pieces of balsa directly from the shapes given in drawing #1. Notice that two large floats are attached to the front of the model and one small float is used to support the tail.

Attaching the floats to the model is important. They should be rigidly fastened to maintain a constant angle during the take-off. In addition, the floats must withstand the shock of ground landings experienced when



floats are joined by a strip of bamboo $\frac{1}{32} \times \frac{1}{16}$ ". This brace is joined to the cross brace of the float, as shown in drawing #1. Now look at drawing #2. The wire wheel axle at the end of the landing gear fits through a wire eyelet which has been cemented to the bamboo brace which joins the floats. The distance between the ends of the landing gear should be greater than the distance between the floats—in this case 6". In this way the ends of the landing gear, forced together to fit inside the wire eyelets, exert outward pressure and insure permanent float attachment.

A wire arm is attached to each float to prevent it from turning about the axle. This arm fits alongside the landing gear strut, where it is bound with a rubber band. The wire should be a flexible sort so the float angle can be changed by merely bending the wire arm with a pair of pliers.

The rear float is attached by a single bamboo strut $\frac{1}{32} \times \frac{1}{16}$ ", cemented to the float as shown in drawing #2.

The strut length is 2" and the end is pointed and inserted into the bottom of the motor stick. In the case of fuselage models, the float could be attached to the fuselage cross brace.

Make certain the difficulties of float attachment are completely straightened out before covering the floats with tissue. The balsa framework of the floats should be given a coating of full-strength banana oil before covering. This is to preserve the wood against the water that a tissue-covered float is practically certain to absorb. In covering the float, attach the tissue in small, carefully fitted sections. Make sure the sections of the tissue are tightly joined to avoid leaks.

Banana oil or clear lacquer make good waterproofers. Two coats should make the tissue sufficiently resistant to water. My floats were treated with two coats of thick banana oil. No water accumulated inside, even after they were submerged in the water for a length of time.

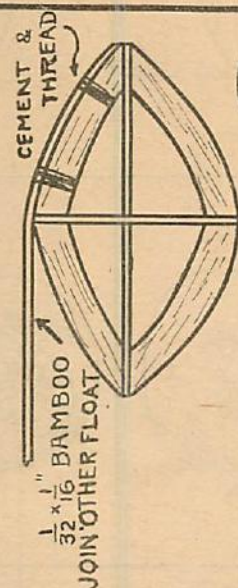
These floats are of ample size, so that (Turn to page 95)

TOP VIEW

MAKE TWO

FLOATS THIS SIZE

SIDE VIEW

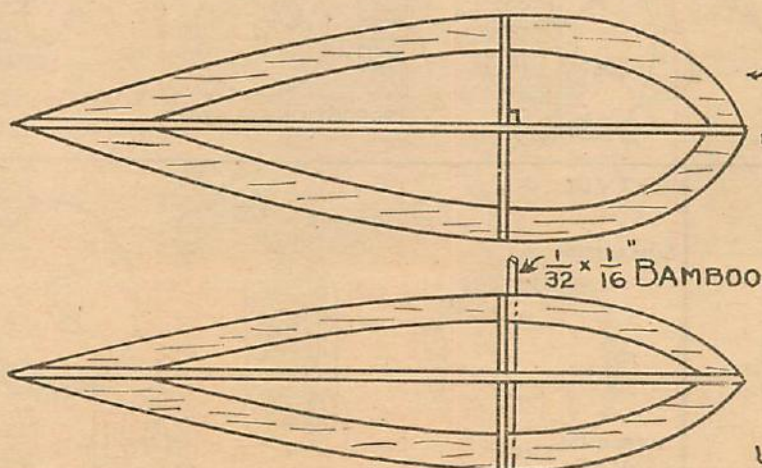


1

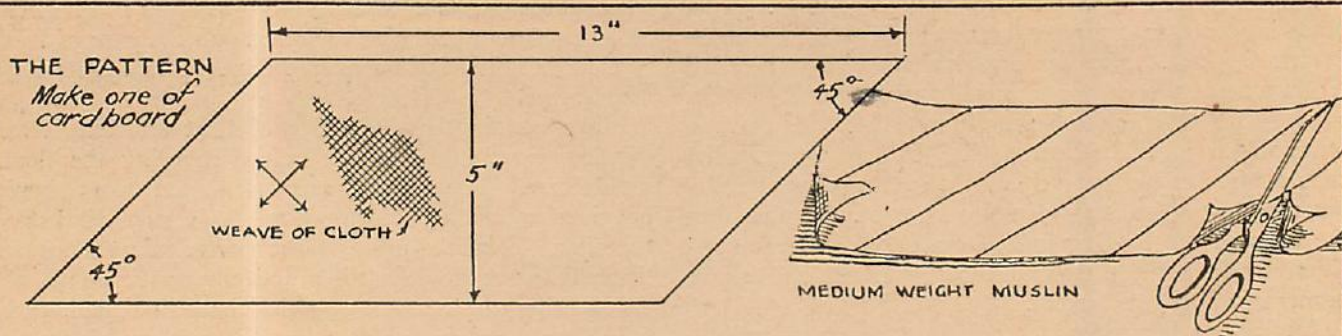
6" BETWEEN FLOATS

 $\frac{1}{16}$ " SHEET BALSA USED THROUGHOUT

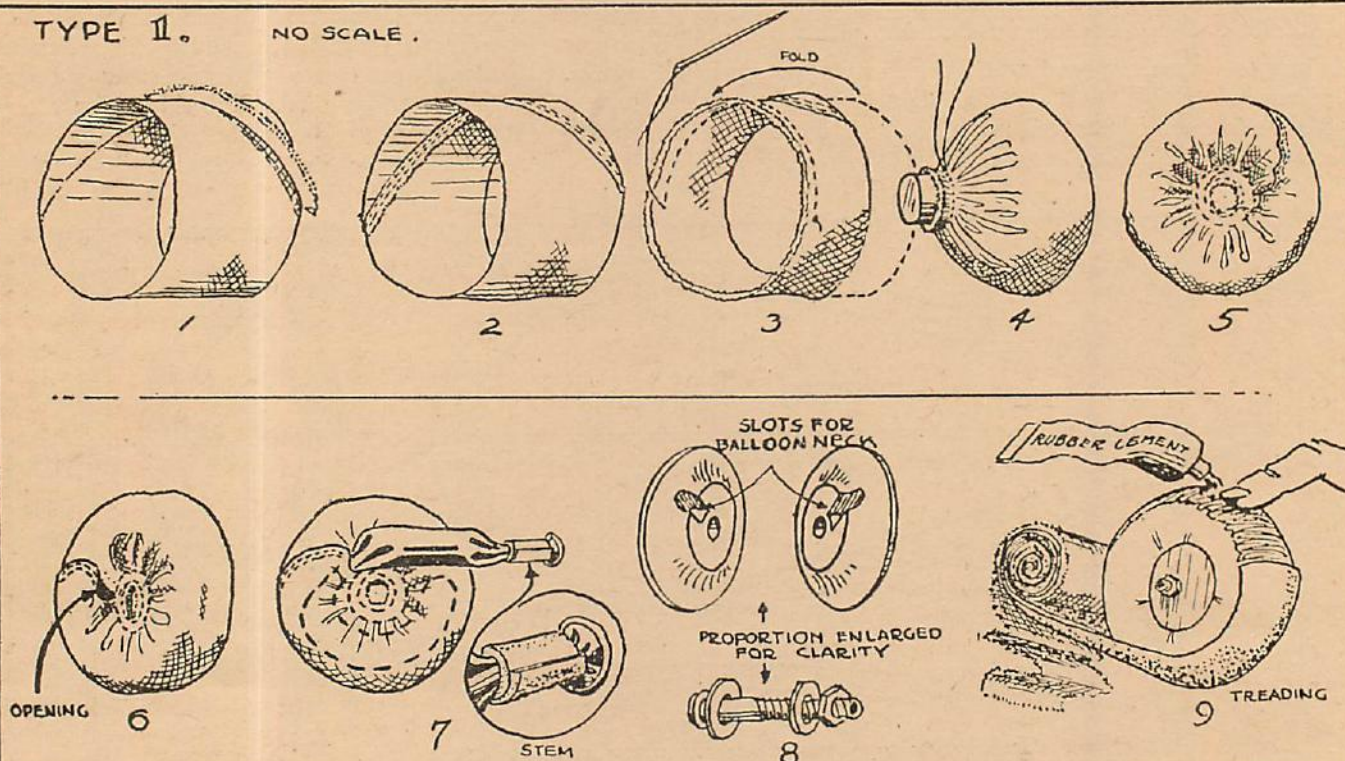
THESE DRAWINGS ARE EXACT SIZE. USE AS PATTERNS

USE $\frac{1}{16}$ " SHEET BALSA

MAKE ONE FLOAT THIS SIZE

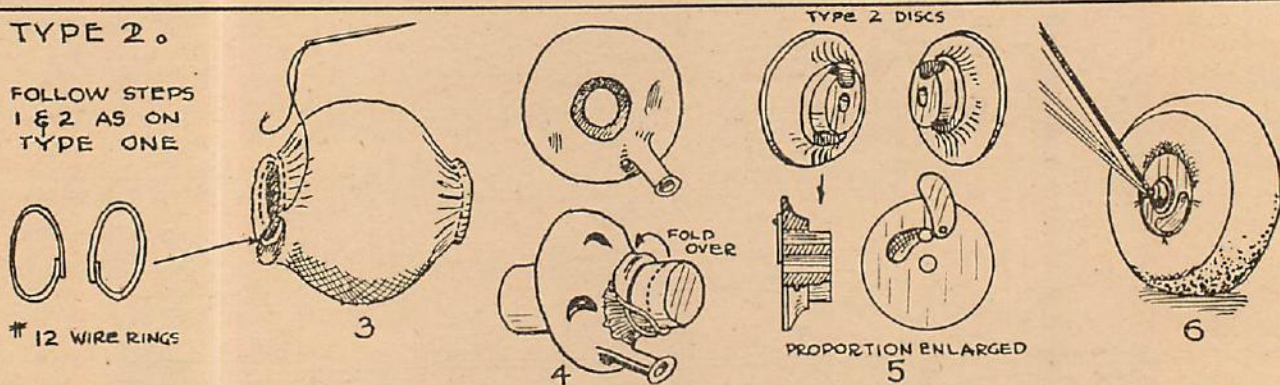


TYPE 1. NO SCALE.

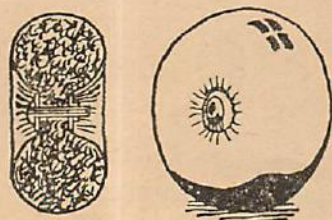


TYPE 2.

FOLLOW STEPS
1 & 2 AS ON
TYPE ONE

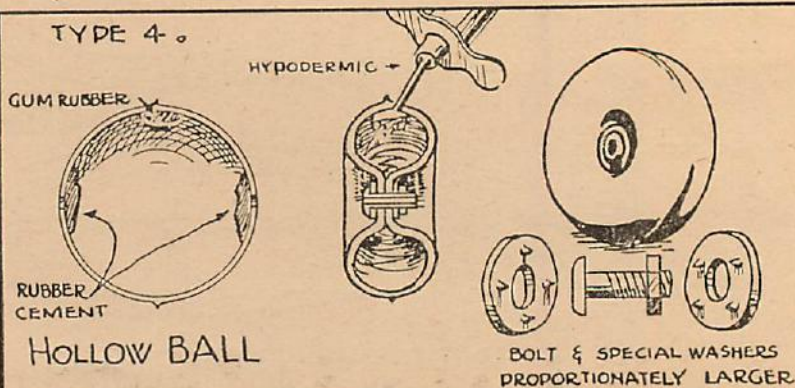


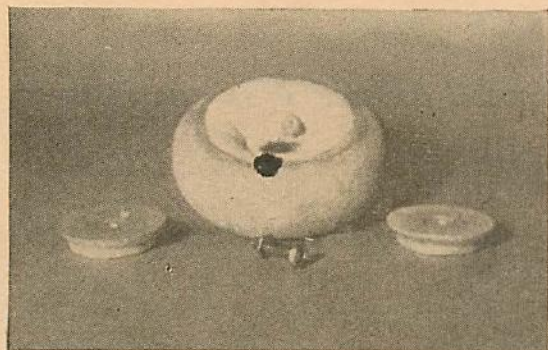
TYPE 3.



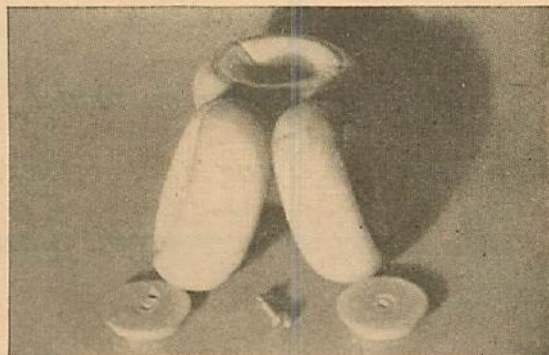
SPONGE RUBBER BALL

TYPE 4.





Jack up your gas model and put on a pair of "dough-nuts," shown complete with inner tube inserted, discs, casing, and hollow axle bolts. Make 'em any size to fit your plane.



More Balloon Tires

This month they're gas-model air wheels—real tires that are sturdy, yet inexpensive and easy to make.

USING 5-cent balloons for inner tubes for gas-model pneumatic tires sounds like a joke, and really did spring from an innocent joke. It seemed reasonable to use them as tires for lightweight rubber-powered models, as I described in the August issue. But gas-engine models were something else again.

When model builders nevertheless cannot afford to buy ready-made parts for their gas models, they look around for substitutes that will fit their budgets. Here we have the solution to the tire problem in being able to make a pair of 4" diameter tires for less than a dollar, including tread and all.

Of course, the balloons alone will not hold the 20 pounds pressure possible, but they will when inserted in the casings you can make from these directions. The author placed a pair of the Type #1 wheels on a wingless gas-model fuselage and literally beat the landing gear off against the floor. The tires were not hurt in the least and now repose on the rebuilt landing gear. The pressure advised for types 1 and 2 is about 7 pounds, or just enough to fill out the casing well.

The materials for type 1 are: about $\frac{1}{2}$ yard of medium weight unbleached domestic muslin cloth, pressed; several 1x10" nickel balloons and a tube of rubber cement (from the dime store); 2 $\frac{3}{16}$ " aluminum or brass bolts 1" long, drilled out to your axle size; 1 roll of "Band-tex" rubber bandage (from your drug store); a sheet of $\frac{1}{2}$ x2" balsa for the discs; a large needle, and #36 white thread.

Make a cardboard pattern as described on the drawing and with it mark out several cloth patterns with the weave running on a bias, as shown. Cut these out with scissors. Sew the ends together on a sewing machine as in figure 1, leaving a $\frac{3}{16}$ " margin. Turn inside

by Alan D. Booton

out and sew twice across this margin for strength, as in figure 2. Place the outer edges together and mark a

line around the cloth $2\frac{1}{4}$ " back from the folded edge. The margin at the doubled edges may vary, but it is important to have the $2\frac{1}{4}$ " spacing from the folded edge exact in order to have an even diameter on the completed tire. Sew by hand along the mark as in figure 3, taking $\frac{1}{8}$ " at a time. After getting clear around, pull the thread and pucker the hole tightly onto a 1" diameter dowel or tube, and tie the thread, as in figure 4. Remove the dowel, space the puckers as evenly as possible, and then dampen and press with an iron to flatten them out. Now sew carefully over the pucker thread three times and around the inner edge once to prevent fraying, as in figure 5.

Select a balloon and wrap a 1" square piece of Band-tex tightly around the neck to make the "valve stem." (Note: the Band-tex adheres to itself.) To insert the "inner tube," cut the thread about $\frac{1}{2}$ " along the outside seam first sewn, starting next to the pucker thread as indicated in figure 6. Fold the end of the "tube," start it into this hole and pull it all the way around inside the casing by folding the cloth each time and grasping the end of the tube. Figure 7 shows how it works. Now sew the seam tightly around the "stem."

To pump the tire up, stuff the nozzle of the pump in the neck of the "tube" until it reaches the Band-tex stem. Hold your first finger and thumb around the neck while pumping to keep the air in and to prevent the neck of the "tube" from bursting. Maintain the hold on the stem after removing the nozzle and then twist the neck into the stem. Double the twist over and wrap another piece of Band-tex around, the doubled neck and release the hold. (Turn to page 95)



Flight-tested on a Moyer sport model, they were almost too bouncy.

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



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

"BLUSHING" MODELS

Question: Why does banana oil on the covering of a model sometimes turn white? H. W. L., Galesburg, Ill.

Answer: When banana oil and dope are applied in moist weather they "blush"; that is, they turn white wherever they are put on thickly. An example of how sensitive banana oil is to moisture in the air is shown by the fact that banana oil applied in my cellar workshop turns white on some days when it won't turn white if applied outside. The slight increase in moisture in the usually dry cellar is enough to blush the dope. The only cure is to apply it when the weather is dry and put it on in thin coats, brushing out the thick spots.

GAS-MODEL FLEA

Question: Are any plans available for a gas job of the Flying Flea? T. M., Oak Park, Ill.

Answer: So far as I know, the Flying Flea has not been produced as a gas model. Adjusting a model of the Flea variety would be a delicate operation. The rubber-powered model (AIR TRAILS, June, 1936) proved quite a problem until the correct settings for the front and rear wings were located. It seems almost certain the early part of a gas-powered Flea's life would be full of crack-ups. But after the "bugs" were removed, the thrill of watching it fly should more than repay you. Much has been written about the Flea, including the inventor's instruction book, telling how to build a full-size replica. If you decide to build a gas model, there should be plenty of data and plans available.

WHEN TO COVER

Question: Is it true that a model should be assembled before it is covered? J. H., Glen Ellyn, Ill.

Answer: This is not the case. Models are considerably easier to cover if they are not assembled. The more completely you can "knock down" your model, the easier it will be to make a really presentable job of the covering. Wise procedure is to assemble your model temporarily to make sure all the parts fit together. Pin the parts together if necessary. After you've satisfied yourself that the parts line up, take the model apart and cover it. Then make the final assembly of your model. Painting or doping can best be done when the model is disassembled.

SPACING RIBS

Question: I am making a 60" model of a German sailplane. The original design calls for a wing rib every foot. That means I should have the ribs in the model

1" apart. Is this necessary, or could I save weight by spacing them farther apart? R. T., Springfield, Ohio.

Answer: It seems unnecessary to have the ribs 1" apart in a model. The trouble of cutting the extra ribs would hardly be repaid by the more perfect wing shape. As far as weight is concerned, ribs spaced 1" apart would not add enough weight to a 60" model to seriously handicap its flight. But regardless of this, it seems advisable to increase the spacing between the ribs to 1½ or 2". In general practice, a good rule is to make the space between the ribs equal to 1/3 the wing chord.

POWER FOR DISTANCE

Question: Does a model need a lot of rubber and a small propeller to fly a long distance? S. M., Galveston, Tex.

Answer: A long-distance flight usually requires a propeller which runs a long time. And a small propeller with a large amount of rubber spins so fast that the duration is always considerably less than the slow-spinning, large-diameter propeller. So it seems the large propeller with as little rubber as possible will give the longest distance flight.

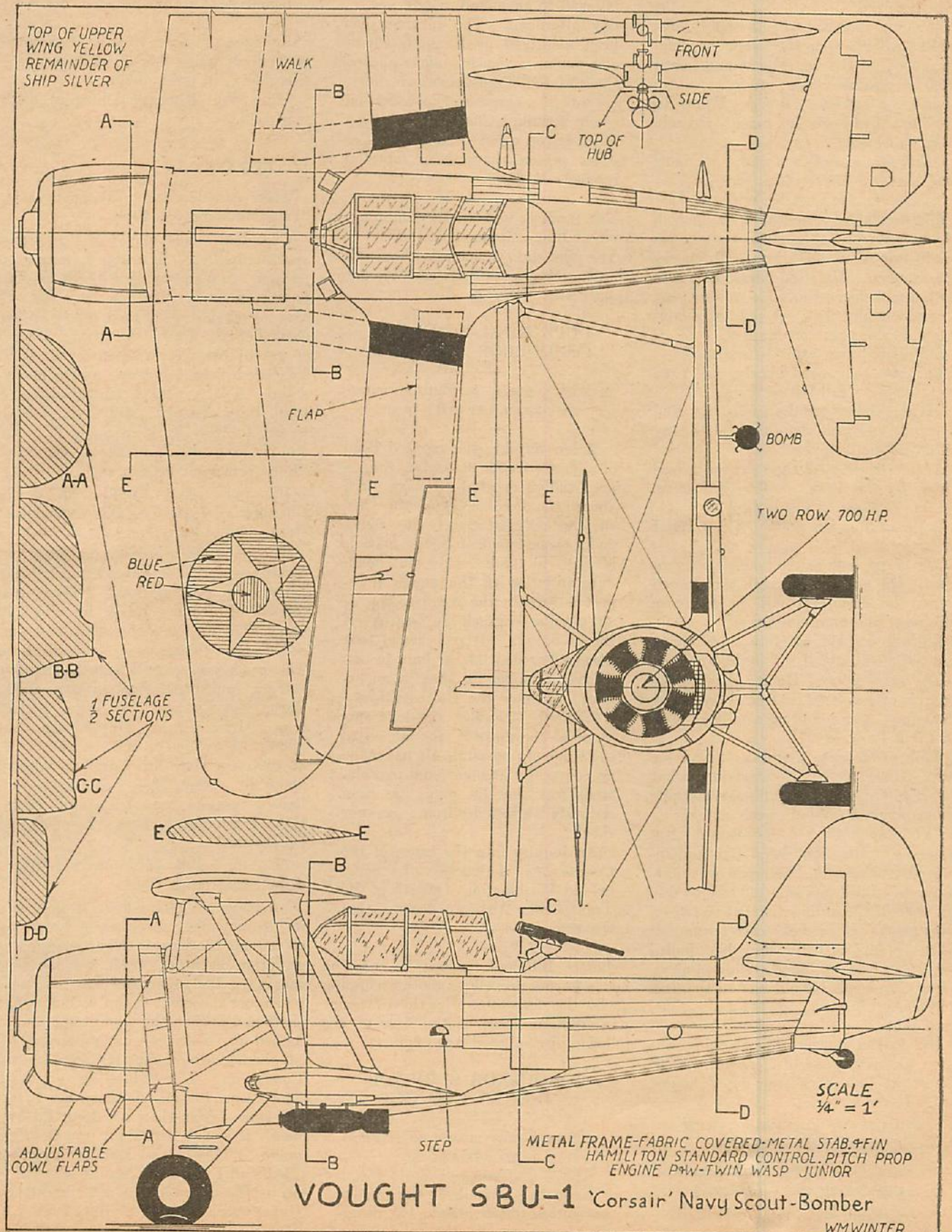
Possibly S. M. is thinking of the old days when we used to fly heavyweight twin pushers. These were made of hardwood with two small propellers. Usually a skein of rubber was required to power these heavy models. The length of the propeller duration was about 20 to 30 seconds. But that didn't prevent the model from flying a long distance. Flights greater than half a mile were not uncommon, especially when flown with a tail-wind. And to make matters even more interesting, these twin pushers usually flew in a straight line—never wavering from their arrowlike course. This type of model made a very efficient long-distance flier.

