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Bubbles of Doom

THE G-2 "BRAIN DEVIL" FACES A VENOMOUS DEATH

"Do you think it will rain? It drizzles. The weather is fine. This is the story of a zebra who was smarter than the rest. Once upon a time, a zebra caught a monkey . . . ." It was this senseless jargon poured into the air from Malstatt, Nauen, and Strasbourg that brought Philip Strange to that lonely G-2 field in the heart of the Bois d'Autre. And it was there that he found men fighting to the death for the possession of—a common electric globe!

CHAPTER I

RIDDLE OF THE ELECTRIC BULB

The night was dark, and the wind-blown flares below formed a flickering "T" in the blackness. Captain Philip Strange frowned thoughtfully over the cowl of his S.E.5. It was an odd place for a conference—this G-2 station in the heart of the Bois d'Autre. He could have flown on to Chaumont in the same space of time. But he would soon know the answer.

While the ship moaned down through the gloom, the tall G-2 ace gazed off toward the Front. The Intelligence station was as close to the lines as they had dared place it. Usually the ugly glare of front-line artillery was visible from this point, but tonight the sky was almost solidly black. Here and there, a few star-shells broke the Stygian darkness, only to make the night seem blacker than ever as they faded out.

Suddenly one of the flares below him went dark. He saw men run to the others, and they, too, were quickly extinguished. As the last one went out, the tiny red light of a blinker tube began a swift signal to him:

"D-a-n-g-e-r, W-a-t-s-i-g-n-a-l-t-o-l-a-n-d. S-o-u-n-d-r-a-n-g-e-r-s r-e-p-o-r-t B-o-c-h-e p-l-a-n-e-s n-e-a-r-t-h-i-s—"

"Tac-tac-tac-tac!" Above the drone of the engine came a muffled throbb of machine guns. In the same instant, two crimson streaks shot through the bottom of a lowering cloud. Strange shoved the throttle open, zoomed steeply. Then he saw that the unknown pilot was not firing at him. The exhaust stacks of a second plane had become visible, and in a moment another pair of tracer streaks probed, cherry-red, toward the first ship.

The phosphorous lines crossed like fiery lances. Almost at once, a searchlight blazed up from an A-A battery a mile away, and its giant white finger poked toward the darting ships. Two Fokker D-7's flitted past the beam, their Spandaus flaming. The searchlight shifted toward the other two ships, which were still battling fiercely in the dark.

Strange started. Both of the fighting planes were German!

The first ship was a Fokker, painted gray like the others. It was plunging furiously at a checkered Albatross, its guns ripping into the other plane's tail. For a second, Strange thought it was a mistake, but as the waving searchlight spotted the Albatross, the D-7 pilot dived more fiercely than before.

Strange swiftly charged the guns before him. There was but one answer—to that vicious attack. The man in the Albatross must be an Allied pilot. He drilled up to engage the Fokker. Its gray tail leaped into his sights, and he squeezed his stick-triggers. Flame spurted from the Vickers snouts, and the cowl shook under the throng of the guns. The Fokker hastily started a loop. Strange followed through, eyes grimly narrowed.

Another burst crashed from his smoking guns. The Fokker swerved madly into an Immelmann. With cool precision, Strange followed every move. The frightened Boche stared back, his goggled face visible in the glare of the searchlight. Strange lifted the nose of his ship. Down went his trips, and into the twisting Fokker tore two blasts of Vickers hell. The German sprang up—and died under that lash of lead.

WITHOUT slackening his trips, Strange kicked over and dived. The other D-7's were hammering burst after burst into the Albatross. Strange booted his rudder, sent a raking fire across the nearest gray wing. The pilot sheered away frantically. Before Strange could re-center his aim, the ship was lost in the dark.

He whirled around toward the others. The man in the Albatross was fighting with a skill almost superhuman. Twice, the third Fokker pilot had him under his guns. Both times, in a wild and amazing twist, the other ship rolled free. Then, with a violent turn, the German forced the Albatross back through the search-
light beam where it was mercilessly silhouetted. Strange had a glimpse of the pilot’s bare head, of a blood-smeared face. He stiffened as he recognized those fierce-set features. The pilot was Jack Milton, one of the men in his own air intelligence unit!

That D-7 was again plunging after the checkered ship. Strange whirled desperately to cut him off, but the German’s guns were already pounding. One short burst crashed from the Fokker’s guns, and Milton slumped in his seat. Strange groaned, but to his relief Milton sat up again. The checkered wings flashed in the light, and back swept the riddled plane. The German had ceased to fire, was swinging around toward Strange. A look of amazement came into his face as the guns on the Albatross blazed.

He swerved frenziedly, but too late. Like glowing wires, Milton’s tracers struck. Flame and smoke belched from under the Fokker’s cowl. The Boche hurled himself aside. There came a sudden explosion as the fuel tank blew up, and the German was lost in a whirlwind of fire.

Strange zoomed to avoid the inferno. He saw Milton sag down, struggling to glide his ship toward the G-2 field beneath. He was banking closer when the third D-7 came shrieking out of the night. Like a gray rocket, it plunged for the Albatross. Strange stood the S.E.5 on its tail. For a split second, the hurrying Fokker was in his sights. The Vickers snarled at his touch. There was a grinding roar as the German’s prop blew to pieces. The Spandaus went dark, then smoke puffed back from the Fokker’s nose.

In a vicious whirl, the crippled German plane went onto its back. Something was catapulted through the billowing smoke, and Strange saw the doomed pilot, his hands clawing at the empty air. He shivered, turned his gaze toward the Albatross. It was wobbling down, barely under control. Milton’s head was against the side of the pit, his eyes focussed on the field below. Pieces of fiery wreckage were floating to earth, showering sparks where they struck the ground.

Strange eased in nearer the Albatross, flying parallel
to guide the wounded man. Milton’s face twitched toward him, ghastly in the half-light. The ships were three hundred feet from the ground when the empty Fokker crashed. It burst into flames, brightly revealing the G-2 field, even to the listening-post huts hidden back under the trees. Strange waved to Milton, swiftly landed.

He was out of the plane the moment it stopped. Several men came running from the line, and among them he recognized the stocky figure and bulldog face of Colonel Jordan, the chief of G-2. Jordan was the first to reach him.

“Strange!” he exclaimed. “So it was a trap for you!”
“None, they were after Jack Milton!” Strange flung back. “He’s in that Albatross.”

Jordan ran after him toward the spot where the checkered ship was landing.

“Are you sure it’s Milton?” he said breathlessly.

“Positive,” rapped Strange. “And he must have some valuable information, the way they went after him.”

The Albatross swayed down, its engine now silent. As it stopped rolling, Strange jumped onto the wing. Milton was huddled over the stick, his German uniform stained in three places with blood. As Strange bent down, the dying man opened his eyes.

“Phil!” he said hoarsely. “Tell Chaumont—it’s tonight!” A spasm of coughing cut short his words. As it ended, Strange saw his red-flecked lips moving. He bent lower to catch the whispered words.

“Under—seat.” Milton reached down a trembling hand. “Box—take to—”

Another convulsion racked his tortured body, and Strange saw that the end was near.

“Ray—Ray—Nods!” gasped Milton. He made a last desperate attempt to finish, then fell back against Strange’s arm. The G-2 ace looked down at him with filmed eyes, then slowly lowered him against the seat. As he straightened, he saw Jordan on the other side of the cockpit.

“Dead?” whispered the colonel.

Strange grimly nodded.

There was a lump in his throat as he helped Jordan lift the body from the cockpit. They laid it upon the ground, and an awed silence fell over the group of men who had reached the scene.

“He’ll have to be searched.” Jordan mumbled. “He may have concealed some information about him.”

“Ask some one else to do it,” Strange said dully. “Some one who—didn’t know him.”

Jordan beckoned to one of the station officers. While the man searched Milton’s clothes, Strange hurried to the Albatross. Jordan followed.

“What did Milton say to you?” he asked angrily.

“He said ‘tell Chaumont it’s tonight.’” Strange answered. “I don’t know what he meant. We might have learned if those devils hadn’t got him.”

Jordan looked alarmed. “Didn’t he say anything else?”

“Yes.” Strange reached into the cockpit, took a metal box from under the seat. “He said to take this to some one. The name sounded like ‘Ray Nods.’ Does that mean anything to you?”

“No,” said Jordan, puzzled. He watched uneasily as Strange unfastened the clasp on the lid. “Be careful, Strange—it may be something very dangerous.”

Strange held the box to his ear, then cautiously raised the cover. The interior was filled with dirty cotton waste, but he saw a round, shiny object underneath. Jordan leaned over eagerly as he pulled the waste aside. Then they both gazed down in amazement. It was only an electric light bulb!

Strange looked up and stared at Jordan.

“What’s the answer?” the colonel blurted out.

Strange silently held up the bulb against the light from the burning Fokker. There was not a thing about it to distinguish it from one of a million others.

“Maybe there’s a message hidden between the glass and the metal slug,” suggested Jordan.

Strange tilted the bulb, peered down inside.

“Nothing there,” he muttered. “It’s just a plain electric light bulb—and yet four men fought and died over it.”

“I’ve got it!” said Jordan. “Milton thought he was making off with something important, but he got this by mistake. And the Germans thought he had what was originally in the box.”

Strange shook his head. “Milton was no fool, colonel. I’m afraid there’s some hidden meaning which we haven’t caught.”

“What secret meaning could there be to an electric bulb?” scoffed the G-2 chief.

“I don’t know,” Strange carefully replaced the bulb and closed the box. His eyes were hard as he went on. “But Jack Milton died to bring it to us—and I’m going to find what it means.”

Jordan turned as the officer who had searched Milton came up and saluted. “Find anything, Kennedy?”

“No, sir,” reported the G-2 lieutenant.

“Have the body carried inside,” ordered Jordan.

“And get this plane rolled out of sight.”

Strange waited until Kennedy and his men were out of earshot. “Did you know Milton was across the lines?” he asked Jordan.

The colonel nodded gloomily. “I sent him and Carl Deane on the same mission. That was five days ago. It didn’t seem important enough to drag you away from that British job. We heard rumors that the Germans were up to some trick in this sector. Half of those tales are groundless, as you know. It was just a routine check-up.”

“And now,” Strange said grimly, “Milton dies to warn us that the rumor was true.” He looked at his wrist-watch. “Nine-twenty. It means something will happen within the next six or seven hours.”

“It can’t be an ordinary offensive,” grunted Jordan. “The Boche hasn’t moved in any extra troops. We’ve watched the back areas.”

“They could be bringing them up right now,” returned Strange. “A dark night like this would be perfect.”

“If Milton had only—” Jordan broke off as the rumble of a motor became audible from up in the night. “Good Lord, that sounds like a Gotha! And that burning ship will make us a fine target!”

Strange listened for a moment. “It’s a Liberty motor. Are you expecting anyone else to land here?”

“Yes, General Thorne,” said Jordan with relief. Strange eyed him keenly as they went in toward the huts under the trees. “Why are we meeting here, Colonel?”

“Because,” rasped Jordan, “this is the only place we can hear all three of those cock-eyed codes!”
"Codes?" said Strange quickly, staring at Jordan.

"Yes," snapped Jordan. "The craziest bunch of stuff I ever heard. But wait till you hear it. There's no way to describe it adequately."

A battle-scarred D.H. roared down into the light as they reached the camouflage nets suspended between the trees. The pilot taxied in and swung around beside a G-2 De Haviland on the line. A bulky figure jumped from the rear cockpit, and Strange recognized the familiar shaggy mustache and bristling eyebrows of General "Wild Bill" Thorne, Chief of the Air Service. It was apparent that the gray-haired old warrior was in an angry mood. He glared around from under his beetling brows, then strode across to where Strange and Jordan had paused in the shadows.

"What the hell's happened here?" he roared. Strange caught the accented word.

"You mean you've seen another scrap, General?" he asked swiftly.

"Seen?" thundered the older man. "The damned butchers almost shot us down. Queerest thing I've run into for a long time. Three gray Fokkers shot down an Albatross—"

"What?" exclaimed Jordan and Strange in unison.

The general glared. "That's what I said! It looked like three Boche jumping another—but I figured out the other man must be an escaped prisoner, or maybe a spy. So I told my co-pilot to get into the fight and—what's the matter with you two?"

"It's the same thing that happened here!" exploded Jordan. He hastily described the attack on Milton, and what had followed, ending with the discovery of the electric light bulb. An expression of stupefaction came into Thorne's weather-beaten countenance.

"Somebody must be crazy! When we dragged that Albatross pilot out of the wreck, he had an empty light socket wired tightly around one wrist!"

CHAPTER II

ACE OF A THOUSAND FACES

"Oooh, Lord!" groaned Jordan. "This thing gets worse every minute."

"If we could only guess what Milton meant by "Ray Nods," muttered Strange.

"The whole thing's insane," Thorne said bluntly. "No, there's some ominous meaning to it," declared Strange. "Did you identify the pilot of that other Albatross?"

The general shook his head. "Too badly smashed."

"Where did the ship crash?" asked Strange.

"Not far from the 41st Pursuit. We were passing near there, on the way here, when we ran into the fight. The Albatross pilot must have been trying to land at that field. We managed to drop two of the Fokkers, but the third escaped."

"Any chance of getting information from the Fokker pilots?" put in Jordan.

"No," growled the general, "both ships burned. We landed at the 41st to learn what we could—but we drew a blank. The Albatross pilot didn't have a single clue on him—nothing but that blasted light socket. I even pried the socket apart, but there wasn't anything there. Thought it might have hidden a message."

"Well," said Jordan, helplessly, "there's only one explanation that I can see. The bulb and the socket aren't important in themselves. They're merely symbols for something."

"Just the same," replied Strange, "I'd like to examine this bulb with a magnifying glass."

Lieutenant Kennedy appeared as they started toward the main building. His plump face had an excited look.

"Beg pardon, Colonel," he said hurriedly, "but the French and English stations are sending the same thing as the German one. I thought you'd want to know."

"Connect the amplifiers in that end room," Jordan ordered quickly.

Strange glanced at him, puzzled, as Kennedy trotted back toward the listening-post shacks.

"What's this about French and English stations?"

"He meant the Boche stations, Nauen and Malstatt," explained Jordan. "They've been sending in French, at Nauen, and English at Malstatt, since ten o'clock last night. And not wireless code, either—they're using voice radio. Strasbourg is using voice radio, too, but they're talking in German—if you can call it talk," he added sardonically.

They had reached a door at one end of the main hutment, from which wires ran to the separate listening-post shacks farther back. As they entered, one of three amplifiers on a table came to life with a hasty flow of words in English:

—and the elephant waited for his striped friend, and watched even when the zebra did not see him.

"Now what the devil's the idea of that?" roared Thorne, as the amplifier went silent. "What kind of poppycock—"

"You ought to have been here before," snapped Jordan. "That's less idiotic than some of the rest."

He switched on the other amplifiers, but they were silent.

"That's queer," he said thoughtfully. "It's the first time since last night they've stopped talking. Maybe they've changed their transmitting angle, or their wavelengths."

"Then they're sending on directional beams?" inquired Strange.

"Yes," said Jordan, "and if you can make head or tail of the truck we've caught, you'll do better than a dozen code men who have tackled it. Here are a few specimens."

He pointed to some scribbled sheets which littered the table. Strange picked up one which was marked "Translated from French, Nauen station." He ran his eyes over the first few lines:

It is full moon. It is dark. Do you think it will rain? It rains. It drizzles. The weather is fine—"

"Of all the blasted nonsense!" thundered General Thorne, as he glowered at another paper. He wheeled toward Jordan. "I thought you said this was important business!"

"It must be," Jordan said obstinately. "The Boche wouldn't stop all regular code from those three big stations unless this stuff meant something. If we could find the key, we'd probably learn the secret of this mysterious drive or whatever they're up to. Even if it's set for tonight, we might still flash orders to counteract it in time."

"Maybe you're right," he said gruffly, "but it looks to me like a German stunt to focus attention on this sector, so they can pull something in another area. How could this rubbish be a code, anyway?"

Strange looked up from the paper, turned to Thorne.
"It could be an enciphered code, General. These sentences are evidently taken from one of those French at a glance books. Secret means might be arranged so that spies on this side of the Front could use the same books with the right meanings written in invisible ink."

But Colonel Jordan dismally shook his head, "We thought of that, Strange, but there's too much of it. They've quoted the Bible in French, read a German dictionary, repeated our Declaration of Independence—and a hundred other things, such as nursery rhymes, jokes, and a lot of other balderdash that didn't make the least sense. I tell you they'd have to carry a small library."

"Garde a vous!" one of the amplifiers suddenly rasped, and in the next instant the others broke into speech, with German and English. Strange hastily switched off all but the Malstatt station. A tense voice was speaking in English:

—this story of the thirteenth zebra, who was smarter than the rest. Once upon a time, a zebra caught a monkey and put it in a cage, but that night the monkey crawled out and ran home to his wise old grandmother who lived in the woods across the river. Now the zebras wanted—

The door abruptly opened, and Kennedy came in.

"Colonel!" he exclaimed. "This is—"

"Keep still!" snapped Strange. He snatched up a pencil, copied the words which came from the amplifier:

—get back the monkey. The zebras' friend, the elephant, said he would try to help, but he was half-blind and the rest of the zebras thought of their thirteenth cousin, who was traveling near the woods, and was very clever. So they sent a parrot to tell him—

"It's no use, Strange," interrupted Jordan. "That stuff's been going on for hours."

Strange's eyes blazed up at him.

"It's a message to the greatest German spy alive!"

Jordan and Thorne both started, and Kennedy gaped at him open-mouthed. The amplifier rasped on:

—old elephant plodding across the river, but the night was dark and the monkey had taken—

"Colonel, if you'll only listen—" Kennedy broke in.

Both Strange and Jordan whirled on him furiously, and he stopped with a gulp.

—but he knew the thirteenth zebra would help him and tell him what to do—

The unseen speaker concluded. Strange scribbled down the last words, beckoned to Kennedy.

"Get me a magnifying glass and a light bulb. He jerked open the lid of the metal box. "This size, or as near as possible. Step on it!"

Kennedy gulped again, dashed out. Strange spun around to the others, his eyes gleaming.

"If he heard that radio order, we'll get him!"

"Get him?" repeated Jordan. "Who?"

"The thirteenth zebra," Strange said with a grim smile. "Doesn't that suggest anything, colonel—zebra-thirteen?"

"Holy smoke!" breathed Jordan. "Z-13—that's Karl von Zenden, the impersonator!"

"Right," said Strange. "Our old friend the 'Man of a Thousand Faces.' And if he's in France, you can bet this is a big scheme."

Thorne picked up the scribbled message.

"Monkey . . . cage . . . grandmother in woods . . . . "By Heaven you've hit it, Strange! The Boche was using this crazy story to tell von Zenden that Milton had escaped."

Strange unsnapped the safety catch of his .45, slid the gun back in his holster.

"They must be desperate," he said, his eyes fixed absentl on the bulb in the opened box. "That 'Z-13' stood out like a sore thumb. Wise old Grandmother in the woods—obviously refers to this G-2 station. 'Parrot' refers to this very message, I think. It's clear that von Zenden is in this sector—and they want him to rush here and find out what we've learned."

"What about the elephant?" said Jordan, frowning. "I can't figure that."

"I'll 'river' means the Front," said Strange, "then 'elephant' must mean the German Army. 'Plodding' would fit that—"

"Hold on," cut in the G-2 colonel. "What about this sentence: 'The elephant waited for his stripped friend, and watched even when the zebra did not see him.'"

"I don't know," admitted Strange. "It may mean they have spies near here waiting to help him."

"Then we'd better send for reinforcements!" exclaimed Jordan.

"No, we've enough men to handle a dozen spies. Strange turned as Kennedy breathlessly again entered. "Good! Now we'll set our little trap."

"What are you going to do?" growled Thorne.

"Switch this bulb for the one in the box, so there won't be any mixup. While we're waiting for von Zen-

"den, we'll see what the magnifying glass shows."

Thorne shook his gray head. "I doubt if he'll show up. Too much of a risk."

"Not for that Prussian devil," said Strange. "Satan himself couldn't be more fiendishly clever than Karl von Zenden. I'll wager you ten dollars he'll be at this station in thirty minutes, made up as some one who'd have a right to be here."

"I'll take that," grunted the general.

Kennedy had been listening, round-eyed. "It's too bad I didn't tell you about that message sooner," he said excitedly. "We'd have had more time."

Strange stared at him. "What are you driving at?"

This was a 'repeat,' said Kennedy. "It came in half an hour ago, I tried to tell you and the colonel, but you wouldn't listen."

There was a brief silence, then Strange shrugged. "Well, no harm done. But it cuts down our margin of time."

"Hadn't we better get some men to hide around the buildings?" exclaimed Kennedy.

"No, he'd spot that," said Strange. "We'll stand pat."

He opened the metal box, took the substitute bulb and compared it with the other. "Seems ridiculous," he said musingly, "that this could have any real importance."

He had hardly finished when hasty footsteps sounded from the adjoining room. All four of them started as the door was flung open. A short, bald-headed sergeant appeared.

"Sorry to bust in, Colonel," he panted, "but somebody's cut our main wires. All three lines just went dead."

"The first move," muttered Strange. Jordan jerked the non-com into the brighter glow of a desk-lamp, peered into the startled sergeant's face. "All right, Peters," he mumbled, releasing the man's arm. "I just thought you might be some one else."

Peters looked astonished. General Thorne made an angry gesture as Jordan turned around.

"Are we going to stand here like fools and let von

(Continued on page 62)
Snapshots of the War

Left: Some of you birds have been pestering us for dope on the huge wartime Handley-Page jobs. Well, here's an unusual "shot" if there ever was one! It shows a British H-P going over the lines on a bombing raid; and we can assure you that in snapping this view from the rear turret, the gunner was taking an awful chance—for there was a strict rule against taking cameras aloft for such pictures. There are three fellows shown up ahead there: The front gunner, standing with his weapon ready; and the pilot (left) and bombing officer (right) sitting side-by-side in the cockpit behind. Another Handley-Page can be seen in the air below. (Puglist photo.)

Below: Here's one for you fans who collect pictures of the Ace. Yes, it's the "Red Knight of Germany" again—and the camera certainly caught him in a pleasant mood! He's wearing his winter air apparel consisting of fur-lined helmet and heavy black leather flying coat. We especially like this picture of Baron von Richthofen because it was sent to us by a reader in Germany. No, you can't buy the original.

And now we have the great Albatross D-3, the finest Jerry single-seater of 1918, one of which von Richthofen used at the beginning of his amazing fighting career. The D-3 employed the 180-h.p. Mercedes power plant, and it had a monocoque (single shell) body of plywood. Believed to have had a top speed of 110 m.p.h., below 10,000 feet, this Albatross was an extremely sturdy job. And it was a great battler, though a little heavy on the controls. Note the Vee-strut arrangement.

This photo also came from our friend in Germany. It's supposed to show von Richthofen and Boedeke examining an L5 Type Wolfschke locomotor, but there's some question as to whether Boedeke was alive at the time this particular ship was built. We'd say it's a swast "shot" of the Wolfschke, though, and considerable structural detail of this well-streamlined ship is offered. That's a Parabellum gun mounting on the rear cockpit.