WATER-COOLED ENGINES

Question: Is there a water-cooled model gas engine manufactured for use in a model boat? H. H. H., Philadelphia, Pa.

Answer: This question is a little outside the field of model aviation. H. H. H. should be able to find almost any sort of air-cooled model motor to suit his requirements, whether he wants it for a boat or airplane model. However, a water-cooled model gas engine may be difficult to find. The gas engines used in airplane models to-day are all air-cooled, the easiest and most practicable way of cooling. Water cooling has many disadvantages that retard its progress in model aviation as well as in the large plane field. The model boat experts could probably give more help in this problem than model airplane builders.

Wings for the Navy



THE CRIMSON LINE

(Continued from page 16)

the monk and the youngster had accomplished in Belgian Congo when the White Pygmy had been killed. If it hadn't been for them, a horrible disaster would have occurred.

The famous flyer had just seated himself at the desk when the telephone rang. He picked up the instrument and heard "Red" Gleason's voice.

"Bill. A guy just landed. Wants to see you. Won't give his name. He acts crazy as a coot."

Bill hesitated and then said, "All right. Send him in. Better frisk him first."

"We have. He's not heeled."

Minutes later, when the door opened, Bill saw a small man come timidly inside in front of Red Gleason. His cheeks were sunken. His thin black hair was matted and uncombed. He was wearing a wrinkled blue suit. A pair of dilapidated sneakers was on his feet.

Bill said: "You want to see me?"

The man advanced slowly, his large eyes staring. "Bill Barnes!"

"That's right." Bill signaled for Red to go out and shut the door, but to stay within calling distance.

As the door closed, the stranger moved across to the desk. "He's still alive. . . . I think he's still alive."

Bill eyed him uneasily. "What can I do for you?"

The glassy look in the man's eyes vanished. His body went rigid. He leaned across the desk and said in a hoarse whisper, "The murderer lives!"

Bill watched him carefully. "Sit down and tell me all about it," he said calmly.

The man didn't. He stood where he was, his eyes riveted on Bill. "You think I'm crazy. I can see that you do. They all think I'm crazy."

Bill's words were soothing. "Now see here. I haven't the slightest idea what you're talking about. Tell me something about yourself. What's your name?"

"You wouldn't remember me. But wait—" His right hand streaked inside his suit coat. The move was startling, and Bill's hand darted out to grip the butt of the automatic that rested on clips alongside his desk. He released it when he saw that the man had pulled out a thin stack of faded, yellowed newspaper clippings. He put one on the desk and shoved it across toward Bill. "You read that."

Bill looked down. The clipping was from the front page of a six-year-old issue of the *New York Star*, dated August 3rd. It read:

SURVIVOR OF DIRIGIBLE DISASTER FOUND

CONQUEROR'S JUNIOR NAVIGATION
OFFICER PICKED UP AT SEA

San Francisco, Aug. 3rd—Radio reports from the U. S. destroyer

Hurricane, state that a man has been picked up from a floating piece of wreckage in the vicinity of where the giant dirigible *Conqueror* plunged to an unknown fate yesterday afternoon. The survivor has been identified as Kenneth Chandler, junior navigation officer aboard the ill-fated Transpacific air liner. He was in a semiconscious condition when found. Chandler is being taken at top speed to Honolulu. No other persons have been reported rescued—

The stranger slid another clipping in front of Bill. "Read that, too."

The pilot did. It had also been taken from the *New York Star*, and was dated August 5th:

DOPE KING VICTIM OF CONQUEROR DISASTER

BARON SUSUKA, NOTORIOUS DRUG
SMUGGLER, REPORTED DEAD

Baron Susuka, the reputed head of a large narcotic smuggling ring, is unofficially reported to have been aboard the dirigible *Conqueror* when she crashed mysteriously on August 2nd. Department of Justice officials refused to make any statement. Substantiation of the unofficial report is seen in the recall to-day of all agents engaged in search of Baron Susuka. It is believed that Susuka boarded the air liner in disguise and under an alias in an attempt to enter the United States.

Kenneth Chandler, the lone survivor of the disaster, is confined to the Honolulu hospital. He has made no coherent statement, and psychiatrists fear that his mind has been seriously affected from nervous shock.

An inquiry into the cause of the *Conqueror's* destruction is being held at Washington. Officials of the Transpacific Airways declare that the tragedy—

Before Bill had finished he saw the man's fingers propelling another clipping across the desk top. The third account was from an issue of the *Star* of the following year, dated April 2nd:

CONQUEROR SURVIVOR JUDGED INSANE

KENNETH CHANDLER COMMITTED
TO ASYLUM

Kenneth Chandler, the junior navigation officer aboard the dirigible *Conqueror* and the only person

to escape death in the air liner's destruction last August, was to-day committed to the Pixton Mental Hospital in Hillsborough, Long Island—

Bill raised his eyes to look at the man in front of him. "And you're Kenneth Chandler," he said quietly.

"And I'm Kenneth Chandler," the man said.

IV—ESCAPE

Their gazes locked. Bill finally said, "What brought you here?"

Chandler leaned across the desk and spoke rapidly. "I escaped from the asylum. A plane made a forced landing on the grounds. The pilot was lost. I saw my chance. I'd been trying to get away before. I took the plane. I have to get to New York. I saw your field. I needed help. I knew you'd understand. That's why I landed here. I think Baron Susuka's still alive. I have to get to New York to prove it." He stopped suddenly and shook his head. "I see you don't believe me."

Bill put out a hand. "Sit down, Chandler. I honestly want to hear your story. But take it easy."

The man came around the desk and seated himself. "I haven't much time. They may trace me here." Then, in a torrent of excited words, he told Bill about the feverish hours that had preceded the *Conqueror's* take-off from Tokyo six years ago; about Kammato's murder and the photograph; about Baron Susuka and the secret service trap. "I know what wrecked the *Conqueror*. I've tried to tell the authorities at Pixton. They listen and do nothing about it. They think I'm crazy. Perhaps I was—perhaps I am—but everything I tell you is true. You have to believe me!"

"Go on," Bill said quietly. "What caused that crash?"

"A plane. A plane dived straight into it. I remember it clearly. I had received instructions to climb to the observation platform topside to make some readings. It was around noon. I don't remember the exact time. I climbed the shaft and opened the trap at the top. I looked up. I saw it—a plane diving out of the clouds—diving straight for the *Conqueror*. I couldn't do anything. There wasn't time. It came like a falling star—faster than anything I'd ever seen. It smashed straight into the *Conqueror*. There was a terrific explosion. That's all I remember until I was picked up by the destroyer. I don't know how I ever came out alive. But, I tell you, it was a plane that destroyed that ship."

GUARANTEED TO FLY 500 FT.

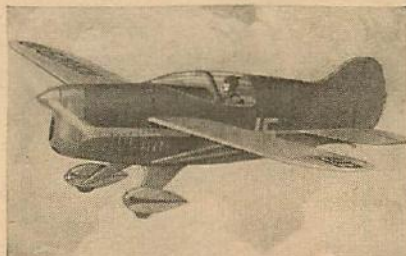
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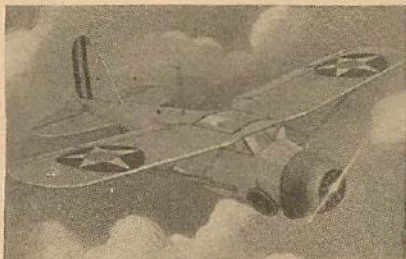
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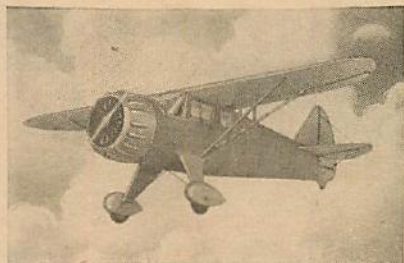
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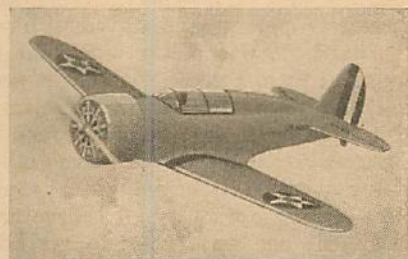
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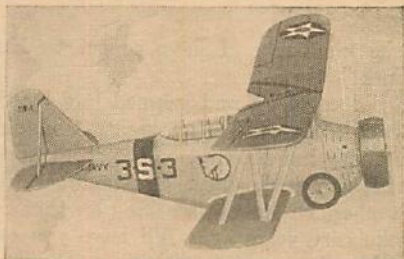
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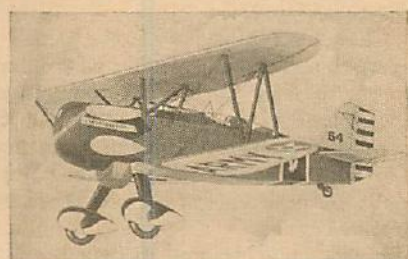
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A plane! You hear me? I can see it plunging at me now!"

Chandler's eyes were distended, his breathing was rapid. His hands groped nervously across the desk top to pick up the two sections of the automatic pencil that the monkey had dropped.

"Why didn't you tell that story to the authorities years ago?" Bill asked.

"I didn't remember. I didn't remember anything clearly until I saw a picture in the paper a month ago. A fat man's face. Suddenly I remembered the photograph Kammato had given me—the photograph of Susuka. It looked like that. Then I started to remember everything. I think he still lives—Baron Susuka.

"Listen. I saw a fat man come aboard the *Conqueror* that morning. Brady told me it was Baron Susuka. He didn't look much like Kammato's photograph, but I thought that was because of his disguise." Chandler fitted the two sections of the pencil together, then pulled them apart. His fingers were trembling. "I believed the man was Baron Susuka, then. I don't, now. I think he's still alive. I have to find out. He killed Kammato—my best friend. I have to find out. That's why I escaped."

"Let's get this all straight," Bill said patiently. "You saw a man's picture in a newspaper that reminded you of Baron Susuka's photograph. That's why you think he's still alive."

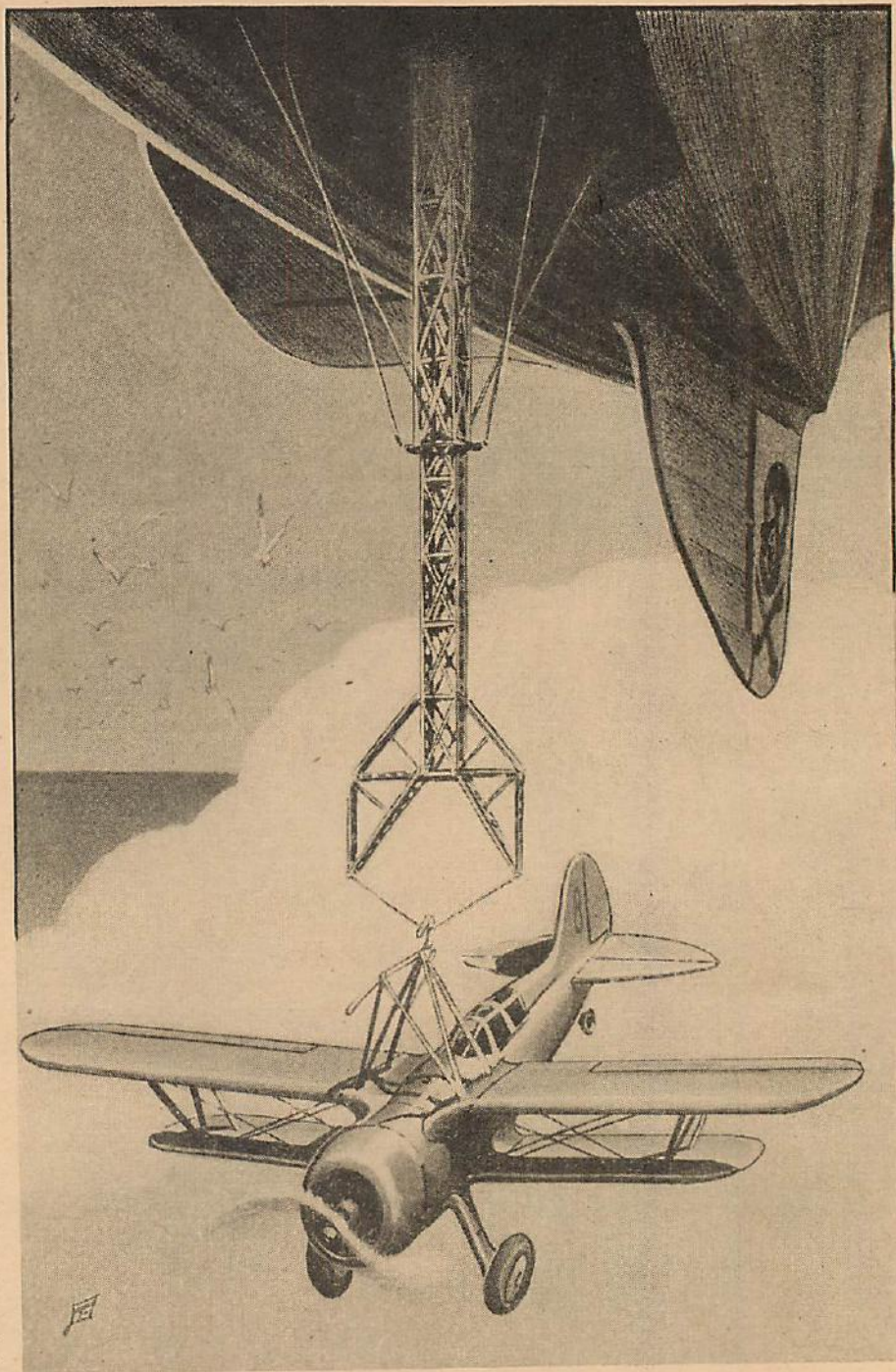
"Yes. The photograph Kammato gave me—the picture of Baron Susuka—was in the wallet in my pocket when the *Conqueror* crashed, and stayed with me afterward. I was pretty much out of my mind then, I guess. I thought people were trying to steal it. I always kept it hidden. Just before I went to Pixton I had it placed with some other of my personal belongings in a secret place in New York City. I believe now that some one was trying to get hold of that photograph. My room at the asylum was burglarized five times, my effects thoroughly searched. The authorities did nothing."

Chandler fumbled with the pencil in nervous agitation. "That's why I have to get to New York. I'm going to get that photograph—compare it with the newspaper picture. It's the same man, I'm sure. He's Baron Susuka. But I can't be positive until I see those two pictures side by side—" The man stopped suddenly and stiffened. "Listen!"

Bill did and heard the distant keening of a siren.

"They're coming after me!" Chandler leaped to his feet. "I have to get away! Let me go!" He ran to the door, yanked it open, and came face to face with Red Gleason.

Chandler staggered back, turned toward Bill. "Barnes! Let me go! They'll



The pilot dexterously threaded the hook to the lowered trellis.

take me back. I have to get to New York!"

Bill came up and gripped him by the arms. "You'll be all right, Chandler. Let me handle this. I'll get in touch with the authorities. I remember that Stephen Drake was working on that Susuka case years ago. I'll have you talk to him."

"No—no—don't tell any one yet—until I get the photograph. They won't believe me. They think I'm crazy." The man was wild-eyed. "It happened once. It will happen again. The *Sky King* will be destroyed. All those people will be killed. Let me go!"

"The *Sky King*!" Bill took a firmer grip on Chandler. "What're you talking about?"

"Transpacific's new dirigible. The line's starting again. Baron Susuka may have caused the *Conqueror's* destruction. He may do the same to the *Sky King*. If he's still alive, I don't know—yet. I'm not sure. I can prove it with the photograph. Let me go. Quickly! I'll get in touch with you. I'll tell you where to meet me in New York. I'll tell you everything then. Please let me go!"

The wailing of the approaching siren was close at hand. Bill made a snap decision that he was later to regret. He said to Red: "Let him take off. Help him."

Chandler dodged past Red and ran down the corridor. Bill heard his gasped, "Thank you. I'll wire you." And then

he was out the door and running across toward the apron where his plane stood. Red Gleason went after him.

The telephone bell rasped, and Bill went back into the office, lifted the receiver. One of the guards at the main entrance said excitedly: "Men from Pixton Asylum here, sir. Demand entrance. Claim there's a dangerous maniac inside."

Bill shot a look out the window. He saw that Chandler had scrambled into his plane, that the engine was roaring. He waited until the little biplane had started down the runway and then said: "Let them in."

As he replaced the receiver his eyes swept over the desk top. The green automatic pencil wasn't to be seen, and he realized that Chandler, in his agitation, had probably taken it with him. Bill shrugged and went out to stand on the steps of the administration building. The high gates that blocked the south entrance to the airport swung back and a powerful automobile charged through. It roared up the road, came to a tire-screaming halt on the apron. Six uniformed armed men poured from it. One of them pointed to the biplane that was angling up into the sky down by the border of the field and yelled: "There he goes!" The man ran out into the field, raised his revolver and pulled the trigger in rapid succession in the general direction of the vanishing plane.

Bill's eyes thinned as he went toward the car. The man who seemed to be in charge of the group came hurriedly to meet him. "Mr. Barnes. We gotta have a plane. You gotta fly us after that man there." He pointed with his gun in the direction of the rapidly dwindling biplane. "He's a maniac."

Bill said, "You're sure?"

"No stallin'. We followed that plane here. Hurry up. Get us a ship. We got to grab that bird."

"Now wait a minute," Bill said, his words clipped. "I have no planes for hire. And I'm not in the habit of receiving orders. Do I make myself clear?"

The man scowled. "So that's your game, is it? Obstructin' justice! I'll see that you're reported, wise guy. The fact that you're a big shot airman doesn't mean a thing to me."

He swung around and barked out a hoarse order. "He's gone. Get into the car."

The uniformed men obeyed. The leader gave Bill one last ferocious glance and then stepped into the car beside the driver. The sedan swung around, headed down the road and disappeared through the gates.

Bill was staring after them when Red Gleason came up. "A bunch of tough hombres," Red said.

Bill nodded. "They tipped their hand when they started shooting. Those guys

weren't any more Pixton Asylum guards than I am."

V—MEETING

IT was ten minutes after six the next morning when Bill was awakened by the telephone ringing. He said sleepily into the mouthpiece: "Bill Barnes."

He instantly recognized the voice at the other end as one of his guards. The man said: "Sorry to disturb you, sir, but a telegram just came, marked urgent."

Bill was suddenly wide awake. "Send it right in."

When the telegram was delivered he opened it quickly and read:

PLEASE COME DIRECTLY YOU GET
THIS STOP HAVE VITAL INFORMATION STOP ADDRESS FIVE HUNDRED
FIRST AVENUE NEW YORK STOP
CHANDLER

Bill read the brief message again, then reached for the telephone. When he was connected with Martin, the head mechanic, he said, "Get a Snorter on the line, pronto!" He hung up and hastily dressed.

A sleek low-wing amphibian was poised on the concrete, engine booming, when Bill reached the apron. He spoke briefly to Martin, swung up into the cockpit and took off.

As the Snorter raced toward New York through low-lying storm clouds, Bill regimented the items he had gleaned from Chandler's jumbled story. How much was fact and how much was the product of an insane mind, he had no way of telling. Yet, he knew certain things as true—that Transpacific was planning to reestablish their Pacific air line; that at their San Francisco base they were preparing a new dirigible, the *Sky King*, for a trip to the Orient at some unannounced future date. Those facts, coupled with the knowledge that the *Conqueror* disaster had never been satisfactorily explained and that the dope smuggling had not decreased despite Baron Susuka's reported death, had caused Bill to telephone long distance to Stephen Drake the previous evening. But the special agent had been put on a case and couldn't be reached and Bill had hung up with the realization that the preliminary investigation of Chandler's charges was squarely up to him.

And now as the Snorter streaked on through the murky morning, the famous pilot cursed himself for ever allowing Chandler to go to New York alone. The story was not all the raving of a madman. There was something sinister behind it. The pursuit of Chandler by those men who had posed as Pixton Asylum guards had proved that.

Bill leaned forward in the seat and pushed the throttle to the last notch. What if Baron Susuka should be alive?

What if the same fate that had struck down the *Conqueror* was stalking Transpacific's new *Sky King*? Everything hung in the balance until he could get to Chandler.

A steady rain was slashing down when Bill landed the Snorter on the East River and taxied her to the 31st Street seaplane base. He left the big machine in charge of attendants there and hurried to a taxi. Once inside, he took the telegram from his pocket, read the given address and told the cab driver. The man nodded and put his vehicle into motion.

The rain increased in volume as the taxi nosed southward on First Avenue. The silver-gray curtain made visibility poor and their progress was slow. The buildings flanking the street were indistinct blurs in the downpour.

Bill sat well back in the tonneau and waited until the taxi pulled to the curb and stopped. He said, "Here?"

The driver pointed to the vague bulk of a building across the sidewalk. "Yeah. In there."

Bill paid him, jerked the collar of his coat up around his ears, opened the door and ran, head down, for an illuminated doorway. By the time he had raced up the stone steps, jerked open plate-glass doors and thrown himself inside, the teeming rain had soaked him to the skin. He wiped the wet from his face, looked around and found himself in a small anteroom. He saw a white-uniformed man at a desk and he thought of only one thing—a hospital!

The man got to his feet and walked toward the pilot. Bill saw sudden recognition come into the man's eyes. His stride quickened. His face brightened. "It's Bill Barnes!" he said in a nasal twang.

The famous pilot nodded. "That's right. I came to see a Mr. Kenneth Chandler."

The man frowned. "Chandler? I don't think—oh, yeah. Yeah. He's here. Just a minute."

As the man turned away Bill said, "Is Chandler hurt? Is this a hospital?"

The man looked around, frowned and then suddenly laughed. "You had me going for a minute," he said. "Yeah, a hospital—sort of."

He vanished through a door.

Bill waited and looked curiously around him. The anteroom was deserted. The man wasn't gone long. He stuck his head through the door and said, "Come on in. Here he is."

The pilot went through into the room beyond. The air was cold. Bill didn't notice the rows of square wooden doors that lined the walls. His eyes went instantly to a table in front of him. Stretched out on it was a nude figure. The side was stained with dried blood. It was Kenneth Chandler and he was

dead. And then, and only then, did Bill realize that he was in the *Morgue!*

VI—RENDEZVOUS WITH DEATH

THE attendant said, "They brought him in last night. Found him up in the Bronx. Been plugged five times. Dicks don't know who done it yet. Maybe they'll want to talk to you, Mr. Barnes. You knew him?"

Bill forced his voice to be casual. "Slightly. He sent me a message to meet—" He left the sentence dangling, uncompleted, as the full significance of that telegram struck him. Chandler had wired for him to come to this address—to meet him at the *Morgue!*

The attendant shot Bill a puzzled look and said, "What?"

Bill shrugged. "They sure blasted him down. Well, that's how it goes." His words were deliberately careless, but he was thinking feverishly, "Why did Chandler send that telegram? Did he know he was going to be killed? Did he realize that his body would be brought to the *Morgue*? Had he hoped that he, Bill, would come; would find something on his body—the photograph of Baron Susuka, perhaps?"

It seemed too utterly fantastic. Yet — Bill half turned away and said unconcernedly, "Could I look over his clothes?"

The attendant shook his head. "The dicks got all his stuff. You better go see 'em at headquarters."

Bill nodded. "Yes. I think I will."

But he didn't. He had scarcely seated himself in a taxi after leaving the *Morgue* when a new possibility suddenly confronted him. Had Chandler, himself, sent that telegram? Any one could have signed his name. If he hadn't sent it, who had and why?

Bill dug into his pocket, pulled out the telegram and found the address of the telegraph office where the message had been dispatched. He told it to the cab driver.

And while the taxi nosed through the rain toward mid-town New York, Bill sank back into the corner prey to one appalling thought. He had, he realized, unwittingly been partially responsible for Chandler's death. If he had only had sense enough to have kept the man at the field the previous afternoon or at least gone with him to New York. But, he hadn't—and Chandler had died.

And the motive for the murder? There seemed to be only one thing—the photograph of Baron Susuka. Chandler had come to New York to get it, convinced that it would prove that the criminal still lived. Had he obtained the photograph at the time of his death? Had his killers taken it from him? Was Baron Susuka still alive? Question after question whirled in Bill's mind and went unanswered.

The cab came to a stop before the branch telegraph office. Bill told the driver to wait and hurried inside. He was immediately ushered into the manager's office.

The official was flustered when Bill identified himself. "This is a great honor, Mr. Barnes," he said. "I hope I can be of some service to you."

"You can," Bill showed him the telegram. "It was sent from this office early this morning. I'd like to see the original."

The manager agreed, and went out. When he came back he handed Bill a yellow sheet of paper. "Here it is."

The sheet was one of the company's standard blank forms. The message had been written with red pencil. One line of the pencilled words had been stroked out, however, and other words had been inserted, written in ink.

Bill's eyes were riveted to the sheet. A flush stole over his face. The pencil marks were of a peculiar crimson shade of red—the exact color of the lead that had been in the pencil that he had missed from his desk after Chandler had gone. It seemed proof enough that Chandler had written the original version of the telegram! But those inked

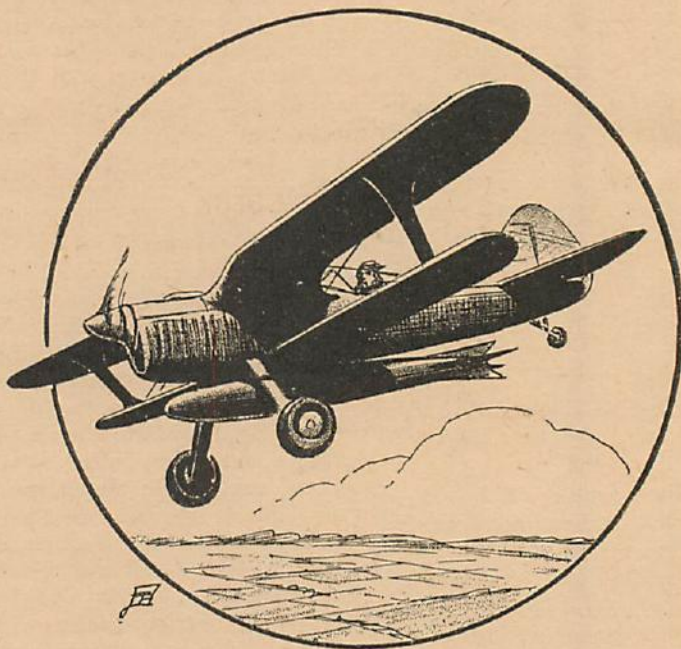
Bill thought: "Chandler wanted to meet me at his hotel room. Why? To show me the picture of Baron Susuka? Seems likely. But before he was able to send the written telegram he was killed. Then, some one—probably one of his killers—played a grim jest and, changing the address to the *Morgue*, dispatched the wire. Perhaps. But, if the murderers were after the photograph, did they get it? Or might it be still in Chandler's room?"

Bill repressed his excitement, thanked the office manager and hurried out to the waiting taxi. He stepped hastily into the tonneau and rapped at the driver, "Hotel Matson—quick!"

THE Hotel Matson was a small eight-story building on East 45th Street. Bill entered the lobby and went directly to the desk clerk. He said, "Is Mr. Kenneth Chandler in?"

The clerk shook his head. "Nope. Went out last night with a bunch of guys. Hasn't come back."

Bill hesitated and then, for the third time that morning utilized the fame which his aerial exploits had won him. "Look here. I'm Bill Barnes. Mr. Chandler wired me to meet him here.



Bill's knots held. The robot plane roared on—

words! The writing was different. Some one had changed the original message!

Bill held the paper up to the light and with difficulty made out the red pencilled words that had been scratched out. The telegram, as originally written in red pencil, had read:

PLEASE COME DIRECTLY YOU GET
THIS STOP HAVE VITAL INFORMATION
STOP ADDRESS ROOM FOUR
SIXTY HOTEL MATSON NEW YORK
CHANDLER

Chandler's *real* message!

He said if he wasn't in, I was to go to his room and wait."

The clerk's eyes flew to Bill's face. "Say, you *are* Bill Barnes, aren't you?" He extended his hand. "Glad to know you. Boy, haven't I read plenty about you guys!"

Bill shook hands. "Swell to meet you, too. Er—all right if I go up to Mr. Chandler's room?"

The man looked undecided. "It's sort of irregular. But, seeing it's you, Mr. Barnes, I guess it's O. K. Only I don't want to get into any trouble with Mr. Chandler."

"He won't get you into any trouble," Bill said grimly.

The clerk called a bell-boy and gave him a key. "Take this gentleman up to four-sixty."

At the door of the room on the fourth floor, Bill pressed a bank note into the boy's hand and said, "O. K., son. Give me the key and run along."

"Thanks." The boy grinned, took the bill, handed over the key and disappeared down the hall.

Bill waited until he was gone, then opened the door cautiously and slid inside. He needed only one glance to realize that some one had beaten him to it.

The room was in wild disorder. The mattress and sheets had been pulled from the bed. Drawers had been jerked from the dresser and overturned on the floor. The upholstery of a chair had been slashed with a knife and the stuffing bulged out.

Bill closed the door behind him and viewed the disarray, his eyes smoldering. The thorough search to which the room had been subjected seemed to indicate only one thing—that Chandler's assailants hadn't found what they sought on the man's person. Whether they had finally located it was an unanswerable question.

Bill kept his hand near his pocketed revolver and cautiously inspected the room. He moved across to a small desk, looked down at the jumbled mess of stationery. A bottle of ink had been overturned and the liquid had streamed across a pad of telegram blanks. Beside the pad Bill saw a large green automatic pencil which he recognized as his own—the one Chandler had taken!

He put the pencil in his vest pocket and picked up the pad of telegram blanks. On the top sheet were impressions of words that had been written on a foregoing page. Bill took the pad to the window, held it to the light at a slant and could vaguely make out the first words of the telegram that he had received.

Chandler, then, had written the telegram here in the room. The indentations from the writing of the previous sheet proved that, together with the presence of the pencil with the crimson-colored lead.

Bill was turning back to the desk when his eyes detected a movement in the dresser mirror. He saw in that flashing second that the room door had opened silently; saw a hand, gripping a gun, probe through and heard a harsh voice say, "Don't move!"

Instinctively, Bill's right hand stabbed down toward the revolver in his coat pocket. Then he froze. He hadn't a chance.

The door opened wider. "Raise those hands!"

Bill turned and slowly obeyed. He

saw three men file silently into the room. Black hoods were over their heads and only their eyes showed through small holes cut in the cloth. Each man held a gun trained on the pilot. The door was closed.

Bill found his voice and said loudly, "What's this—a hold-up?"

The masked man in the lead reached Bill, rammed the barrel of his revolver into the pilot's stomach and said in a burning voice, "Shut up! Give us that photograph!"

Bill feigned amazement. "What?"

The leader repeated his words. "Give us that photograph!" His companions took up positions on either side of Bill.

"I haven't any photograph," Bill said. "Where is it?"

"I don't know what you're talking about."

The leader nodded his head and said coldly. "All right—slug him!"

Bill had a fleeting impression of one of the men stepping behind him, of an upraised arm, of a revolver swishing down. He tried to whirl out of the way and failed. The gun butt smashed into the back of his head. He fell.

Later, through a whirlpool of fire-streaked blackness, Bill heard a distant voice say, "If he hasn't got it on him, he goes to headquarters. Now don't pull any boners. Remember what happened to Schiller for changing that telegram and sending it. He's in hell now—the wise guy!"

VII—THE DECK

ON Third Street, in New York's Greenwich Village, is a four-storied remodeled brownstone house with a large neon sign hanging above the canopied entrance. The sign is never extinguished and its glowing red tubes blazon out two words: THE DECK.

If you asked Richard P. Crompton III, playboy socialite, about the Deck, he'd say: "Smartest club in New York." He'd be speaking of the luxurious night club on the ground floor with its daring show, its famous orchestra and its superb cuisine.

If you asked Gus Hamilton, hard-cased gambler, he'd look you over carefully, then drawl: "Straightest gamblin' house in town, partner." He'd be referring to the undercover gambling rooms on the second and third floors with their soft-spoken croupiers, their Park Avenue guests.

If you asked Tony Mardelli, ex-convict and killer, he wouldn't talk unless he knew you well. Then he'd say out of the corner of his mouth: "Just a front for Nick Laznick."

And he'd be thinking of the secret rooms and subterranean passages in the old house, of the flourishing crime agency with its international network of underworld clients; of the fat man with his power of life and death.

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But, if you asked Nicholas Laznick himself, the fat proprietor of the Deck would only smile affably and answer not at all.

For Nicholas Laznick talked little, and then only to one man.

That man was now seated in the crime czar's hidden office and Laznick was speaking. He said, "You searched Barnes thoroughly, eh?"

Swede Hansen said, "Yes, Boss. We searched him good. He hasn't got it on him."

"And he refuses to tell where it is? You have used persuasion as I ordered you to do?"

"Yeah. Seminoff's been working on him down in the steam room. No luck, Boss. Barnes says he don't know anything about the picture."

Laznick's agate eyes flamed. "He knows, damn him! And he's going to talk!" The big man leaned forward, his massive hands white-knuckled on the chair arms. "Do you realize, Hansen, what this may mean?"

The thin-faced man looked at Laznick uncertainly. "You mean snatching Barnes and holding him here?"

Laznick shook his head impatiently. "Barnes—no! That is bad, perhaps. I mean the photograph—the photograph! If it falls into the wrong hands, everything is finished, Hansen. It means that I, Nicholas Laznick, will be identified as Baron Susuka. It will bring the whole howling pack of police here. I will have to flee for my life, and so will you, Hansen. All that may easily happen if we fail to find that photograph. We must find it quickly."

Hansen started angrily from his chair. "O. K., Boss. I'll go down to Barnes. I'll make him talk! I'll—"

Laznick cut him off with a growl. "Sit down. Such tactics do not work with that man." He stared somberly across the room. "This could not happen at a worse time— Just when those fools at Transpacific are starting up again. Their *Sky King* left San Francisco secretly early this morning, bound for Tokyo on a test flight. They are being careful. They are not taking any chances. They remember the *Conqueror* too well. But the *Sky King* will suffer the same fate. I will leave here to-night at six o'clock to personally supervise its destruction. But, before I go, that photograph must either be found or—"

Hansen said softly, "Or what, Boss?"

Laznick was silent, then: "Or Barnes must die!"

Hansen drew in his breath sharply. "But, Boss, he's— There'll be hell raised if—"

"He knows too much. Even if he tells us where the photograph is, his life is forfeited." Laznick drew back in his chair and his lips twisted into a tight smile. "I have a plan. Bring Barnes to Room K."

VIII—THE PRISONER

WHEN Swede Hansen had gone, Laznick took a black silk hood from a desk drawer, slipped it over his head and waited until his chief lieutenant's voice came over the amplifier with: "He's there, Boss."

Laznick then left his office and went down a narrow hall to where a steel door stood ajar. Hansen, masked in a purple hood, stood in the opening. He whispered to the fat man, "Barnes is pretty weak. Seminoff was beating hell out of him when I got down there."

Laznick gestured for Hansen to leave and went inside the room, closing the door. He looked across to the far side and saw Bill Barnes strapped to a straight-backed chair. The pilot was slumped forward against the bonds, his chin resting on his chest. His eyes were closed. The flesh of his face was a swollen fiery red. Whip slashes showed on his cheeks. A trickle of blood oozed down from his nose.

Laznick said, "How do you do, Mr. Barnes."

Bill straightened up with an effort. His tortured blue eyes opened, stared vacantly, then came into focus. His puffed lips moved. "Who are you?" he said weakly.

Laznick sat down on a metal chair directly in front of his prisoner. "That does not matter. I have come for a little talk. It concerns a photograph. My men report that it is not on your person. You will therefore please tell me where it is to be found."

Bill said wearily. "I don't know—I don't know."

"I regret that I do not believe you, Barnes. You know altogether too much. You even know who I am, eh?"

Bill's eyes thinned. "Yes. I think I know who you are." His voice had gained strength. "You must be Baron Susuka."

Laznick chuckled. "Brilliant deduction, my friend. You fell into the trap nicely. I was not certain how much that fool Chandler had told you. Very well—and what if I am this Baron Susuka? What then, eh? I have a new name. You do not know what it is. I have a different face beneath this mask. You do not know what it is like. If you were to escape, you could go to the authorities and say: 'Baron Susuka lives.' But, you could not identify me unless you had that photograph. So, I make a bargain with you, Barnes. You tell me where that photograph is—and then I let you go, eh?"

Bill shook his head. "I tell you I don't know where it is." He strained against the straps. "You'd better release me right away."

Laznick's eyes blazed through the holes in the mask. "Release you—no! You are going to die, Barnes. Once before you got in my way. That little mat-

ter of Dr. Hawthorne and the radium. You won then. You are in my way once more. This time you will not win. No!"

Bill's face went dark with anger. "You were responsible for the Stormer—"

"Being stolen? Yes. You were forced to destroy the airplane yourself. That must have been agonizing. And I am going to cause you a little more mental agony. It has to do with a good friend of yours—an intrepid Department of Justice agent—Stephen Drake. I am afraid I will be forced to cause his death. In fact, I am rather certain of it."

"You kill him and you'll have every G-man in the country on your trail!" Bill said.

Laznick shrugged. "I have had experience with G-men. They do not worry me. But this Drake has never been thoroughly convinced that Baron Susuka is dead. He must be removed. Of course, I might manage to save his life if I found the photograph. That is up to you, Barnes. I make you one more offer—and that is all."

Bill stared at the man, a new light in his eyes. He said finally, "If I tell you, Drake goes free and so do I?"

"Naturally."

"All right. I mailed the photograph to my airport."

Laznick laughed. "You tell lies poorly, Barnes. Every move you made since you landed in New York was observed by my men. You did not mail any letter. No. You cannot bluff me." He looked at his wrist watch. "I have no more time to waste. You have sealed your doom. There are three men who know too much. The first, Chandler, is dead. The second, Drake, is as good as dead. The third is you, Barnes. With the three of you out of the way I can afford to take my chances with the photograph. And I have a most delightful scheme for finishing you, Barnes."

Bill's gaze never left the masked man. The criminal went on. "You have, of course, heard of airplanes directed by radio. I have experimented successfully with such machines. I will use one of these airplanes when I destroy the *Sky King* to-morrow."

At Bill's start of amazement, Laznick chuckled. "That surprises you, eh? I destroyed the *Conqueror*. Why? Because those fools at Transpacific plotted their air line so it would pass directly over my secret base. And now they are hoping to reestablish the line. The *Sky King* has already left. To-night I fly to the coast, then to my own dirigible far out above the Pacific. We will sight the *Sky King*. The radio plane aboard my dirigible will be dispatched. I will guide it by remote control with my own hands. It will carry a powerful bomb. I will cause the plane to smash straight into the *Sky King*, to annihilate it. But that should not concern you. I tell you about it for a reason.

"I have another radio plane out in New Jersey. To-morrow morning you will be taken out there. You will be bound securely, then placed in the single cockpit. Slung below the fuselage, Barnes, will be a bomb similar to the one that will wreck the *Sky King*. Your plane will be directed into the air and across Long Island. When you are directly over your own field, the plane will dive, will crash in the midst of your airport buildings. The bomb will explode. You will be blown to atoms. Your airport will be wrecked. Your men killed."

Bill's face mirrored his horror.

morning you will ride the flying bomb when the sun rises over New Jersey."

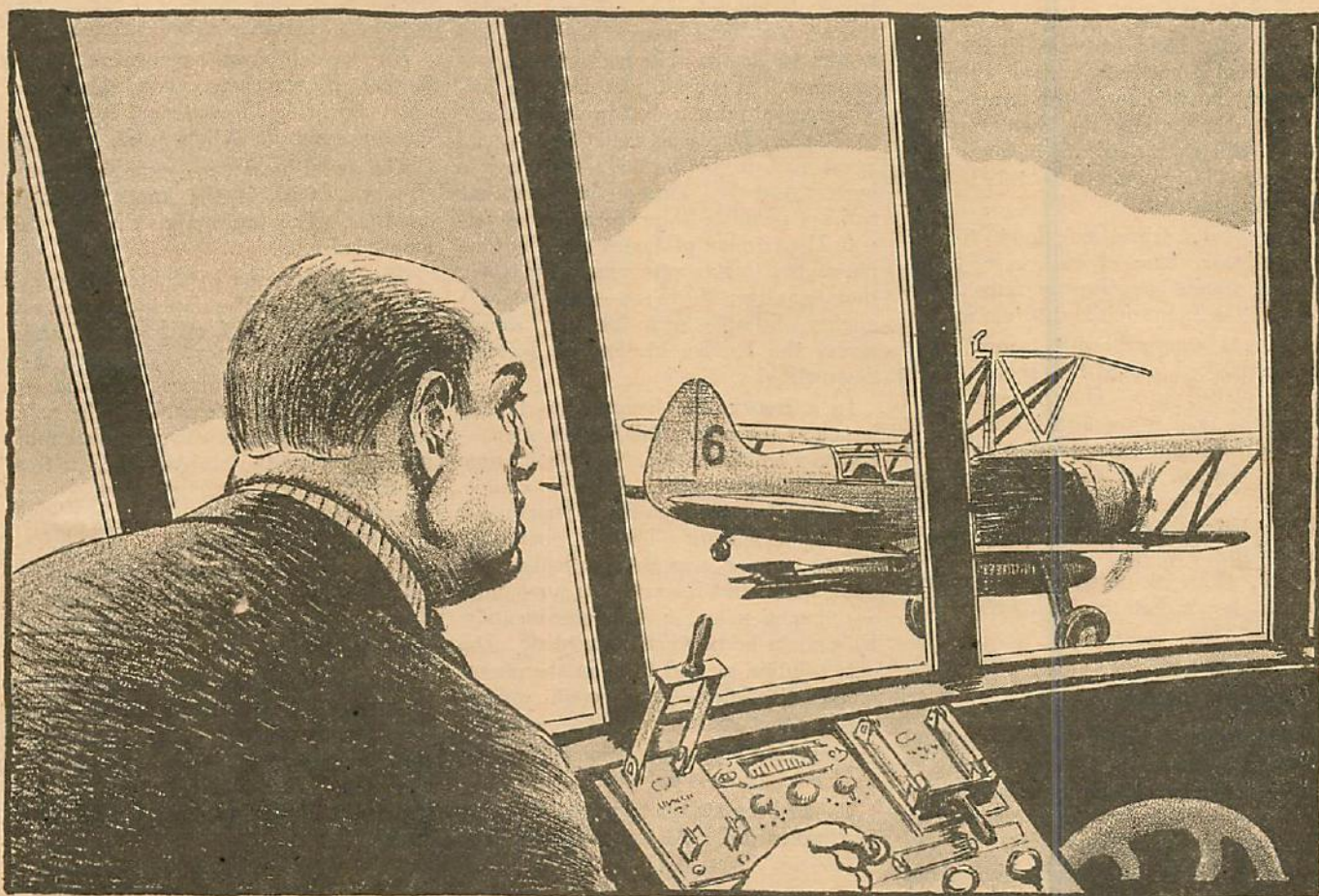
IX—ROBOT RIDER

THE sun was a blood red as its top segment cut into the Jersey horizon. Bill saw it and shivered. He lay back in the tonneau of a powerful sedan. His hands were securely tied. His legs were lashed together. A gag stuffed his mouth.