Above is a rare photo of a rare ship—the British Martinsyde F-4 fighter of the early 1917 era. This job was a single-seater that used either the Daimler or the Sunbeam engine. None of these aircraft were built, and as far as we know, none of them ever went to France. A couple, however, are reported to have seen action in Defense of London work. (Puglist photo.)
Excitement? Yes, you’d think that eighty air battles punctuated with twenty-three confirmed victories and two bad crack-ups would be enough excitement for anybody. But when they signed the Armistice, that slim Texan, Major Fred Lord, still hanker for more. He found it—plenty of it—in revolution-torn Russia. And in this stirring article, specially written for FLYING ACES readers, he relates some of those close “squeaks” with the Reaper that made living in Cossack-land a never-ending gamble.

By Major Frederick I. Lord

Who at 17 became the youngest of all R.F.C. Flight Commanders; who at 18 became a Squadron Commander; who at 19 had twenty-three enemy aircraft to his credit—an American record second only to Bickenbacker’s; and who, for his brilliant work in Russia, received the Order of St. Anne, the Order of St. Stanislaus, the White Army Medal, the Russian Service Cross, and the Russian rank of Colonel—to go with his Distinguished Flying Cross and Bar, British Flying Cross, and Croix de Guerre already awarded him by the English and French Governments. And we are also mighty proud to add that he is an Honorary Member of the F.A.C.

How many of you were aware of the fact that the War didn’t end on November 11, 1918? True enough, the hostilities between the Allied and Central Powers were called off on that date. But over in the north of Russia there was still plenty of scrapping going on. Indeed, for another year, both British and American troops were hard at it, fighting on the side of the White Russians against the powerful—and ultimately successful—forces of Bolshevism.

In the Great War proper, I, like many other Americans, served in Britain’s Royal Flying Corps. In France, one day just before the Armistice, a Spandau bullet with my name on it punctured the vitals of my old Sop Dolphin. They pulled Yours Truly out of the resulting mess of broken struts and ripped fabric and shipped me off to a hospital. Yes, I was in for an overhaul. But three months later I was up in Archangel, North Russia, flying with the R.F.C. against a new enemy—the Bolos, as we called them. And now, have you got a map of Russia handy? If you have, you’ll find Archangel lying on the Gulf of Dvina just off the White Sea. Then about a hundred miles almost due East you’ll spot the town of Pinega alongside an arm of the Pinega River. Anyhow, that dreary and forbidding section was the locale of some of the weirdest close-shaves with the Reaper I ever had. And in this article, I’m going to tell you about some of them.

During the Summer, the sun never set for several months, and during the Winter we didn’t see old Sol for a like period. In that long-day and long-night setting, a blood-thirsty revolution was underway. All revolutions are cruel—as note the Spanish variety now going on—and this one was no exception; there were daily revolts and executions, fighting was fierce and no quarter was given or asked. Many soldiers froze to death, others starved, and yet others were murdered in their own beds by Bolsheviks—traitors masquerading in our own army.

And now that you’ve got the “feel” of this thing, here we go—

THE ONE-ARMED BLUE MAN

A group of the peasants with whom Major Lord lived in Pinega. “There was so much spying, treachery, and back-knifing at this advanced point on the White-Red Front,” he tells us, “that the brawls and babies were the only ones really beyond suspicion.”

Commander Roberts was a one-armed man. He had lost his arm during the gallant British
in Russia

attack on the Mole at Zeebrugge when the H.M.S. *Vindictive* lost a thousand of her thirteen hundred men. He was now serving in our map section. I had been ordered to fly him for a short hop around Archangel so that he could make some corrections in the maps.

We took off in a D.H. 9, and after about thirty minutes I figured it was time to get back since I knew we didn’t have much gas. But the old commander gesticulated with his one arm, pointed to his maps, begged me to go on just a little further.

Another fifteen minutes went by. Archangel and our airport were now out of sight behind us. We were flying at 9,000 feet over endless forest as far as one could see. A crash here would mean starvation—if one wasn’t killed outright.

“I’m going back,” I yelled, and started to turn.

An empty blue sleeve flapped in the slip stream. The commander leaned forward and shouted, “No, no! Just a moment more. I’m almost finished.”

He looked so pleased with the work he was accomplishing on his maps that I just didn’t have the heart to refuse him, so I kept the ship on her course. Minutes passed—and then came a slight sputter! We were about out of gas!

I could see us cracking up among those pines below us—maybe crawling away from the wreckage only to be eaten by wolves, which were plentiful here. Or perhaps captured and shot by Bolsheviks. I “leaned” the mixture, throttled down. Sweat was running down the stick but I grinned at the commander and made a gesture that meant, “It won’t be long now.”

He shouted, pointed straight ahead. I got certain words, “... village ... short way ... hay field ... ?”

Stretching the glide, manipulating the mixture, we went on, 8000 feet—7000 feet—and yet I could see no signs of village or fields. Down to 6000 and then 5000 feet. Commander Roberts now pointed north, nodded vigorously. Vaguely, far ahead I saw a patch in the forest that appeared lighter in color and of definite shape as though it might possibly be a field.

Another thousand feet gave us a couple of more miles of glide and I saw the field and cluster of houses. The motor coughed and gave up; the prop stuck up, still and straight, like a sore thumb.

Without making a turn and holding her up as long as possible, I cleared the trees around the tiny field.

Frederick L. Lord as he is today. He holds the rank of Major in the U.S. Air Corps Reserve.

Now, only 10 or 15 feet high and over the edge of the field, I heaved a sigh of relief. We were safe. We’d made it!

I saw a tree stump protruding from the hay and pulled back on the stick to get over it. And at that moment the chatter of a machine gun made me jump. The air around us was whistling and whining with bullets. We were being fired on! Only the fact that I’d pulled back the stick to clear the stump saved us at that moment.

Almost as the wheels touched the ground we were out and running. I dashed for the woods, figuring the Bolos had captured the village and were firing at us from there. But Roberts screamed something at me and ran toward the village. One of us must be wrong and running directly into the muzzles. Again the air hummed and buzzed about my ears, dirt jumped around my feet—and then I got the direction of the machine gunning. It was from the forest and I was running straight into it!

I quickly turned and followed Roberts toward the nearest cluster of village huts. His blue tunic was bobbing among the hay, his empty sleeve flapping behind. He clambered over a low wall and I finally caught up and dived after him. We were crouched there panting, when an excited group of villagers surrounded us and guided us to safety.

Much fuss was being made about Roberts. Soldiers, women, and children ran up, stared at him in awe, then religiously crossed themselves. Everybody was yelling. “The one-armed blue man—the one-armed blue man,” intermingled with, “We are saved—we’re saved.” They were arousing a sort of joyous frenzy throughout the village.

Suddenly, one young soldier grabbed his rifle, leaped the wall, and charged toward the Bolsheviks in the forest. The entire village followed

Some of the motley Allied soldiers with whom the Major fought in North Russia. Six nationalities are represented here—Americans, Englishmen, Russians, French, Italians, and Serbs. Note the man with the head wound, also the sheepskin-lined flying boots worn by the Russian to his right. We wonder how many of these courageous men are still alive today.
with whatever weapon was at hand, even pitchforks and sickles. There was a short fierce fight and the triumphant villagers returned with many captives and two machine guns. They had routed the enemy. Then picking up Roberts they carried him, like a football hero, down the street.

I was mystified about the whole proceeding but gradually pieced the story together. The natives here had a legend about a mythical man who was their protector.

It seems that several centuries before, these simple people had been ruled by a great warrior who, in his distant travels, had secured some blue dye and so always wore a bright blue coat which contrasted highly with the drab apparel of the peasants who had no such color. Single handed, the legend had it, this great fellow had defeated a raiding enemy tribe; then, on another occasion, he had lost an arm while killing a huge bear that had been the scourge of the neighborhood. In short, this man was sort of an ancient Paul Bunyan and tales of his prowess were myriad.

According to the peasant lore, this hero would often be gone from the village for long periods, but he always seemed to return at the precise moment when his people were in danger. And even when he died, these stitious folk did not lose their belief that their "One-Armed Blue Man" would return when they were menaced—for he always had done so before!

At the time of our arrival, the town had for days been besieged by a strong force of enemy soldiers who they expected would storm the town to massacre them all very soon. Many were wounded and they were short of ammunition. Their situation looked hopeless. They were on the point of surrendering when they saw our airplane land and Commander Roberts run to them in his Navy uniform. Here was their "One-Armed Blue Man" come from Heaven to save them!

* * *

FROM SEAPLANE TO SNOWPLANE

THROUGH the twilight of the northern night, two aircraft were skimming along over snow blanketed countryside. I was flying one of them—an old Sop one and one-half strutter with a rotary motor. The other was piloted by a young American from Detroi, Captain Jimmy Hunt, R.N.A.S. and R.F.C. Hunt was one of the best seaplane pilots in the service and the ship he was piloting was a tiny Sop Pup pursuit job mounted on floats. This seaplane had recently been captured from the Bolsheviks and was in dubious condition. Russia had used it earlier against the Germans.

During the War, Jimmy had performed many long distance patrols over the North Sea and was credited with sinking a sub. He had even flown a tremendous flying boat which carried a Camel on the top wing to be released in mid-air when they were attacked by German airplanes.

When the British found they were short of pilots with flying boat experience, in North Russia, Hunt volunteered.

All during the winter months when the snow was piled deep over the 'drome, he would fly on regular patrols, taking off and landing in the snow with flying boats and seaplanes. You see we had no skiis for our land jobs and it was impossible to clear runways, since the snow would drift back before you had them cleared. So most of the land-job pilots had it pretty soft during the winter. Let Jimmy and his seaplanes do the work!

Jimmy had come to Archangel to ferry this ancient seaplane to the Front. The previous night he had been so sure that he doubted if the thing would fly that far but that he was going to try anyway. I told Jimmy I thought I probably could get my Sop one and one-half strutter off from behind the hangars where the snow was packed hard; for it was a very light ship and took off and landed slowly. I would escort him part of the way. It's a serious thing to come down in that country with the temperature 40° below and farms miles apart.

On the fatal day I pushed the old Sop out onto the snow, fiddled around with the air mixture until the rotary sounded all right, bounced against a snow drift, and was in the air. I saw a cloud of snow race across the field below and then Hunt's seaplane was flying beside me.

Visibility was poor; the Northern twlight was further darkened by a fall of sharp, biting, sand-like snow. Our goggles would cover over with it and it would sting us through our masks. We huddled down in our cockpits, flew on. Mile after mile of white rolled under us and I was thinking Jimmy must be wrong about the weakness of his motor—it seemed to be going great guns.

(Continued on page 34)
Taxi in on this runway and pick up a plane load of laughs! In this department, we present a collection of jokes, cartoons, and humorous verse. For all original contributions which we can use here, FLYING ACES will pay $1. Contributions cannot be returned. Address all letters to WISECRACK-UPS.

NEW WAY TO SAY IT

Happy girl: Oh, I feel like a feather in the breeze!

Air-minded kid brother: Don’t use such archaic expressions. You mean you feel like a Taylor Cub in a tornado.

ERROR

Mechanic: What on earth happened to your Flying Flea?

Aviator: My near-sighted grandfather mistook it for a mosquito and swatted it.

SHORT STORY

“Hello there! So you want to take a hop, eh? Okay, here we go. See those cown down there? Just watch.”

SCR-E-E-CH! Z-O-O-O-OM!

“Boy-oh-boy! Look at ‘em scatter. Bet that farmer’s mad. Ha! Ha! Say, here we are over town. See those two tall buildings over there? Watch this one!”

WHI-Z-Z-Z!

“Ba-bee! Right between ‘em! Some fun! Whatcha holdin’ on so tight for? Aren’t scared are ya? Look! Those patients down in that hospital yard. Here’s a darb stunt I thunk up.”

ZOW-OW-O-W-IE!

“Ha! Ha! Ha! Bet that gave ‘em a thrill. Missed the hedge by half a foot! And now here we are back at the field. I’ll show you a real spot landing, Thore! Thought we’d turn over, didn’t you? Lot’s of sport, huh? How’d you like it—er—what’s that piece of paper you’re handin’ me? My license is revoked? My license? Say, who are you? The new inspector in this district? Say—wait a sec! I—uh—Well, can you imagine a dirty guy like that!”

MORE FAMOUS LAST WORDS IN AVIATION

“Watch me spin this prop with my eyes closed.”

“This is Jimmy Doolittle’s pet stunt.”

“Don’t worry. That other plane will get out of the way.”

“I’ll bet there’s hardly any fog at all near the ground.”

“That delayed drop parachute record will be a cinch.”

DUMB DORA thinks a Douglas transport’s cruising speed is 18,000 miles per hour. You see, a pilot at the Los Angeles airport pointed one out to her and said it was scheduled to go to New York in ten minutes.

TOUGH LUCK

First pall bearer (sadly): Poor Bussy! He was one man in a million.

Second pall bearer: Yeah?

First p. h.: Sure. That airline company advertised that only one passenger in 1,000,000 got hurt. He was him.

PHOENIX!

Goofer: How’s that new plane of yours—the one you call the “Flying Opera House”?

Woofus: Very fine, my lad. Of course, she doesn’t go very Faust, but I manage to Romeo all over the country in it.
LATE summer breeze kissed the lindens in Kaiser Bill's home town. Birds chirped under those lindens, and Frauleins stormed the post offices to get word from the palpitating Front as to whether their Herr Romano had been liquidated or not.

But as this story opens on the drome of the Ninth Pursuit Squadron, located south of Bar-Le-Duc in sunny France, we should worry about the whole Potsdam family.

Jitters were prevalent on Major Rufus Garry's reservation. For days rumors had been thicker than Spandau bullets. The Krauts were up to something in the neighborhood of Mont Sec, and the brass hats sojourning at Chaumont were squirming in their swivel sofas acquiring quite a shine on the seats of their whipcord pants—because they couldn't find out about it. Boche planes were as plentiful over Mont Sec as Zulus around a pot of stewing missionary. Many a Yankee patriot came back from look-see jaunts over that inflamed wart on the topography of France with a lot of wiser.

Phineas "Carbuncle" Pinkham, freak of fate and soldier of misfortune to his fellow men, scoffed at the idea that any Boche could stop him from taking a close squint at the aforementioned eminence. There were times, however, when even Phineas was wrong. He ran into an assortment of Pfalz pursuit ships; Fokkers with three wings; Fokkers with two wings; and a smattering of Albatross jobs. They dropped on his neck just as he got a glimpse of activity at the foot of a steep slope. Boche were parading back and forth toting heavy sandbags. Trucks, that looked like a line of bugs, moved along a road. And there was a big tent a mile off to the left. It bore a Jerry Red Cross insignia on its roof.

Phineas had time to observe three ambulances crawling away from the hospital tent just before a flock of lead smacked into his Spad and almost flipped the ship over on its back.

Archie iron sprayed him and a piece of it bounced off his cranium, ushering in the night hours ahead of schedule. There was little doubt that the hunk of scrap iron saved the Government twenty-five thousand dollars. Kraut pilots forgot to shoot when they saw that Spad go into convulsions and do everything in the air that a dog with a fit could do on the ground. When Phineas reached out for his scattered marbles, he was only a thousand feet in the air and if he had had a penny of smoke streaming out from the tail, it would have formed a corkscrew in the air.

JUST when it seemed that the ground was going to leap up and kiss him Phineas pulled out. A wing tip almost hamstrung a stork in a ruined chimney of a house on the democratic side of the lines when he gave the crate the gun. Up he went, wiping beads of sweat as big as marshmallows off his homely face. Then he picked himself a likely looking landing field and brought the Spad down. It seemed to be shaking, too, when he climbed out of it.

"B-Boy!" Phineas gulped. "That was as close as wall paper and p-plaster. Oh-h-h-h, my dome! I bet it looks like a cracked egg. I had better leave on my helmet to keep my brains in 'til I git to a hospital. Oh-h-h-h-h-"'

Not far away there was a sunken road. An ambulance went lurching by and Phineas Pinkham let out a howl. The meat wagon kept on rolling, so the Yank took out his service revolver and aimed carefully.

BANG!

The rear tire of the ambulance blew out with a loud report and the Florence Nightingale hack did an Annette Kellerman into a ditch. A Dough climbed out, started cursing.

"Cripes—what're they makin' them tires outa now? Bread dough? Huh—that's the t'old blowout—"

"Bon jooye," trilled Phineas, climbing over a fence. "It's a lucky accident. You almost lost a patient. Haw-w-w-w-w! I will just git in an' lay down while you fix the tire. You give good service in this sector, gar-song. I hope you'll hurry, as I ain't sure how long I will live."
"You can drop dead now," the dough clipped, "for all I give a blanket—blank—blank—blank!"

"Tsk tsk," sighed Phineas, shaking his head despite his aching scalp. "Just because a wounded man asks for succor—"

"Yeah. That's what I am—a sucker. I shouldn't have stayed back in Brooklyn. It's a lot of parsley, this here guebre," the dough complained. Grumbling, he went to work while Phineas climbed into the ambulance to soothe his aching cranium. He took something from his pocket and plastered it on his face when the meat wagon finally began rolling toward a base hospital.

"Catsup's quite a help," he observed to himself. "Unless you are losin' at least a gallon of blood, they will not take you in, the dopes. I hope it ain't too big a crack, though, 'cause maybe they can weld it as good as new. I'll git hunk with them beer gulpers. He-e-ey, are you drivin' over roof tops or—? I'm a mortally wounded officer."

"Now ain't that too bad?" the driver tossed back at his passenger. "Just have a little patience an' I'll take ya fer a ride along the Champs Delizzies. Shut up!"

Phineas Pinkham rarely did what he was told, but this time he was beyond objection. In an hour he had arrived at the hospital. He was carried in and laid on a nice white bed. Never had anything felt more exotic to the Pinkham carcass. Right then and there the hero from Boonetown, Iowa, decided that he would make his sojourn last three days so he could catch up on some sleep. But a doctor looked at the Pinkham brain container and told its owner that he had a skull as thick as the door of a vault.

"You'll be out in the morning. Say, you could sell that skull of yours for plenty of dough, Lieutenant—to the Smithsonian Institution. Ha! ha!"

"I am dyin' an' they think it's funny," Phineas moaned. "Out in the A. M., huh? Just when I was gittin' comfortable. Boys, what I could think up to do to the Krauts lyin' here in bed like this! Oh well, I ain't out yet. I am glad I purchased that last book for my library."

In the morning a nurse ran wild looking for a surgeon. She found one and led him back to the Pinkham cot. Phineas was on the floor with one of his legs twisted around his neck. The other one was flopped loosely in front of him, looking like a wide open "V."

"Ha-a-a-alp!" he yipped. "Do somethin'—I giss that forced landin' broke most of me up from the—hips down. Oih-h-h-h-h, that's it—stand there and enjoy my agony! Ohh-h-h-h-h!"

The doctor knelt down, looked the knotted Phineas over. He helped the nurse get Garrity's errant pilot into the bed. Then he scratched his head.

"They'll have to take some X-rays," the boss medico decided. And while Phineas yelled and squirmed he got the Boonetown miracle man's right leg from around his neck. "Huh—he's passed out. Well, let 'im be. If he needs a hypo—"
ON the drome of the Ninth Major Rufus Garity was pacing the floor of his sanctum. For an hour he had been waiting for word from Lieutenant Pinkham. Suddenly his telephone set up a racket, and the Old Man jumped, swore, and snapped up the receiver. It was the hospital near Larouville calling. Garity was told that Lieutenant Pinkham was a patient there—that he had cracked up.

"How bad?" yipped the Major, "I'm not good at guessing."

"We don't know," the voice came from the other end. "I think he's broken both legs and one arm. As soon as we take pictures—"

Garity hung up, pawed at his face. Poor Pinkham! He must be in terrible pain, he thought. Running out of the Operations Office, he yelled at Captain Howell, leader of "A" Flight, and Bump Gillis, hutmate of the wounded Pinkham, who were sitting at a table fighting over a checker game.

"Come on, come on," howled the C. O. "Pinkham's smashed up. Broke both legs—we'd better go see him before—maybe he found out something over Mont Sec. Well, what're you waiting for? What—?"

Bump Gillis had a sour look on his face. "Huh, there's somethin' fishy about that bum hein' in a hospital. I—er—picked up a book he's been readin' lately. Once I went to bed, and he looked like he was in a knot and he was grunting like an elephant lifting teak logs. My bet is that he is practicin' up somethin', the crackpot! I've got the book here. I'll show it to you. Here—"

Major Rufus Garity snatched the dog-eared book out of Bump's hand.

On the cover he read:

BE A CONTORTIONIST

Make Big Money. Circuses and Carnival Shows


AND DON'T FAIL

To Take Advantage of Our Other Startling Offer at the Same Time: Dr. Flubb's Miracle Massaging Lintiment. Price—10c

"Uh—er—that head!" stuttered Major Garity apologetically. "If what I—think is—true, I'll fix that weak-chinned son of a cuckoo! Legs broke, huh?" Major Garity barged out to the tarmac and yelled for an official U. S. taxi cab. In just five minutes he was rolling off the drome with both fists clenched and itching for the feel of that receding Pinkham chin.

"That makes me even with that bum for cuttin' up cordite and puttin' it in my tobacco!" chortled Bump Gillis.

Phineas Pinkham was getting pictures taken of his undercarriage and his right wing when Major Garity stormed into the emporium of succor. The flyer took one look at his Commanding Officer then at the book the Old Man held in his fist.

"Gimme my clothes," he gulped. "I'm gittin' out of here."

"Be still, Lieutenant, how do you think you'll get well if—"

"Hah, git well? I don't want eight more fractures in my dome. One side! Every man for himself!"

"Pinkham, get out of that bed!" roared Garity, picking up a hundred-pound weight used to keep cracked undercarriages in place while they are healing. The nurse squeaked and the doctor made a dive for the Major. "Invalid, huh? You flap-eared big mouth. Contortionist, eh? In ten easy lessons!"

"Twelve," Phineas corrected him, jumping out of bed like a rabbit after nibbling loco weed. "Oh, awright, I am busted! But I had a rest comin' to me. You wouldn't let me go to Paree to git my nerves untangled. I says to myself, I'll take a vacation on my own hook. I—uh—hook—hook? Say, it is not a bad idea, haw-w-w-w-w! Boys, it is lucky I took a few hours off here, Major, as I got me a great idea."

"Get your clothes on, Pinkham! I'll give you just two minutes!" the Major screeched.

"You would think I was an Indian," complained Phineas, "with only a loin cloth to put on. Well, I'm hurrrin' ain't I? I am no fireman!"

In ten minutes the squadron car was rolling toward Bar-Le-Duc. And Phineas Pinkham was riding in it with Major Rufus Garity.

"I wish you would take it easy over the bumps, the culprit called to the driver. "It was no dandelion blossom that hit me on the dome. Well, if I have a relapse with this cracked dome of mine, I'll sue somebody. I know my rights!"

"What did you do with the Spad, you halfwit?" Garity growled at him.

"Oh, it's over near the Meuse," chirped Phineas. "I will go get it as soon as I am well."

"Oh, you will, will you?" the C. O. sniffed. "Want to bet?"

"Awright, but I would not advise you to send anybody else for it as it is liable to blow up. I have got a bottle of nitro hid inside of it. I was goin' to drop it on Mont Sec. And the Hess's not in very good shape. If anybody had a forced landing, well—awright, you send somebody for it, haw-w-w-w!"

KA-ZAM! The Pinkham fist whaled the Boche sentry in the chops.

AT this, Old Man lost his temper and threw his pipe against the windshield. Hot embers of Lady Nicotine sprayed the driver's physiognomy and he threw both hands up into the air and let the boiler have its head. The car whanged a tree and Major Rufus Garity described an arc through the ozone and plopped prop foremost into a very ugly looking mud puddle. The C. O. of the Ninth was in no mood for a game of Jackstraws when he finally reached the drome. His feet were pulsating with the urge to kick somebody when he removed his boots. Phineas went to his hut and began to play Bump Gillis.

"You blab-mouthed Bum!" he railed. "You—!"


"Krauts!" yelled Bump, jumping out of the door. Phineas was just one leap behind him. Everybody on the drome was accelerating speed. A machine gun began to sputter. The Old Man drowned it out with his trumpet- ing. Overhead four Boche ships winged over and piqued at the field of the Ninth. Five hundred feet up, they lifted their noses and clawed for the roof. But four

(Continued on page 86)
CIVIL WAR in Spain! Civil War, the most bitter of human struggles, the most insane, the most unreasoning form of warfare!

Father against son, brother against brother. Mothers shielding grim weapons and daughters sniping from casement windows—the same casements, perhaps, from where their Andalusian ancestors threw kisses to the Conquistadors who sailed with Cortez to conquer Montezuma.

Today the Spain of glorious history is no more. At this writing it is a shambles, with the key Loyalist stronghold—Madrid—on the verge of complete collapse. At any day the capital city may fall into the hands of the Rebels, to open a new and perhaps a more pathetic chapter in the history of Spain.

Where it will all lead to, no one knows. Who is fighting whom, is even more mysterious. Those political lines which have been erected are not completely understood. We only know that the progress of Spain has been halted—hurled back fully one hundred years.

So far, according to reliable reports, more than a hundred thousand men, women and children have been killed. More than double that number have been made homeless and already the grip of starvation is being felt on both sides. Amid it all, no one character has stood out to promise any bright political future for Spain. Thus far, no foreign government has dared to make any practical move to stop the slaughter or encourage an armistice. That is one of the penalties of civil war. No one knows where to begin, for there is neither head nor tail in such a widespread upheaval.

Civil war at its best is a terrible thing, but civil war conducted with modern weapons in the hands of fanatics who have little or no knowledge of their tactical use, can be a bloodthirsty scourge. A trained soldier representing a well-established government can conduct warfare as clean as warfare may be carried on, but give an unbalanced "patriot" a gun and he immediately becomes drunk with power, and nothing is safe. Multiply these conditions with machine guns, armored cars, naval destroyers, tanks, howitzers and above all, a military airplane—and we begin to get an idea of how terrible civil war can become.

In this war as in the recent Italo-Ethiopian affair, military experts all over the world have been watching the progress of aviation to see whether the winged arm is living up to all the grim promises that have been made during the past ten years.

The Ethiopian war did not offer much material to work on, since the Ethiopians had no air force to combat the Italian forces. In this Spanish fray, however, we are at last getting some idea of what the modern military machine can do.

At best, Spain has never had a great air service, even though it was Spain that gave the world the great Hispano-Suiza aero engine. But airplane factories scattered throughout country have manufactured DeHavilland, Fokker, Loring, Lorraine, Dornier, Potern, and Nieuport type craft under license; moreover the firms that make Spanish types (at Cadiz, Carabanchel Bajo, and Barcelona) were believed, under pressure, to be capable of turning out 600 planes a year. However, since Spain has been so chopped up and overrun, it is to be presumed that practically no manufacturing has been carried on at all.

From the best available reports, the Spanish Air Service has been undergoing complete reorganization for the past year or so, but nothing definite has been accomplished. There were about eight military fields in Spain and four in Morocco when hostilities commenced. Most of the flying equipment was for use of the Army, and only a few Dornier "Walt" flying boats were available for the Navy.

For single-seat scouts, the Spanish used the French Nieuport 52, and their reconnaissance machines were the French Breguet XIX. It is interesting to note that the American Fleet-Knight machines were used there as trainers. Among the rest of the listed Iberian equipment one finds a Clerva Auto-giro, a Fokker F.VII, a three-engined Junkers, a few British Tiger-Moths, and some ancient D.H.9s.

Just how much of this material remains in the hands of the Loyalist troops is a conjecture, but the flying and fighting school was just outside Madrid at Alcalde de Henares, and it is to be presumed that they at least hung on to a few of their Nieuports, No. 1 Fighter Squadron was at Getafe, also near Madrid. But most of the other fields appear to be in the hands of the Rebels.

We have a good idea of the repeated bombing of Madrid by Rebel fliers, and many of us have wondered what type planes were being used. We have since learned that the Rebels managed to obtain several of Italian Caproni 101 bombers, such as used against the Ethiopians.

These machines are powered with three 370 h.p. Paigieo "Stella V11" radials and have a top speed of 155 m.p.h. with a full military load. The racks are light and carry only a comparative small load, but they have a very comprehensive armament. One gurner stands high behind the wing's trailing edge and fires in all directions above the tips of the props and rudder. Below him is another gurner with two weapons which fire down a tunnel under the tail, and in addition another mounting is so set as to fire out of either side cabin window.

OUR cover this month shows the sort of action which might be seen over Madrid at night when the Rebels bombard the town. Loyalists in Nieuports are depicted attempting to drive off the big Caproni which has just released two bombs.

The Nieuport shown is the Spanish version of the Nieuport Delage 52, which is a seaplane powered with a 550 h.p. Hispano-Suiza motor. It has a top speed of 168, carries two Vickers guns firing through the air screw, and all in all is a good machine for the work. We do not know how good the Spanish defenders are, but during a recent raid, staged by six Caproni bombers, two were shot down outside Madrid.

How long this aerial warfare will continue is hard to

(Continued on page 93)
Air Race Thrills and Threats
WITH PHOTOS OF THE L. A. MEET

That triumph of Michel Detroyat and his hurtling Caudron at the Los Angeles National Air Races bids fair to revolutionize our air racing. Other foreigners now plan to make an onslaught on the generous U. S. prize money. But the Americans are already designing special speed craft to meet this menace to their contest supremacy.

By Charles F. McReynolds

When the dapper and likable Frenchman, Michel Detroyat, captured the Thompson Trophy and the Louis W. Greve Trophy races at Los Angeles National Air Races last September, he did more than take the bulk of the money prize and racing honors—he also completely revised America's idea of air racing. When he threw his Caudron C-460 around the pylons at Los Angeles, the only real competition he had to face was that offered by the representatives of the so-called back-yard racing class. Detroyat's plane had been built at a famed aircraft factory under the supervision of experts who boasted years of racing and military experience. The plane was not a "million dollar" proposition by any stretch of the imagination, though some have intimated as much. But it is believed that it spoiled the best part of a $50,000 check.

In comparison, the American machines that faced it in those two foremost racing events, could not have cost much more than $15,000 apiece.

There really were a few American planes capable of offering the Frenchman real competition, but unfortunately they were not able to appear. After all, the pay-off comes at the finish, and not on estimated speeds. There was, for example, Roscoe Turner's revamped Wedell-Williams racer, which crashed while being flown to the air races. Turner claims his bus would have done close to 400 m.p.h.

Benny Howard's "Mister Mulligan" also crashed and (Continued on page 92)
Here, fellows, is the startling craft that mopped up the field—Michel Detroyat’s flashy Caudron C-140! This Renault-powered bullet took both the Thompson Trophy and Louis W. Greene Trophy races to upset the well-laid plans of our Americans and launch a new era in National Air Race speed practices. In sweeping the Thompson event, Detroyat averaged 342.8 m.p.h.—fully 12 m.p.h. faster than Doohill’s record set in 1932. And it was a speed of 373.4 that brought the Frenchman first honors in the Greene contest. Would you like Detroyat to step out of the cockpit there and let you take ‘er “around the block”?

Now for some close-up stuff for you detail hounds. That’s Art Chester, himself, working on the “Jeep” Monocoque motor during a lull at the racing pits. Both the small size of the ship and the interesting mounting of the popular American inverted power plant are shown in this photo. Art, who is now 35, was born in Downers Grove, Ill. His present home is in Chicago.

The ladies who flew and won—in a stock model Beechcraft, Louise Thaden and Blanche Noyes, noted feminine pilots, being congratulated by Vincent Benda, donor of the famed Benda Trophy. The fans, in the last photo ever taken of R. A. King’s low-wing racer “Sunny.” Shortly after the camera snapped, she flew off in the Thompson race—and cracked up. This photo, taken at the racing pits, shows, incidentally, what continuous care the speed jobs were given. Note the groups in the background working on the various machines.
Wings of the Viper

GREAT "BUZZ BENSON" PACIFIC WAR YARN

By Arch Whitehouse
Author of "Sea Hangar Snare," "Code in the Cockpit," etc.

Yanking the speedy Vought through a lightning Immelmann, Buzz Benson slammed back, unmindful of the splashing flame and debris from the stricken M.T.B. He rocketed the scout-bomber past the very nose of that plunging ship. Then his guns spoke again, to hurl a hail of death into the vitals of the second Mongol raider.

Answered without opening his eyes. "Should be in sometime this afternoon. We're making time."

"The rest of the fleet behind us?" asked the elder Cressford.

"I believe so. You can't get anything out of old Blanchard. The ships probably have to slip through as fast as they can and then plan to re-form for the northward movement somewhere off Cape Mala."

"When do you think they will engage the Nipponese fleet?"

"It seems reasonable to presume that the enemy will force an action as soon as possible now. We may even see it ourselves, Lonny."

"Whew!"

"Whew is right," muttered the elder Cressford, shifting his position and peering about as he pulled his robe up. "And the quicker we get you off this floating runway, the better, young fellow. The minute you stick your feet on real soil again, you're being clamped in a prep school somewhere. This is no life for a youngster like you."

"But these are war days, dad," remonstrated young Cressford.

"Yes—but not for youngsters like you. You've done your bit."

"Bit?" gasped Buzz. "He's done enough to let him out of the next seven wars. But you'd better mosey off to school, Lonny."

"School is going to be pretty slow after all this."

"Well, when it gets too slow," Buzz grinned, "just close your eyes and visualize that scene when we went down into the drink just before the Navy turned up to pull us out. That ought to make a nice clean prep school bed seem like a little bit of heaven."

"But I hope I see some of this action," persisted Lonny.
“Maybe you will,” broke in Lauren Cressford. “Here comes Bad News Blanchard, the Banshee of the Bridge. He looks like something they use to haunt houses.”

“I knew this couldn’t last long,” moaned Buzz turning over and burying his face in the robe. “Tell him I’m dead.”

But young Lonny was up on his feet before the Rear Admiral was all the way down the companionway.

“Ah, Lonny,” the Admiral said, “Getting your sunshine? Where’s Mr. Benson? . . . Ah, there you are, Benson . . . . Sit still . . . . sit still.”

BEHIND the Rear Admiral stalked his Flag Officer, Lieutenant-Commander Adrian Maxstead, a gentleman who seemed to take his duties even more seriously than did Blanchard. He stood to attention, tight-lipped, cold. Cressford squinted out of one eye, winced at all the gold braid. The Admiral forced another smile and sat down on the foot-rest of Benson’s chair.

“What’s the bad news from old Norton?” Buzz began.

“Sorry, that’s the trouble,” Blanchard said quietly. “There’s no news of any sort. There’s been a complete two-hour blank-out of all low band waves and we can’t use our sets.”

“What are you talking about?” snapped Buzz. “How can that be? You can’t blank out the ether.”

“That’s what radio experts have claimed for years—but no set using anything up to about 185 meters has been able to send or receive a word of any sort for more than two hours.”
“How do you know that, if you can’t use your set?” demanded Buzz.

“We can use commercial broadcast bands and we have thus been advised that the phenomenon has silenced other sets.”

“So what?” demanded Cressford.

The Admiral refers to the fact that Navy radios are not easily adaptable to changes for such high wavelengths,” broke in the haughty Flag Officer, “and that as long as this condition remains, the whole intercommunication system of the Navy is out of order.”

“And with the possibility of a major naval engagement likely to break out within a few hours, you should be able to realize the seriousness of the situation,” Blanchard continued.

“Gimme a wrench and I’ll fix it,” smirked Cressford.

“I always use ordinary baking soda in a case like this,” Buzz added. “Have you ever tried baking soda, Admiral?”

“The Admiral wishes it understood,” the Flag Officer broke in again, “that this is a most serious condition. We can’t hold communication during action in the commercial broadcast bands. It would be impossible.”

“Sure, you’d get three bars of There’s A Small Hotel with every order for a broadside,” laughed the elder Cressford. “What a swell war, I’m for it.”

“Gentlemen,” the Admiral finally snapped, getting to his feet. “You’re all mad! Do you realize that should the enemy attack at this minute there would be nothing we could do to contact the rest of the fleet. I know that it’s hard to believe such a radio blank-out could happen, and hence you’re facetious. But it has happened!”

Just then a radioman came around the corner of the control tower buttress carrying a message form.

The Flag Officer took the message form, read it and started to hand it over to the Admiral. Buzz noticed a strange frown on his face, but before the Admiral could read it, the radioman said: “I just got that much on the 19.34 meter band, sir. It’s not very clear, but I thought you would . . . . would . . . .”

A strange look had come into the radioman’s face. He gasped, stiffened as though he were shot, then fell forward on his face!

Cressford leaped to his feet, knelt beside the man. He felt his pulse, listened to his heart, then amazed glanced up at the Admiral and said: “Dead!”

Admiral. “Only Navy men with Intelligence experience in China know who the Viper is, and even they are not sure. Come to my quarters, will you?”

“But wait a minute,” said Benson, glancing around.

“I happen to remember that there is a high speed Russian torpedo plane known as the M.T.B.-1, and if there is anything to this message, we better be prepared for it.”

“There’s that new Vought scout-bomber,” said Lonny. “The one they flew aboard yesterday for deck tests.”

“You refer to the SB2U-1,” the Flag Officer snapped.

“You can’t take that.”

“Yes they can,” cracked the Admiral. “None of our men have flown it, and if Benson wants to break his neck in it, I’m perfectly satisfied. Have it brought on deck, Maxstead. Baking soda, bah!” the Admiral barked, leading the way up the companionway to the bridge.

“And now sit down!” Blanchard stormed as they entered the chart room. “You don’t know who the Viper is, eh? Well, I don’t know one man in the world, I’d rather hear less about it,” the Admiral raged. “If he’s anywhere in this section, I can understand why we can’t use the low band radio. That devil seems to have the power of making the whole universe do his bidding.”

“Cut the embellishments and let’s hear about his dirty past,” Cressford went on. Benson was still trying to figure out the strange radio message.

“This man known to the U. S. Navy—that is, a small part of the Navy—is a giant Mongol maniac who has been a thorn in our side for the past ten years. He stands nearly seven feet tall, is as handsome as sin, and commands a crazy insurgent machine that is fast spreading across Asia. He is the son of a Mongol prince, who is supposed to be a direct descendant of the great Hulagu, who is supposed, in turn, to have taken all Genghis Kahn’s tricks and doubled him in spades. He has naturally inherited all the treasure Hulagu snatched when he sacked Baghdad in 1258, which, by the way, is said to be the most valuable private fortune in the world today.”

“I’ve read of that Hulagu guy,” broke in Buzz.

“Well, Mangu Khan, or the Viper, as he is known, is out to unseat the modern Baghdad—America. He has made that threat for years and he in all probability is working with the Japanese Blood Brotherhood, the Nipponese National Socialists who are considered responsible for this war.”

“What is one lousy Russian torpedo-carrier?” snorted Cressford.

“One lousy torpedo-carrier, let me advise you,” snarled the Admiral, “would be the last thing I want to see just now.”

“I wonder what killed that radioman. He most certainly was murdered,” broke in Buzz again.

“You’re right, Benson,” the Admiral agreed. “That man was going to say something else just when he keeled over.”

“He wasn’t shot and he wasn’t knife,” said Cressford.

“He must have been poisoned in some way.”

“We’ll find out after our Medical Officer has made a thorough examination,” the Admiral answered.

“I doubt it,” said Buzz, still studying the message.

The Admiral took up his phone, gave several crisp orders, then assured himself that the Vought scout-bomber had been placed on deck. No sooner had he placed the speaker back when a wild screech of warning sirens screamed through the tube of the Yorktown. Bells rang, bugles ranted. The sound of running feet echoed along steel corridors and the bark of C.P.O.’s were added to the general confusion.

The Admiral snatched at the phone again. Then there was a screech of a motor, the whine of wires, and to it all was added a thunderous boom.
As Buzz looked out, a silver two-seater torpedo carrier, bearing a snarling insignia of a coiled viper, was diving upon the Yorktown.

The rest was explosive drama. The torpedo plane hurtled directly into the wrath of three A-A guns. It came down like a monster projectile, greased for the skids. There was an abrupt lunge and a snub-nosed green and white torpedo shot out of the chutten between the raider's two pontoons and flashed in the sunlight.

Buzz sighted the new Vought on the deck, with a handful of bluejackets—and Lonny Cressford—standing nearby. He tried to yell, but no sound came from his throat. He could only stand helpless and watch the inevitable.

"Lonny!" bellowed Lauren Cressford over Benson's shoulder.

"Goor Lord!" gasped Admiral Blanchard.

Now the torpedo struck and there came a thunderous roar. The Yorktown shivered from stem to stern and a great curtain of flame swept up in a fan from the wide-lipped stern of the carrier.

The torpedo-bomber ripped over, hammered through a tornado of anti-aircraft fire, and swept around, flashing its silver wings in the sunlight. Without looking again, Buzz darted out of the chartroom, down the companionway, and across the wide carrier deck to the Vought. He looked about for Lonny, but he was nowhere to be seen. There was a handful of bluejackets sprawled about around the plane.

"Lonny! . . . Lonny!" yelled Buzz, pulling wounded men from in front of the plane.

"Where's Lonny?" someone else yelled. It was the voice of the elder Cressford, but considerably changed now.

"He was here a minute ago."

"Lonny! . . . Lonny!" yelled Cressford.

Buzz took one look skyward, muttered a low growl and clambered upon the wing of the SB2U-1. In ten seconds he was in the cockpit, screaming through the open cowling for someone to flag him off. He glanced over the maze of dials and saw that she was ready to go. His eyes sought the Officer's cockpit out of a shelter at the base of the control tower, gave her the gun.

The Vought snorted and raged against her wheel brakes. Buzz flipped his heel, released the brakes, and let her cant down the deck. Already the Yorktown was losing headway, for it was evident that the torpedo from the Viper plane had blown away most of the screws and possibly the steering gear. For it had caught the carrier full in the stern.

The Twin-Wasp Jr. ripped the Vought clear of the deck long before her wheels had passed the forward A-A battery turret. Buzz held her steady and let her climb for about thirty seconds, then he whipped around and slammed after the silver torpedo bomber.

The race was interesting to those who saw it, for the Vought, fitted to do at least fifty miles per hour faster than the M.T.B.-1, was soon in position beneath the tail of the racing Ruskii. With a slow tilting of the stick, Buzz hammered a few short bursts at her, still keeping well out of the gunners' arc of fire.

This so annoyed the Viper pilot that he soon turned and came back, storming lead at the new Vought from a commanding position. What the raider lacked in speed was certainly made up for in maneuverability.

In a few minutes Benson found himself in a bad spot.

The Viper plane cut inside him on every turn, giving the gunner a perfect target; and it was only on speed that Benson seemed to be able to clear.

And now Benson attempted to draw the fight toward the mainland, hoping to keep in a position where he could trace the landing place of the Viper plane. But suddenly there came one of those amazing interludes that was fast becoming a regular feature of his wild existence. As the Viper plane slammed on him again, something happened in the rear cockpit well down the fuselage of the new Vought. A gun started to spatter from somewhere and in an instant Buzz knew.

"Lonny!" he cried.

He turned, saw the slim shoulders and toupee-haired head of young Cressford peering over a Browning gun. He saw the boy draw a careful bead and let fly at the diving Viper bird.

"Lonny!" yelled Buzz in joy. "Where the deuce did you come from?"

But Lonny was too busy driving the Viper off. He spaced his bursts beautifully like a skilled organist manipulating his stops. The Viper plane, drenched with lead, darted back and forth frantically in an effort to evade this death spray.

Lonny looked up, grinned at Buzz. In a minute the tide had been completely turned and they saw the Russian plane wheel, nose down, and hurdle the opposite direction—toward the gray-blue line that was the coast of Southern California. The pilot gave his L-D motor everything she could swallow and hurtled at breakneck speed for the haven that evidently nestled somewhere off there in the blue.

"Boy, was I glad to hear you playing at soldiers back there!" Buzz yelled through the tube at his gunner.

"Where the dickens did you come from?"

"Just climbed in during the big blow-up," yelled Lonny. "I knew you'd go after him, so I played safe and stowed away with the rest of the gear."

"What's this all about, anyway?" Buzz asked, more to say something than with the expectancy of getting an answer.

"There's only one way to find out," replied the lad with youth's directness. "Let's keep after him and see where he lands. That might give us an idea."

"Hang on!" yelled Buzz.

The Russian torpedo-bomber clung grimly to its slight lead and the gunner continued to spray the Vought from the rear. Buzz decided to play safe and keep just out of range, but he still kept the machine in sight.

This game of cat and mouse continued for about twenty minutes with both Buzz and Lonny watching the silver raider. There was no question now but that he was heading for a definite point somewhere along the Mexican coast. Buzz figured that it could not be more than fifty miles south of the California state line—dangerously near the San Diego naval base.

All this set him thinking as he trailed the retreating M.T.B.-1. There was this business of the complete blank-out of the short-wave bands just when the U. S. Navy which was setting itself out for the naval engagement of the century, and the sudden appearance of a mad Mongol leader who had sufficient power and money to threaten a whole nation. If the Japanese Navy had been warned of this blank-out they could have revamped their radio systems to use either the higher broadcast bands or perhaps they would adopt the ultra-short wave bands—which would leave the whole United States fleet at its mercy. No fleet is stronger than its system of communication. All the elaborate battle plans and routine tactics would be of no use without the nerve cen-
ters of inter-communication emanating from the Fleet Admiral's bridge.

The more Buzz thought of this the more he was determined to follow the silver Viper ship to its lair. He realized that Lonny was right on that point.

The coast was looming up with distinctness now. It was a bleak rugged frontage with a wide high wall of greenish-gray granite standing up like a strange fortress from the white-capped rollers that hammered at the base.

Buzz saw that the Viper plane was beginning to lose considerable height now, so he opened up again and raced after it, determined to risk a stray bullet to make certain what was about to happen.

"There he goes," Lonny yelled. "Look, he's going down."

"I see him. You watch him closely, too, because we want to absolutely sure what happens. I think we're in for something new!"

They were.

The silver torpedo-bomber dropped down in a series of easy S-turns and gradually eased its way into a reasonably calm space of water that was protected by a jutting portion of rock. They swept over it, peer down.

The M.T.B.-1 hit the water, threw her plumes of spray, then eased into a gentle swishing taxi toward a blank face of rock.

"What the deuce is he up to now?" demanded Buzz.

"He's going to bust his prop on the rocks if he's not careful," said Lonny.

Buzz circled and they watched. Then to their amazement the M.T.B.-1 disappeared inch by inch, as though it had slipped through a hole in the rock that had been cut out to fit it perfectly. They sat there amazed, as first the wings then the long fuselage slipped from sight. Yes, the plane seemed to be swallowed up foot by foot until there was nothing left but the whale-like tail. Finally that went, too.

Both Buzz and Lonny stared, exchanged glances of puzzled amazement. They circled again, lower and lower. There was nothing below that gave them even an inkling of what had happened, or how the disappearing act had been pulled.

But they were not allowed much time to investigate. From hidden gun turrets somewhere below came the chugging belches of high-caliber guns. The Vought pranced under the heavy concussion as Buzz fought to get her clear. Lonny yelled and sprayed the rocky walls with wild bursts of fire at points he believed were sheltering the hidden gunners.