Black-hooded men sat on either side of him in the rear seat. Another was at the steering wheel. The car in which he had been brought from New York

The car door opened and Bill was pulled roughly from the tonneau to the ground. He saw that a small biplane had been wheeled from the barn hangar and was standing poised on the stubby turf. Chocks blocked the wheels of the undercarriage. Bill's eyes centered on the long torpedo-shaped bomb locked into position under the fuselage and he drew in his breath softly.

His guards gripped him by the arms and half dragged, half carried him to the plane. Bill realized the futility of offering any resistance. He remained passive as he was hoisted up and into the single cockpit. Heavy straps hung



Laznick crouched over the control board, worked the buttons, and set the plane on a straight course.

"You will have no chance to escape, Barnes. When the plane takes off, the undercarriage will drop away. So that, even if you do break free from your bonds and wreck the radio mechanism and take over the airplane's controls, you will be unable to land without the demolition bomb contacting the ground first and blowing you to atoms. Also, just to avoid the slightest chance of accident, the bomb will be set to explode in exactly sixty minutes from the time of the take-off."

Laznick stood up. "So, my friend, prepare yourself for a pleasant ride. Unfortunately, I will be unable to watch your demonstration. Now I must bid you adieu. To-morrow morning yours will be a dawn patrol. To-morrow

stood motionless beside a large barn. Through the windows Bill could see a ramshackle farmhouse, a stretch of open rolling country. A dead silence lay over the land. Then, suddenly, it was shattered as an airplane engine boomed into life from the vicinity of the barn.

The man at Bill's right said, "They're getting your coffin ready."

Bill's sagging body tensed, and with frantic desperation he renewed his surreptitious fight to loosen the rope around his wrists. He could feel the knots giving slightly. His wild surge of hope was dashed in the next second. The thunder of the airplane engine dropped to a sullen mutter and a voice from that vicinity yelled, "O. K., you guys. All ready for his majesty."

from the framework of the seat. One of the masked men reached over the coaming, pulled the straps tight around Bill's body, lashing him rigidly to the seat.

Bill's experienced eye flashed over the cockpit's interior. He saw a control stick and rudder bar. Everything seemed normal with the exception of a black metal box under the instrument board—the radio-controlled robot pilot.

The man who had adjusted the straps stood poised on the fuselage stirrup. He said, "You won't get out of this set-up, punk. It'd need a Houdini. The detonator on the bomb has been set for sixty minutes. It's six thirty now. At seven thirty the bomb goes bang. That's just in case something goes wrong. It

won't. You'll have dived into your damn airport before seven thirty rolls around. Happy landings."

The man reached out, untied the cord that held the gag in place. "So's your teeth can do a little chattering." He dropped to the ground.

Bill spat out the gag, tried to shift his position and found he couldn't. His bound wrists rested in his lap. He began immediately to work at the knots again.

Some one in the group of men said, "O. K. Made contact with the radio car. It'll be out by Barnes field to take over control by the time he gets there. Let's go."

Bill saw the throttle slide forward as if a ghostly hand had pushed it. The idling engine suddenly roared. The instrument board showed the temperature at 140 degrees and the revolutions at 1675. Bill shot a frenzied glance over the side. They couldn't do this to him. This was murder.

The engine throttled down to 500 revolutions. The chocks were pulled away. Again the throttle moved forward. The plane jolted into motion.

Bill sat numbed with terror. The engine blasted under full power. The speed picked up. The biplane raced down the field faster and faster. As if in a dream Bill saw the control stick move forward, felt the tail come up. The end of the field was racing at him. Never before had a take-off been so terrifying. The stick was moving back—back. The jolting sensation vanished and he knew that the ship was in the air!

X—DEATH DIVE

BILL looked down and saw the ground retreating. Then a tremor shook the plane as the undercarriage was disconnected and fell away. The famous flyer saw it go spinning down.

His fat captor had told him about that. It was part of the diabolical plan. With the wheels gone, he would be unable to land the ship without exploding the bomb—if he should break free and take over the controls. If—

Bill tried to twist around in the seat, to look back. The straps held his body rigid. The plane had momentarily settled into level flight. Then the control column came back. The nose of the ship pointed upward and the biplane climbed.

Bill watched the altimeter, the rate-of-climb indicator. But mostly he watched the minute hands of the chronometer. Sixty minutes before the bomb would explode. Sixty minutes! Before then, he would be over his own field. The control of the plane would be picked up by a radio car out there. And then, with the biplane directed to the right position, the machine would be put into

its death dive—the dive that was to not only blast Bill to eternity, but his airport and his fellow workers as well.

Down below, the earth was streaming away. Bill saw it all in hurried glances as he struggled with the wrist knots. The biplane was flying across the Jersey marshes. Ahead were the metallic towers of Manhattan, the morning sun burnishing them to bloody spikes.

The biplane was still climbing. Five thousand feet had been passed. At eight thousand, the ship levelled as the stick moved to a centered position.

Bill increased his furious struggle until the ropes burned into his flesh like bands of red-hot steel. Every passing second took him nearer his field and nearer to death. He had to escape—somehow! It wasn't just his own life. The masked fat man had promised death to Stephen Drake as well. The special agent had to be warned. But how—how? And Bill cursed the fate that had not permitted him to reach the veteran Department of Justice man by telephone two nights previous. And then, there was the *Sky King*—Transpacific's mighty dirigible with its crew sailing across the Pacific, heading to horrible destruction!

In a frenzy, the haggard-faced pilot jerked at the ropes. He *had* to escape—*had* to warn the others. And then, came the appalling thought. If he did escape, he might be able to warn the victims—but from whom? The fat man, the murder maniac, was Baron Susuka. He knew that. But the man was now under a different name, a different identity. How could he be found—exposed? The only solution seemed to lie in the photograph—Chandler's much-sought photograph. If it could be located—

And the biplane roared on. Time went on. And the knots held.

It had been six thirty when the plane had taken off. At seven thirty, the

bomb would explode, if the biplane hadn't already done its death dive. And now, fifteen minutes had been clipped from the sixty. Forty-five minutes left. And with each invisible thrust of the propeller blades, the ship was hurtling nearer and nearer to the Long Island airport—nearer and nearer to annihilation.

New York City passed.

Bill's wrists were numb. Blood was flowing to stain the ropes crimson.

The hands of the chronometer moved relentlessly on. It was ten minutes to seven—five minutes—seven o'clock!

The frenzied battle in the cockpit continued. Little by little the ropes were loosening. Bill's body was wet. The muscles of his arms ached viciously.

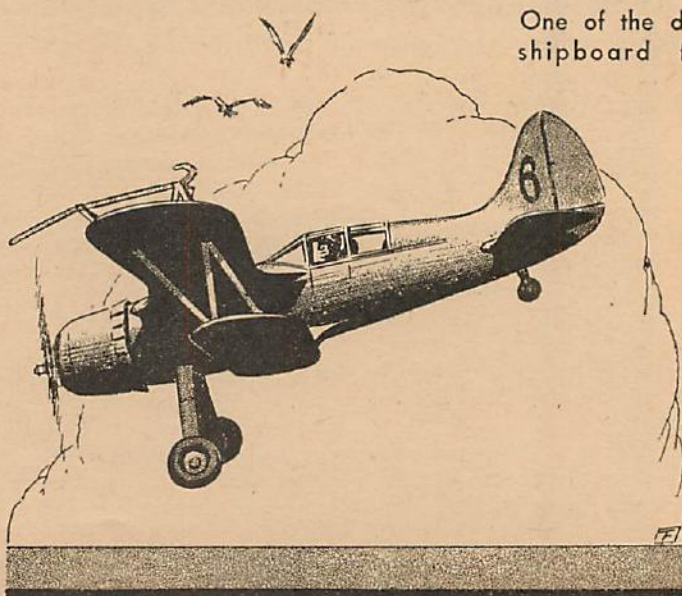
He looked down, recognized landmarks. Horror came. The biplane was near the field. The airport lay but a few miles ahead. A few miles!

The awful knowledge gave him super-strength. One of the knots loosened. Another. The ropes were slipping, the loops widening.

The airport was in sight. He could see it plainly. The biplane thundered closer—closer. Bill shot a frightened look over the coaming. The road that led to his flying field was deserted except for one lone automobile. The radio car! The car that was even at that minute controlling the biplane—the car that would put it into its death dive.

Bill's fight rose to a furious height. There was no more time. He had to get free. Now—or never! Another knot sprang apart! He tugged savagely. Again the rope loosened. His right hand came free! Then his left!

The expansive airport with its white runways, its hangars and field buildings was directly below. Then the control stick in the cockpit jolted forward. The nose fell. The biplane threw its tail high and dived headlong. The death dive!



One of the dirigible's shipboard fighters.

XI—THE NOTE

BILL shouted. His mind froze. His released hands pawed at the straps around his body, jerked them free from the buckles.

The biplane was tearing down in a vertical power dive. The nose was aimed like an arrow straight for the administration building. The engine was screaming. The wind had a thousand shrieking sirens as it tore past. The speed was increasing. The airport was growing larger and larger.

The straps fell away. Bill's body was free. His hands gripped the control stick. His feet rammed against the rudder bar. He tried to close the throttle; tried to jerk the stick back—and couldn't! The biplane was still under control of the radio car.

Faster and faster pelted the machine. The ground was a blur as it whipped up toward the oncoming juggernaut. Bill took his right foot from the rudder, flexed his leg and drove the toe of his boot smashing into the black metal box.

There was a sharp crackle of blue flame. The biplane shuddered. Its wings whipped around. Bill felt the tension on the control stick. He pulled it back. The ship responded. He had control!

Two thousand feet below lay the airport, coming up at the biplane at the rate of three hundred miles an hour. Bill rammed the throttle closed, fought the stick back—back.

The biplane responded. The nose lifted. Carefully, Bill eased the angle of the dive. A wild shout was coming from his lips. The biplane was in his own hands.

The death dive was over. The plane screamed into level flight a thousand feet from the field.

Bill's blood-shot eyes stabbed at the chronometer and his exultation died. Ten minutes after seven! In twenty minutes the bomb would explode. And he couldn't land. He couldn't jump. He had no parachute.

Parachute!

The word exploded across his brain and with it came an idea—the only idea—the only chance of escape.

As the biplane roared on, Bill held the stick with his left hand while his right went to his inside coat pocket. He felt a paper, pulled it free and saw that it was Chandler's telegram. Tense with excitement his fingers fumbled across the pockets of his vest, contacted his green automatic pencil—the one he had found in Chandler's room. He yanked it out, hastily turned the telegram over to its blank side, and holding it against the instrument panel, wrote in crimson-colored lead:

Aboard biplane. Bomb attached to under side of fuselage. Timed to explode seven thirty—in eighteen

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1/16x25 for 5c	1/8x1/830 for 5c	1", pair .30c		1/16", 3/16", 1/4"10c ft.
3/32x24 for 5c	1/4x1/425 for 5c	1 1/2", pair .40c		ALUM. LEAF, 2 sheets for 1c
1/2x24 for 5c	1/2x1/220 for 5c	2", pair .70c		WIRE, 6 ft. 3c
3/16x23 for 5c	3/32x3/3240 for 5c	2 1/2", pair .80c		36" lengths.
1/4x22 for 5c	1/4x1/412 for 5c	3", pair .90c		
1/2x21 for 5c	1/2x1/210 for 5c	3 1/2", pair .95c		
	1/2x1/25 for 5c	4", pair .15c		
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1/2x3/8x43 for 5c	1x2, 1 for9c	3/4" .2 pr. 2c		
1/2x3/8x33 for 5c	1x2 1/2, 1 for15c	1" .2 pr. 3c		
1/2x3/8x21 for 5c	2x1, 1 for19c	1 1/2" .2 pr. 3c		
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minutes. No under-carriage. Can't land. Take off with parachute attached to line. Drop to me. Hurry. Bill.

He pulled off his right boot, bound the message to the leather by the laces. The biplane had sprinted away from the field. Bill brought her around in a vertical bank, headed back and threw the stick forward.

Seventeen minutes left!

The plane was pelting back for the airport, its pilot crouched forward in the seat. Seconds were like minutes. Bill levelled off at less than fifty feet and blasted his ship across the buildings, jerking the throttle forward and back until the roar of the engine became a howling fiendish chatter.

Over the landing field, he slung her around on a wing tip, thundered back. Again he jazzed the throttle to attract attention. He saw men running from the control building, from the hangars, their faces upturned.

Bill waited until he was over the concrete apron, then whipped the biplane around, leaned over the side and threw down the boot.

He saw it land, saw men running. They had it.

Fifteen minutes left!

Every second counted now. Bill took the plane up in a wild zoom, circled and waited. To his feverish mind, the thudding of the engine was the ticking of the bomb that was locked to his plane. His eyes went from the chronometer to

the field below and back again, in an endless shuttle.

Hurry! Hurry!

Down below, the men were scattering wildly, racing toward the hangars. But, to the frantic pilot they seemed to be moving with leaden slowness.

Fourteen minutes . . . thirteen . . . twelve. . . .

One of the hangar doors was now open. The nose of a Snorter came into view. White-uniformed men were wheeling the sleek machine out to the concrete apron. The engine was started. The propeller vanished. The men were scrambling into the cockpits. Another was running from the administration building, carrying a white bundle. Bill saw him hand it to the man in the rear cockpit of the Snorter. The parachute! The life preserver—if it would only arrive in time!

Eleven minutes . . . ten minutes. . . .

A cold sweat was on him. His throat was dry. He found himself shouting wildly to the men below.

The Snorter was now racing down a gleaming white runway, now angling into the sky. Bill pulled the biplane's stick back and zoomed higher.

The hands of the chronometer moved toward twenty-one minutes past seven o'clock. Nine minutes to go!

The Snorter was streaking upward like an arrow, the sun shimmering across its sleek surfaces. Bill levelled his ship, held it on a straight course and waited. He twisted around in his seat and watched the low-winged amphibian. Its

furious climb had taken it higher than the biplane. Now it levelled off, was following his course. The white bundle was being lowered by a rope. The wind caught it, flung it far back. The bound parachute dropped lower as more rope was payed out.

The Snorter was rapidly overtaking the biplane. It settled lower, came closer. Bill held his right hand rigidly on the control stick. His feet were jammed against the rudder pedals. He half raised himself from the seat and held his left hand ready.

Eight—no, seven minutes! Seven minutes left!

The Snorter was almost overhead. The white bundle at the end of the rope swung nearer. The amphibian passed over the biplane, crept ahead.

Bill waited, tense. The dangling parachute was now over the biplane's fuselage, was almost in his grasp. He reached out his left hand.

Suddenly, the biplane lurched. Bill was thrown against the coaming. The bundle slipped past—he had missed the contact!

XII—EXPLOSION

A SHOUT of anguish was wrung from Bill's lips. He clutched at the coaming, caught his balance and saw the parachute slither away and out of reach.

Missed!

He levelled the pitching biplane, shot a look up. The Snorter had climbed steeply, to avoid the danger of the rope tangling in the biplane's propeller, and was now banking around and pelting back. Bill could see the goggles of the two men in the amphibian as they looked down.

Another attempt—that was all he could hope for. To wait and pray that he'd get the parachute the next time. But would there be a next time?

The chronometer showed twenty-five minutes past seven. Five more minutes—just five!

A clammy coldness gripped Bill's body and his heart seemed like a thing of lead as it kept up its terrific pounding, pounding.

The Snorter had come around again, was again approaching, trailing its precious bundle. The waiting was agonizing.

Again Bill raised himself in the cockpit, again he held his left hand ready. A prayer was on his lips. Fear was in his eyes.

Slowly, painfully slowly, the Snorter crept over the biplane. The swinging parachute passed just over the rudder and the fin, swung along the sleek top of the biplane's fuselage.

It came nearer, nearer. The pilot of the Snorter was taking no chances, was using extra caution. Bill held his breath. His eyes never left the roped object.

Nearer. Bill reached out his left hand.

The parachute was almost there. His fingers groped. He struggled to reach out farther. His fingertips grazed the canvas package, fastened on the cord binding it, seized it with a grip of steel.

He had it! The contact was made!

He jerked the parachute to him, saw that the knots had been arranged so that the main rope could be quickly released. He pulled the cord, dropped the parachute into the cockpit, waved his hand in a quick signal to the men above.

The Snorter zoomed, the dangling rope whipping after it. Bill scarcely saw it. He was down in the cockpit, loosening the harness of the seat-pack chute. He freed it, struggled to climb into the webbed straps. A cockpit had never before seemed so small.

The chronometer! Twenty-seven minutes after seven! Three minutes left!

Frantically he snapped the metal clasps, fastening the webbed belts around his figure. He glanced down in a quick check-up and saw that he was ready.

Bill jerked the stick back, zoomed the ship wildly. He had to get it away from the airport!

The biplane climbed dizzily, heading into the east, toward the Atlantic Ocean. Bill waited. He slung one leg over the cockpit coaming.

One minute left! Time was almost up.

He neutralized the controls. The wind tore at him as he climbed to the coaming. He waited for one brief second, took a deep breath—and plunged headlong over the side.

He fell like a plummet. He fell spinning, head over heels. His finger gripped the metal rip-cord ring, but he waited. The bomb would go off at any second now. He had to be as far away as possible. He had escaped from the murder machine, but there was still danger. The bomb had a tremendous charge. When it exploded the blast would shatter through the skies. Death would rain for miles around. Bill forced his legs straight, extended his arms. The spinning lessened and he dived headlong. He saw the earth tearing up at him. Behind, far away to the east and far above was the biplane, streaking on its way toward the Atlantic.

Then, just as Bill's finger tightened on the ring, a terrific explosion thundered. The biplane vanished in a puff of flame.

Invisible bits of debris shrieked past the falling airman. His ear drums felt shattered. But he had escaped—escaped from what had seemed certain death.

He pulled the rip cord. The earth was near now, too near. A momentary tinge of panic gripped him. What if in his haste he had donned the harness incorrectly? But with a loud report, the parachute opened. He felt the violent jerk on his body as his headlong plunge was checked. He looked up, saw the great white silken circle—and he breathed a prayer of thanksgiving.

The parachute drifted slowly down. Bill twisted around in the harness, looked toward his airport. He saw two cars whirl out through the entrance and race down the road toward the place where he would alight.

Bill watched the earth coming up, realized that he would contact the ground in a grassy meadow. He waited, judging his distance. His dangling feet were near the turf when he gathered in the shroud lines on one side, jerked them to him and went in for a sliding landing.

The cars were racing nearer, columns of dust rising to mark their coming. Bill yanked the harness from his body, gathered the silken mass together and ran toward the road. The appalling features of his own narrow escape were suddenly purged from his mind as he remembered the masked fat man's plans. Death had not only been plotted for him, but for others as well. What of Stephen Drake? What of the *Sky King*, with its host of passengers and crew?

They had to be warned—instantly!

Agonized, Bill waited for the cars.

XIII—DOOMED

MINUTES later, the first car came to a skidding stop. Bill saw that Shorty Hassfurth was at the wheel, that Sandy was beside him, and that Sam Cooper, his reporter friend from the *New York Star*, was in the rear seat. His start of surprise at seeing the reporter was only momentary. Then he was throwing himself into the back seat and bellowing above the barrage of questions: "Get back to the field—hurry!"

They did. As the car hurtled down the road, the accelerator rammed to the floorboards, Bill rapped out a clipped version of what had happened since he had left the field. "We have to phone Drake—phone Transpacific! There's not a second to lose!"

He turned to Sam Cooper. "How'd you get here?"

The reporter said, "Working on Chandler's murder. Heard about him landing at your field. I came out to talk to you. Found you missing and everybody jittery over it. I stuck around." His face brightened. "What a story—Baron Susuka alive! You've no idea who he is now?"

"None. Only chance is to find that photograph. But what a chance! I tell you, he's a madman, Sam. He'll do what he said. He'll kill Drake! He'll wreck the *Sky King*! All we can hope to do is block his plans." Bill's face was grim. "The *Sky King* left yesterday morning. She'll be more than two thousand miles out by now. And he's going after her—left last night, flying. I figure he can't possibly reach her until sometime to-night, our time. That gives the *Sky King* a chance. She'll have to be warned immediately by radio to

change her course so that he won't be able to find her. That's her only chance of escape."

Cooper swore softly. "What about Drake? Where is he—Washington?"

Bill's fingers clenched. "I hope so. I couldn't reach him two nights ago. I'll phone Washington. He might be back. Unless—unless that madman's finished him already."

The car charged through the airport entrance, stopped before the administration building. Bill leaped out, yelled at Shorty, "Get hold of Transpacific! Phone or radio. I'll call Drake in Washington!"

As he raced to his office he saw Martin, the head mechanic, and shouted at him, "Get the Lancer fueled and ready for action! May need her. Quick!"

Then he was in his office. He jerked

Bill gripped the arms of his chair. His face was strained and haggard. He said bitterly, "This maniac's got to be found and blasted out. I swore I'd get who was responsible for the Stormer's destruction. And now if he murders Steve Drake and those others—"

Cooper had a notebook out and was writing rapidly. He looked up quickly. "The Stormer! You mean to say that the fat man was behind the radium business? Holy smoke! This is going to be the biggest scoop in years."

"If we ever find out who he is," Bill said sourly. "We haven't a clue."

"Just the photograph," Cooper said.

worries me except—" He shook his head.