They finally cleared, carrying plenty of damage out with them, and raced out to sea again with plenty of steel and explosive in their wake.

"Mark that spot, Lonny. Draw it on something—the back of a map. Anything to give us an idea where it is," yelled Buzz.

Lonny huddled down under his cowling and sprawled the general outline of the mysterious fortress, marking in the high spots and the most important points of topography.

In the meantime, Buzz decided to try the radio and see if the strange condition had cleared up, and also to make an effort to contact Rear Admiral Blanchard. He flipped the head-set over his ears, jacked them into the panel, and spun the wave-length lever over to the Navy band. Almost immediately he got a terrific thud through both ear-phones that almost deafened him. It was a form of static but fully one hundred times more powerful. Buzz felt that his head had been clamped in a vise and then someone had given the vice a blow with a twelve-pound sledge.

"Whew!" he gasped ripping the phones off. "What the deuce?"

Lonny had crawled up to hand over his drawing and frowned when he saw what Buzz had been through.

"Static?" he asked.

"Yeh. Ninety horse-power static. Almost knocked the top of my head off."

Lonny leaned over, glanced at the set, and saw where the wave-length lever had been placed. "No wonder they can't use the low bands, eh?" he said thoughtfully.

"Yeh, but no one else complained of that thump."

"Maybe we were nearer . . . Golly, Mr. Benson!" gasped Lonny. "Maybe they're pulling that game from somewhere in that rock."

"Go to the head of the class, Lonny," grinned Buzz.

They found the Yorktown still floundering helplessly not far from where they had left it, and Buzz had to make a frantic side-slip and cross-wind landing on the deck to get in. He used every wile he knew, from flaps to wheel brakes, and only just hung on by the skin of his teeth. A gang of bluejackets nailed him just as the Vought was about to skitter overboard a few feet short of the take-off lip.

Cressford, Maxstead, and Admiral Blanchard were on hand, relieved, but angry at first. Then Buzz clambered out, snatched the piece of paper from Lonny's hand and went hurriedly into an explanation of what had happened.

"How soon can you get under way—any way at all?" he said anxiously to the Admiral.

"You tell us. We're adrift now without power or a rudder and no reliable means of communication—until some vessel comes close enough to take a visual signal."

Buzz grabbed at a chart sheet that stuck out of Flag Officer Maxstead's jacket pocket. Maxstead tried to snatch it back, but Buzz waved him off and opened the fluttering sheet.

"We are trying to communicate with San Diego over a wide broadcast band, but we are having the devil's own time breaking through. There's about six high powered stations over the Mexican border jamming the ether with a lot of wild garbled news despatches. You know what for," the Admiral explained, while the elder Cressford stood arguing with his son near the searchlight platform.

"Well, look here," Buzz went on pointing to the portion of the chart he believed covered the point in question. "This is where we chased that guy in the Russian ship. He landed in a cove about here, taxied up to the wall of rock—"

"And disappeared," broke in Rear Admiral Blanchard with a hard grin.

"How did you know, Admiral?" demanded Lonny.

"That's the Viper, sure enough. He's a devil. He can do anything."

Flag Officer Maxstead took the chart away from Buzz, folded it quickly. "I'm sorry," he said stiffly. "But that's my personal chart. I have been working out some special courses on it. Do you mind?"

"Not at all. Not at all," replied Buzz with a strange glint in his eye. "I notice you had the same spot marked, too. Know anything about it, Maxstead?"

"Nothing—only that is the point, as far as we can make out, from where these strange ether disturbances appear to be coming."

Buzz's face changed at that. He smiled cheerfully and added: "You bet. I tried to use the set in the Vought (Continued on page 73)
J. R. Harrell, Louisville, Ill.—As we have explained so many times, you must pass a thorough physical examination to get into the Army Air Corps. And if you require glasses, you cannot hope to get in. You may obtain a private ticket and fly if you use goggles using compensating lenses.

Erwin Fuller, DeLuz, Calif.—It is virtually impossible to state today which of the two Fokkers, the D-7 or the D-8, was the better fighter. One was faster, but the other climbed faster. Many factors would have to be considered before making any decision. Personally I believe a good pilot in a D-7 could defeat a fair pilot in the D-8, but that is only my opinion, and I am probably partial to the D-7.

Milton Carder, Chicago—I do not have any record of the pilot you inquire about, but you might get it by writing to the Air Ministry, Adastra House, London, England. The details of your war relic collection is very interesting. We'd be interested in looking over that war-relic room picture you speak about.

Chuck Holman, Webster Grove, Mo.—Photographs such as you require may be purchased from R. R. Martin, 1615 North Western Avenue, Hollywood, California. Write for his list.

Bob Camden, Chicago—We have no official reports on the type guns used on the present-day German Air Service planes, but we believe they are using the British type Vickers and a form of the new Bren gun as their movable weapon. However, we do not know for certain. The Vickers and Lewis guns were much faster—or it may indicate only the flight leader—so you have plenty of leeway.

Lawrence Williams, Albuquerque—I do not believe there is incidence in the wings of the Pterodactyl. I do not know for certain, but after studying many photographs of it, I am almost certain that there is not. I have seen no detailed explanation of the machine at all, so I can't be certain.

Hector Donald McKinnon, Jr., Inglewood, Calif.—Many thanks for the check-ups on the Northrop ships. We note that you say the “Consolidated A-11” we pictured was really the A10-A which when refined became the PB2-A, fifty-five of which were sold to the government, also that the “Northrop A-13” really was the SB built for the export trade. Yes, it’s all quite confusing—and once again we cry out that they ought to quit this numbering business and let us have some good old names like Heiddiver, Shrike, and . . . yes, even Flying Flea.

Jack Elliot, Santa Barbara, Calif.—How about keeping in close touch with the articles we are running on the history of our warplanes? We’ll come around to the Parabellum, eventually.

Dick Bruce, Ontario, Canada—Canadian Airways have now reached as far west as Medicine Hat, Calgary, and Edmonton; and it is proposed to push the Canadian Western Airways as far as Vancouver. Most fields are fully lighted and have full teletype, radio, and meteorological equipment. The Stinson Reliant has a top speed of 138 m.p.h.

Joe Myers, Hammond, Ind.—The Joyce Javelin in the Buzz Benson story was only a ship of fiction and the Joyce Jumbo engine was a “take-off” on the German Junkers “Jumo.” I do not know the true speed figures of the Northrop FT-1, and I’m not quite sure that yours are correct either. Your guess is as good as mine. Unofficial figures seem to be around 290. The Hawker monoplane fighter, if that is the ship you mean, is listed as a single-seater fighter, not as an interceptor. The new Supermarine “Spitfire” is also listed as a single-seater fighter. I do not know what planes the Army Air Corps has accepted at Wright Field since April 15, 1936. Why not write and ask them?

Sam Aronson, Pittsburgh—Thanks for all the nice words about our magazine and its contents. With reference to your argument concerning the British machine guns, I refer you to official reports on the guns. All the World’s Aircraft for 1935 (information for which is supplied by the American firms themselves) distinctly states that the Lockheed XP-9 carries one 7.5 mm. and one 12 mm. gun and if there is anything highbrow about millimeters (a form of measurement which has been in common use for centuries) well, we’re going highbrow, that’s all!

Robert Sternecker, St. Louis—Your question is not very clear. I believe most engines given an impression of “missing” when they are idling, and I know of no reason why the average radial offers that impression any more than an in-line or Vee-type.

Leo Hart, San Francisco—I do not know whether you could purchase a Curtiss “Swift” without the armament aboard or not. Then, what would you do with it when you got it? I do not know why it was turned down by the Army Air Corps—and, as a matter of fact, I am not at all certain that it was. I have only heard reports to that effect. The new Rolls-Royce “Merlin” motor is still very much on the secret list, according to latest reports from abroad. Its actual horsepower has not been divulged.

George Butler, Chelsea, Mass.—No, Flying Aces has had that name since early in 1929 and has not been published under any other title.

Ralph Di Franco, Norwich, Conn.—You simply can’t get enough of this attack stuff, can you? We know no more concerning that Fokker X-A than we told in the last issue. We do not know what engine it used, but it looks like the Curtiss Conqueror.

Al Packett, Florence, Mass.—So you are looking for a 1st. Lieut. E. M. Roberts who served in the R.F.C. during the war? If Lieut. Roberts reads this will he get in touch with Packett at 81 North Main Street, Florence, Mass? Glad you are “clicking” so well with the English pen pals.

Merle J. Gilbertson, Flora, N. Dakota.—The Aeronaia plant is located at Lunken Airport, Cincinnati, Ohio. We (Continued on page 61)
This present day Spad interceptor shows how synchronized Vichara guns are now streamlined into the nose to lower air resistance and afford better forward visibility. This unusual inverted seaplane is turned out by the Bleriot Company of France. Its Hisso engines gives it a top speed of more than 200 m.p.h.

It was on that memorable day when Constantinesco perfected his hydraulic-principle synchronization gear that our modern sky gun era was born. Then came development of the striking disintegrator belt link feed system. And now today, such startling weapons as the light Bren gun and the secret Vickers-Berthier are bringing new triumphs in the grim science of quick death.

Modern M.G. Marvels

By David Martin


With Drawings by Arch Whitehouse

When Tony Fokker devised his famed gun gear which allowed the pilot to dive directly on his target and pour his burst of fire in the exact direction of flight, he started something. That was back in the early days of the War.

This device completely revolutionized air fighting, or what was considered air fighting in those days. And so the British and French pilots were caught cold, because they had been relying on a make-shift proposition where the observer fired over his tail, making it necessary for the pilot to fly away from his target to attack.

German flyers, on the other hand, had simply to aim their ships dead on the enemy and press the trigger. To make the situation clearer, an allied plane, in order to engage a German equipped with Fokker's gun gear, had to allow the German to get on his tail to attack him. Naturally this situation gave the German all the edge. Thus, for several ticklish weeks, the Allies were "up a tree" trying to solve this situation.

Behind the German lines, orders had been given that Fokker monoplanes fitted with the new gear were not to cross the Allied line. This, of course, was to prevent the secret of the gears falling into the hands of the Allies. But one day, a young German airman was trapped in the air by a formation of D.H.1s—single-seat pushers that could fire forward because they had no tractor props to worry about. At any rate, they caught this young German and forced him to land his plane in British territory.

Within ten hours, the Fokker synchronizing gun gear was being taken apart in London—and then the British suddenly realized that one of their own men, a certain Sergeant Kauper, had devised a like arrangement some weeks before, only to have it turned down, or at least shoved aside.

Immediately, a number of Kauper gears were turned out at the Sopwith plant and fitted to the Sopwith two-seaters (one and one-half strutters), and these were sent overseas to combat the Fokkers while further experiment went on.

In the meantime, a young Roumanian engineer at the Vickers plant, saw the weakness in the cam-and-rod gear arrangement and realized that something better would have to be produced. He immediately saw the value of an hydraulic system which would give a surer impulse between the propeller and the gun trigger.

And so he devised a very simple system, as shown in Mr. Whitehouse's drawings, which brought into play an impulse pump set behind the prop. This, naturally, was timed to force a jet of oil under pressure through to the trigger-tripping device at the back of the gun.

To explain it more clearly, the prop was geared to the small pump so that when the blades were in line with the muzzle of the gun, the pump piston was up. This prevented the gun from firing when a bullet might strike the blades.

The rest was very simple. Oil, kept under pressure by a hand pump in the cockpit, was forced through a copper line to a trigger-tripping device set at the rear of the gun. Then once the prop was turning, timed impulses from the small pump were sent through this oil line to control the trigger bar, which as long as it was held back, tripped the trigger and fired the gun between the whirling blades of the prop.

When the device was used in rotary motor mountings, the pump was usually set behind the motor and timed to its whirl, but in the case of stationary engines, like
How the C. C. Gear Works—And Two New Guns

THE CONSTANTINESCO GUN GEAR—INVENTED BY A ROUMANIAN ENGINEER CONNECTED WITH THE VICKERS WORKS.

The fixed Vickers gun is controlled—not operated—by gears timed to a hydraulic oil-line system. The pump sends an impulse of oil under high pressure to the trigger-tripping gear, but the gun does not fire until the pilot presses the trigger-release. Then the C.C. gear control prevents the gun from firing when the prop-blade is in line with the muzzle of the gun. The pilot must keep the pressure of the oil line up, or the gun will fire late and the bullets will hit the prop.

THE DISINTEGRATOR BELT LINK

To eliminate the cumbersome, and often inefficient web belts, Vickers devised the disintegrator belt link. These links, made of aluminum, were slipped together and a round of ammunition was slipped into the interlocking holes. In this way a belt of any length could be made.

THE NEW LIGHT Bren GUN.

Length, 45 inches; weight, 21 lbs. Rate of fire, 500 per minute—Recently adopted by the British Army to replace the Lewis gun.

This weapon is an adaptation of the Lewis. It works on the same principal of utilizing the gasses for the backward movement of the moving parts. There is a possibility that the Bren gun will be used as a movable weapon on multi-seat aircraft.

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the Hisso or the Rolls Royce, the pump and gear could be connected directly to a ring gear bolted to the back of the prop.

It was necessary for the pilot to keep his oil pressure up to a certain standard, or the impulse would be directed to the trigger lever and the gun would in turn fire late and often hit the prop. In heavy fighting, pilots often forget their pumps (after about 300 rounds had been fired, the pressure naturally went down). Unless a flyer remembered to work his pump-pressure handle, he stood a good chance of shooting his own prop off.

But in spite of this, the Constantinesco device (or C.C. gear, as it was called) was far better than the Pokker gear, which suffered both from vibration and excessive wear. In fact, the Constantinesco gear is still in use in all European air services. But of late the British, who have been turning out extremely high speed motors, have had to look for something new, and the Bristol firm has now incorporated a new gun gear device for use with their latest motors. It includes a governor which automatically changes the timing as the engine speed rises. Very little has been given out about this gear, but it does not seem to involve very elaborate changes.

A

O

THER matter which puzzles many readers of aviation stories is the method of feeding guns. Mr. Whitehouse’s detailed drawing shows the Vickers disintegrator link system which came into use some time in 1917.

Prior to this, machine guns mounted on planes had to use the old web belt, and it was always a problem figuring out what to do with the empty section of the belt. Then again, weather conditions affected these belts considerably; for if they got wet or damp they shrunk, making it hard to withdraw the bullets from the loops.

But the disintegrator link system solved all the problems. These links were punched out of sheet aluminum and made so that they fitted together, as shown in our illustration. Then, where the holes matched, cartridges were shoved through to form the pins holding the belt together so that it was continuous and, above all, flexible.

When these belts were fed into the fixed Vickers guns, they were taken in by the feed block in the same manner as were the former web belts. But once the round had been extracted from the new belt, the links naturally fell away into a chute and dropped clear into the air.

Thus, there was no lengthy web belt to worry about after the extraction of the live rounds, and the new belt suffered in no way from changes in weather conditions. In addition, these belts could be made up into any length and could always be kept on hand ready for action. These same disintegrator belt links are still in use today. That goes to prove how well this device filled the bill.

In the early wartime days, they resorted to many makeshift mountings. Here we see a Lewis gun along on the top wing of a Nieuport and still carrying its ground butt attachment instead of the aeroplane grip. The pilot in the pit, incidentally, is none other than the famed Georges Guynemer.

THERE are, however, many changes now taking place in aeroplane machine guns, mountings, and turrets. The high speed aircraft now reach make it imperative that gunners be well protected and given steady firing platforms. The speed of props, new cockpit arrangements, and the like, necessitated certain changes in the synchronization gears (the United States now uses an electrical timing gear) and guns today are more often set very low near the pilot’s knees where he can easily get at them to remedy stoppages.

New guns are appearing regularly in the leading nations, and it is possible that the Brownings, Vickers, and Hotchkiss types will be “out” before many more months have passed. Already we notice many movements abroad, either to improve the Lewis or replace it completely.

For instance, the British have purchased manufacturing rights for the new Bren gun made by the Czechoslovak Arma Manufacturing Company of Brno, Czechoslovakia. This gun will replace the Lewis gun in infantry and armored car outfits, and there is a possibility that if the feed can be changed so that the magazine will carry about 100 rounds instead of 30, it will also go aboard the two-seat fighters of the R.A.F.

Our drawing shows the Bren gun in some detail, for we figured our readers would be interested in this unusual weapon. As can be seen at once, it is a modernized version of the Lewis gun, incorporating a gas cylinder, piston, and recoil spring. In other words, it is a gas-recoil weapon.

A general description of its action is as follows: The gun is cocked and loaded from the magazine; and when the trigger is pressed, the sear releases the slide, which is then forced forward by the push-rod mounted inside the stock. The recoil spring in the base of the stock materially assists this movement, of course.

As the push-rod goes forward, the bolt moves forward with it, "strips" a cartridge from the magazine, and shove it into firing position. Toward the end of its forward movement, the slide rises on bevelled lugs, comes to a gradual stop, then is locked. The bolt, however, continues forward and its hammer strikes the firing pin and fires the cartridge.

As the bullet passes the gas-block near the end of the barrel, the expanding gasses pass through the gas regulator and into the gas cylinder where they drive back the piston. This unlocks the bolt. Then the slide opens the breech, extracts the spent cartridge and strikes the ejector, which throws the "empty" through a slot at the bottom of the gun.

Meanwhile the gas (still driving back the piston and slide) compresses the recoil spring. And when this point has been reached, the forward movement is started again by the recoil spring, which inserts the (Continued on page 86)
New Snags in Germany . . . Our Japanese “Situation” . . . A Note for British Readers

These past few months have seen more wild incidents in Germany than have been posted on the world’s bulletin board for years. There have been times when we’ve wondered how much of it is true and how much has been created by imaginative newspaper correspondents. We who once fought the Germans have found it easy to believe many things, in spite of the wave of war-propaganda debunking which has cropped up like a rash during the past few years. We have felt at times that we have been prejudiced and that we might have been a little unfair in our views. But every once in a while something blows off that makes us wonder.

In other words, just how much truth is there in all the stories concerning the growth of the new German Air Service? How much flying are they really doing, and what’s in back of it all?

Like many others, we have found that the German, as an individual, is no different from any other man. As a soldier he was loyal to his country and his flag. As a prisoner he seemed to have as much grim humor as anyone else, appearing to be just another poor devil in a uniform with his own views on war and its cause. No one can question his courage or his ability to “take it.”

It has always been our contention that if one took a representative soldier from every army that fought on the Western Front and induced them to strip and enjoy a swim in a nearby swimming hole, it would be almost impossible to pick out any particular nationality—unless they were speaking.

But now, let’s get back to the subject of Germany. A very good friend of mine in England wrote to me this summer, saying he was going to Germany for his annual vacation in hopes of picking up some new “dope” on the war-time German aces and perhaps some new photographs. I should explain that he is making a collection of such data in hopes some day of writing a new history of the war in the air; and he has in the past, sent me many things of interest—photographs, lists of aces, and other info which has appeared from time to time in this magazine.

Remember, he is a charming young English chemical engineer who is only interested in war-time history. He wouldn’t give you a nickel for a stack of modern photographs three miles high and he’s never given a second thought to our Lindberghs, Amy Mollisons, Clyde Pangborns or Schneider Cup Races. As far as he is concerned there has been no flying since November 11, 1918. That’s the sort of a fellow he is.

And now, with that under your belt, I’ll feed you his latest letter, just as he wrote it. I’ll dispense with the usual opening and go right into it:

“. . . . Now about Hitlerville,” he says, “You were right! I wouldn’t trust the perishers any farther than I could throw the Queen Mary. We arrived okay, and I managed to pick up quite a pile of information on German war-time air history. Well, everything was going fine—until I hiked out my camera and started to take a few snaps of some Arado and Junkers single-seaters, believing you would be interested in them. Ye Gods and little fishes! What a stink there was then! Cream shirts! Black shirts! Brown shirts! Red shirts! Every color of shirt under the sun rained down on me. They grabbed my camera and began snarling and barking at me like machine guns.

“Now my German is pretty good, but at their speed it all went blooey! Well, to cut a long story short, I finally managed to get a word in and told them I was in their noble country to do honor to their war-heroes—and a pile of trash like that.

“They changed in a flash. Two of them stuck their chests out and gave me a long story of what they did in the Great War. You should have heard them. With two more like those two they could have taken Verdun and Paris in one day. They destroyed my films and promised to return my camera to me in England, but it hasn’t arrived yet. One thing, though, I did notice was that their military aircraft seem to be in the air day and night, and you can’t get within a mile of one.”

And that’s that! It is not a particularly cheerful picture, neither is it particularly condemning. But just what such tactics get the Nazis is pretty mystifying. It is impossible to keep the details of a plane, a gun, or a battleship a secret very long. There are too many people connected with its building, and to attempt to stop anyone from photographing a military plane seems to be the height of stupidity; for as we have shown in the pages of FLYING ACES, we can take the most meager details of a plane and provide a complete copy of it in model form within a few hours. Consider, for example, the job our model builder, Mr. Battaglia, did simply from news photos on the Boeing 299 (Continued on page 92)
Modern Planes Album

The Tipsy-S

We have been getting oodles of stories on this new English light plane which is powered with a converted Douglas motorcycle engine known as the Sprite, which, from what we can make out, turns out about fourteen duck power (actually about 22 h.p.).

Those who have flown the Tipsy-S are struck by its performance. It flies well, does all the things larger and more powerful ships are asked to do, and it may well become the first real threat to the popularity of the Poul. It is manufactured in England by the Tipsy Light Aircraft Corp. It was designed by E. O. Tips, an Australian designer, employed at the Fairey works.

As may be seen, the Tipsy-S is a low-wing monoplane with unusually smart lines. The wing is built up on a main and auxiliary spar with wooden ribs set in pyramid arrangement. The leading edge is covered with three-ply and the rest with fabric. The cockpit is unusually comfortable, having space for baggage, touring necessities, parachute, and general sport equipment. The tailplane and fin are of wood covered with plywood while the rudder and elevators are fabric covered over a wooden frame.

In a recent test 5.05 litres of fuel were placed in the tank (a little more than a gallon) and she was sent on an economy run. She flew for one hour at a speed of 65 m.p.h., but her top speed is about 97 m.p.h. In a glide test, coming in over a rope stretched 6 ft. 6 in. above the ground, with no assisting wind and without use of flaps, the Tipsy-S (of all names!) pulled up exactly 90 yards from the rope! It takes off in 70 yards. Its total weight is 550 lbs., span 24 ft. 7 in., and overall length 18 ft. 8½ in.

The undercarriage consists of two shock-absorber legs anchored to the main spar of the wings. The Tipsy-S is now the cheapest light plane manufactured in England.

The Ryan S-T

The Ryan Aeronautical Co. continues to improve its famous S-T, and now they offer three distinct machines under the same trade listing. The difference, of course, is in the motors. The Standard S-T is powered with the 95 h.p. Menasco B4, the S-T-A with the 125 Menasco C4 engine, and the S-T-A Special with the Menasco C4S (supercharged) 150 h.p. engine.

The 150 h.p. job is the latest addition to the S-T line. It climbs at 1,000 ft. per minute and has a top speed of 138 m.p.h.

As shown, the S-T job is a low-wing monoplane carrying two in open cockpits. The fuselage, covered with thick Alclad metal which eliminates internal stiffening, is of durable construction and boasts clean lines. Pilot and passenger cockpits are equipped with metal seats designed to take seat-type parachutes or Kapok-filled cushions. A baggage compartment to care for 40 pounds of luggage is included.

Dual controls are standard on all models, but the extra set may be quickly removed. A torque tube connects the two sticks for aileron control and a push-pull tube inside the torque tube provides the elevator connection. Brake pedals operated by the heel are mounted on both sets of rudder pedals.

The front of the Ryan wing is covered with sheet aluminum alloy carried well back beyond the front spar. The aileron construction incorporates a steel tube spar with aluminum alloy ribs and balancing is effected by locating the hinges behind the leading edge, which is also covered with alloy sheet. The wing flaps, built somewhat like the ailerons, incorporate heavier members. They lower to a 30 deg. angle. We do not know the prices on the Ryan planes. We suggest that you write the firm for further information.
LATEST OF THE LIGHT PLANES

While our new Ryan S-T is the most recent American contribution to the sport craft field, abroad they are still playing with smaller and lighter machines. Among these are the new Pou, the Jungmeister, and the Tipsy-S. And don't let that last one fool you—its flying belies its name.

THE Pou H.M.18

Interest continues in the French Pou de Ciel in spite of the accidents that cursed it for a time. Today, the little machine seems headed for a new wave of popularity, and most certainly it is showing an advance in this country. We shall be very surprised if there are not a lot carrying American license numbers by next Spring.

We depict herewith the latest Pou, which made its debut during a recent “Flea” meet at Ramsgate Airport, England. Eight of these machines were entered—and not one accident was experienced. M. Bret, a French pilot flying a Pou with a 4-cylinder Ava two-stroke engine, won the race; S. V. Appleby, British enthusiast, was second; and another Frenchman, Robinneau, was third. The winning speed was 59.5 m.p.h.

The new Pou, designed by Mignet to correct faults in former versions, is a most interesting craft. Note that the rear wing is in no way covered by the upper wing. That should eliminate all that gap trouble. The single-seat cockpit is entirely enclosed, and Mignet now uses a 38 h.p. Mengin flat-twin four-stroke motor that develops 38 h.p., giving the ship a top of 100 m.p.h. and enabling it to clumb 1,000 feet per minute.

Note also that the rear wing is faired into the hump of the fuselage and that an elevator has been set into the trailing edge of this wing (to be used mainly for trimming).

Henri Mignet gave a rare display when he put the H.M.18 through its paces at the Ramsgate show. The little machine responded beautifully, climbed at an astonishing rate of speed, and all in all gave Pou enthusiasts something to write home about.

BUCKER “JUNGMEISTER”

THIS is a popular German light plane designed for amateur and military training work. It is well liked abroad, and many are to be seen in England, France, and several other European countries.

The “Jungmeister” is a light single-seater biplane employing the 140 h.p. Hirth HM-6 engine. The wings are set as single-bay with a center-section carried above the fuselage on N-struts. The outer sections have an 11-degree backsweep and are interconnected by parallel interplane struts with lift and anti-lift wire bracings attached to the front spar fittings only. The wings are built up on two I-section spars with wooden ribs and covered with fabric. Ailerons are carried on all four wing-tips. The fuselage is welded chrome-molybdenum steel-tube framework, the forward panels are covered with light sheet metal, and the rear half is covered with fabric. The undercarriage, of split-type, carries two streamline side Vees incorporating steel spring oil-damped shock absorbers. The wheels carry brakes and balloon tires and are mounted on bent axles, the inner ends of which are hinged to a steel tube Vee below the fuselage. The tail skid steers from the rudder bar.

The power plants used are the Hirth 6-cylinder in-line inverted air-cooled engine, as used in the German Air Service. The export models, however, seem to be using the British 270 A.W. “Cheetah” radial. This is the type shown in our drawing.

The performance figures with the radial have not been given out, but with the German Hirth motor the “Jungmeister” has a top speed of 142.8 m.p.h. It lands at 50 and cruises at 124. It stunts well and in all probability makes a splendid machine for advanced fighter training.

Carl Bucker was a war-time Naval aviator in the German service. He began manufacturing on his own in 1933, starting off with a two-seat acrobatic plane. His plant is at Rangedorf near Berlin.
GREETINGS, F.A.C.'s! Once more your old friend, Doug Allen, greets you from the F.A.C. tarmac, and let me tell you fellows and gals that it is mighty good to be back after an absence of two months, most of which time was spent in bed. Take my advice, F.A.C.'s, and steer clear of the "flu" for it is one nasty thing to get. Believe me, I'd rather crack up in a plane any day than go through that again.

But—they say that all's well that ends well, so from now on I'll be answering your letters pronto. And now before actually diving into the Club News I think we all owe Herb Powell, our Managing Editor, three rousing cheers for conducting the "meeting" last month on these pages. Yep, Herb, you make a good Vice National Adjutant. Take a bow! (I'll take one of those cheers, Doug, and turn the other two over to charity—Ye Ed.)

Boy! I wish you buzzards could see this desk of mine! I have letters to the left of me, letters to the right of me, letters in front of me, and letters in back of me. Of course, the folks here did their best to take care of matters during my absence, but there were certain things held over pending my return, and first on the list is the writing of these Club News pages. Frankly, your old pal, having been out of touch with matters for the past several months, feels a bit "rusty," so I trust you'll pardon any errors or shortcomings. Moreover, if any of you have sent in Club News that hasn't been run—or if you have written and your letters have not been answered—just remember that your old friend, Doug, is back and at your service once more. We're getting keep it up! And while we're on the subject, we're sure that other F.A.C.'s throughout the country are decorating windows. How about some pictures? We'd like to run them in these columns.

From time to time we've told you in these columns of the fine printing work being done by F.A.C. individuals or units operating their own little printing presses. Now along comes a letter from Eddie Jay, Chicago, asking our approval in connection with a swell plan of his to print up window posters for dealers on his G-2 patrol. Eddie's layout reads:

"BUY A FLYING ACES MAGAZINE! Then Join the FLYING ACES CLUB. Learn How You Can Receive the Beautiful Awards of the Club. Read the Magazine for Full Particulars!"

When you get 'em off the press, Eddie, be sure to send us one in order that we may reproduce it in the magazine.

Well, well, well! What's this? Darrell Rolls, F.A.C. member of Applegale, Oregon, has turned the pages of aviation memory back and signed up none other than Walter Hinton as an honorary member of the Club. We're mighty glad to have Mr. Hinton as an honorary member—for it was he, our older members will recall, who piloted the famous NC-4 across the Atlantic back in 1919—way back when ships and motors were young. And that was the first real trans-Atlantic crossing, too.

Next we come to a letter from our girl friend, Gene Shaffer, Oakland, Calif. Gene says, in part:

"I'm trying to get new honorary members, but gosh I don't know whom to ask! I've already tried Gen. J. J. Pershing, but he had to decline because of his position in the Army. Do you think the three Army fliers who go under the title of the 'Men On The Flying Trapeze' would be okay? I know one of them—a Major C. Chennault."

Gene, you bet we'd like to have those three intrepid fliers as honorary members of the club and we'd suggest that you hop right to it before some one else beats you to the draw, as the Westerners say. Moreover, if you can "hornswoggle" a picture out of 'em we'll publish it in the old mag.

And here's a letter from good old Erin—from our good friend Samuel Barrett, to be exact. Sam conveys the good news that they now have ten members in their Flight, which they are naming the First Ulster. We're wishing you the best of luck, Sam, and if GHQ can be of assistance, please feel free to call on us at any time.

Shortly after we made the announcement of the new F.A.C. Medal of Honor, your old friend, Doug, was taken sick. So it wasn't until this
writing that he knew how you members scattered throughout the world received word of the new award. My friend, Herb, in the next office, saved a cross section of those letters for me, and permit me to tell you buzzards that I spent several enjoyable hours today reading them.

While on the subject of that coveted medal, Herb called my attention to a letter indicating that Jimmie Hunter, F.A.C. at Raleigh, N. C., had saved Ray Ellen, of Clayton, N. C., from drowning during the summer! From the looks of things, Jimmie will be the first F.A.C. to be awarded the Medal of Honor with the Valor Bar. Anyway, this matter will be taken under consideration by the Awards Committee of the General Staff at their next meeting.

By the way, if any of you folks know of any heroic acts cut out by any members of the club, we'd like to know about such notable instances. Proper investigation on the part of the Awards Committee would follow, and Medals of Honor with the Valor Bar would quickly go to those F.A.C.'s whose heroism was found deserving of this highest F.A.C. award.

From out of the West word comes to us from Capt. Frank "Stormy" Yahlituri, of the Legion Aeronautica Mexicana, F.A.C. unit in Los Angeles, that their organization is forging ahead. In a recent progress report, Capt. Frank and his crew have taken active part in the National Air Races recently held in L.A., and we may have some pictures of the unit's activities to pass on to you fellows in the near future. Frank, how about helping us make good on that promise—we're waiting with outstretched arms for those pictures.

And say—here's an interesting letter from Commander Harold A. Ogden, of the Clearfield, Pa., F.A.C. organization! Harold's letter this time is postmarked, "York, Pa.," and he proceeds to tell us that he is attending Thompson College there to town—10 minutes is a long time in flying, but lack of space prevents our quoting it in its entirety. However, the following is of especial interest, so we quote it:

"On the way to York I stopped at the McConnells Sesquicentennial, went on and waited at York station to board the American Pilgrim 100-A Transport. I also met the D. of C. Radio Operator, C. E. Irish, who showed me how all the teletypewriter and shortwave sets work. I heard a call put through to Pilot Hamilton of Pennsylvania Airlines reporting Cleveland at 7,000'. I also heard several other pilots reporting and still others talking to various ground stations. When I showed Mr. Irish my card and told him I was a Squadron C. O., he was very gracious to me and told me that he had heard several times of the F.A.C. continuing. Harold had this to say:

"Since I was accorded so much friendship at other places because of my card, I determined to use it at the airport. I had never shown it to any one connected with aviation before the mere fact that I am a pilot and plane owner is enough to get me by. But I now find that there are as many F.A.C.'s active in aviation itself as there are in model-building, and any one interested is glad to know that you belong to such an organization."

A mighty interesting letter, you will agree, and we're glad that Harold has brought up this membership card angle, since many of our members, like Harold, are actual flyers.

Hold tight, F.A.C.'s, for we're going into a couple of loops—George Call, of San Francisco, has up and did it again! This time he has brought into the club as an honorary member a very noted airman—Dick Grace, famous movie airplane crack-up artist. When it comes to getting honorary members that count, George doesn't have to take his hat off to any one. Welcome, Dick Grace.

From across the Broad Atlantic comes a letter from our friend, Jack Fenwick, Herne Bay, Kent, England, telling us how much FLYING ACES is enjoyed there and at the same time giving us a little food for thought. In part, Jack's letter reads:

"I enjoy FLYING ACES no end, and I often read the complete mag through at one sitting. That is, if my cousins have not got hold of it first. Then I have to wait until they come out of hiding. It sure has plenty of snap to it, and you have some unusual photos. As I am engrossed in the photographic business, I cannot help but notice that some of the readers photos of their planes are very poor. I know this is not your fault, as the photographs which are sent in are often not good for reproduction."

Jack goes on to say that he will be glad to discuss photographic matters with F.A.C.'s who would care to write him. Go to it, you photo kivis.

Once more back on this side of the Ocean, Alfred Schmidt requests us to announce that a new model organization, called the Model Aero Engineers, is being started in the city of Hartford, Conn. This club is the outgrowth of the desire of a group of experienced model plane engineers to establish designing and flying clubs in that State. Among the engineers are Carl Acherer, Alfred Schmidt, George Gumbus, James Grant, Edward Brandt, John Hayes, Edward Spels, Ted Spels, Edward Rosen, Elliot Schweiger, Melvin Thaler, Martin Riley, and Jean Card. Any person 12 years or over is eligible for membership if he lives in the Hartford district. All those interested should get in touch with Alfred Schmidt, 29 Vernon St., Hartford, Conn.

And say, how did you like Major Lord's swell article, "I Dabbled With Death In Russia," appearing in this issue? Well, credit is certainly due Walter Joseph, of Middle Village, L. I., N. Y.—for it was Walt who induced Major Lord to become an Honorary F.A.C.

Well, F.A.C.'s, as it is getting rather late and the lights are beginning to gleam in the buildings forming the "canyons" about us here in N. Y., we'll say "au revoir" until this time next month. Don't forget—send in any Club News you may have on tap, since we like to mention as many different individuals and outfits in these columns as possible, and if yours doesn't appear herein you have only yourself to blame. How about it?

—DOUGLAS ALLEN.
The Distinguished Service Medal of the Flying Aces Club has been awarded to the following members of G-2 for exceptional services to the club:

Dick Hanley
Guido Bianchi
Virginia Lee
David Knapp
Alfred Jolley
Wanda E. Black
Howard Irwin
Milton Sanders
Billy Rohrs
Eugene Strimpling
William Niendorf
W. G. Honecker
Ted Koch
Bill Brown
Bernard Didsbury
Harry Stewart
Thomas O'Brien

The following winners of the Distinguished Service Medal of the Flying Aces Club have been given the first award of the bronze props for additional services to the club:

Johnny B. Bryson
P. Wm. Landrock
Charles Scott
John Poulantonis
H. J. Ourler
William Robertson
Ed Guszkiewicz
Laurabelle McCain
V.W. Mansfield, Jr.
Florence Matulis

The following members of G-2 of the Flying Aces Club have been awarded the B.F.A.C. ring for exceptional service to the club:

Willis Gallop
Leonard Carrion
Harold Lloyd
William Gregg
Edward Munzing
Walter Joseph

The following members of G-2 have been cited by the Flying Aces Club for exceptional services to the club and are being considered for the Distinguished Service Medal:

Leroy Scott, Jr.
Delores Bosank
M. H. Shapiro
Alex Thorne
William Bates
William Wilbur
Richard Blayney
William Ciacca
Kenneth Marriott
Bernt Olsen
John Reible
Elmer Ueber

I Dabbled With Death in Russia

(Continued from page 12)

THEN suddenly he popped up in his seat and signalled to me—he was going down! He pulled on his motor, dropped down to a hundred feet and headed back for our starting point. Several times he circled what to me seemed a likely landing place; he was seeking for a spot where the snow was not too deep, or where it was packed hard. From time to time he nodded approvingly at the mountains and I could see his prop slow down.

But now we were getting near Archangel again and I thought he would make our field all right, when abruptly he signalled me, "No use—must land." We flew over a clearing. The snow was smooth and level. Here and there little tufts of dead grass stuck up through it. I motioned to Jimmy that it looked good to me—like a field with eight or ten inches of snow on it. He laughed back at me and held his nose. He didn’t agree. Then his motor stopped dead, ending all suspense. He had no choice but to land in that field.

Down he went; he levelled off and the pontoons skidded over the snow. "A perfect landing," I exulted. The ship settled, a cloud of snow cascaded upwards and blew away—and then where I expected to see Jimmy’s ship there was only more snow. Not a sign of ship or him! Then I saw part of one wing protruding from the snow and presently Jimmy floundering around shoulder deep. He waved he was okay and another signal that seemed to say, "Now you see why I didn’t want to land here."

What I thought was grass sticking out of the snow was really the tops of small trees and the snow there was loose and unpacked. When he landed, the little pursuit job just simply settled down under many feet of soft snow and was all but hidden by it.

Though he was only a few miles from Archangel it was hours before the rescue party got to him. By that time he’d about decided that white was the hue of the world and that the temperatures of the tropics were a myth. Forty below is no Autumn weather. A few more hours and it would have been, "Good-by Jimmy!"

GRIM GIFT

I HAD been stationed at Pinega for several months. This was many miles from our base at Archangel. I had an old R.E.8, "Harry Tate" as we called this model. The motor was virtually worn out and my maximum ceiling was about 2000 feet, and that only with throttle wide open. Pinega was surrounded by a system of blockhouses and trenches and was our most forward position on the front. Five miles farther along the river were three small towns which were held by the Bolsheviks.

Pinega was entirely garrisoned by Russians so I was the only English-speaking person in town. I had no mechanics and had to do all my own work on the R.E.8, including clearing of landing strips, and erecting of a canvas hangar—besides continuous patrols over the lines. The Russian officers put a detail of peasant women to work helping me, but they proved more of a hindrance than a help.

As an orderly I had a fourteen year old boy named Stepan—a real Stepan Fetchit!—who was orphaned when his parents were murdered by the Bolsheviks. Each day Stepan would learn a few English words and he soon could understand all I said. He slept on a pallet beside my door. He was a proud lad when I replaced his rags with a snappy uniform.

As my flying field was on an island in the river, I had a small wood-burning steamer allotted to me. It was probably about forty-five feet long. On my first time aboard her there was a sudden banging of machinery below and the boat stopped in midstream.

I went forward and asked the fifteen year old boy I found in the wheel-house where the captain was. His reply was, "I am the captain, sir."

And when presently a grimy-faced boy came up from below he said, "And this is the engineer. He’s fourteen!"

The deck hand of this marvelous crew was a husky youth of twelve.

I soon learned that not only did these boys know how to handle that boat, but they also knew the river channel better than any boatmen in the neighborhood.

As weeks went by, the enemy became annoyed with my constant bombing and placed a price on my head—75,000 rubles was the figure. Several attempts were made on my life right in my own town.

ONE a hand grenade was tossed into my window while I was asleep. It failed to explode, possibly because it had been frozen and thawed out so often.

The crash of glass brought guards running. They captured the would-be assassin, took him to the edge of town, and summarily executed him. His body was dumped into a shallow grave—and the incident was forgotten.

About this time I was learning to smoke a pipe. I needed a tobacco jar and told Stepan as much.

Before that he’d frequently absented himself for a day or two a time but now he didn’t approach me for several days. I saw him several times in the far corner of the backyard working over a large iron kettle under which was a furious fire. "Poor kid," I thought, "must be delousing himself and boiling his clothes."

And then one night when I came in...
JOIN THE FLYING ACES CLUB

Honorary Members
President and Mrs. Franklin D. Roosevelt
Vice President John Nance Garner
Casey Jones Rear Admiral Byrd
Wallace Beery Capt. Edward Rickenbacker
Al Williams Colonel W. A. Bishop
Major von Schliech Colonel French
Lieut.-Col. Pintard General Balbo
G. M. Bellanca Amelia Earhart Putnam
Capt. Boris Siergievsky Franklin Thomas
Capt. Frederick Turner Capt. Edwin C. Munick
Charles A. W. Scott Capt. O. A. Anderson
Richard C. DuPont Tom Campbell Black
Capt. A. W. Stevens Chancio D. Chamberlin
Mrs. Charles S. Baylis
Lieut.-Col. Theodore Roosevelt

Official Charters
F.A.C. Flights and Squadrons are recognized only when they have been awarded Official Charters. These Charters are illustrated to depict the various steps of advancement in aviation. The Ballon is in keeping with the high ideals and purposes of the Club. They are printed on a very fine grade of paper and the names of the Squadrons are hand-lettered. Charter applications must always be accompanied by a complete list of members with their addresses. For the Flight Charter send 25c, for the Squadron Charter 50c, to cover costs.

Volunteers for G-2
G-2, the Inner Circle of the F.A.C., is open to a restricted number of members who are qualified for Secret Service activities. Those who are chosen will have unusual opportunities to win the Club's Distinguished Service Medal. Those who are accepted will be given a secret number and identification card as well as the secret code. Assignments will be made by letter and code.

Save This Coupon for the NEW CADET WINGS of the Flying Aces Club

All members with Official Membership Cards are eligible for Cadet Wings. This coupon, with two others and 10c, entitles members to Cadet Wings. Do not send this coupon alone. Save it until you have three. Then send them in all together with a self-addressed envelope and 10c to cover cost of wrapping and mailing. Only one pair of Cadet Wings is allowed to a member. If you lose your Wing, send 5c for new ones. Canadians send International Reply Coupon for 10c or Official F.A.C. (paper) coupons.

Do Your Part Share to Advance Aviation
No Dues No Red Tape
How to Join and Form a Flight or a Squadron

To advance the cause of aviation, over 50,000 men and women, boys and girls, have banded together to form the FLYING ACES CLUB. It's the easiest thing in the world to join. Just clip out the application blank at the right, fill in, and mail, along with a stamped, self-addressed envelope, and you will receive your official membership card by return mail. After that you can quickly advance to earn CADET WINGS, PILOT'S WINGS, and other honors.

FLYING ACES CLUB, 67 W 44th St., New York

The Beautiful F. A. C. Ring
The official F.A.C. club ring is a beauty and should be worn by all members. It is self-adjustable, to insure a perfect fit. It is finished in antique silver. Sent postpaid anywhere and prepaid for in installments for only 50c. (A STERLING SILVER ring of a similar design, may be had for $1.00.)

December Membership Coupon
I, the undersigned, hereby make application for membership in the Flying Aces Club. I agree to live up to its rules and regulations; to foster the growth and development of aviation; and cooperate with all other members in the work of spreading aviation information, building up confidence in flying for national defense and transportation. I will always build up my club and its membership, and do my best to win the honors that the Flying Aces Club offers.

My name is _______________
Address ____________________
City ____________________ State _______________
Mail this application, enclosing a self-addressed, stamped envelope. Canadians send International Reply Coupon worth 5c. British send a similar coupon worth sixpence.

Citations and Awards
Citations and awards, heretofore published in this page, will henceforth be found at the close of the Club News. Be sure to refer to those columns—YOUR NAME may be among the names to be found there.

F. A. C. Stationery

Official F. A. C. Pennants
Due to popular request, we have ordered a new supply of F.A.C. stationery and official F.A.C. (paper) pennants. The stationery is of high quality with the Flying Aces Club letterhead attractively hand-lettered, and the price is amazingly low—100 sheets, postpaid for 25c. The attractive pennants (with glaze on the back) sell at the rate of 6 for 10c or 25 for 25c.

Save This Coupon for the NEW PILOT WINGS of the Flying Aces Club

All enrolled members who have won their Cadet Wings are eligible for Pilot's Wings. This coupon, with four others and 10c, entitles Cadets to Pilot's Wings. Do not send this coupon alone. Save it until you have five. Then send them all together with a self-addressed envelope and 10c to cover cost of wrapping and mailing. Only one pair of Wings to a member. If you lose yours, send 5c for new ones. Canadians send International Reply Coupon for 10c or Official F.A.C. (paper) coupons.

FLYING ACES CLUB, 67 W 44th St., New York
Fields for Light Planes
That Hammond Y-1
Lambert’s New Ships
Don’t Forget Bleriot!
Another Club Idea

On the Light Plane Tarmac

FIELDS FOR LIGHT PLANES

WHICH comes first—the chicken or the egg? Will more flying fields bring about a wider use of private aircraft? Or will the wider use of planes bring bigger and better landing grounds?

This is the problem that is facing the manufacturer today.

The same problem came up in the automotive industry years ago, when the progress of the automobile was retarded by the lack of good roads. Then Mr. Ford invented the flivver so everyone could purchase a motor car—and the license fees and tax on fuel provided enough to build good roads. Of course, the wild spending spree that went on during the war years materially helped. Today, aviation can look forward to no such assistance. It’s all in the hands of the youngsters who are now coming up.

At the present time, the lack of good fields for private flying and club work is a distinct drawback. True there are many fine air fields in this country—but most of them are terminals and bases for commercial air lines where traffic is too heavy for the joys of private flying or amateur piloting.

What is needed now is a chain of fairly wide landing grounds offering suitable hangar and servicing convenience for private planes plus hotel and refreshment service for pilots and passengers. Flight training at modern commercial airports is getting to be a ticklish business. Our Army and Navy pilots are not asked to train under such conditions.