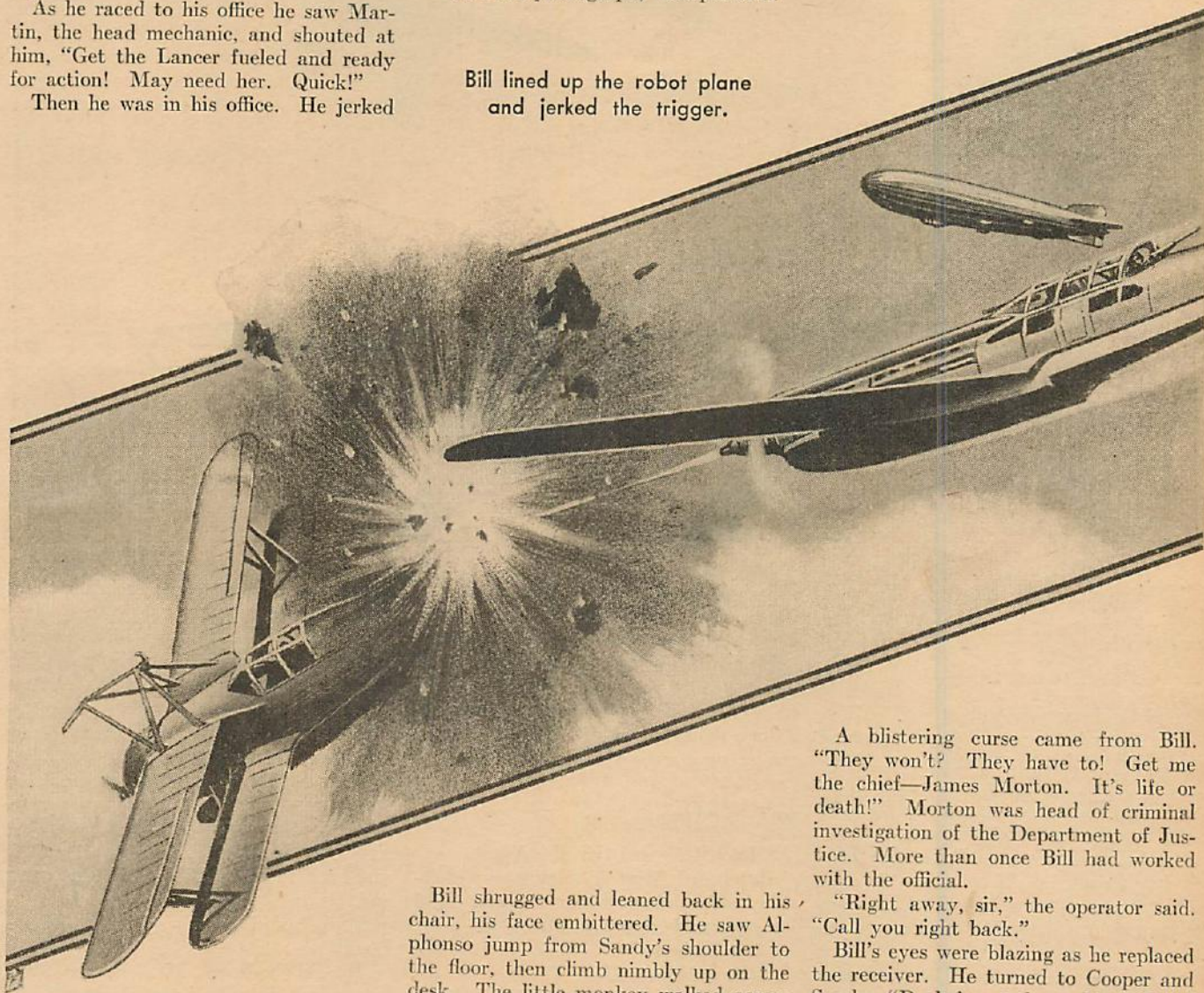
Sandy said, almost timidly, "See, Bill? I told you I'd teach him to write. See how he can hold the pencil and make those X's?"

"Uh-huh," Bill said absently. "He's almost—"

The telephone bell rang sharply. Bill jumped, grabbed the receiver and jammed it to his ear. "Drake?"

It was the airport's switchboard operator. He said excitedly, "Mr. Drake's not there, sir. Out on an important case. They won't tell me where. They—"

Bill lined up the robot plane and jerked the trigger.



his coat and vest from his feverish body, slung them across the desk and seized the telephone. He rapped out an order to his switchboard operator to call Stephen Drake at the Department of Justice in Washington.

The operator said, "Right, sir. Call you back."

Bill banged down the receiver and saw that Sam Cooper and Sandy Sanders had entered the office. The boy had found Alphonso, and the little monkey was perched on his shoulder and was chattering happily.

Bill shrugged and leaned back in his chair, his face embittered. He saw Alphonso jump from Sandy's shoulder to the floor, then climb nimbly up on the desk. The little monkey walked across the desk top and squatted down to inspect Bill's coat and vest. His hairy hands poked through the clothing, while his beady eyes blinked rapidly.

Bill glanced at his wrist watch. The wait for the call to go through was agonizing. He heard Sandy's hushed command. "Hey, quit it, Alphonso. Drop that." Bill looked up and saw that the monkey had taken the green automatic pencil from the vest pocket and, holding it tightly in his paw, was making crimson X marks on a desk pad.

Bill smiled wearily. "Let him alone, kid. He doesn't worry me. Nothing

A blistering curse came from Bill. "They won't? They have to! Get me the chief—James Morton. It's life or death!" Morton was head of criminal investigation of the Department of Justice. More than once Bill had worked with the official.

"Right away, sir," the operator said. "Call you right back."

Bill's eyes were blazing as he replaced the receiver. He turned to Cooper and Sandy. "Drake's not there. Looks bad."

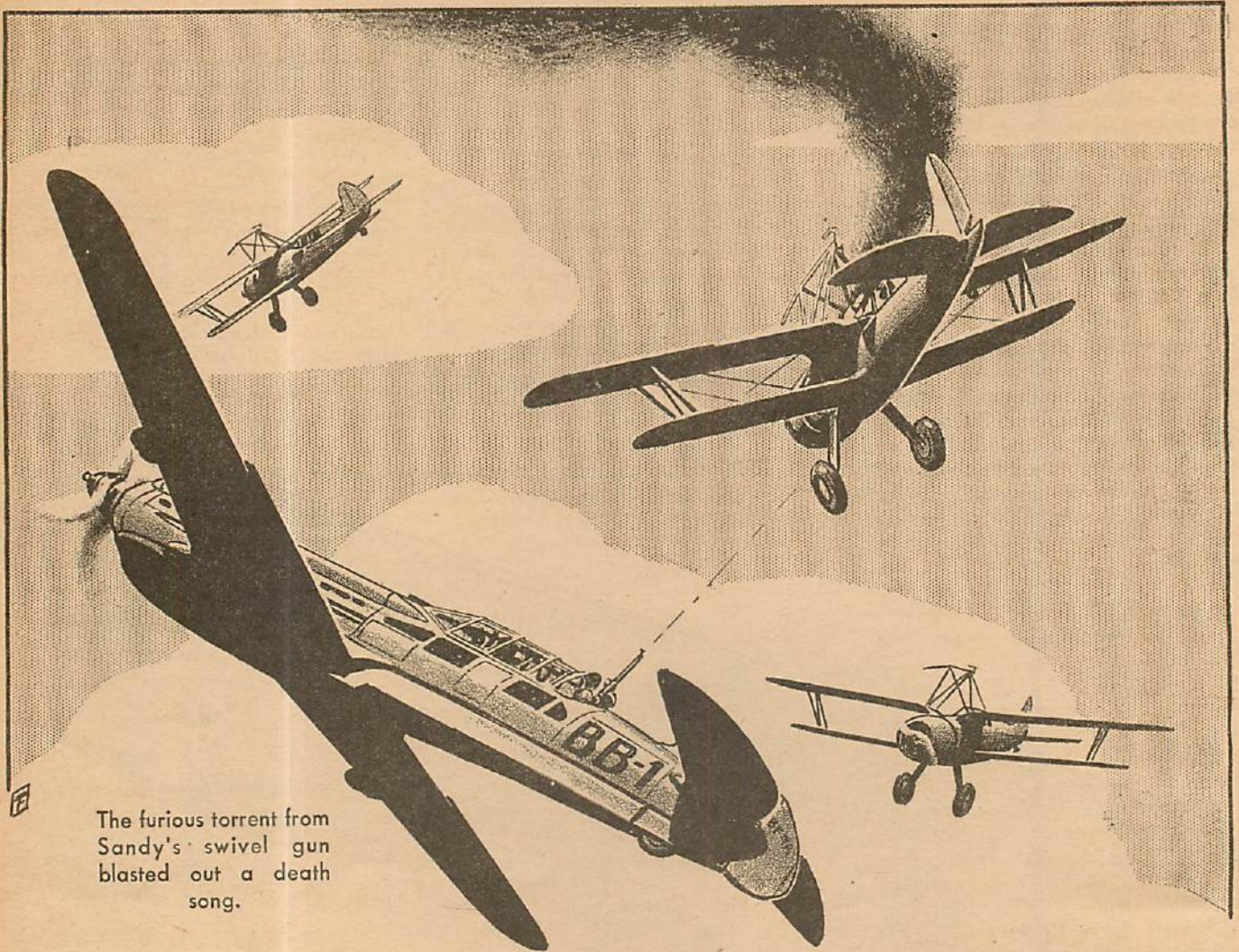
The sound of pounding feet came from the hall outside. Then Shorty raced into the office, followed by Tony Lamport, the radio operator.

Shorty said breathlessly, "Bill! Tony's talked to Transpacific. They're frantic. The *Sky King's* been out of radio communication for twenty hours!"

Bill came half out of his chair. "What—"

Tony said, "They're afraid something's happened like the *Conqueror*. They're trying desperately to contact her."

Cooper's eyes were wide. "He's wrecked her already! He's got her!"



The furious torrent from Sandy's swivel gun blasted out a death song.

"Wait a minute," Bill said. He sank back in his chair. "He can't have reached the *Sky King* yet. He left New York last night, flying to the coast. There he'll change to another plane and fly out to his own dirigible in mid-Pacific. He is going to dispatch the radio plane with his own hands. No, he can't have reached the *Sky King* yet. Now I remember. He said her radio was going to be put out of commission. She's probably still O. K. But—" His face suddenly blanched. "Good God! Now there's no way to warn her! She'll keep to her route. She'll fly straight into the trap!"

Utter silence followed the dire pronouncement. The situation was appalling. Transpacific's mighty new dirigible was cruising placidly on her way, cut off from all communication.

The telephone bell rang with the abruptness of an exploding bombshell. Bill started, whipped the instrument to him, said, "Yes?"

A familiar voice came to the pilot's ears. "Barnes? This is James Morton. What's the trouble?"

Trouble! Bill was white-lipped. He talked rapidly, the words hammering out with machine-gun staccato. He didn't stop until the whole story was told. He finished with: "We've just received word.

The *Sky King* can't be reached by radio. There's no way to warn her. But where's Drake? We have to warn him."

He heard Morton's startled gasp. The official's voice was hollow, strained, when he spoke. "Barnes, Drake's working on a dope-smuggling case. *He's gone to the Orient on the Sky King!*"

XIV—ACTION

DRAKE aboard the *Sky King!*

Bill heard Morton talking on, excitedly, asking about Baron Susuka. And he answered automatically. "I don't know who he is."

"But we *have* to know!"

Bill said, "Yes." But he wasn't thinking of that. He was thinking of a flying bomb diving into the shining envelope of the *Sky King*. He was seeing the explosion—seeing his friend, Stephen Drake, and the others being killed. His grip on the receiver tightened as if to crush it. He said, "There's only one chance. There's only one plane fast enough to get there in time. I'm taking off in the Lancer. I'm going after the *Sky King!*"

He was on his feet now. That was it. The only way! He cut through Morton's protests, abruptly terminated the conversation. The receiver jolted down

on the hook. Bill kicked the desk chair back, whirled around.

"Shorty. Get out to the Lancer! Whip those grease monkeys into action! Get the ship ready immediately!"

Shorty disappeared.

Bill turned back, grabbed his coat and vest and slung them across his shoulder. He saw Alphonso squatted on the desk, his fingers toying with the green pencil. Suddenly the bottom section became unscrewed. The pencil came apart and a small roll of paper fell from the hollowed end.

Sandy said shrilly, "Bill! Look! Look!"

But Bill had seen. His hands stabbed out, seized the roll of paper, unfolded it. He needed only one glance to tell him what it was—the last link in the whole hideous nightmare!

He shouted, "It's the photograph!"

It was. And with it was a newspaper clipping.

The photograph was faded and cracked, but the fat man's face was easily discernible. And to remove any possible doubt Chandler had written across it in crimson lead, "Baron Susuka."

Bill's excitement mounted as he looked at the newspaper clipping. It was a reproduction of a fat man's face. And

underneath, in small type, was: "Candid photograph of Nicholas Laznick, the genial host of the Deck."

Bill placed the photograph and clipping side by side on the desk top. Except for the man in the photograph looking much younger, the resemblance to the man in the halftone was unmistakable. The same fat face, dark eyes, bald head, twisted lips—the same man!

Cooper was beside Bill. He said, "Baron Susuka—Nicholas Laznick! For the love of Allah!"

Sandy stopped his shouts of, "He found it! Alphonso found it! He's smart!" to ask, "Who's Laznick?"

Cooper said, "Runs the Deck down on Third Street. Big-shot gambler. The cops have been trying to get something on him for years—"

Bill scarcely listened to the reporter's excited words. All that didn't matter now. To him all that mattered was that Laznick was the destroyer of the Stormer, of the *Conqueror*; the murderer of Kammato, of Chandler—the man who, even at that moment, was racing across the Pacific to kill again.

The airman whipped around. His words chopped out. "Sandy, get dressed! You're coming with me. Cooper, phone Morton. Tell him about the photograph. Tell him to hold off raiding Laznick's place as long as possible. If Laznick's warned of what's happened, he may rush the job on the *Sky King*. I need every last possible second."

Bill's lithe figure straightened. "I'm going after the *Sky King*! I'm going after Nicholas Laznick! And I'll get them, so help me!"

XV—THE PIRATE

THAT morning, at 6 o'clock New York time, Nicholas Laznick reached a secluded private air field in California after a fast flight across the continent. Another powerful biplane was waiting, engine running, in front of a hangar. The machine was one of the dope-smuggling fleet, and built into the center section of the top gull wing was a braced metal hook—a device which enabled the plane to contact an extended bar below the keel of the *Pirate* and to be drawn up inside the hull.

Laznick was in a jubilant mood as he lowered his great bulk into the rear cockpit of the second plane. Everything was working out as he had planned. Within an hour, Barnes would meet his death, and then, later, much later, would come the destruction of the *Sky King*. The criminal spoke through the intercockpit telephone to his pilot in front. "The *Pirate* is waiting at the proper place?"

"Yes, sir. About twenty-eight hundred miles out, away to the north of the *Sky King's* route. We should reach the *Pirate* in twelve hours."

"Good. Do you know the *Sky King's* position at the moment?"

"She's roughly sixteen hundred miles out, sir," the pilot replied. "The *Pirate* will have plenty of time to head south and cut her off after we get there."

Laznick smiled. "That is excellent—excellent. Now, take off."

But everything wasn't excellent, for within two hours after leaving the coast and heading due west across the Pacific, the biplane's radio broke down completely. Nor could it be fixed.

And for the entire twelve-hour duration of the flight, the fat man scowled in the rear cockpit and cursed the harassed pilot at the controls.

It lacked ten minutes of 6 o'clock that evening, New York City time, when the dope ring's dirigible, the *Pirate*, was sighted high in the sky. By 6 o'clock the pilot of the biplane had dexterously threaded the contact hook to the lowered lattice work and the plane was drawn up into the hull of the dirigible.

And it was then, and only then, that Nicholas Laznick learned of what had happened in New York.

The *Pirate's* commander was waiting, his face white, when Laznick dropped down from the cockpit to the deck of the dirigible's hangar.

"We've been trying frantically to radio you, sir. We couldn't get you."

Laznick cursed. "The set broke down." He looked at the commander's agitated face. "What is wrong?"

"Everything, sir! Everything! Barnes escaped! Headquarters radioed hours ago. Barnes is in the Lancer. He's heading after the *Sky King* to warn her!"

Laznick's big hands shot out, fastened around the commander's throat, his fat face black with fury. "You lie, damn you! Barnes could not escape!"

The commander struggled. He gasped out, "It's true. He's already left San Francisco. He's—"

Laznick released the man and headed for the radio room on the run, banged the door open. The operator slid out of his chair, backed away from his enraged chief. He stuttered out, "Headquarters trying to contact you, sir. Mr. Hansen's on the air now."

Laznick jerked earphones over his head, yelled into the microphone. "Hansen? The Boss?"

The earphones vibrated as Swede Hansen's voice came back. "Boss! Where've you been? Barnes escaped! He's in his Lancer. Heading across the Pacific. We tried to stop him. Sent planes out. They couldn't catch him. He left San Francisco at 3 this afternoon, our time."

Laznick's eyes glittered. "You will all pay for this! You—" His string of oaths was cut short. Hansen's voice rose to a shout.

"Wait a minute!" There was a slight pause, then: "Boss! The cops are here—at the Deck. They're raiding the place. Barnes must have found the photograph. They're coming in—shooting."

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They're all over. Boss! Boss! Do something! They've got us! They're throwing bombs! They're smashing in the radio-room door now! Boss! Boss you—"

Laznick heard a terrific crash and then the radio went dead. The criminal crouched forward, jerked the microphone to his lips. "Hansen! Hansen!"

When there was no answer, Laznick lunged to his feet. He tore off the ear-phones, hurled them across the room, and stormed through the door.

He found the commander in the control car and bellowed at him. "Head for the *Sky King* full speed! Prepare the radio plane for launching!"

The commander turned and shouted out the orders. Men rushed madly to obey. Laznick stood, legs far apart, his hands drawn into big fists. "They think they have got me. I will smash that *Sky King* to atoms if it is the last thing I do." He bellowed at the commander. "How long before we contact the *Sky King*?"

The officer was bending over his chart table. He calculated rapidly. "Four hours, sir. Our top speed's 65."

"Four hours! Why in thunder didn't you get nearer when you knew this had happened?"

"Your orders, sir. If we had moved from our position you would never have found us—with your radio dead."

Laznick glowered in silence. Then, "Barnes left San Francisco three hours ago. We have to get to the *Sky King* first!"

The commander nodded. "We will, sir. Easily. Barnes can't average more than 400 miles an hour in his Lancer."

XVI—THE AVENGER

BUT at that very minute the needle of the Lancer's air-speed indicator was quivering at 480 miles an hour and creeping higher. And Bill, crouched down in the front cockpit, watched it, his bruised bronze face impassive.

Speed! The only hope!

The Lancer was streaking high across the water world that was the Pacific, streaking on and on, her mighty Diesels hammering out a crescendo of power, the winds screaming a shrill accompaniment around her silver surfaces. She was a shaft of light, a shimmering meteor.

Ever since the super-plane had taken off from New York the terrific speed had continued. Once they had landed, at San Francisco. The pause had been brief. The great tanks of the sleek machine had been filled and then the Lancer had been on her way again, her bullet nose aimed down the air road that the *Sky King* had taken.

It had been shortly later that five bi-planes had made a surprise attack on the silver monoplane. But Bill had the throttle moving forward and the Lancer

had pelted away without a bullet marring her dural plates.

And now three hours had passed since the shores of America had dimmed and vanished. Three hours and almost fourteen hundred watery miles had blurred away. And as many miles again and more lay ahead before the threatened *Sky King* could be overtaken.

Bill nudged the throttle wider and his eyes kept up their continuous zigzag from the instruments, to the maps, to the charted course of the *Sky King*—the course that was the Lancer's. He listened to the smooth pounding of the engines and his face was grim. He knew that the Lancer was getting the most gruelling test of her whole career. But she couldn't fail now. If she did, Stephen Drake and others would die; Trans-Pacific's mighty airliner would be reduced to ruins—and Nicholas Laznick would win.

In the rear seat was Sandy Sanders, his boyish face aged by the tenseness. Little, if any, conversation passed between the boy and the tight-lipped man at the controls. They both knew the terrific odds they were facing. It was as if they were saving their breath, saving every speck of energy for what lay ahead.

And Bill, as the awful race continued, found his mind shuttling back to the past. He thought of Chandler, the man who had been judged insane, the man who had cracked the whole vicious business wide open. He had paid for his knowledge with his life. Yet, even as his corpse had lain on its marble slab in the Morgue, he had outwitted his sworn enemy, Baron Susuka—Nicholas Laznick. He had passed on the vital evidence that was to shatter Laznick's crime empire and turn the master criminal into a hunted fugitive.

Bill saw it all clearly now. Chandler had had the photograph in his hotel room when he had been surprised by Laznick's men. Realizing that escape was impossible, Chandler had stuffed the photograph and the clipping into the pencil he had taken from Bill's field with the hope that Bill, himself, would come to the room and would pick up his own pencil. And fate had ordained that such a thing would happen.

Bill stared into the clear skies ahead. Chandler had been sacrificed so that the mad assassin, Laznick, could be exposed. The Lancer's pilot gripped the control stick tightly. The *Conqueror's* officer hadn't died in vain. Laznick could claim no more victims. He had to be stopped—dead!

Savagely Bill bent over his charts, and for the hundredth time he calculated his position. Panic threatened to engulf him as he realized that four more hours had to be passed before there could be any hope of reaching the vicinity of the *Sky King*. Four more hours! And in

that time, would Laznick get there first? Would the radio plane with the lethal cylinder clamped to its belly be released to execute its dive of destruction? Would Bill find only a tangle of twisted framework sinking to oblivion?

A shudder passed over him. Speed was their only hope—the Lancer's terrific speed.

At intervals during the agonizing flight, Bill talked to his field over the radio, reporting his progress. When San Francisco had been three and a half hours astern, the excited voice of Tony Lamport came to Bill's ears. The radio operator tersely reported the details of the raid on the Deck and the capture of Laznick's chief lieutenant, Swede Hansen. The man had made a full confession to the government operatives and had revealed the world-wide crime organization that Laznick had headed.