Of course, it would be financially impossible for anyone to go out and build a number of landing grounds for the use of private planes. But it certainly would help the game if it could be done. There are a number of so-called emergency landing grounds maintained by the Department of Commerce all over the country which with very little expense could be fitted up for this sort of work. We have a half-baked idea that they ought to be arranged in zones, with key fields where complete flying training could be carried out well away from the high-speed conditions and aerial confusion of the big airports.

We visualize a chain of country-club type fields all over the nation where one may land and obtain mechanical assistance and servicing while enjoying a good meal and the companionship of flying men. We see weekend gatherings of light planes from all over the area flown in by cheerful guys and gals who are out for flight fun. We see Saturday night gatherings in the dining halls and reception rooms where wind-burned young pilots laugh and swap experiences and argue the respective merits of their craft.

Now if we had a billion bucks...!

THAT HAMMOND Y-1

THEY tell us this new Hammond Y-1 light plane is making the old-timers wince. They bring it down to 200 feet, pull the stick all the way back—and start taking off their flying coats. The ship is said to come in and land from a full stall at 50 feet. The hydraulic struts have an 18-inch path of travel and all bounces are fully taken care of with no damage to the plane. And once the brakes are applied, she stops in her own length. It is almost impossible to spin the Y-1 and a directionally stable gear keeps the plane on an even course, once it has been taken off, without the use of a rudder at all!

LAMBERT’S NEW SHIPS

THE Lambert Aircraft Corporation of Robertson, Mo., has just announced the completion of two new craft which we believe will be of interest to our light plane enthusiasts and picture collectors.

The first is the Twin Monocoach, a low-wing twin-engine craft equipped with a retractable landing gear. It carries four in luxurious comfort at a top speed...
of no less than 165 m.p.h.

The Twin Monocock uses the Lambert air-cooled five-cylinder direct-drive R-266 motors which are rated at 90 h.p. at 2375 r.p.m. As may be seen by our illustrations, these motors are well faired into the wings and their nacelles house the retractable landing gear. Low pressure tires on Ebbert-Hatch wheels, brakes, and a 3-inch stroke in the oleo shock-absorber make landings unusually comfortable.

The fuselage is made up on welded steel tubing and covered with fabric. The wings are made of wood and are also covered with fabric using full cantilever inset-balanced type ailerons. There is a trimming tab on the left aileron only. An ingenious flap-construction has been employed which extends under the fuselage, stretching from aileron to aileron. The flaps are manually controlled; and according to the manufacturer, these deaccelerators have reduced the landing speed about fifteen miles per hour. Without flaps the Twin Monocock lands at 60, but with the flaps down she comes in safely at 45.

The second plane, listed as the Lambert Monosport, has just undergone preliminary flight tests. It is a two-place cabin monoplane of exceptionally clean lines and should be most suitable for the flying sportman. It is a decided departure from the familiar Monocoupe which has so long been associated with the Lambert firm.

The fuselage is of steel tubing, as in the Monocock, and the wings are built up on wooden spars and covered with fabric. Full cantilever construction has been employed throughout, no braces or wires of any type being exposed.

The Lambert R-266 motor of 90 h.p. is again used, which gives the Monosport a top speed of 128. It cruises at 115 with a range of well over 500 miles. And believe it or not, it climbs 1,000 feet per minute and has a ceiling of 15,200 feet.

We do not have the prices of these planes, but full details may be obtained by writing to the Lambert firm at Robertson. And tell 'em you read about it in FLYING ACES!

DON'T FORGET BLERIOT!

YOU light planteurs ought to read the life of Louis Bleriot. We have just seen a few amazing items from his unusual career. For instance, when Bleriot attempted to fly the English Channel in 1909 he did not have a compass on his old Bleriot No. 11—he stood on the cliffs at Calais and asked someone to stand up and point at the general direction of Dover. He took off, disappeared in the fog and was not seen again until he turned up over St. Margaret's Bay with an engine that was overheating. He had crossed that 23-mile water stretch at a height ranging from 150 to 300 feet.

Having arrived, he faced the problem of getting enough height to climb over the cliffs of Dover. His engine was in a bad way by this time and as he made two circuits in an effort to get high enough to land on the cliffs, a rain

Stories Back of the Above Pictures

1—THOUGH the offer stood on the books for more than an entire year, no airman claimed the $50,000 cash prize posted by Publisher William Randolph Hearst back in 1910 for a coast-to-coast airplane flight to be completed within thirty days. With no takers the offer was withdrawn.

It would still be a tough proposition today—to go that slow!

2—SPEAKING of air stowaways and such, one must hand the palm for pioneering in this field to the female meloe, or oil beetle. This "critical" hides in a flower-head until a bee alights on the blossom, then it hops aboard the bee for a free ride back to the latter's cells, where it calmly deposits its eggs.

The Commerce Commission should make the bee charge two cents a mile.

3—WHICH weighs more—a loaded railroad car or an empty one? Naval Aviation officials will tell you that an empty one weighs more—when it's helium that you're transporting; for a recent check showed that a tank car full of this dirigible lifting gas tipped the scales at forty-six tons less than the empty car!

Why not put some more in and fly the train?

4—MARKETING by air is the latest. And Ralph W. Hitz recently enjoyed a completely airmailed repast in his penthouse atop a New York City apartment. His pate de foie gras was flown from Florida, his soup came from New Orleans, a baked Smithfield ham arrived from Virginia still smoking hot, and pineapple leaves from Hawaii garnished the meal.

Next time your mother asks you to go to the store, tell her to buy you an airplane.
storm came down and actually cooled the motor enough to enable him to get high enough to reach the down beyond the cliffs. He landed, broke his prop and undercarriage, and was almost arrested by a village policeman for disturbing the early morning peace (it was 5:20 a.m.).

Bleriot never had to fly after that. His fortune was made.

ANOTHER CLUB IDEA

We hate to be always pointing to our British cousins in showing how things are done in this light plane business, but somehow, we must admit they seem to be able to put it over. Perhaps it's because their communities are so compact, whereas we Americans are scattered over a 3,000-mile continent, and those who want to do things can't seem to get together with others who have like ideas.

Anyway, here's the latest from our good friend John T. Avis, of Poplar, London, England! It's an illustrated leaflet all about the Civil Aviation Service Corps of which John is a flying member. It seems that back in 1924 a few London lads with very little money, and no chance of getting into the R.A.F., decided that there was no reason why they could not fly—if they pooled their efforts. They banded together and formed the Civil Aviation Service Corps and approached a commercial flying school at Cambridge with a plan. The school listened to their scheme and provided a plan to give them flight training at cheap rates—in job-lots, so to speak. At first there were only nine enthusiasts; but within a short time membership was increased to over fifty, and in no time at all several had got their "A" licenses (private to you). To make it even more systematic, they turned the club into a number of squadrons and told the R.A.F. to watch their smoke.

Today, they have six dual-control training ships at their disposal. The most perfect staff, ground and flying, are of first-class rating. They enjoy a form of squadron life and squadron tradition, even to the point of wearing neat blue uniforms.

The school they work with is a member of the Air League of the British Empire and has very many good connections. Under the club plan they can give these Civil Aviation Corps lads flying at a cost of less than $8.00 per hour. They also arrange for ground courses for those who for various reasons cannot fly. We call it a great idea.

The Airmail Pals

As we go to press, the old Pen Pal Pal department is once more humming with activity: your old friend, Doug Allen, is back with us once more and is lending the R.H.P.D. a hand, so by the time you read this, all the recent letters will have been exchanged. Due to the fact that we are a little behind schedule in exchanging letters, you buzzards are very apt to get just exactly the kind of Pal you have in mind—for we have a swell supply to pick from.

From time to time, we receive letters from English Pen Pals who would like to correspond with an F.A.C. residing on the West Coast. Here's a rare opportunity for one or more of you English F.A.C.'s not only of corresponding with a fellow from Los Angeles, but in the bargain you will later have the pleasure of meeting your Pal from the Movie Capital of the world. Bob Dieckmann, of L.A., says in part: "If possible I would like a correspondent in England, since I am planning a trip there next summer and would like to establish a contact there." We're holding Bob's letter in our special folder and all mail addressed to Bob in care of GHQ will be promptly forwarded to him.

And here's a surprise! Bill Ahern, of Brooklyn, N.Y., sort of objects to the title "R.H.P.D." Bill asks: "Oh, couldn't you call him something easy?" Bill, we were under the impression that "R.H.P.D." was rather unique. What do the rest of you pen and ink sloggers think of Bill's suggestion? Write and tell us whether you like it or not. If not let us have your suggestion for a better title.

LAST month we told you of the great friendship formed between Bob Skotnick, Canton, Ohio, and Joe Link, of Queens Village, N.Y., via this department. This month let us tell you what Jack Cafarelli, Teaneck, N. J., thinks of the labors of the R.H.P.D. Below is a part of Jack's letter:

"Through your columns I have obtained a very interesting Pen Pal in Connecticut—Donald Woodworth. We have passed our twentieth letter, and we are still going strong."

And say—here's an opportunity for some of you fellows around twenty years of age to correspond with a vivacious, air-minded young lady of 19, living in Kokomo, Ind. As a matter of fact, fellows, Miss Lindley Coy is so airdomed that her friends have nicknamed her "Lindy." Her letter, likewise, is being placed in a special folder and first one to write for it gets it. Moreover, all other letters will be promptly forwarded to "Lindy."

From far off Hilo, Hawaii, comes a letter from Melynn Chan Nui, saying in part: "I wrote once for a Pen Pal and got a swell one. I would like additional Pals from the Western or Southern States, Mr. Sells has some interesting pictures of Hawaii which he will gladly exchange for others. Here's a swell chance for you Western and Southern photo collectors to get some mighty nice pictures of the "Paradise of the Pacific."

Leaping swordfish, I'm afraid I've written too much copy. Really, one could go on and on and on since this is so interesting, but here's signing off until next month. In the meanwhile won't you scribblers write a few lines to your old friend.

THE RIGHT HONORABLE PAL DISTRIBUTOR.

HOW TO GET AN AIRMAIL PAL

FIRST, write a letter just as if you were writing to your new pal—the kind of letter which tells your age, particular interests in aviation, your hobbies, etcetera. (If you wish, you may include a separate sheet of paper telling us, in a general way, what kind of a pal you seek). Next, send this letter to Airmail Pals, care FLYING ACES, 67 West 44th St., New York City, and be sure to enclose a stamped, self-addressed envelope.

Now, when your letter arrives, we select a Pal for you from our battery of Pals—the sort of Airmail Pal your letter indicates you want—and mail his letter to you in the stamped, self-addressed envelope you send us, and we mail your letter to him. Then you're all set! Of course, if you want additional Pals, just write us again.

REGARDING FOREIGN PENS

In case you do not reside in the United States, write a pen pal letter as above—but do not enclose a stamped, self-addressed envelope or send money for stamps. Your pal letter will be forwarded to an American correspondent, following which you need only wait for his reply.

If you are an American and wants a foreign pal do not write a pen pal letter. Simply send us a stamped, self-addressed envelope with a note telling your age and stating that you wish a foreign correspondent. A foreign writer's letter will be returned to you in the envelope you send us—whereupon you may begin writing to him direct from your own home. The foreign airmail pals are cared for in this fashion because foreign stamps sent in from other countries cannot be used in the United States to forward letters to Canada or across the seas.

Those of you who seek foreign pals will be given American correspondents whenever the supply is exhausted. Please note also that we cannot supply you with foreign pals in non-English speaking countries where FLYING ACES is not distributed.

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With the Model Builders

We'll begin with this month's personality "shot." Our young friend, this trip, is Martin Peterson, of Woodstock, N. Y., and he's holding his 44-inch Curtiss Robin flying model. There's a lot of careful workmanship tied up in that job, if we know our models—and we think we do. Does she fly well, Marty, old boy?

Here's the top-notch model of the month—a nifty Boeing F4B-4 turned out by Bill Allen, of Greenville, Ohio. Bill says he built it last Christmas during his vacation and that it's won every exhibition contest in which he's entered it. "Maybe they didn't take a very good look at it," he states modestly—which is the height of something or other when you're considering a flimsy blue ribbon job like this.

Before and after! And it's a sad story, mates! You see, Alvin Stohman, of Orange, California, decided to try out his Pusa-Moth model in a football stadium—where there's always a tricky wind ready to foul the hero who's hankering for a much-needed point after touchdown. Anyhow, Alvin put 200 turns on the prop, and Diameter poked her ugly nose into the picture just 30 ft. from the takeoff! On the left you see how Alvin's Pusa-Moth looked before that memorable hop—and on the right you see how she looked when he nearly bore her home.

Swift! Swift!

Here's a new one. Not something out of that tubwell, a la Betty Boop, but a wisp plane built by Irving Stombaugh, of Signal Mountain, Tenn. It's a tiny Boeing F4B-4 built to a scale of 1/22nd of an inch to the foot. Friend Stombaugh would like to know if there are any other model builders among our F.A. readers who go in for this sort of thing. Write Irving direct, if you're interested.

Bob Seipel and Ed Hornaday, of Philadelphia, resurrected the plans of the speedy Northrop XFT-1 that appeared 'way back in our September 1925 issue—and got busy. Above is the trim model they turned out, and we'd say she looks all set to "go places." Mighty nice workmanship!

We don't get this one very often. It's the old Boeing Mailplane. John Miller of Chicago is the fellow who constructed her, and he informs us that she has a span of 3½ inches and is equipped with air wheels, movable controls, and movable tail wheel. We like it a lot, John.

Well, we finally found one wartime model for you out of the current bunch of photos. Yes, it's a Gotha bomber from the model workbench of Perry Hemberger, of Hollywood, Calif. You must have been around the movie lots, Perry, to get the dope on this one. She's a pretty nice job, though the struts seem overly stout. But maybe Perry figured they needed 'em that way to carry these heavy bomb loads.
Judging by the letters you fans shoot our way, there’s nothing so popular on the model tarmac as a flying copy of a sleek military craft. Well, fellows, here’s a scout-bomber that’s the latest on the line. What’s more, this is the very ship that Buzz Benson flies in this month’s smacking-good Whitehouse yarn, “Wings of the Viper.”

Gather the balsa and let’s go—

Make the Vought SB2U-1

By Herbert K. Weiss

The first radical departure in years from the well known “Corsair” O2U and O3U series by the Chance Vought Corporation is the SB2U series. The SB2U-1 is typical of modern low-winger design, having split trailing edge flaps, retractable landing gear, controllable pitch prop, and the new cowl flaps. The power plant is a Pratt & Whitney Twin Wasp Jr. 700 h.p. engine. Top speed is in the neighborhood of 240 m.p.h. A Navy order for 54 of the type is now being filled at the Hartford plant.

Except for a few details, our model is of standard construction. Care should be taken to have all joints cemented securely. The completed model should be a rigid structure free from “wing flapping” and tail flutter.

Fuselage and Center Section

Procedure is varied slightly in this model from the customary method: for the center section of the wing is to be assembled first. Use the plan to lay it out on. Waxed paper should be placed over the page to prevent the balsa from sticking to the paper. Ribs are cut from 1/32" sheet balsa. Cut out two halves of each fuselage bulkhead from 1/16" sheet balsa, and cement the halves together. If necessary, cement a strip of 1/32" by 1/16" across the joint to give stiffness.

Now cement bulkheads B, C, and D to the center section in the position shown in the plan. When these are securely fastened, cut stringers from 1/16" sq. balsa and cement them to the three bulkheads, beginning with the side center stringers and working toward top and bottom simultaneously so that the fuselage will not warp. Bulkheads A, H, E, F, and G may now be added, and the tail block carved, added and sanded.

Build up the front of the cowl from 1/16" sheet balsa, cut formers g, h, and k from 1/16" sheet and cement them together with the four strips of 1/16" sq. which form the cowl skele-

ton. The cowl may be covered with stiff paper, but 1/32" sheet balsa is better appearing and more durable. Several pieces of 2" wide balsa will be required.

When the whole cowl is assembled and dry, sand it thoroughly. Push rods may then be made from pins, using the heads and soft wire to simulate spark plugs and leads. Build up the front and rear enclosures from 1/32" bamboo. The center section hatch is covered with 1/32" sheet balsa. Bend the rear hook and cement it to bulkhead G. Another piece of wire running across the bulkhead between the hook and the balsa prevents the hook from pulling through.

Wings

Cut the wing ribs from 1/32" sheet balsa to the shapes shown. Taper the front and rear spar before assembly. The leading edge is left square until the wing has been assembled and cemented, then is cut and sanded to finish the contour out smoothly. Wings tips are 1/32" bamboo with 1/16" balsa braces. Make one right and one left panel.

To build the left panel, make a carbon copy on white paper, and then holding the paper to the light, copy the plan on the other side. Or simply build the left panel at the same time as the right panel, transferring dimension with a ruler. Cement both panels to the center section with 1/32" dihedral on each side.

Tail Surfaces

Stabilizer and rudder for the flying model are built as shown. Leading and trailing edge are 1/16" sq. balsa, as are the ribs, while the main spar is in each case 3/16" by 1/16". Tips are bent from 1/32" bamboo. For a scale model, stand the main spar on edge, use 1/16" by 1/16" ribs running perpendicular to the main spar, and sand the whole to a streamline shape after the cement has dried.

(Continued on page 95)
ONE of France’s latest “sky forts,” this Hispano-Suiza 12-Ybrs powered Bernard boasts a top speed of 203 m.p.h., a theoretical ceiling of 31,168 ft., and a range of fully 1,740 miles. Besides its load of eight bombs, the craft bristles with machine guns mounted to fire from “blister” turrets projecting both above and below the fuselage. You solid-scale fans will find this job a striking model subject.
Plans for a Gas Job

Air Speed Indicator

By Phil Zecchitella

In going back over early gas model history, one thing steadfastly remains in our memory. It is a little picture of a gas model with a shiny new engine in its nose and of its proud father—proud, but defeated. Defeated because the new motor wouldn't perform. Everywhere could be seen these new fangled models with baby powerhouses in their hulls—and frantic modellers blistering their fingers trying to start them. Remember?

At one of the early National meets—and we say "early" only in relation to gas models—a newsreel syndicate thought it would be a novel idea to have some shots taken of a gas model zooming off the ground from a take-off. Cameramen and modellers appeared "on location" early in the morning. Cameras and models were judiciously arranged for best angle shots and the modellers were told to 'let 'em have it.'

The first young man, now director of one of the largest gas model groups in the country, knelt to his crate, whispered a few endearing aeronautical phrases, and started to flick the prop. For fully a half hour the young man flicked while cameras poised and technicians grunted—and yet no action. Finally, there was a sputter which succeeded, at least, in waking half of the newsreel crew. The sputter was finally coaxed into a roar and the model started on its journey down the runway. But alas and alack! The model directed itself into a tiny waft of weeds (there were at least four of them) and that seemed sufficient resistance to make the prop go back to where it was before it started, wherever that may have been.

The young man again stooped to the model and a few more phrases passed between him and the craft, although by this time we do not vouch for their enduring or even aeronautical quality. Flick! Flick! Again he was at it.

And so it went on. A successive series of would-be take-offs until the motor coughed and stopped, always at the crucial moment, and then it was back to that Flick business again.

And those poor newsreel men! Foot after foot of very valuable celluloid wasted and not a damned thing to take back to the boss. If it were shown on the screen as recorded, it would have looked like a new kind of exercise in which the enthusiast was obviously interested in exercising only the wrist and the vocabulary with that queer Flick maneuver as the motif.

But now look at us gas jobbers! Do the engines start today? Ask us! Why here only last month we had to devise a method of stopping the darned things because they ran too long in the air! And now hot on the heels of our time switch we are presenting an air speed indicator to record how fast they go. (In the background we hear rumors of radio control being quietly developed. Quietly, that is, in view of the fact that the A.C. Spark Plug Company has posted a $200 cash prize for radio controlled models at the next national meet. They're not so dumb, these modelers!)

What with time switches, radio control, and air speed indicators, we can practically guarantee hot and cold running water with the gas models of the future! And while we are pointing to the future, we may as well envision just what the gas model will develop into, with Yankee ingenuity such as it is—

Among the standard equipment will be noted a shiny automatic time switch resembling a telephone dial. Numbers in the dial (from 1 to 9) will represent seconds. If a five second flight is desired, number "5" is dialed. If it is a contest and the engine running time allotted is 45 seconds, then numbers "4" and "5" are dialed. For a minute and one half "9" and "O" are dialed.

Next there'll come a built-in air speed indicator with a visible dial on the wing center section. This may also be connected to the carburetor (needle valve, to you) and set at a determined speed, such as twenty miles per hour. When the model attains that speed, it will automatically "throttle" to it. In this manner, the most economical engine running speed may be maintained thereby.

Above we see the author's original gas model speed indicator. The wire "whisker" which controls the indicator arm is clearly seen running in the channel at the top of the face. Speed calibrations should be drawn in along the line marked "M.P.H." The airflow "straightener" is made with soda straws.
giving maximum flight time for the fuel consumption. There will be a retractable landing gear (introduced by that ingenious fellow, Phillips of the old Jordan Marsh Club, way back in 1936 at the Detroit Nationals) which will reappear when the model is about to land. This last feature will operate in conjunction with a sensitive diaphragm which will also serve as a recording altimeter. The engine, unless we are going to fall down on the job, will have a self-starter. If this proves too bulky or far-fetched for your way of thinking, then we will become very practical and invent a portable inertia starter for hooking in on the nose of the model. After the engine has been revved into starting, it would be disengaged from the starter.

Meanwhile, the radio receiving unit in the model has been tuned to the same frequency of two transmitters which are situated in adjacent flying fields. A signal broadcast from the transmitter will be received by the unit in the model. Various signals will correspond to the various controls in the craft. The model is taken off the ground with one transmitter and piloted in the direction of the duplicate transmitter.

When the model is out of sight of the take-off transmitter, it is picked up by the second broadcasting unit, which, by this time, is in the same vicinity of the model. After completing several maneuvers (and perhaps dropping some literature), the model is directed back to the first transmitter which brings the model to a graceful three point landing and taxies it right up to the microphone. The model at this point is probably expected to take a very nice bow and smile.

Now, let our imagination sweeps us away (with the aid of Editor Powell, of course) where we come to get back to this old business of an air speed indicator before it gets too old fashioned for you!

The type of air speed indicator which we are presenting is nothing new in theory. It was used since the early days of aviation (quite extensively on light planes) until the pitot tube was developed. Many ships today still use this kind of air resistance indicator. It is mounted on a wing strut and read while in flight.

The trick, of course, was to adapt this gadget to gas models. On the real ship, the pilot can look out and read the speed at any time during the flight; but granted that a similar arrangement is mounted on a gas model, how is the builder to know how fast the model went after it has landed?

That was the first detail to be ironed out. Also, such air speed indicators for real planes are calibrated between forty and one hundred miles per hour. Forty miles per hour may be assumed to be the take-off speed. Comparing the relative speed of a gas model and a large ship, it becomes evident that the air speed indicator starts to function in the real plane when it would have long since reached its apex in the gas model. On the airplane, the air speed between zero and forty miles per hour is uncertain. At this low pressure, the air does not tend to stabilize its direction because there is not enough speed. From forty miles and upward, it becomes practically no problem. And yet, our gas model requires an indicator that will function from zero and forty (and this is just as good a time as any to politely inform you that very few gas models fly faster than twenty miles per hour—except in a power dive).