Right after that, James Morton had spoken to Bill, his voice vibrating with emotion. He, too, told of the raid, of the extent of Nicholas Laznick's evil influence and control. He ended with:

"Save the *Sky King*, Barnes!" His words were almost a prayer. And then his voice became hard and brittle as he said: "And whatever you do, get that man Laznick. Smash him down. Blast the life out of him. He's a murderer a hundred times over. The whole country is watching you, Barnes. You're all alone in this. It's up to you. Save the *Sky King*. And—kill Nicholas Laznick!"

Kill Laznick! The words rang in Bill's brain long after the radio contact had been terminated. Save the *Sky King*! Kill Laznick!

The Lancer screamed on, racing the sun in its westward journey. Bill turned back the hands of his chronometer as they crossed the time belts. The Lancer had left New York when the morning sun was blazing, and it was still high in the sky, and would be for hours yet. The pounding Diesels now seemed to pick up the war cry. Save the *Sky King*! Kill Nicholas Laznick!

Four hours had now passed since the west coast of America had been left behind. The four went into five and the five into six. Still the pulsing machine arrowed on, with the needle of the air-speed indicator hanging at 490 miles an hour.

Bill estimated his position again and excitement came, feverish excitement. An hour more! An hour would see the *Sky King* overtaken! But Laznick and his dirigible—had they already arrived?

The minutes ticked away. The pilot shouted to Sandy over the intercockpit telephone, ordered the swivel gun broken out and held ready. He himself checked the 37 mm. automatic cannon that fired through the hollow shafts from the Diesels. He saw that the chambers had been loaded with alternate high-explosive and incendiary shells. He

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checked over his two stationary .50-caliber machine guns, glanced at the ammunition counters. Everything was ready.

He shot a look back and saw that Sandy had the .30-caliber gun on its track. The boy was standing in the cockpit, inspecting it.

Bill spoke into the microphone. "Keep your eyes ahead, kid. If you see anything—shout!"

And then, exactly ten minutes later, Sandy shouted. His young voice blasted through the earphones over Bill's head. "Look! To the northwest!"

Bill's eyes whipped across the cloudless sky. They saw nothing but the sun-washed blue, and then—His heart leaped thudding into his throat. He saw a small, elongated object, a shining object.

A dirigible!

Feverishly he seized binoculars, jammed them to his eyes, thumbed the lens adjuster. The shining object instantly enlarged. He saw it clearly even to the markings on the side.

It was the *Sky King*!

He shouted at Sandy. "That's she! That's—!" He never finished the sentence as his glasses suddenly ranged above and beyond the *Sky King*. For he saw something else—something that

sent cold sweat breaking out over his body. He saw another dirigible and he knew that it was Laznick's!

XVII—THE KILLER

NICHOLAS LAZNICK sat forward in the control car of the dirigible *Pirate* and held powerful binoculars to his eyes. His lips were twisted as he watched the *Pirate* narrowing the distance between the far-away *Sky King*. He said over his shoulder to the commander, "We got her! We got her!"

His big hand came up to rest on a panel that had been built into the forward end of the control car. The panel was studded with push buttons labeled: *Start. Release. Right. Left. Straight. Glide. Climb. Dive.* At the side was a lever which regulated the speed of the robot plane.

"The radio plane is ready to be dispatched?" Laznick asked.

"All ready, sir."

"Excellent. Excellent. We will wait until we are closer. There will be no mistakes made. I, myself, will guide that bomb. I, myself, will blast that gas bag out of existence. I will show those fools the power of Nicholas Laznick."

The commander shifted uneasily. His

face was pale as death, and his hands shook.

Laznick held his glasses steady. "We have beaten Barnes. By the time he gets here all will be lost. The *Sky King* will be gone. And the *Pirate* will be heading back to Tupper Island." The criminal suddenly tensed forward. A curse broke from his lips. "Look! A plane! A plane! It's Barnes in the Lancer!"

He lunged to his feet, jerked away the binoculars. His fat face was contorted as he whipped around on the commander. "Dispatch the radio plane! Quick! Quick! Barnes is here!"

The order was shouted into the communication tube.

Laznick stood on his feet, his whole massive body shaking with fury. Again his glasses whipped to his blazing eyes. He saw the sleek silver shape of the Lancer, clearer and nearer now—much nearer.

Furiously he plunged across the control car to a side window and looked back along the under side of the *Pirate's* keel. A biplane was being lowered by the extending lattice work. The radio plane.

Laznick rushed back to the control column. His finger jammed down on

the *Start* button. He waited momentarily, then pressed the *Release*.

The robot plane, engine blasting, disengaged its hook from the supporting bar and dropped into flight. Laznick crouched over the control panel. He shouted over his shoulder. "Get three of the four planes ready for launching! Pilots to attack Barnes."

He worked the buttons, shoved the lever forward and saw the robot plane roaring out ahead of the *Pirate*—roaring now on a straight course for the *Sky King*. And under its fuselage gleamed the torpedo-shaped bomb.

XVIII—THE CANNON

BILL saw the enemy dirigible. He whipped the Lancer around and threw the throttle to the last notch. The final reserve of speed he had been nurturing leaped into the Diesels. Their screams rose to a screeching wail. The Lancer blurred across the sky, faster, ever faster. The airspeed indicator jolted to five hundred miles an hour and went on. Five hundred and ten! Five hundred and twenty! Five hundred and thirty!

The two cigarlike shapes of the dirigibles enlarged with amazing rapidity. Bill held a death grip on the controls. He raised the glasses to his eyes. Had the robot plane been launched?

Then he saw it, saw it being lowered, saw it drop free from the *Pirate*, and head across the air straight for the *Sky King*.

The robot plane! The flying bomb!

Horror seized Bill. Could he stop it before it reached its helpless victim—before it streaked down in its death dive?

The Lancer was making top speed. Nothing more could be wrung from the pounding engines.

Bill nudged the controls until his amphibian was racing down the channel of sky that separated the *Pirate* from the *Sky King*—the channel across which the radio robot was now tearing.

It had to be stopped. It couldn't reach its hulking victim!

Feverishly Bill saw that the cannon was ready for instant action. The Lancer was pelting closer to the robot plane. Closer and closer. But the flying bomb had covered a quarter of the

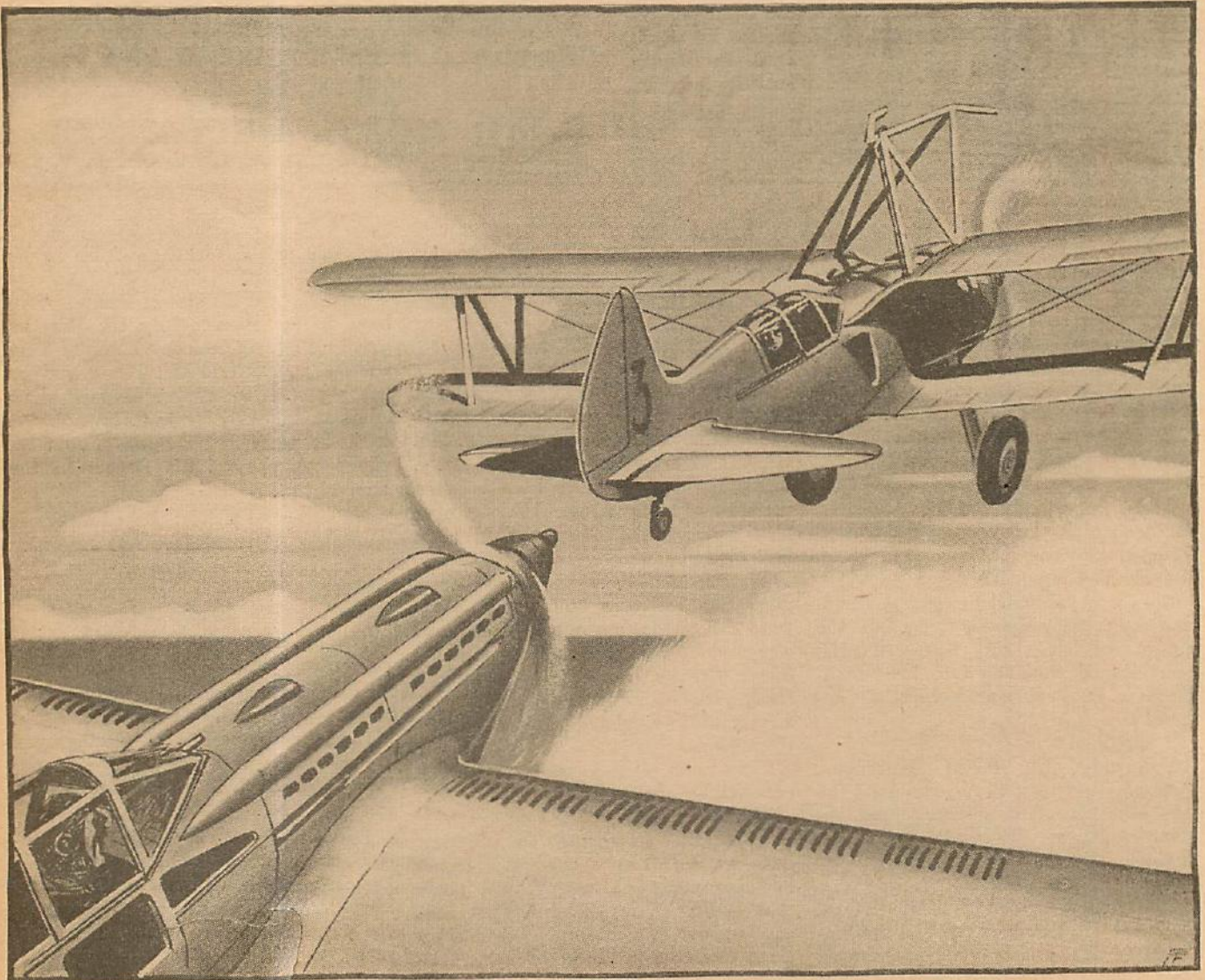
distance to the *Sky King* and was tearing on.

The blood drained from Bill's face in that awful minute. He could see the riderless plane clearly now—could see the shining tube slung to its fuselage—the bomb!

The pilot's eyes burned down the gun sights which framed the death ship ahead. And then the appalling thought jabbed through Bill's consciousness. If he fired on the robot, the powerful bomb would be exploded. The charge would blast through the heavens. Destruction would come to the Lancer—perhaps to the *Sky King*.

The distance was dwindling with the rapidity of light. The radio plane was squarely in the gun sights. It was now halfway across to the *Sky King*. No more time could be wasted. Bill saw the solution.

He waited, counting aloud to himself, waited until he had reached "ten." He held the Lancer rigidly on its course. He waited until he was almost on the robot, until the flying bomb had almost passed across his gun sights, until all but



Bill waited. He saw the man in the cockpit turn around. It was Laznick—

the tail section could be seen. Then he jerked the trigger of the cannon.

The gun roared. A deadly stream of shells pumped out. Explosive and incendiary shells. The torrent cut across the robot plane, cut away the entire tail section as if it had never been there.

The robot staggered. Its nose dropped—and it dived! Dived not for the envelope of the *Sky King*, but for the glinting waters of the Pacific far below.

The Lancer had streaked past where the robot had been and Bill pulled the stick back. The mighty plane screamed for the heavens.

Bill threw himself to the side, looked down, his face burning with a strange light. His plan had worked. The robot plane had been put out of control and the bomb hadn't exploded.

Far below, the death machine was plunging headlong. Fire was now creeping up its mutilated fuselage. The flames whipped higher and higher. Then the whole heavens seemed to split wide open as the bomb exploded!

The Lancer whirled up, helpless in the blast of air. The wings whipped over. Bill struggled for control. The throttle was now closed. He fought the stick and the rudder pedals until the pulsing amphibian was wrenched into level flight.

Again he looked down. The *Sky King* was flying serenely on her course. The robot plane had utterly vanished. There was nothing left but a plume of black smoke.

He had won. He had saved the *Sky King*!

XIX—FURY

ONCE again it was Sandy who warned him. The boy's voice reached his ears. "Bill. They're lowering more planes!"

Bill looked at the *Pirate*. A biplane had been released from the launching mechanism and another was being lowered. The first plane was now racing across toward the Lancer.

Bill banked his amphibian around and clipped into the microphone. "O. K., kid. Laznick's aboard that gas bag. And Laznick has to be killed! Mop up on these crates!"

"Ready, Bill!"

And once again the Lancer threw itself into action. Bill crouched down in the cockpit, his fingers on the firing trips. His face was the mask of the avenger. No mercy could be shown. Again Morton's orders flared across his mind. Save the *Sky King*! Kill Laznick!

A third biplane had now joined the other two in the sky. The trio roared toward the Lancer. The battle was on.

It was suicide on the part of the enemy pilots. Bill flew his ship as he had never flown it before. He knew that victory was now in his grasp. His fin-

gers rammed down on the trips. The two stationary machine guns yammered out their torrents of death. The Lancer's burning lead slashed into the biplanes, ripping along their wings, their fuselages, pounding into their power plants.

The silver amphibian was here, there, everywhere. Enemy bullets hammered into her metal skin, but she went on, escaping destruction by inches. One biplane went plunging helplessly down the path of destruction that the robot had taken. Only ten seconds passed before flames burst from the second ship and the pilot twisted in his cockpit and died. Then the furious torrent from Sandy's swivel gun blasted out a death song for the third.

They were gone. But Bill, his eyes shining with the lights of holy fury, did not pause. Laznick had to die. The *Sky King* had been saved. Transpacific's mighty air-liner was even now hovering in the sky near by. She and her crew had been saved. Half the command had been obeyed.

The Lancer charged the *Pirate*. The enemy dirigible had swung around and was heading into the northwest, her engines blasting out full power.

Bill settled in his seat. The gun sights showed nothing but the gleaming covering of the dirigible. His fingers went to the trigger of the cannon and then he hesitated. The *Pirate* was entirely at his mercy. Yet it had to be destroyed. It was a thing of murder, and inside lurked the arch-killer—Nicholas Laznick.

Bill's lips tightened. He pulled the trigger and held it down. The cannon thundered. One hundred and fifty shots a minute. Bill saw the stream of shells pump into the shining envelope. Explosion followed explosion. Flame streaked up. The envelope sagged, seemed to split.

And the Lancer pelted up in a thunderous zoom. Her work was done. Bill sank back exhausted against the seat and watched the flames spread, the column of smoke thicken.

Inside was Nicholas Laznick. The destroyer of the Stormer, of the *Conqueror*, the murderer of Kammato and of Chandler.

Suddenly the lattice work under the pitching dirigible lowered. On its end was another biplane. Laznick was escaping!

The biplane broke contact, dived far down from the doomed *Pirate* just before a terrific explosion blasted out. The whole dirigible became a thing of fire. Its stern was flung high and the *Pirate* pitched downward.

And through the inferno of flame shot the biplane, to streak away into the northwest.

"It's Laznick!" Bill shouted, and threw the throttle wide.

The Lancer roared into action, raced after.

XX—PURSUIT

All the weariness abruptly left Bill. Everything within him rose to a terrific peak. Here was the end of the trail. The final act.

Laznick!

And into the cockpit of that racing Lancer seemed to come voices from the dead—the voices of Laznick's victims. They seemed to join in a frightened chorus that the criminal must die.

The throttle moved. The speed increased. The intervening distance between the two planes melted away. The Lancer was on the biplane's tail, and Bill's fingers touched the firing trips.

Suddenly the enemy plane zoomed, whipped over, came shrieking down on the amphibian. Its guns blazed. A torrent of lead flicked across the Lancer's wide wing.

Bill brought his ship straight up, blasted her over in a screaming Immelmann, to come bulleting down again. And his adversary had once more sought safety in flight.

But flight was hopeless. Again the Lancer blasted after the biplane. The enemy was zigzagging, trying frantically to shake its pursuer. Bill waited. He saw the man in the rear cockpit turn around. He was now close enough to see the fat face. Quickly he put his binoculars to his eyes. The face became clear. It was the face that had been in the photograph—in the clipping. The face of Baron Susuka, the face of Nicholas Laznick. The fear-twisted face of a man who was about to die.

The recognition was all Bill needed. He guided the Lancer closer until he couldn't miss. Then he pulled the trigger of the cannon.

Shells poured into the biplane with deadly accuracy. They slashed through. They exploded. A column of flame stabbed up.

Then it was over. The rider, the biplane, everything vanished. And in their place was a falling train of bits of matter drifting to the ocean below.

Nicholas Laznick was dead!

BILL throttled down and circled. He watched the wreckage cut a smoky swath through the blue of the sky. It splashed into the waters of the Pacific. A puff of white steam geysered up. The ocean parted and closed.

Bill shook his head. It was all over. The whole frightful campaign was ended. The *Sky King* had been saved. Nicholas Laznick had died.

Bill straightened out his plane, leaned back in the seat. He saw the *Sky King* now far in the distance, and with a jerk of the control stick he headed the Lancer for it. Beneath them lay the almost totally submerged wreckage of Laznick's *Pirate*.

Bill said into the microphone, "Sandy, you O. K.?" He looked into the rear-

view mirror and started with surprise. Calmly seated beside Sandy in the cockpit was Alphonso, the monkey.

Bill gasped, "How in thunder did that ape get here?"

Sandy grinned, and his reply came through Bill's earphones. "I brought him along. Had him hidden back of the seat all the time." The boy became serious. "You remember Alphonso found that photograph, Bill. So I figured we'd better have him along just in case we got into trouble. He's smart, Alphonso is."

"I'll never forget about that photograph, kid," Bill said. He pulled the green automatic pencil from his pocket and handed it back to the animal. "Alphonso, you're a genius. Here, keep this pencil. You've earned it."

The monkey seized the pencil, chattered wildly and immediately began making crimson X marks on a map.

Minutes later the silver amphibian reached the mammoth *Sky King*, swooped triumphantly around it. The crew were crowded to the windows, waving vigorously. Bill jockeyed his machine closer, his eyes searching. He thought for a moment he saw Stephen Drake, but he couldn't be sure.

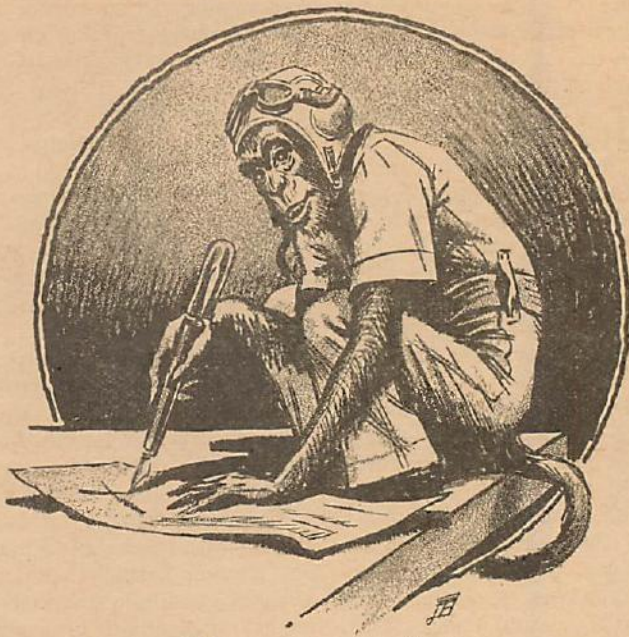
Bill talked to Sandy. "O. K., kid. That's that. We're striking for Honolulu. We could use some fuel."

The bronzed-faced pilot looked again at the *Sky King*. The mighty air-liner was gliding majestically on her way, the sun burnishing her great envelope to dazzling silver.

Emotion crowded up into Bill's throat. His clenched fist was raised high above his head, and he yelled, although he knew no one could hear him. "Ahoy, the *Sky King*. On your way! On your way!"

XXI—REWARD

FOUR full days had passed since the battle over the Pacific before Bill



Alphonso signs his check.

reached his home field. He and Sandy had encountered reception after reception at Honolulu and San Francisco. Transpacific had thanked him with words and with a financial reward. But the greatest reward he had was a simple cablegram that was waiting for him at his home port. It was from Drake. The message was simply: THANKS, BILL.

Sam Cooper was waiting for them in Bill's office. He cut through the enthusiastic gathering and showed Bill a newspaper.

The headline read: SKY KING BLAZES PACIFIC AIR TRAIL. And underneath: Tupper Island Revealed as Base of Laznick Gang.

"I scooped the country!" Cooper said. "I beat 'em all!"

Sandy had Alphonso on his shoulder. The monkey was clinging tightly to his green pencil. The boy said, "And you know who's responsible for that?" He patted the monkey. "Alphonso—that's

who. He found out who Baron Susuka was. You can thank him, Sam."

Cooper grinned. "And don't think I won't. In fact, my paper has issued a reward to Alphonso." The reporter pulled out a slip of paper and put it on the desk. "A check for a hundred dollars."

Shorty laughed. "A check! Good grief! What good will a check do that dumb ape? He won't be able to cash it."

Sandy put Alphonso down on the desk and turned to Shorty. "What do you mean he won't be able to cash it?" the boy said angrily. "Look at him now."

Alphonso had turned the check over, was scribbling on the back with the pencil.

"See," Sandy said excitedly. "He's signing it now!"

They all looked. And sure enough up near the perforated end of the check was a large crimson X mark.

CYRFALCON

(Continued from page 24)

But he cut a mad, wide swath of destruction with his new weapon. Troop trains, machine-gun nests, trench mortar pits, trenches, E. A. and sausages—all were targets and victims for the terrible blow of his cannon plane. He was in truth a hunting falcon, launched from the mailed fist of war, to swoop down on the planes of the enemy and break them with a blow from his closed claw, the heavy gun.

But Masters did not invite Brick to accompany him to Paris on leave, and Chumleigh did not invite him to his estate near London. Brick flew alone, and lived alone.

Then the Kaiser made his last mighty

bid. All planes were in the air, days and even clear nights. The skies swarmed with the queer Fokker tripes and the new and terrible D-VIIs.

So Brick found himself in formation again, for the first time in many days. The flight was heading north and west, toward the lines, on morning patrol. Masters flew at the apex of the V of twelve machines, Chumleigh, with his cork leg and a borrowed machine, at the tip of the right wing, and Brick, as a veteran, across from the Englishman on the left wing tip.

It was Brick who first spotted the twelve little specks up against the sun. He flew down in front of Masters and

waggled the wings of his plane, pointing upward. The planes of the flight closed, their Hissos growled, and they climbed to combat.

Brick climbed with them, past the level of the enemy flight, and even higher. He was no coward, and would not deliberately dodge a dog fight, but he knew the strength and weakness of his plane and its armament. The big gun was heavy. Outside of that, he mounted only a light Lewis on the top of his wing. This gun could be tilted down toward his cockpit, but had to be loaded in the blast of the prop, and if he really sighted it, he would have to rise partially.

His plane had neither the climbing power nor the maneuverability of the others; to be safe as possible and to really make himself useful in a scrap, he realized that he would have to be above them all, where he could shoot down at attackers, outranging them one hundred or two hundred yards, smashing them before they even started to shoot. He searched the sky above him. Ah, a plane up against the sky. By the silhouette of the long, blunt-nosed fuselage he knew it for one of the new Fokkers.

But the Fokker did not wait for Brick. The tail flipped up and the blunt snout nosed down for him.

Long before the other plane was within machine-gun range, Brick loosed a shot from his cannon. The tracer ruled a dark line—just over the center section of the Fokker. Like two knights jousting with long spears and winged steeds, the two planes rushed headlong at one another. Then the German aimed his lance. Two spots of flame leaped from the shadow of the muzzle.

Brick, not having time to reload the cannon, had his hand halfway up to the pull cord of the Lewis on the wing. Whang! His head jerked to a hard smash. His ears rang. He had a fleeting, dizzy glance of the German banking steeply away and upward. Was he hit? Was this the end? He shook his head. In front of his face there were three little holes punched neatly in the lower aluminum ring of the wind screen. He felt his helmet. The leather was roughened in a long groove, but he could feel no blood.

The German had the height and the maneuverability, and he held his advantages with the skill of a master flier. Brick felt no fear, even then, but he knew for an instant, some instinctive sense like his shooting skill, told him that this man could have outflown and outfought him the best day that he ever lived, with any plane anywhere near the equal of his own.

Brick had often scoffed at fliers who told tales of the "Indian sign" feeling, of one man knowing that the other could

beat him, or that he had the other man; but now he felt it to the full. He climbed, and the German climbed faster. He banked, and the German banked more sharply, slashed in. Tac-tac-tac! Brick's Spad shivered as tracers chewed into his camel back, missing his head by inches.

Brick managed to slip a shell into his cannon, and when the German dived in front of him, Brick could hardly believe his eyes. He yanked his nose down in line with the Fokker's tail. But just as he was about to pull the trigger, the German shot upward. Brick craned his neck to see him pass overhead and come buzzing back down, a perfect Immelman executed from a dive—a neat trap.

And Brick had seen something else that gave him a not-so-pleasant thrill. From the struts of the Fokker streamed the pennons of a flight leader, and from the dragons on the bodies and wings of the Fokkers he had seen as he climbed through the fight, this meant that his opponent was the German ace of aces, Von Reitmeister himself.

The Spandau spoke again, and slugs popped through the fabric of Brick's center section and plowed furrows on the upper surface of the wing.

But Brick was angry and desperate. Instead of diving or trying to bank away from the blast, he stood up in his seat. The burst ended just in time to prevent him from poking himself right into the line of the tracers. The German had been coming so fast that he swooped above Brick's head, missing his plane by inches with his wire-spoked wheels.

Scorning the pull cord, Brick jerked the Lewis down and aimed it by the grips. His luck and his shooting skill held. The Fokker roared over his head. "Now!" The little voice spoke. Brick squeezed the trigger. The drum whirled. Tac-tac-tac! Tac-tac-tac! It had a slower tempo than the Vickers, geared to the motor.

The wind stream that slapped Brick back against his cockpit blew back a broken chain of empty shells and acrid smoke from the two short bursts. Short

bursts, but the German swam for an instant in that steel ring at the end of the long muzzle, and Brick's uncanny shooting instinct told him that he had scored.

The Fokker darted away in the start of another of those marvelous climbing turns, faltered, nosed down and slid off to the left. A puff of black smoke belched from the short stacks of the Mercedes, and the propeller flickered. The wind stream of the dive kept it spinning lazily, but Brick knew that he had conked the enemy's motor.

For the first time then, Brick saw his adversary with the sun full on him. It was Von Reitmeister, sure enough—a pure silver plane, no dragons. The large molded brass radiator gleamed like a helmet in the sun; but from the golden snout to the silver rudder there were no decorations or heraldry other than the streamers of a flight commander on the struts and the severely plain black crosses of the Knights of Malta on the wings and fuselage of Von Reitmeister's Fokker.

And the baron was at his mercy now—the man who wore the laurels passed down from Boelcke to Richthofen; the man who boasted forty-seven machines to his credit, confirmed. What would that bunch of snobs back at the field think when he got confirmation for this man? He would write in the combat report, simply, "A silver Fokker with black crosses, no other markings. One of the new D-VIIs. Pennons on wings, believe may have been Von Reitmeister." And they'd know darned well it was Von Reitmeister.

Brick pressed his eyes to the sight and nosed downward for the shot. In the cross hairs of the sight he could see the goggled face of the German, twisted backward and upward to watch him—a face pale and intent, but not showing fear. The man was watching him, calculating, trying to pick the exact moment when he should throw his powerless ship into some desperate twist or dive. But that would do him no good, and Brick knew it. He might miss the German the first time, but would hit him



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sooner or later. The roaring Spad rushed on the powerless Fokker.

The Fokker loomed quickly in the sight. Then another sensation came to Brick, just as strong as that terrible Indian-sight feeling, just as gripping as that thrill of triumph when a Fokker slid away with smoke pouring from the motor. It was a very real memory, almost an hallucination, of a helpless rookie and a silver plane. He jerked his face away from the eyepiece of the sights. A flip of his wrist and he rocked his ship into alignment alongside the Fokker.

He looked across at the face in the other machine. A black streamer blew back from the German's helmet. Brick raised his left hand in a flip of a salute. A brief instant and the sign was returned. Then Brick banked away. The

fight was broken off. With clear skies, and the remnant of his circus to protect him, Von Reitmeister would land safely within his own lines.

"OF COURSE, you couldn't call it war, but then, I let the German beggar sail away, too. I was above them both." Chumleigh was perched on the corner of Captain Masters' desk, what he termed his favorite roost.

"No, it wasn't war, but things like that—well, they sort of let us know that men will keep on being human, and not beasts, wars or no wars," Masters mused.

Brick marched in and saluted smartly. "Sir, I'm looking for some paint." He grinned, and both Chumleigh and Masters, for the first time in months, saw again the attractive red-headed kid they

had both known at first. "I'm going to paint that thing off my machine. It looks too much like a flying Liberty Loan poster, or—or something."

Masters returned the salute and the smile. "I think that can be arranged."

Chumleigh's pleasant English voice interrupted. "I've put in for a bit of leave, you know. You've been going it pretty hard, Baxter, and I wondered if the captain, here, couldn't arrange a leave for you, too, to coincide with mine? I'd like to show you both some of our English countryside for a couple of weeks or so."

"I think that can be arranged, too," Masters said.

Back in the bunkhouse, Brick found a game of stud. A soap box was pushed toward him, and he sat in.

"YOU CAN TELL A MAN BY HIS HANDS"

(Continued from page 32)

like this before," he said to Bill Clark. "I think I'll get the super at Miami and ask him what I ought to do."

"He'll tell you to mind your own business, which is taking your ship from Miami to Barranquilla," Bill answered. "What do you care if some sap loses his pants?"

"The ship and the passengers and the cargo are my responsibility," Jed said with dignity.

"You're not responsible for their morals," Bill said.

The four motors of the giant air yacht droned steadily on as Bill Clark piloted the ship past the tip of Cabo Cruz and above that stretch of the Caribbean that is known as Bartlett Deep. The water below changed from emerald and aquamarine to a deep indigo as the floor of the sea dropped away to a depth of over four miles. The air was mellow and soft, and half the passengers were now asleep.

Jed Lawry's own head was nodding as young Dannie Meeker suddenly appeared beside him. Dannie's face was flushed and his voice trembled as he spoke.

"Mr. Lawry, sir," he said, and gulped. "You better come back here. Something is going to happen. They have over five thousand dollars in one pot. I—"

"I'm going aft," Jed said to Bill Clark, and climbed out of his bucket seat.

Something crept up Jed's spine and caused the nerves at the base of his skull to tighten until they ached as he stopped before the compartment where the four men were gambling.

Kennedy, the Barranquilla banker, sat with one of his long, slender hands cupped against his stomach. From the top stuck the corners of five cards. His face was grim and tenacious. He was watching Hart, the Kingston planter, with eyes that were lumps of ice.

Hart tapped the board with the tips of his fingers while he studied the cards

he held. Jed saw that Anderson and Roberts had dropped out of the pot. And when he looked over Hart's shoulder he saw something else. He saw four aces and a deuce of hearts nestling in Hart's cupped hand.

All of the lima beans that were not in the center of the board were piled in front of Kennedy. Jed felt a surge of exultation as he realized that the chances were a thousand to one that the little planter would clean Kennedy with this one hand. His own hands were trembling as Hart carefully placed his hand on the table and reached into an inner pocket and brought out a wallet. He carefully sheafed over some bills and placed four on the table. They were each for five hundred dollars.

"I'll see your thousand and raise you a thousand," he said in an even voice to Kennedy.

Kennedy calmly counted out all but two of the lima beans in front of him. Jed saw that he was not raising. He was merely matching Hart's bet to see his hand.

"I'll call," he said.

Jed Lawry felt nauseated as he saw the expression on Hart's face as he spread out his cards. He supposed that Hart thought he was smiling. But he wasn't smiling. He was snarling. His teeth were bared like the teeth of a wild animal about to make a kill.

He uncovered the aces one by one until there were four of them. He tossed the deuce of hearts to one side.

"Four little bullets," he said, and he leaned forward to scoop in the pot.

"Just a moment," Kennedy said in a voice that was slightly amused. "Just a moment. I have something I want you to look at."

His long, slender fingers ruffled the cards out in a row on the board before him. There was a smile on his lips as

his eyes flickered over the faces of the astonished onlookers.

On the board in sequence were the nine, ten, jack, queen and king of spades.

"Just a little king-high straight flush," he said. "I caught the king on the draw."

Those two long, slender hands came forward and fastened around the pile of beans and currency. Jed Lawry was nauseated again as he saw the expression on Hart's face now. It was something ghastly to see. All the malevolent greed in the world was stamped on it.

Then things happened so fast that Jed had difficulty in putting them in their proper order later on.

Hart's right hand flashed inside his coat as Kennedy began to pull the pot toward him. When it came out it was wrapped around the butt of a small, wicked-looking automatic. He swept the gun around the compartment and then let it rest, pointing directly at Kennedy's stomach.

"Take your hands off that board!" he snapped. "Rest your elbows on it. The rest of you do the same."

Slowly, reluctantly, Kennedy lifted his hands from the table and cupped them together, palms forward, before his face. His eyes were still as cold as ice. But now there were lights in them like the reflection from a dancing fire. He turned and shook his head at Anderson as a deep growl escaped the burly "engineer." His eyes burned even brighter as Hart made a motion with his free hand toward the money.

They had all forgotten Jed Lawry in the tenseness of the little drama that was taking place under their eyes. And Jed had almost forgotten himself.

"You'll regret this," Jed heard Kennedy say, and suddenly something clicked in his brain. This was his ship.

These were his passengers. He was the skipper. They were his responsibility.

"Gentlemen!" he said. Hart turned on him with a snarl.

"You keep your lip out of this!" he said between his fangs. "You get back up in your cubby hole and mind your own business."

The thing that Jed did then was instinctive. It was the thing that had won him the reputation of being the best skipper on the South American runs. He knew what to do without any undue deliberation. And he did it.

His left fist came up in an arc and bounced off the right side of Hart's jaw. His right landed on the left side with even greater force. He neatly picked the automatic out of Hart's hand as it banged down on the playing board. He noticed that the safety catch was still on, and he was more than a little glad, because he had seen Hart's finger tighten on the trigger.

"All of you sit still," he said to the four men as a woman screamed down the runway. "Hey, kid," he said to Dannie Meeker. Dannie came running.

"Quiet the passengers down," he instructed. "Tell 'em a passenger had a stroke or something. Tell 'em anything, but keep 'em quiet. Tell 'em there is nothing to worry about."

"O. K.," Dannie said. He gulped and turned on his best smile.

"All right, you babies," Jed said. "You listen to me." Hart's eyes opened and his head came up slightly. His eyes rolled for a moment, then focused on the scowling face of Lawry.

"May I take my winnings now?" Kennedy broke in. Jed glared at him.

"You take nothin'," he said sharply. He turned and beckoned to Dannie Meeker. "Go up and tell Clark what has happened," he told him. "Then come back here. I'll need you."

When Dannie came back, Jed instructed him to search all four men for weapons. No others were forthcoming.

"Now," he said to Dannie, "count those beans."

When he had finished, Jed said to Kennedy. "You're the bank; where's the money?"

Kennedy growled deep down in his throat again, but he produced the money. Jed laid the four five-hundred-dollar bills Hart had put in the last pot to one side.

"All right," Jed said. "How much did each of you have in this game?"

"Listen, skipper," Kennedy said. "The money I've won I won fairly. It's my money. I want it."

"Close your trap," Jed snapped. He had an awful feeling in the back of his mind that he was throwing away his job. But he intended to see it through. He went on: "I'm giving the orders here. I don't know anything about whether you won your money fairly or not. All I know is, I remember you took two

thousand dollars away from a couple of Kingston planters on my run only a short time ago. It looks as though you had a couple more suckers to-day. I don't know about that. Now, each one of you tell me how much he put in the game and I'll give it back to you. Then, when you get to Kingston, you can get a room in a hotel and play your heads off. You can shoot one another all you want to. But not aboard my ship."

"You'll regret this," Kennedy said.

"Shut up," Jed said. "No tin-horn gambler is going to run my ship."

"You think I'm a professional gambler?" Kennedy asked quietly.

"Nothin' but," Jed answered. "You got a pickpocket's hands."

Kennedy's icelike eyes gleamed for a moment. Then he smiled and said, "Two thousand dollars of the bank is mine."

Jed distributed the bank until only the four five-hundred-dollar bills remained. Those he pushed toward Hart. Hart took them without a word and stuck them into his wallet.

"Now," Jed said, "I'm going to put the co-pilot down here in the compartment across from you. He's going to have one of these guns in his pocket. There's nothin' he likes to do better than shoot guys like you." He turned to the man he had hit twice on the jaw.

"I'm sorry I had to hit you. But I can't have people going around pointing guns aboard my ship. I tried to warn you before about gambling with strangers."

With that Jed got up and went forward to the bridge. He answered Bill Clark's inquiring gaze with a snort of disgust.

"I told you they were a couple of card sharpers," he said. "I knew it all the time. You can always tell a man by his hands. You take this gat and go back there and keep order. If one of 'em starts anything, slap 'em on the side of the skull with it. I'll take the ship in."

Two hours later Jed Lawry set the big boat down on the waters of Kingston Harbor and taxied toward the spot where the shore crew would jockey it up to the gangway with their handling lines.

When all the passengers were ashore, he unlocked a compartment and took out the pouch of registered mail. Lashing it to his wrist, he went up the gangplank. Bill Clark was waiting for him at the top.

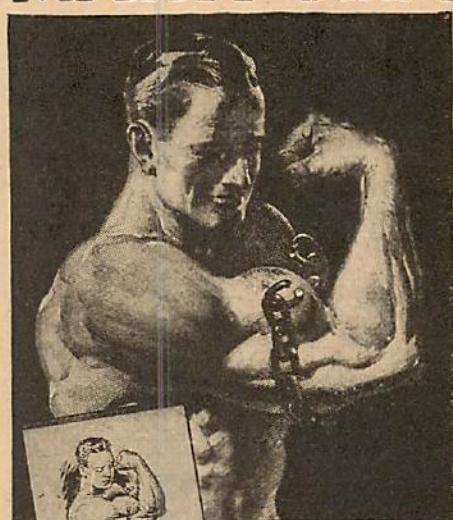
"There's no band here to meet our little hero," Bill Clark said to him with a grin.

"Nuts!" Jed answered. "We'll probably both be fired by morning."

"How perfectly thilly," Bill lisped. "They certainly wouldn't fire a pilot for just hitting a passenger on the chin a couple of times."

"All right, wise guy," Jed said, and started toward the administration building.

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He spent an hour scratching his head and making out a report on the trip. The more he thought about it, the more certain he was that he would lose his job. He completed the rest of his routine work and started looking around for Bill Clark. While he looked for him he thought about that slick-looking bird, Kennedy from Barranquilla. Jed was sorry he hadn't had an opportunity to lay one on his jaw. Anyway, he'd told Kennedy what he thought of him. He'd stay off his ship in the future.

He had about decided that Bill Clark had gone on to their hotel alone when he saw him talking to the superintendent of the port in the main office. They were both laughing about something. When Bill saw Jed he pointed a finger at him, and they both laughed even harder.

"The fair-haired boy," Bill said to the super as Jed came up to them.

"I left a report on your desk," Jed said to the super.

"Clark's been telling me you had quite a trip," the super said, grinning. Jed regarded them both suspiciously.

"What's so funny?" he asked. "I been tryin' to find something to laugh at for the last three hours."

"Shall I tell him?" the super said to Clark.

"You better," Bill said. "He's about ready to hit himself on the jaw."

The super handed a radiogram to Jed. Jed's eyes grew wide and round with perplexity as he read it. It was from the divisional manager at Miami to the superintendent at Kingston, and it read:

WILL YOU PLEASE COMMEND PILOT LAWRY ON HIS SPLENDID JUDGMENT AND LAUDABLE ACTION DURING TODAY'S TRIP TO KINGSTON STOP JUST RECEIVED ENTHUSIASTIC REPORT

ABOUT HIM FROM KENNEDY ONE OF OUR DIRECTORS OF SOUTH AMERICAN LINES STOP KENNEDY GREATLY IMPRESSED BY LAWRY'S DECISIVE ACTION STOP RESULTED IN THE ARREST OF TWO PROFESSIONAL GAMBLERS NAMED ROBERTS AND HART WHO HAVE BEGUN TO PLY THE LINES STOP KENNEDY WISHES LAWRY AND CLARK TO HAVE DINNER WITH HIM AT HIS CLUB TONIGHT STOP PLEASE INFORM THEM STOP

Jed Lawry lifted his head after reading the thing through three times and gazed into the grinning face of Bill Clark. He shook his head.

"Kennedy is really a banker," he said, half to himself, "and the two we thought were planters were a couple of con men."

"You thought," Bill Clark corrected him. His face became serious. "Remember," he said, "you can always tell a man by his hands!"

AMERICA'S BIGGEST LAND PLANE

(Continued from page 61)

respective positions around the crankcase. The push rods may be made from small pins. Paint the entire motor black except the crankcase, which is gray. Now put the cowls over the motors and fasten to the nacelles.

Many model-building articles suggest the use of scrap balsa to build up a landing gear. However, I have found it poor policy to use balsa for any landing gear. For best results, birch dowels of the proper sizes— $\frac{1}{16}$ and $\frac{1}{8}$ " diameter—should be used. Cement the joints securely. If the builder desires, the landing gear may be made of brass rod and tubing soldered at the joints, which is the best method. Note that the motor nacelles have large recesses or wheel housings into which the wheels are retracted. Merely hollow enough for the wheel and landing gear to fit, as shown by the retracted position on the drawing.

The tail group may now be joined to the fuselage. Use the same method as you did in fastening the wing panel.

Fillets are required where the wing and tail surfaces join into the fuselage. An excellent method is to use Plastic Wood or Savagrain crack filler. Form these to the proper shape. When thoroughly dried and hard, the model may be painted.

Give the entire model about five coats of good clear dope. Allow each coat to dry thoroughly. Sand well with #320 wet or dry sandpaper, but be careful not to sand through to the wood. Now give the model about two coats of du Pont surfacer. Sand again with the #320 paper. If there are any small pores which are not thoroughly filled up, apply more surfacer in successive coats until they disappear.

Now the model may be painted silver. Choose a good aluminum paint. The finer the powder, the better. Give the model two or three coats and allow each coat to dry thoroughly before applying the next.

The ship has a red stripe (shown on

the drawings) running from the nose down along the side of the fuselage. It has a dark blue line on either side. The nose is also red, as are the leading edges of the cowls and the control surfaces. The shaded portions on the wings and tail are red or "international orange." The wing license numbers are black and appear on the top of the right wing and on the bottom of the left wing. Line them up so that their outer limit comes approximately at the point marked S-S for the wing section on the drawing. Templates for these numbers appear on the drawing. The letters "AA" appear on the top of the left wing and on the bottom of the right wing. These are also red. The insignia on the fuselage has a silver eagle in a blue field with red letters "AA."

The small black spot in the nose in the front view of the drawing is the opening for the air conditioning of the ship by special ground equipment after each trip.

THE 1936 WAKEFIELD WINNER

(Continued from page 48)

packing space available for the ocean trip. It should be a boon to modelers who must carry their models through cramped quarters.

WING

The tapered wing has a nice graceful shape. Whether a tapered wing is aerodynamically worth the increased construction difficulties is a question frequently discussed. However, no one will deny that a tapered wing has the advantage in appearance.

Only two rib shapes are given—the center and the end rib, on drawing #4. Each rib is cambered to $\frac{1}{8}$ or $12\frac{1}{2}$ per cent of the chord and the maximum camber is located at 30 per cent of the chord. The rib bears a close resemblance to the Clark Y. The undersurface is flat. However, the maximum camber of the Clark Y is slightly less, being only 11.7 per cent of the chord.

The center section of the wing is flat to fit on top the fuselage. The method of attachment is relatively simple and

follows our accepted methods. The rubber bands are attached to the wing by bent-pin hooks which are inserted and cemented to each corner of the center section. The wing is made in two halves and then joined by building up the center section. A balsa fairing is cemented to the leading edge of the center section. Gussets of $\frac{1}{8}$ " balsa are added to each corner of the center section. Likewise two bamboo auxiliary braces, $\frac{1}{8}$ " rounded, are put through the three center ribs for additional strengthening.