To get back to the low speed problem, under various circumstances low speed air flowing over a surface is very undecided as to direction. It may for a time be head-on and then there may be a side gust, all of which tends to make an air resistance instrument very erratic. At a higher speed, the air tends to straighten and confine itself to one general direction by virtue of its velocity.

Therefore, in the case of gusty conditions, a honeycomb device may have to be added to your gas job air speed indicator (see photo) to straighten out the air flow. There will also have to be a separate calibration for use with the honeycomb attachment since it will then require a greater air speed to affect the indicator vane.

The indicator face is made from 1/32" sheet balsa, preferably of the hard variety or so called "rock" balsa. It is then covered with a smooth-coated sheet of heavy paper. This will strengthen the bearing joint and also make it easier to ink when calibrating. At the bottom of the face is inserted a shaft housing, one of the many varieties, provided that it will be firm. The indicator arm must be so constructed as to move in one direction only—across the face. Any tendency to move up or down when under air pressure will greatly affect its efficiency. One end of the indicator arm is provided with a shaft, mounted firmly and inserted into the shaft housing on the indicator face.

The vane is cut from sheet aluminum and glued to the indicator arm. The extreme end of this arm is (Continued on page 60)
Yup, Douglas has done it again! This trip it's the staunch and speedy XFD-1, a sky-hurting product that's of special interest—for it's the first fighter-class craft turned out by that famed firm. We call it a prize subject for you solid modelers, so trot out your tools and go to it—

The Douglas XFD-1

By Kipp Cooper

The XFD-1 is the only plane of the fighter class to be constructed by the Douglas Company, long famous for its many successful designs contributed to both the Army and the Navy. The XFD-1 is a development of the Bureau of Aeronautics' Design No. 113 for two place naval fighters. While the performance was over 200 m.p.h. for the XFD-1—which compared favorably with most single-place fighters of the Navy—further experimental work on this type of design was stopped by the Bureau.

The original plane was powered with a 700 h.p. Twin Wasp Jr., but this was replaced by the Curtiss-Wright SGR 1820-F53 750 h.p. engine. As no further contract for this plane was opened by the Navy it is now offered for export use to which it is adaptable as a high performance fighter-bomber.

Building the Model

Our model can be constructed of any suitable material, but pine is recommended because of the fine finish which can be obtained. If pine is used in the construction, a sharp pen knife will be found the most useful tool, along with a small plane and some assorted grades of sandpaper.

The fuselage is perhaps the most difficult part of the construction, due to the rather complex structure incorporated to protect the flyers from the slip stream. Study the drawings carefully before proceeding with the actual construction. Mark the fuselage shape on a block of the correct size and with the aid of the fuselage cross-sections proceed to shape the fuselage. The sliding cockpit covering may be made from the same block as the fuselage and painted so as to imitate glass. Or you might call upon your ingenuity and work out this covering in celluloid or cellophane. This feature, then, will be left to the builder as he can better judge his ability. The final finishing and shaping is done with fine sandpaper.

Wings, Tail, and Carriage

Wings are cut from a block of the desired size and shape and final finishing is done with a small plane and sandpaper. The upper wing may be made in one section. But as the lower wing passes through the fuselage, two methods are available—one is to make the wing in two sections and fasten each to the fuselage separately, and the other is to turn it out in one piece and make an opening cut in the fuselage. The latter is recommended because of the better joint that is possible. The wing flaps (which are shown on the drawings as broken lines) and the ailerons may be made by grooving the surface of the wing.

The tail surfaces are laid out on the wood and finished to the correct sections, after which they are joined to the fuselage. Each may be grooved, as were the ailerons and flaps, to indicate the movable portions.

The landing gear and wing struts are fashioned as shown in the drawings, and finished to a streamlined section by the use of sandpaper.

Next, each part is treated with a suitable wood filler and when dry sanded lightly to insure a smooth surface on which to apply the coats of paint. All the fillets are made of plastic wood or a similar material, and they are roughly formed to the desired shape before drying, after which final forming may be done with knife and sandpaper.

(Cont. on page 95)
By Avrum Zier
Model Department Editor

Because of the increasing interest in gas jobs, we are going to devote our entire space this month to stability as applied to a fuel driven model airplane.

In reality, there is little difference between a large airplane and a miniature gasoline driven model; for both are powered by horsepower and both depend upon the same principles of flight. Whatever difference there is, probably lies in the stability factor. You see, a miniature model depends more upon inherent stability, while a large airplane depends more upon the manipulation of controls. Anyhow, it is quite obvious that a gasoline driven model must possess a high degree of stability if it is to be a stable flyer.

Stability, of course, depends upon the air forces acting on the airplane. If these forces acting upon a correctly designed ship are of sufficient magnitude to bring the airplane back to its original attitude of flight, then we can consider the ship as being stable. The degree of stability may be expressed in terms of the efficiency of the recovery of the plane to level flight, or in terms of the prevention of displacement from level flight.

In planning an airplane, the designer first decides upon the type of ship he desires. With a few basic ideas in mind, he sketches a rough outline of the ship. Using this outline as a basis, he ultimately builds up the final design.

With the ship laid out, the next step is the performance calculations, involving top speed, altitude, climb, etc. Then come the stability calculations. Should the degree of stability prove to be too low it becomes necessary to alter the design accordingly until the proper degree is assured for the planned ship.

Actually, the calculation of stability is not as hard as it may seem.

In this article we are going to study the effect of the various forces on the stability of a gas model. But before we can delve into this we must first learn something about certain factors of the airplane which play very important parts in determining stability. Probably the most important of these is the location of the center of gravity of the entire ship. The determination of its location is found by what is known as a moment summation of forces. This moment summation is taken about the vertical and horizontal planes. The intersection of the determined distances from the reference lines (about which the moments were taken) is the true location of the center of gravity.

While this method is most accurate, it becomes a long and tedious task on the part of the model builder, since the weight of each individual part comprising the airplane must be known, as well as the center of gravity of the part itself.

Another important factor effecting the stability of a gasoline driven model is that of the airfoil section. In the past, many model builders have used airfoil sections...
of their own design. Personally, I believe this to be a grave error and one that may lead to the failure of the model. In using a section of his own design, the builder too often knows little or nothing of the characteristics of the section. Because of this it is a matter of guess on the part of the builder where the wing should be placed on the model to obtain the most efficient angle of attack.

Because of these unknown characteristics, actual calculation of the proper wing area required to sustain the ship becomes impossible, thus involving a wing area guess which in all probability will be in excess of the required area. The effect of too much area is well known. It increases the resistance of the model and wastes power.

No words can over-emphasize the importance of using a section with known characteristics. Wing sections adaptable to model planes can be found in N.A.C.A. Report No. 460. (This report can be purchased from the Superintendent of Documents, Washington, D. C.)

We have stated in a previous article that for an airplane to be in a state of equilibrium it must be stable about three axes (Fig. 1). If any displacement is made from any of the three axes, the inherently stable airplane will set up automatic forces which will restore it to its original position. If an airplane is displaced and immediately returns to its original attitude of flight without any oscillations, the ship is said to be statical stable. Should the ship experience oscillations while returning, with each oscillation decreasing in magnitude, the ship is then said to be dynamically stable. If, on the other hand, these oscillations tend to increase, the ship is classed as being dynamically unstable.

Most gas jobs are high wing types, thus they possess a low center of gravity which increases the lateral stability of the model. In Figure 2 a high wing gas job is shown. Here, the center of gravity is at a considerable distance below the center of lift. If this ship should by chance be displaced laterally, the center of gravity will act as a pendulum and tend to swing the ship back into position. It is quite obvious that the lower the center of gravity is—that is, the farther away the center of gravity is from the center of lift—the greater will be the pendulum effect, hence the stabiler the model.

In a great many cases it is possible to eliminate the use of dihedral if the center of gravity is extremely low. You may now ask: "How is it possible to obtain a low center of gravity?" A low center of gravity can be obtained by distributing the weight accordingly. All gas model weights, such as batteries, coil, and other such items, should be placed as far below the center of lift as possible.

Lateral stability, then can be obtained by using a low center of gravity. Should this condition fail to give proper stability, then it becomes necessary to incorporate dihedral as well. But remember that the use of dihedral decreases the efficiency of the wing.

If you do need dihedral remember that this angle can only be determined by tests on the model itself. A fair approximation which will give satisfactory results is to divide the vertical tail area by the wing area. If this ratio comes out within the range of .08 and 1.2, a dihedral angle of 3½ to 5 degrees will be sufficient. If the range is near .05 then it is possible to use 2 degrees.

In achieving stability, a great deal also depends upon the horizontal location of the center of gravity with respect to the center of pressure travel of the wing section used. As we all are aware there is a certain amount of pressure acting on the wing. Since this pressure is distributed along the chord, there must naturally be a point on the chord at which the pressure can be said to be concentrated. It is at this point that we consider the center of pressure as acting.

This center changes its position along the chord as the angle of attack changes. Every airfoil section shown in N.A.C.A. Report No. 460 indicates the position of the center of pressure along the chord for every angle of attack. Although not necessarily true for every airfoil section, the center of pressure moves forward as the angle of attack increases and backwards as it decreases. This factor is very important, as it alters the stability qualities tremendously.

Its effect on stability can best be illustrated with reference to Figure 3. In Figure 3A we represent the
airplane by a line of thrust and a wing section. The center of gravity, which remains constant, is indicated for convenience on the thrust line. It is assumed that a particular airfoil is used, thus we know its center of pressure travel.

Now, Figure 3A shows the ship in horizontal flight. The wing, in this case, is set at its most efficient angle of attack, which we shall say is 3 degrees. From the characteristic chart we find that the center of pressure is located at 40% of the wing chord. Considering only the center of pressure acting on the wing, it can be seen that its lifting effect would have a tendency to nose the ship over, and about the center of gravity. The force (pitching moment) tending to nose the ship over would be equal to the lift multiplied by the distance “x.”

Another force acting on the section is that of drag. This force, acting backwards horizontally, as can be seen from Figure 3B, will tend to pull the nose up. Its force will be equal to the drag of the wing multiplied by the distance “y” (force times an arm). The drag and lift are easily calculated once the wing area is computed and the characteristics of the section used is known.

Let us now see what effect the change of angle of attack has on longitudinal stability. In Figure 3C is shown the airplane in a positive pitch position where the wing is now at a 12 degree angle of attack. From our characteristic chart we find that the center of pressure has moved up to 25%. Since our center of gravity remains in the same place, it is noted that the center of pressure, or the lift on the wing, is now acting ahead of the center of gravity. And instead of tending to nose the ship down it is pulling it up. However, the drag is still acting back, which likewise is also tending to pull the nose of the ship up.

Strange as it may seem the drag on a wing does not always act backwards. At times, for example, in pulling out of a dive, the drag is found to be acting forward. While this seems strange, many test pilots who have experienced shedding of their wings in pulling out of a dive, have related how the wings instead of tearing backwards upon failure actually moved forward.

Another instance of this phenomenon was found in the case of Babe Smith, as related in the article, “A Girl Conquers Gravity,” appearing in our October issue. Babe was undergoing a test in a wind tunnel to determine the upward air velocity necessary to float a human body. At all times, pieces of cloth were fitted from her arms and down her sides to a point just below each knee, another parallelogram-shaped piece was sewn between her legs. This served as a supporting surface. As told in the article, the first experiments with these wings worried the Institute directors. They were fearful the blast full on the wings would whip back her arms from the shoulder and perhaps break them. Strangely, though, the blast actually forced her arms to bend inwardly at the elbow. “As a matter of fact,” said Babe, “I had to use great strength to hold them out.”

Such a case is usually found at high angles of attack.

We have thus far seen the effect of center of pressure travel on the stability nature of our gas model. Of course, this is not the whole story by a long shot. But considering what we have just observed from Figures 3A, 3B, and 3C, it has been shown that the center of pressure travel is in percent of the chord, thus the larger the chord, the greater will be the travel. The effect of a large travel is quite obvious inasmuch as the distance “x” is increased, which means that the pulling up or nosing over effect is likewise increased (lift times distance “x” equals force tending to displace ship). Our distance “y” does not change sufficiently to cause a great difference in the displacement force. Any change of “y” is due only to the center of pressure travel along the mean camber line, which is a mean line between the upper and lower cambers (Fig. 3B-M.C.L.).

To maintain a small travel range of the center of pressure it then becomes quite obvious that the use of a small chord is our only solution. It is a wise act on the part of the builder to maintain the center of pressure always in back of the center of gravity. The reason for this becomes quite obvious as the direction of pitch is reversed at high angle of attacks.

Knowing the location of the center of gravity and the center of pressure travel, this can be easily determined. Should the center of pressure move ahead of the center of gravity at small angle of attack, one of two alternatives may be taken—either decrease the range of travel by decreasing the chord, or move the center of gravity by shifting weights. The former is the best.

At any rate, remember that the center of gravity should be ahead of the center of pressure for good results. In most cases it is satisfactory to locate its position at approximately 7% ahead of the center of pressure location during level flight. Of course, the 7% limit is an average and depends upon the section used. In some cases where the travel is small it may be possible to use 5%, or even less.

Thus far, we have only observed the effect of the fore forces of the wing on longitudinal stability. Another force effecting the stability is the propeller thrust. Let us see what effect it has:

In figure 3D we again represent our airplane. This time we are interested in the thrust line and the center of gravity location. Assuming that the center of gravity is now located below the line of thrust and acting forward, it is quite apparent that its thrust, or force, will tend to nose the ship downward with a force equal to the thrust multiplied by the distance “z.” Had the center of gravity been located directly on the thrust line there would have been no tendency to displace the ship. It is only in the case when the force is acting on an arm that we have a displacement from normal flight.

Other forces acting on the model are its weight and resistance. The weight, as indicated in Figure 4, acts vertically and through the center of gravity. It therefore produces no pitching effect. The total re-

(Continued on page 94)
Construct the Zephyr

This snappy sky buzzer is one of those rarin’-to-go R.O.G.’s—a high-spot hitter, and no mistake! Building her, you’ll find, is simplicity itself. But keeping her out of the air once her prop is hooked in will be a real job!

By Abe Bergman

Here we go, stick fans, for your model of the month a natty, easily-built R.O.G. job that packs plenty of pep. All you’ll need to make this top-notch littlezoomer is a spare hour or so—plus the following materials:

- Hard Balsa motor stick—3/8” by 3/4” by 18”
- Balsa for wing, rudder, and elevator 1/16” by 2” by 18”
- One foot of No. 8 wire
- Balsa block for propeller—3/4” by 1” by 8”
- One sheet of superfine tissue

Have you got those supplies handy? Okay, then, let’s go ahead with actual construction:

STICK AND WINGS

First off, carefully study the detailed drawing on the next page and closely examine the accompanying photograph to see how everything “hooks” up. The motor stick is similar to that in other rise-off-ground models. The shaft consists of 3/4” by 3/4” by 15” hard balsa, as stated above, with thrust bearing and rear hook secured to it with wound thread made fast with cement.

Now, make a full-size drawing of the right and left wings on a separate piece of paper. (Since the accompanying plans are in half-size, this, of course, involves doubling the size shown.) The wing is constructed in two parts and is then cemented to insure proper dihedral.

The spars should now be cut from medium stock balsa. Note carefully the correct run-of-the-grain as depicted in our sketch. Smooth the rough edges of the spars out with sandpaper. Next, affix these spars to your full-size drawing with pins, using a translucent wax paper between work and drawing.

Soft balsa is employed in the building of the seven ribs which are required. Moreover, you will again notice in the plans that the ribs are drawn half size, therefore in cutting them be sure to double the dimensions given. It will be noticed that the ribs taper.

After sanding the ribs, cement them to the spars you have already pinned to the drawings of the wing. The spacing of the ribs should be checked in the plans. Sufficient time should be given for the cement to harden.

TAIL SURFACES AND PROP

In the interim, you can start construction of the rudder and elevator. Use the same trick of making full-size drawings as you did for the wing. Cut the leading and trailing edges of the rudder and elevator and pin to drawings. The edges are of 1/16” sheet balsa, medium stock. Here, too, refer to the plans for the grain run.

We are now ready for the serious job of attacking the 3/4” by 1” by 8” block, and fashioning the model maker’s nemesis—the propeller. The block should be sanded before any cutting is attempted. If you made certain your block has flat surfaces, your job will be relatively easy. Carefully sketch the shape of the propeller onto the block with a hard pencil. Again note, in obtaining dimensions, that the plans are half size. In cutting a propeller it has been our experience that a sharp knife is of primary importance. After the rough cutting, the wood is sandpapered from a thickness at the hub of 1/4” to a thickness at the tips of the blade of 1/32”. Next, the propeller shaft is inserted and we are finished with the most difficult part of our ship.

Our wing should be dry by this time. A sharp razor blade will remove it from the wax paper. Two blocks, each 2 1/4” high, are employed in forming the dihedral. One block under each tip of the wing will form the angle. The centers should be firmly cemented and left to dry. The rudder and elevator are now dry enough to be covered with the tissue. To obtain a good covering, care should be exercised in smoothing all the cemented parts.

LANDING GEAR

Let us now use our No. 8 wire to fashion our landing gear and wing clips. Using a long nosed plier (with constant reference to the detailed drawing) we shouldn’t encounter any difficulty in the making of these parts.

The wing is now ready for covering. We only cover the top, and no adhesive is used on the ribs. The paper should be cut so that it will cover one half the wing—meaning two operations for the entire wing surface. The paper is laid on one side of the wing and the adhesive is applied to the trailing edge. Run the finger along the paper, securing it to the wing. Now apply the adhesive to the leading edge and with a pulling motion of the finger, draw the paper taut and wrinkleless. The same method is used for the other half of the wing.

ASSEMBLY

All our parts being finished, we now assemble them.

In fastening the wing clips to the wing spars, be sure there is no paper at the points of contact, else the wire will not adhere. The elevator is cemented to the under side of the motor stick. The rudder is securely cemented to the top. Then, 1 1/2” from the front of the motor stick the landing gear is attached.

One inch celluloid or balsa wheels are used for the landing equipment. The propeller shaft is inserted into the thrust bearing, using three washers for free movement. The ship is powered with two strands of 1/8” flat rubber. The rubber should be slightly slack to insure a good long winding.

FLYING

I found the proper glide was obtained with the wing one inch to the rear of the landing gear. This distance will vary, however, in different ships.

Now, fellows, comes the thrill of flying your completed R.O.G. Zephyr! After a few trial runs, adjusting the (Continued on page 85)
CONSTRUCT THE ZEPHYR

MOTOR STICK - BALSA - 8 x 1/4 x 13"

WRAP WITH THREAD AND CEMENT

Rudder

NO 8 WIRE

ELEVATOR

SCALE 1/2 = 1"

BALSA SPARS

PROPELLER - BALSA - 3/4 x 1" x 8"

[55]
Flying Aces Glider

By Arthur Wachter
With Drawings by Nick Limber

Fellows, we’ve got a special treat for you here—a top-notch glider! And we call it a treat because in the flurry of rubber and gas-powered models that have been buzzing around the skies, many of us have forgotten what a load of fun can be had with a simple, power-less soarer. Anyhow, we’ve got a zippy ship right here that’ll quickly “sell you” all over again on this exciting zooming sport.

You’ll only need a couple of hours to construct this remarkable darting job—and we’ll guarantee you’ll like it so well that you’ll want to save these plans. For we’ll lay ten-to-one that you’ll want to make another F.A. Glider at some later date. Here we go—

WINGS

The wings are cut from a piece of 3/4" sheet balsa. The wing pattern appears on Plan 1. First we suggest making a paper pattern of the wing, then with the aid of this pattern carve the wing out of sheet balsa. After the wings have been carved, it is necessary to form the airfoil section with the aid of a sandpaper block and some fine sandpaper.

By referring to the front view of the glider, it is noticed that the wing tapers. This tapering should be given to the wing before the airfoil is sanded. The shape of the airfoil appears on the first plate and we feel sure it will be easy enough for even a beginner to apply to the wings.

Once the wings have been completely sanded, shaped, and tapered, the builder applies a few coats of dope. When the dope has dried, the wings are re-sanded and glued together. By using blocks of wood, the wings may be cemented with the proper dihedral angle. While the wings are drying we will start constructing the fuselage.

FUSELAGE

Our fuselage is made of hard balsa. After the proper shape is given to it, a strip of bamboo is glued to the bottom of the front end. This acts as a protector for the balsa body when the glider is landing and also tends to bring the center of gravity forward and lower. A common pin is stuck into the nose, as shown in the side view. By allowing a loop to protrude from the nose of the ship, clay (which is later added to the glider as weight) may be placed into it, also tending to bring the C.G. even closer to the nose. When the fuselage is completed, we focus our attention on the tail unit.

TAIL AND ASSEMBLY

The tail unit is made of 3/64" sheet and is sandpapered into a streamlined shape. Note that the rudder is made of three pieces and that the largest piece is glued in a slot cut into the fuselage. Before gluing the rudder into place, however, it is necessary to complete and cement the stabilizer on the body. Once this is accomplished the rudder is glued and the entire assembly is doped and sandpapered several times. By this time, our wings are dry and the cement is hard enough to hold the proper dihedral angle.

It is now necessary to glue the wing on the body. To do this, we cut a slot, or form a bed, on the fuselage and allow the wing to rest on it. If you note carefully in the side view you will see that the bed is so formed as to allow the leading edge of the wing to be higher than the trailing edge.

By again using blocks to support the wing tips, we cement the wing on the bed and allow it to dry. While it is drying we make the wing streamlinings of thin sheet balsa and glue them to the trailing edge of the wing and side of fuselage.

Your glider is now completed. It is advisable, however, to allow some time for the cement to harden before attempting to fly your ship. We will also have to warn you, now that your ship is completed, that there is one fault with it—that is, it will have a tendency to fly away from you and get lost in the clouds. So don’t write in telling us you lost your ship and that we are responsible—for we warned you.

Before each flight, it is advisable to test-glide your ship. By this we mean that you should glide the model from shoulder height into the wind. A left circle should be executed with the left wing’s trailing edge warped slightly up, and with the right wing’s trailing edge warped slightly down.

When your F.A. Glider performs this evolution well, you’ve got maximum performance. So get that left circle down pat—and let ‘er go! And how about a snapshot of it?
FLYING ACES GLIDER
FULL SIZE DRAWING

FUSELAGE CROSS SECTIONS

AIRFOIL SECTION

WING MADE OF 1/8" SHEET BALS

PLACE CLAY IN LOOP FOR WEIGHT

PIN
LEADING EDGE

ELEVATOR MADE OF 3/64" BALSA

RUDDER MADE OF 3/64" BALSA

DIHEDRAL AT EACH TIP - 3 1/2"

SWEEP BACK AT EACH TIP - 1 1/2"
News of the Model Meets

BUFFALO JUNIOR NATIONALS
INDIANAPOLIS LEGION MEET
N. Y. STATE FAIR CONTEST
CANADA NATIONAL TOURNAMENT

BUFFALO JUNIOR NATIONALS

CLAIMED as one of the most success-ful contests, the 1936 Scripps-Howard Junior National Air Races came to a close at Buffalo, N. Y., on September 2. While only one national record was shattered, the competition was so keen that a record crowd turned out. In both the stick and fuselage events many of the models flew out of sight. To the winners went trophies and cash awards valued over $1,500.

To Chester Lanzo, of Cleveland, went the highest honors. Lanzo broke the world's record in the open stick model event. His red and white model soared out of sight after a flight of 18 minutes and 10 seconds. This was a little more than six minutes above the old record. Lanzo also won first place in the acrobatic event. His winning ship not only released gliders and bombs in mid-air, but after dropping its tiny pilot with a parachute, it exploded in mid-air.