COVERING

The original model was done in white. The patches that appear on the fuselage in the photographs are the result of a hasty repair job executed on the field during the contest. Judge had taken one flight and was winding for his second when the rubber broke. Fortunately the damage was slight, or else the Wakefield would still be with us. As an ardent motor-stick enthusiast, I can't help but comment that a demountable stick in this model would have freed Judge from the mental torture he experienced when the breaking rubber tore through the fuselage.

The paper was tightly stretched and doped on all parts of the model. The propeller was finished in a silvery color. This seems like a good idea. When the model is high in the sky in the firm grip of a rising thermal, the rotating propeller will flash in the sunlight after the remainder of the model is no longer visible.

FLYING

The motor consisted of 6 strands of $\frac{1}{4} \times \frac{1}{20}$ " pyraline rubber. The length was twice the length of the fuselage, or 60", giving 33" of slack. American builders prefer the smaller-size rubber. There doesn't seem to be much difference. It all depends on what variety you're accustomed to using. Freshness of the rubber coupled with the ability of the person winding seem more important than the type of rubber.

Winding is done preferably through the front. The small, uncovered section of the rear of the fuselage makes rather cramped winding facilities in addition to exposing the tail to the danger of breaking rubber. The propeller shaft and the rear hook should be covered with rubber tubing to protect the motor.

In winding the motor, Judge took advantage of the extra slack and stretched the rubber several times its natural length before starting to wind. Watching the winding operation was quite alarming if you weren't familiar with the unusual length of motor, as Judge

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TRANSPARENT • WATERPROOF



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seemed to be stretching the motor an impossible distance.

The model had what the British refer to as a typical overpowered Yankee climb. In a short time it was high in the sky. It had a nice glide. The long-running propeller ties in with these characteristics to make an ideal contest model. The weight of the model was slightly over 4 ounces—the necessary qualifying weight for the Wakefield event.

MATERIALS NEEDED

FUSELAGE

- 8 pcs. $\frac{1}{8} \times \frac{1}{8} \times 30$ " for longerons and bracing
- 8 pcs. $\frac{1}{16} \times \frac{1}{8} \times 8$ " for stringers
- 1 pc. $\frac{3}{16} \times \frac{3}{4} \times 5$ " (three-ply hardwood) for nose plugs, etc.
- 1 pc. brass tubing of $\frac{1}{16}$ " inside diameter for landing gear, prop and nose-plug bushings
- 1 tail wheel $\frac{1}{2}$ " in diameter
- 1 pr. hardwood wheels $2\frac{1}{8}$ " diameter
- 2 pcs. bamboo $\frac{1}{8} \times \frac{1}{4} \times 7$ " for landing gear
- Several feet of heavy wire for auxiliary landing gear bracing.

WING

- $\frac{1}{20}$ " sheet balsa for ribs
- 2 pcs. $\frac{1}{8} \times \frac{1}{4} \times 18$ " for leading edge
- 2 pcs. $\frac{1}{16} \times \frac{5}{16} \times 18$ " for trailing edge
- $\frac{1}{8}$ " flat balsa for wing tips and center-section gussets
- 2 pcs. $\frac{1}{16} \times \frac{5}{8} \times 22$ " for spars
- 4 straight pins for wing attachment hooks
- Small sliver of bamboo for auxiliary center-section bracing.

ELEVATOR AND RUDDER

- 1 pc. $\frac{1}{16} \times \frac{1}{8}$ (oversized) $\times 5$ " for rudder spar
- $\frac{1}{8}$ " flat balsa for ribs and outline of rudder
- 1 pc. $\frac{9}{16} \times \frac{1}{16} \times 18$ " for elevator spar
- $\frac{1}{20}$ " sheet balsa for ribs
- $\frac{1}{8}$ " flat balsa for elevator outline

PROPELLER AND EXTRA ITEMS

- 1 propeller block $1 \times 1\frac{13}{16} \times 1\frac{1}{2}$ "
- 1 spinner block $1\frac{5}{8}$ " diameter $\times 1\frac{1}{4}$ "
- 30 feet $\frac{1}{4} \times \frac{1}{20}$ " pyraline rubber
- Heavy wire for shaft and rear hook
- Light spring wire for slack-rubber device
- 3 sheets of tissue
- Banana oil, cement, and dope.

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The July Contest

The following readers were winners in the July "Gullible's Travels" contest with the indicated number of allowable, correctly picked errors:

First prize, \$5—Harvey Hayes, Houston, Texas., 115.

Five prizes of \$2—Lawrence Williams, Albuquerque, N. M., 104; Thomas J. McBride, Cornwall, N. Y., 97; Allan Campbell, Pawtucket, R. I., 95; Robert Farley, Stockton, Calif., 86; Gene Jones, Topeka, Kan., 81.

Five prizes of \$1—Earl Brimm, Kendallville, Ind., 80; Spencer Crane, Walton, N. Y., 78; John A. Powers, Jr., East Providence, R. I., 78; William Tuerck, Jr., Laurelton, L. I., N. Y., 78; Ray Meyer, Louisville, Ky., 78.

HOLLOW STICKS

(Continued from page 59)

which has come to be the standard for Class C tractors is $10 \times \frac{1}{8} \times \frac{1}{4}$ " tapered to $3/32 \times \frac{1}{16}$ ". Make this former from hard wood and round off all corners so that the former becomes oval in cross section. The blank for booms of this size should measure $3/4$ " tapered to $5/16$ ", cut out of $1/64$ " semi-quarter-grained sheet balsa. Before bending, sand this blank with 10-0 sandpaper until it is smooth.

Soak the blank in hot water and bend it around the former in such a way so that the seam comes at one of the small sides. This should be bound with $1/2$ " bandage and put into an oven. Bake the boom until the bandage just begins to tan. Remove the bandage and smooth with 10-0 sandpaper. Cement the seam and make sure that, as you cement, the seam and the boom itself are absolutely straight. After the cement has dried, run over the boom with the sandpaper.

Cement the large end of the boom to the motor stick, with the seam of the boom down. Then, in order to close up the small end, just put a drop of cement over the opening. Neither caps nor plugs are necessary.

A boom for a model which will fly on $7/64$ " rubber should weigh about .0045 ounces. Braced booms are never used because they are impractical.

HOLLOW SPARS

A model with hollow spars is a rarity because of the difficulties encountered in making them. The chief requirement of the fellow who is going to make hollow spars is a scale capable of weighing to .0001 of an ounce, as two or three ten-thousandths will determine whether a spar is too weak or unnecessarily strong. An average 16" hollow spar should weigh about .0035 ounces in order that a wing of 36" span on a model strong enough to take $7/64$ " rubber may weigh about .021 ounces complete with clips.

Hollow spars are made in exactly the same way as any other hollow part. Balsa is bent around a former, wrapped, and baked, after which the seam is cemented. You may make round or streamlined spars. Round spars should be bent around brass tubing whose inside diameter is $1/16$ ". Streamlined spars

are made on formers $1/16 \times 3/32$ " and tapered to any desired size, depending on the length. The corners are rounded and the blanks are bent in such a way so that the seam is on the thinner side. While the spars are drying on the formers they may be bent to fit any shape. In making a hollow spar model, you can use curved wings if you wish; in fact, you might as well make up your mind to use curved wings, because if you don't they will probably be curved anyway, since it is extremely difficult to keep the spars straight. In making hollow spars it is advisable to use ordinary straight-grained stock instead of the quarter-grained cut of wood, as it is easier to bend around the sharp curve of the front edge of the spar.

Indoor model builders regard the hollow spar as not worth its trouble. It is possible to make a wing with solid spars that is almost as light by careful selection of wood and careful building. An experienced builder can make an indoor wing to weigh .025 ounces and yet be of solid type. The secret is: get the most out of every material you use in the construction.

A New Angle in Model Flying

THE Wonderplane is an interesting attempt to combine the flying ability of a model airplane with the reliability and steady-flying characteristics of a kite. It looks like an airplane, although it is flown with string in kite fashion. Unlike the ordinary kite, however, it is capable of airplane stunts, including loops, sideslips, dives, and rolls.

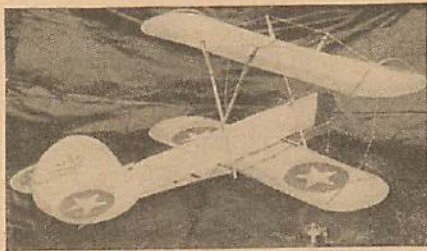
The ship is a biplane. The span of the upper wing is 56 inches, the lower wing slightly less. The over-all length is just about 5 feet. Ready to fly, the weight is about $1\frac{1}{2}$ pounds. The wings and tail surfaces are built up from hardwood—bamboo, reed, and spruce—and covered with bamboo paper. The two fuselage frames are built of reed and covered with silk and tissue.

The Wonderplane comes in knock-down form. All construction has been completed and it can be assembled and made ready to fly in a half hour. A pair of pliers, a few pieces of soft pliable wire, and a piece of cord for wing bracing are the only necessary materials. Even the rank amateur will have no trouble assembling it.

Only a light breeze is necessary for flying. The Wonderplane will perform nicely in a steady breeze of 5 m.p.h.

The ample wing area of about 10 square feet proves very effective in lifting the weight of the plane.

Strong light cord is best for flying. Thirty-pound-test cord is recommended, since the pull on the string is appreciable when flying in a stiff breeze. An ample length of cord is desirable because the



The Trevor Wonderplane.

plane should be stunted only after it is several hundred feet off the ground. A fishing reel or the type of stick used for wrapping kite line is helpful for handling the cord to avoid tangling.

The Wonderplane can be flown from fields that are too small for ordinary model flights. It is under control at all times and can be brought in for a landing at the same spot as the take-off.

This ability to fly in small fields should be borne in mind when considering that the 5-foot size does not make the plane easy to carry.

The usual run that is necessary to put a kite into the air is not necessary with the Wonderplane. In launching, play out about 200 feet of cord, launch the ship into the wind and then pull in the cord hand over hand. The plane will climb rapidly. Then let the plane drift down wind and take up the slack until it begins to settle. Then pull it up again. Repeating this process several times will soon exhaust your supply of flying line, and the plane will be tugging at the string high above your head. The small propeller mounted at the front of the fuselage, spinning in the breeze, will add to the plane's realistic appearance.

Loops are performed by pulling the flying line until the plane is nosing straight down, and then letting the line slack. It will stop diving and pull around into a loop. Other maneuvers can be performed by skillful manipulation of the cord. The careful pilot, like the careful airplane pilot, never stunts near the ground. There should be several hundred feet of altitude available for recovery from stunts.

FROM THE WATER UP

(Continued from page 65)

the Buzzer model, which weighed .95 ounces, rides lightly on the surface. The floats will support fully 4 ounces before they are submerged. Using large floats has the advantage of making take-offs easier and the landings gentler. The floats themselves weighed .14 ounces.

In flying a hydro model, you'll quickly notice how the left float tends to drag on the take-off. The result of the propeller torque, this added drag on the left float causes the model to turn in tight left circles and oftentimes does not allow the model to get sufficient speed for a take-off. There are several ways of overcoming this trouble. Usually a combination of the several methods will act more efficiently than one method carried to a greater extreme.

One system of counteracting propeller torque is to set the left float at a slightly greater angle to the water line than the right float. Then another cure is to adjust your model to turn in right circles. In this way the left float will be lifted out of the water slightly ahead of the right float as the model takes off in a right turn. But if you haven't adjusted your model to make right circles, there is a third method. Allow your model to take off with the breeze blowing toward the left side. The natural left turn will soon bring the model full into the wind and the take-off is usually a simple matter. Don't try this method when the air is moving faster than a very mild breeze. To be on the safe side, don't try any water flying when there is any air stronger than a mild breeze.

As far as preparing the model itself for water flying, there are several necessary items. Waterproof the propeller with one or two coats of dope. This waterproofing should be extended to include the motor stick and any other exposed balsa parts. Lightweight models

with single-surface wings and tail; that is, with tissue on the top of the wing only, are almost certain to warp out of shape if they get wet. One cure for this is "beefing up" the wing and tail structures. That is, make the spars and ribs of greater size. Also add balsa or thread bracing wherever possible.

Another method of preventing warping after the model has received a ducking is to pre-shrink the tissue. This is done by attaching the edge of a sheet of tissue to a piece of wood just as though you were making a flag. Then dip the tissue into a flat pan of water (the bathtub will do nicely). The purpose of the wooden stick is to permit handling the tissue, which becomes very weak when wet. After the tissue has dried, it is attached to the model in the usual manner.

Take-off facilities for a hydro model should not be hard to find. The few feet of take-off run makes it possible for the model to operate from the pools of water that often result from a brisk rain. For fair-weather flying a wooden trough can be easily built. A bucket or two of water is all that would be necessary to fill such a trough, since the model requires a depth of less than an inch. Of course, the big thrill is flying the model on a large pool of water where you can have the kick of watching the water landings in addition to the take-offs.

The general opinion among old-time modelers is that one really hasn't begun flying until you've got your feet wet launching a hydro. When you put your tightly wound model on the water for its first take-off, you'll little care if you're standing on the land or if you're ankle-deep. You'll never give your wet feet a thought as the model skims over the water and into the air for your first successful hydro flight. —G. S. L.

MORE BALLOON TIRES

(Continued from page 67)

The discs are made slightly larger than the inside dimensions of the tire, in order to get a squeeze fit. Cut a slot in one disc large enough to accommodate the stem, and bolt the discs to the tire.

To put the tread on, mark circles on the tire to show the Band-tex width and apply a coat of rubber cement inside the marks for neatness' sake. After the cement has dried, run the tread (Band-tex) on by keeping it stretched continually while rolling. Cut off longer than necessary and trim carefully to get a clean butt joint.

With brass bolts, the author's several pairs weighed not more than 1.6 ounces per pair. It is suggested that you start

with two patterns, doing unto one as to the other as you proceed, to insure a matched set.

Type 2 is the "clinch" type tire and is easier to construct and repair, except for making the tube out of the spherical type of balloon.

Make two #12 wire rings 1" in diameter by soldering or looping the ends together. Use the same cloth pattern as on type 1 and follow steps 1 and 2, but sew each side by hand to a ring with #36 thread.

The "tube" is made by cutting a 1 1/8" hole near the neck of a 2 1/2" diameter spherical nickel balloon and another 7/8" hole exactly opposite. To cement the seam, push a 1 1/2" rod or tube through

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the holes as in figure 4. Let the $\frac{7}{8}$ " hole edge extend $\frac{1}{4}$ " out from under the larger hole and clean a $\frac{1}{2}$ " band all around with benzol. Benzol cleans and softens the part to be cemented. Now apply a thin coat of rubber cement and let dry thoroughly, then repeat. When the second coat is dry, roll the $\frac{1}{4}$ " lap over evenly, as in figure 4, and the tube is finished. If you have trouble with the rubber cement not sticking, dissolve scraps of Band-tex in benzol to the right thickness for cement.

Figure 5 shows the design of the discs to be used with this tire. Each disc is $\frac{1}{2}$ " laminated balsa. The discs are made with $\frac{7}{8}$ " diameter cores to fit in the rings. In making a pair, both discs are hollowed slightly and one has a $\frac{1}{4}$ " hole through to the outside for the stem. Hollow a place large enough for the end of the stem and attach a movable sheet aluminum cover for it.

Assemble the tire by placing the tube in the tire and then inserting the stem (bind the neck with Band-tex as on type 1) through the hole in the disc. Place the other disc on the other side

and bolt them together. Use the same method for pumping up as on type 1, then lay the end of the stem in the hollow and turn the cover over it. It is suggested that the stem side of the wheel be on the inside when placed on the axle of the model.

Fasten the tread as on type 1.

Type 3 is the easiest tire to make, although it is not exactly pneumatic and a pair weigh about 4 ounces. Get two sponge rubber balls and punch a hole through the center of each. The tire effect is obtained by inserting hollow bolts in the punched holes with washers on each side, and drawing them up tight. Our thanks to Mr. Harry Moyer for this type.

Type 4, and the last to be discussed, is made from a hollow rubber ball. A $2\frac{1}{2}$ " pair of these weigh about 3 ounces. Get balls that have the "spot of gum" on the inside to permit refilling with air. Punch $\frac{1}{8}$ " holes centering each half of the ball and dry the inside of the ball thoroughly. Then spread rubber cement inside each hole by squeezing the cement in one hole and forcing the two sides to-

gether several times. Let dry for an hour.

The bolts are $\frac{1}{4} \times \frac{1}{2}$ " drilled for the axle. The washers must have $\frac{1}{16}$ " points projecting on the inside surface to prevent the rubber from pulling out under pressure. To make these, drill four $\frac{1}{16}$ " holes evenly spaced in each washer and sweat closely fitting brad or nail points in to project $\frac{1}{16}$ ", and solder them. File off any rough places on the outsides of the washers. Bolt the sides of the balls very tightly together and inject air with a hypodermic needle through the gum-rubber spots, which will close and hold the air.

If balls with the gum spots can not be obtained, squeeze blobs of rubber cement out on a piece of paper. Punch a hole in each ball with a pin and smear cement on the inside under the hole before taking other steps. Stuff the dried blobs of cement in the pinholes until they project into the balls. Cement on the inside and outside and let dry for at least an hour. The author found that this method was better than stuffing rubber bands in an injection hole.

MODEL MATTERS

(Continued from page 58)

DENVER HI-HATTERS MEET

The Hi-Hat Model Club of Denver held the first gas contest in the Rocky Mountain region, July 3, with 28 entries. Hot weather and only a slight breeze made for excellent flights, including 1h 3m 7s by Don Spaulding, a new open-class record. Results:

1—Don Spaulding	1:03:07
2—Paul Buirgy	25:14
3—Robert Van Buskirk	31:00

A quarter-ounce of fuel was allowed for every pound of weight. Spaulding's model went out of sight in a little over an hour, but it flew unofficially for more than four hours. It finally came in for a landing on a baseball diamond where a game was in full swing. Buirgy's and Buskirk's models both flew away, but were recovered only slightly damaged.

J. A. L. SUMMER SERIES

A junior record for tow-line gliders came to Boston at the first summer outdoor contest by the Jordan Marsh-Boston Traveler Junior Aviation League. Ralph Brown, 14, of Arlington, Mass., flew his Class C glider for 9:32 at Smith Playground, Allston. The contest had N. A. A. sanction.

The aim of the contestants was the Frederick L. Ames Memorial Trophy, to be awarded at the end of the summer for the longest flight with any type of outdoor craft. The meet winners:

Gliders

1-Ralph Brown, tow-line class, C	9:32
2-Hewitt Phillips, tow-line	38
3-Leslie Woodman, hand-launched	35.2

Stick H. L.

1-Frank Barrett, Jr., class C	4:30
2-Robert Shea, class C	1:50.8
3-Sidney Wallerstein, class C	1:45

Fuselage R. O. G.

1-Frank Barrett, Jr., class C	2:52
2-Robert Shea, class C	2:10
3-Morris Sulkin, class C	2:03

JUNIOR BIRDMEN CHAMPIONS

The New York wing of the Junior Birdmen of America sent Sol Roskin, of Brooklyn, to Boston to compete in the Junior Birdmen National Air Races August 4, as winner of the New York championship and silver trophy at the meet held July 1 at Holmes Airport.

Good weather and 200 enthusiastic entrants made wing competition keen.

Roskin placed second in the glider event, 10:50, and the stick event, 12:17.8.

Other Junior Birdmen contest winners reported at the time of writing:

Gordon Agur, San Francisco champion, first in glider event 7:06; first in the stick event, 17:35; second in cabin event, 17:00.

Meyer Lahn, Baltimore champion, first in stick event, 2:53; second in cabin event, :50.

Wallace Simmer, Chicago champion, first in glider event, 4:35.4; second in stick event, 7:41.4; first in cabin event, 2:22.1.

Joe Reeves, Omaha champion, flights unreported.

NATIONAL AERO RESERVE

The Rochester Times-Union branch of the National Aero Reserve held its model meet July 11 at Edgerton Park in Rochester, N. Y. Five events drew over 40 entrants with 84 models. Results were:

Balsa Glider

1-Leighton Webb	1:20.2
2-William Wissman	1:03
3-Wesley Payne	26.2

Stick R. O. G.

1-Leo Gundy	1:20
2-Paul Schroeder	59.2
3-Mel Cameron	52

Cabin Endurance

1-Leighton Webb	1:39.3
2-Bob Helmer	1:01.2
3-Jack Galvin	57.4

Flying Scale

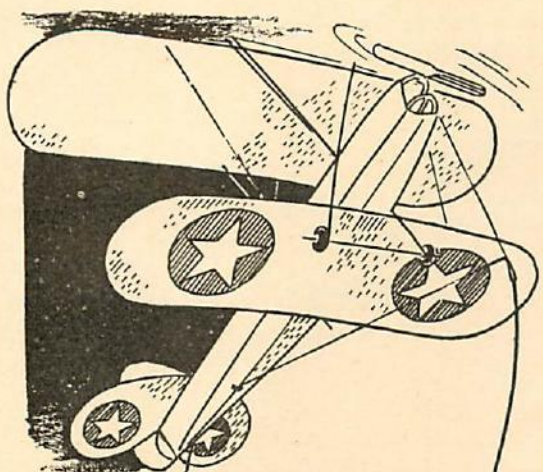
1-Leroy Weber	1-James Rogers
2-James Rogers	2-Richard Pomeroy
3-Paul Schroeder, Jr.	3-Robert Prisch

Lieut. Commander Russell Holderman's squadron conducted another contest in Edgerton Park July 25 that was hampered by a stiff wind. The flying competition resulted in a three-corner tie among Kenneth Klimm, Fred Harrison, and Jim Rogers, each rating 85 per cent in building and flying ability.

CROSS WINDS

	P	T	E	R	O	D	A	C	T	Y	L	
T		A	R	U	P		T	O	N	E		I
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A	C		A	N	E		S	H	E		R	E
C		F	L	E	W		S	A	L	E		R
I	D	O	L	S				B	L	A	D	E
F	A	I		C	E	A	S	E		G	U	N
I	T	S		E	G	R	E	T		L	A	C
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Answers for September



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