The 1936 trophy winners were as follows:
Texaco Trophy—Michael Kostich, Akron, 4 minutes; Buffalo Times Trophy—Ferdinand Falkowski, Buffalo, 22 minutes 30 seconds; Goodyear Trophy—Seymour Stein, Akron, 7 minutes 55 seconds; Blue Flash Trophy—Albert Brothers, Cleveland, 32 minutes 80 seconds; Model Aircraft Builders Trophy—Chester Lanzo, Cleveland, 18 minutes 10 seconds (new world's record); Peerless Trophy—Edward Yambor, Cleveland; B. F. Goodrich Trophy—John Banko, Cleveland; Thompson Trophy—Richard Korda, Cleveland; L. W. Greve Trophy—Chester Lanzo, Cleveland; Shell Trophy—Ed Deemer, Cleveland; Bendix Trophy—Don Mertens, Buffalo.

Don Mertens, just named, will be recognized by our readers as one of our Model Department contributors.

INDIANAPOLIS LEGION MEET

THE American Legion's Fourth Annual National Model Airplane Contest was, in the words of Director H. Weir Cook, "most successful both from the standpoint of number and quality of participants and number of spectators witnessing the event." There were approximately twelve thousand spectators at the Indianapolis Municipal Airport to witness the outdoor events held on August 31.

In the Indoor Events, Ralph Kummer, of St. Louis, won first prize in the hand launched duration class. In the fuselage R.O.G. event, first prize was won by Wm. Gough, Chicago. And in the Experimental type R.O.G. class, Lawrence Harlow, Indianapolis, won first.

In the Outdoor Events the following were winners: Dick Everett, Washington, Pa., won first place in the fuselage type R.O.G. event. In the speed event, Bob Jeffery, of Findlay, Ohio, was awarded first. The internal combustion engine event (restricted), saw first place go to Kenneth Ernst, of Indianapolis. The open event of the internal combustion engine class went to Harold Stofer, Indianapolis. And to Max Sokol, Hamtramck, Mich., went first prize in the exhibition scale model event.

Cash awards totalled $152. In each event, $10 was first prize, $5 second prize, and $2.50 third prize. The contest was conducted under N.A.A. rules.

NEW YORK STATE FAIR CONTEST

NEW YORK'S State Fair Model Airplane Meet was held at the Syracuse Airport on September 9. The contest was conducted under the N.A.A. rules, and there were 125 entries from all parts of the State. Contestants were divided into senior and junior groups. The gasoline event limited to seniors only (those over 16 years of age), attracted 22 entries.

In the exhibition scale event, open to both groups, first place was won by Louis Casale, of Syracuse, with (Continued on page 85)
REALISTIC PHOTOGRAPHY

To attain perfection in the photography of your finished model airplane so that your pictured ship has the "look" of a full-size plane, probably the best type of camera to use is the miniature type. The usual one of this nature is the ordinary camera fitted with a supplementary portrait lens, can also be used. The advantage of the miniature lies in its great depth of focus, giving both a clear picture of the plane and also a distinct background. Thus if your model is photographed at an airport with your camera resting on the ground, the hangars and other ships in the background will give a very realistic effect.

There are at least three methods of introducing human figures into the picture. Probably the easiest is by cutting the figure from a large picture and placing it in a suitable position with the model, being sure to maintain the correct scale and to have the surface at right angles to the camera to prevent distortion.

A second method is to photograph the model, then cut a figure from another picture and after sandpapering the edges thin, gluing it in the proper position on the model picture. The whole is then copied in the usual manner.

A third method is to cut a figure from a negative, cement it on the negative of the model picture, and print the composite. However the emulsion must be removed from the model negatives under the figure, and this makes this method the hardest and the least satisfactory of the three.

Above all, in picturing your model airplanes try to attain the very highest degree of realism. If the model is supposed to be flying, do not show a stationary propeller.

The effect of whirling props can be gained through the use of transparent celluloid discs. And your model may be suspended by fine silk, which rarely shows prominently in the finished print. Dark suspending threads against a clear sky can be removed on the negative by marking out the white lines with a soft black pencil to match the rest.

The miniature camera is also excellent for a record of the model maker's career. The film cost is small and enlarged prints can be obtained cheaply. The beginner with a camera can build up a collection of photographs of his models as he builds them, thus forming a progressive record which will show his gradual increase from simple to exceedingly complex models. Such a collection attractively mounted in a durable album forms a priceless keepsake for later life.

—JOHN DALLAIRE, JR.

Plans for a Gas Job Air Speed Indicator

(Continued from page 47)

The air speed indicator should be firmly mounted to the radiator orna
tment of the car. (If the radiator has no ornament, the indicator itself will make a very nice one, as I discovered while riding through traffic.) With the spring set at any odd point, the car should be driven at forty miles per hour. At this speed the indicator arm will most probably attempt to move past the last notch of the dial. If it does, the spring tension should be gradually in
creased until finally, at forty miles per hour, the arm will just have reached the end of the dial.

If, after having tightened the spring, the arm tends to move clear across the face while still at a slow speed, the vane area should be cut down so as to offer less resistance.

This will establish the instrument as a forty mile per hour indicator. If a faster or slower one is desired, it may be adjusted accordingly. When the maximum speed is obtained—that is, when the pointer is brought to the end of the scale—insert the dial in the housing of the instrument.

One important point, and which we mentioned at the beginning of the article, was that the indicator should be calibrated under the same conditions under which it is to be subjected to. In other words, do not calibrate the instrument in a weather which would not be suitable for flying a gas model. The best thing to do is to at first decide whether you would fly your gas model in the weather that you are calibrating in. If you wouldn't, then it is also the wrong time in which to calibrate the indicator.

WHEN mounting the indicator on the model, it is a good point to utilize the weight of the gadget to advantage by mounting it on the counter-torque side of the wing. In this manner, it will also serve to partly counteract the torque of the gas model. It must, of course, be mounted out of the prop wash which practically resolves the location to the wing. A very nice method would be to build the indicator right into the lower side of the wing with merely the vane protruding. With the size of gas models such as they are at present, this suggestion is not altogether inconceivable.

On our particular model of the air speed indicator there is also attached
the honeycomb arrangement previously referred to and we find that it works out very nicely in straightening out the air flow. This will require a separate calibration due to the increased air flow necessary to affect the indicator arm.

As for the size of your speed indicator, that's up to you. Its size should depend greatly on the size of your gas job. Anyhow, you don't want an instrument so unweildy as to affect the performance of your ship.

There is one thing about this gadget which practically places us in the humanitarian class. Only too frequently do we hear stories about this or that super-speed gas model flying at forty, fifty, even sixty miles (by gadd) per hour. By the time the story is repeated for the tenth time, the flying speed has increased about fifty miles per hour and unfortunate listeners can do naught but listen and suffer—unless, of course, they can think ahead and remember this model would probably go ten miles faster. Anyhow, our gadget may eliminate all that—by actually proving how fast the model really did go.

All Questions Answered
(Continued from page 25)

cannot print the addresses of every aircraft factory in the country. It would take too much space. Get the Aircraft Year Book at your nearest library. That will have them.

Robert Sanders, Voorhis School, San Dimas, Calif.—The Gramman single-seat fighter is said to do 240 top and the two-seater is believed to do about 197, but these figures are not official.

Frank Wyant, Jr., Charlotte, N. C.—So you have another version of how Lufbery died. There are dozens of versions, and yours may be as good as the next. You say a German in a D-7 did it, yet we have records that state it was a triplane. Now we know why aviation editors go mad. Thanks, just the same.

Douglas McCabe, Brooklyn—You tell the fellow who marked you wrong on that Spad vs. Bristol question that he ought to go and put his head in a sak. Particularly, if you want to make the Bristol Fighter. The Bristol was a far better fighter than the Spad.

Bert Lawson, Stillington, Durham, England.—The Vickers Vimy came out late in 1918. It had a top speed of 90 m.p.h. and a cruising speed of 87 m.p.h. The present Hawker Hart is said to do 184 m.p.h. The lower wing of the Westland "Wagtail" had no dihedral. It was perfectly flat. The point about the vertical exhausts on the B.E. and the Albatross could not be confirmed without exhaustive tests, but I believe that if they had been twisted back in the same manner as the exhaust on the Spad and S.E.5, at least five miles an hour would have been added to the speed.

—Clifford Cummings, Delawanna, New Jersey.—Great Britain is now the leading air power in Europe, France is second, and Italy, third.

A. L. Rule, London, England.—Many thanks for your kind criticism. You will note of course by now that one of the changes you suggested for the magazine has already taken place. Thanks for the kind word of encouragement. Just you wait-I've got my name on almost all of the European magazines, and see them as almost as soon as you. Thanks, nevertheless.

Richard Whistler, West Lafayette, Ind.—The U.S. aircraft carriers are: Lexington, Saratoga, Ranger, Langley, and Yorktown. The British are: Courageous, Glorious, Furious, Eagle, Hermes, and Argus. Japanese: Ryujyo, Kaga, Akagi, and Hosho. French: Bearn. Italy and Russia have no true flight-deck carriers. I know of no Bulgarian ace, and a Liet. Suk with whom I corresponded gave me the data on a Bital Roumanian ace. Bulgaria has no aircraft insignia, as they are not allowed to have an air force. It seems they were on the losing side of the Great War.

Morris Elliott, Rusk, Texas.—The plane you refer to is the new Seversky at present on exhibition at Fort Worth U. S. Air Service. I do not know much about it as yet.

—Arch Whitehouse.

Don't Miss
THE NEXT BIG FLYING ACES

On the Fiction Tarmac—
RICHARD KNIGHT—In another smashing modern sky yarn.
PHINEAS—This time our hero gets promoted! KERRY KEEN—And the sad fate of Drury Lang.

In the Fact Hangar—
FISH POACHERS vs. A FOKKER UNIVERSAL—The sensational story of how a war ace saved the British Columbia salmon industry, by Edward Green.

THE DRAMATIC STORY OF DIVE BOMBING—A top-notch photo-feature article.
And other ace specials.

And in the Model Shop—
Full plans for a striking flying model of the sleek Vultee Attack ship, by Bill Winter; The F. A. Fighter—another great Garami flyer; Hints on forming a gas job club, by Pat Sweeney, President of the Central Gas Modelplane Society; And a slew of other great model features.

IN THE JANUARY FLYING ACES

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF MARCH 3, 1909.


<table>
<thead>
<tr>
<th>State of New York</th>
<th>County of New York</th>
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| Before me, a Notary in and for the State and county aforesaid, personally appeared A. A. Wynn, who, having been duly sworn to depose in the matter hereinafter referred to, deposes and says: I am the publisher of the Flyin, that the publication is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the paper, the true and complete name of the publisher, editor, or managing editor, of the paper, and, if owned or operated by a corporation, the name and address of the owner of record, and that the paper is, to the best of his knowledge and belief, a true statement of the ownership, management and circulation, etc., of the paper, the true and complete name of the publisher, editor, or managing editor, or corporation, required by the Act of March 3, 1909, as amended by the Act of March 2, 1922, embodied in section 321, Postal Laws and Regulations, printed on the reverse of this form, to wit: 1. That the name and addresses of the publisher, editor, managing editor, and business managers are: Publisher, A. A. Wynn, Larchmont, N. Y. Editor, A. A. Wynn, Larchmont, N. Y. Managing Editor, Herb Powell, New York, N. Y. Business Managers, None. 2. That the owner is: If owned by a corporation, its name and address must be stated and also immediately underneath the names and addresses of stockholders owning one per cent or more of total amount of stock. If not owned by a corporation, the true name and address of the individual must be given. If owned by a company, firm, or other unincorporated concern, its name, its address, and as those of each individual member, must be given. Magazine Publishers, Inc., 67 W. 48th St., New York, N. Y.; A. A. Wynn, Larchmont, N. Y.; C. A. Publishing Co., Mount Morris, Ill. 3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: If there are none, so state. None. 4. That the two paragraphs just above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner, and this affiant has no reason to believe that any person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as set forth in the statement of copies of each time of this publication paid and distributed, through the mails, otherwise to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only).

A. A. Wynn, publisher. Sworn to and subscribed before me this 21st day of September, 1935. Edward H. Riter, Notary Public, Greene County, Ont.'s No. 2970, Regd. No. 8105, N. Y. Co. Clerk's No. 100, Res. No. 6-2-95, (My Commission expires March 30, 1936)
Zenden take over the place?"

"It's the only thing to do," Strange cut in before Jordan could reply. "Sergeant, go back and tell the others to act as though nothing had happened."

Peters looked uncertainly at Jordan. The Colonel nodded, and Peters went out, closing the door.

"I hope you know what you're doing," Jordan grunted at Strange.

Strange looked at the door which ledoutside.

"Expect von Zenden here in a few minutes. We'll have to trick him into thinking we don't suspect anything. Colonel, if you'll hold the metal box . . . . Kennedy, stand over behind the table, back of the desk-lamp . . . . and now, General, if you'll take this other bulb and pretend to be examining——"

"If you ask me," snorted Thorne, "we ought to be out there laying for your blasted lightning-change artist."

"We may learn more this way," rejoined Strange.

"Hum," growled the general, but he took the bulb and screwed it at it. "This the one Milton brought, eh?"

"Yes," said Strange, "that's—wait a second. I'm afraid I got them mixed when Peters came in."

He focussed the magnifying glass on the bulb in Thorne's hand, then shook his head.

"No, this is the right one. I recognize that lump of solder on the screw-plug."

"Let's see that glass," said Thorne gruffly. "There might be some secret we've missed."

"I've heard of men who could write the Lord's Prayer on the head of a pin."

"That's an idea," admitted Strange. He handed over the glass. "Kennedy, give us a little more light, will you?"

The plump lieutenant tilted the desk-lamp. Thorne then raised the magnifying glass to his eyes, holding the bulb up before his face. It was so close that his already big nose assumed gigantic proportions, and his squinting eyes became enormous. Strange smiled. Thorne glared over the glass at him.

"What the devil are you laughing at?"

"You, General," Strange said softly. "Your make-up looks so different through that glass."

CONSTERNATION flashed into the other man's eyes. He hurled the glass to the floor and his hand shot inside his flying-suit. Strange's .45 seemed to spring up into his fingers.

"Lay down the bullet, mein Herr! The act is finished."

For a moment, a sheer rage blazed from Jordan's eyes, then he obeyed. Strange smiled calmly across the leveled gun.

"And now your hands, mein Freund —clasp them above your head, if you please."

Jordan and Kennedy looked on in stony silence as the prisoner slowly obeyed.

"Good Lord!" the G-2 colonel said in a whisper. "You mean this is—"

Strange reached out, swept his captive's helmet from his head. With it came a skilfully fashioned gray wig.

"Herr Oberst von Zenden," he said with an ironic little bow. The Prussian had now recovered his self-control.

"Congratulations, my dear Strange," he said with a cool mockery. "It was very neatly done."

"I wasn't sure until you so kindly showed me that part of your nose was plastic. But it seems I win the wager, after all."

Von Zenden glanced carelessly at the clock.

"I think not, captain. I shall be gone before the thirty minutes are up," Colonel Jordan spun around to Kennedy.

"Get out there and grab that D.H. pilot. Warn the sentries to seize any one else who comes on the station."

"Yes, sir," uttered the dazed lieutenant. He hurried outside. Jordan turned back to Strange.

"How did you ever guess?" he demanded, staring at the spot where the make-up ended at the top of von Zenden's forehead. "I'd have taken an oath it was Thorne."

"So would I," said Strange, "but when Kennedy mentioned that it was a repeat message, I realized von Zenden had had time to get here. Then I remembered that he had impersonated Thorne once before——"

"Twice before, my dear Strange," the Prussian corrected him. "There was one occasion neither you nor the general knew about."

Colonel Jordan stalked across to the spy.

"What have you done with Thorne?" he rapped.

Von Zenden shrugged. "He has merely been sent out of the way by a false telephone call. I knew it wouldn't do for both of us to arrive here at the same time. Even you, Colonel, would have suspected something wrong."

Jordan turned purple.

"Why, you damned insolent—" he choked off the rest.

"We'd better search him," he muttered.

Strange nodded, kept the spy covered from side while Jordan made the search. The G-2 colonel laid a short-barreled revolver on the table, but nothing else of consequence was found.

"And now," inquired von Zenden suavely, "may I put down my hands?"

Without waiting for the answer, he coolly seated himself. Ignoring Jordan's angry sputter, he smiled up mockingly at Strange.

"Go ahead with your questions, Captain. Or perhaps I can ask them for you: First, why do I want to recover the bulb? Second, who is Ray Nods? Third, why are we using the three mysterious codes?"

"I've had enough of this!" snapped Jordan, before Strange could speak.

"I'm going to get a squad in here and let them work on you. We'll take some of the starch out of this smart-aleck." Von Zenden laughed.

"Before you telephone, Colonel, you'd better take a look behind you."

Jordan wheeled, and Strange took a quick side step, that he could watch both the Prussian and the outer door. It was only an instant, and even before he heard the faint sound of the other door opening, he whirled. There was a scuff of feet, and von Zenden's pilot leaped through the doorway of the empty office adjoining. Before Strange could fire, the man was shielded by Jordan's thickest figure, his gun rammed into the G-2 colonel's side.

"Drop the pistol, Captain!" he snarled. "Or I'll kill your precious chief!"

CHAPTER III

THE MAN IN THE BALL

VON ZEN DEN had not moved, but his ironic gaze was fixed on Strange's face. Suddenly he spoke.

"I might tell you," he said, "that my assistant's pistol has a silencer on it. He can kill your colonel without causing an alarm."

Slowly, Strange let the .45 sink to his side. Von Zenden came out of his chair as though catapulted. Jordan made a horrid cry as the Prussian seized the .45. The other German slapped his hand over the colonel's lips.

With cat-like swiftness, von Zenden closed the door to the next room. Not for a second did he turn his eyes from Strange. Crossing to the table, he put the mystery bulb in the metal box, motioned to the other German.

"I'll guard these two. Take the box and go to the plane. Have the engine started at once, and give me the signal." Von Zenden laughed.

"Ja, Herr Oberst," said the other man thickly. He stepped around the fuming colonel, looked apprehensively at Strange. "Perhaps I had better take this one with me and crack his skull, as I did that stupid lieutenant."

"No," snapped von Zenden. "He might recover his wits and trick you—though he did not show any great brilliance after catching me."

The pilot opened the door, disappeared in the darkness. As the door swung closed, the Prussian replaced his wife's helmet. He looked regrettfully at Jordan.

"I'm sorry, Herr Colonel, but I must ask you to tie up your friend Strange. Your belt will do."

"To hell with you!" grunted Jordan.

"Then—you would rather have me shoot him?" von Zenden said with sudden grimness.

"He's bluffing, Colonel," Strange said coldly. "If he'd intended to shoot me, he'd have used that silencer gun of the other spy."

"The noise of the engine will drown the shot," the Prussian replied sarcastically.

"He means it, Strange," groaned Jordan. He took his belt, fastened
Strange’s arms behind his back at von Zenden’s direction. He had barely finished when the thunder of a Liberty sounded. The Prussian gestured quickly with the gun.

“Stick your handkerchief into his mouth!”

Strange read the purpose in von Zenden’s eyes. He made no attempt to resist, as Jordan hastily tied the gag. The Prussian reached back of him, opened the outer door. Just as Jordan turned, he raised the gun for a vicious blow at the colonel’s head. Strange hurled himself forward, his shoulders lowered. Von Zenden crashed against the wall, and the gun harmlessly slid down Jordan’s arm.

The G-2 colonel clawed out at the spy’s hand. Von Zenden drove his other fist into Jordan’s stomach, and the colonel doubled over, gasping for breath. In the same moment, three thundering blasts sounded from the engine of the D.H. Strange was halfway to his feet. Von Zenden tumbled Jordan over him, switched off the light and fled.

It was several moments before Strange regained his composure from under the stocky G-2 chief. The gag had become partly loosened, but the belt still held his arms tightly. He plunged out into the deep gloom under the trees and nettings. Half-way to the line he managed to get rid of the gag, but his shout of warning was lost in the roar of the Liberty. Mechanics were lighting flares, and he saw the Germans’ D.H. rolling out to take off.

Two station officers were staring after the ship as he dashed up. One was Biddle, the lance major in charge.

“Start that other D.H.!” Strange shouted at the nearest mechanic. “The men in that ship are Boche spies!”

The two officers whirled in amazement.

“You’re crazy!” said Biddle. “That’s General Thorne!”

“It was Karl Von Zenden, made up as Thorne!” Strange flung back fiercely. “Unfasten this belt! I’m going after them!”

The startled major released him. As mechanics ran to the Headquarters D.H., Strange gave swift orders to the major’s aide.

“Flash word to the A-A batteries to spot that ship! Keep your own lights off!”

The aide sprinted for the office. Strange was running toward the D.H. when Jordan appeared, stumbling toward the two-seater. His bulldog face was still a sickly hue, but his eyes were grim with determination.

“Colonel!” cried the G-2 major. “Are you hurt?”

Jordan was pushed by him, bumbled into the rear cockpit. “What are we waiting for?” he rasped at Strange.

Strange signaled the mechanics, and the chocks were jerked away. He fastened his belt as the two-seater rumbled out past the flares. The other ship was in the clearing, its top steaming. But as Strange gunned the Liberty the Germans twisted back in a tight bank. He saw the flash of the claw guns as the pilot warmed them for action. He squeezed his own trip as the headquarters ship soared into the air, and the Vickers responded with an eager throb. From behind, he heard the heavier pound of the Lewis as the angry G-2 colonel prepared for battle.

A searchlight from the nearby A-A battery hurled its white beam up the sky. It shifted, sought to catch the khaki-colored wings of the spy-ship. The man at the controls kicked out of the light, but Strange had a glimpse of his face before the ship turned. It was von Zenden who was piloting the ship.

As the Prussian swerved, a rocket made a red streak above his ship. Strange stared into the blackness above them. Had that rocket been fired by von Zenden’s accomplice—or some one else? He could see no other ship.

Another searchlight blazed up, swept over Strange’s ship. He doddered away, pulled into a climbing turn. Tracers shot out after him, as von Zenden swiftly reversed. Strange threw the two-seater into a vertical bank, pumped a burst from his guns. The Prussian zoomed, came about in a furious turn. Strange felt a grim admiration for the man’s skill. He was handling the heavy ship almost like a Fokker.

A fusilade flashed from the rear-guns of the German’s ship. Jordan answered it with a hot fire, and for a second the sky was thick with tracers and pencils of smoke. Von Zenden sidestepped to avoid two searchlights which probed after the khaki-hued ship. Strange saw him cast an anxious look upward as the D.H. raced past the beams. He whirled his own ship in a quick reversion. The next instant, two winking red eyes appeared above them. They were matched at once by another pair, as two more twin-guns went into action.

With a yell, Jordan elevated the Lewis, just as two Fockers plunged down into sight. The guns shattered fiercely, and one of the Fockers swerved aside. Strange saw that it was gray, like the ships he had fought before. He whirled the D.H. around, and the blast from the second D-7 lanced harmlessly into space. Before the Fokker pilot could re-align his guns, Strange had him in his sights.

Two crimson lines leaped out from the thrashing Vickers. Strange saw fabric fly from the D-7’s tail. He switched the stick and the bullet tracks raced forward to the pit. The Boche made a frantic effort to chandelle. Suddenly, his crouched form jerked half erect. He twisted like a man in some crazy dance, then his riddled body pitched forward, and the Fokker hurtled to the ground.

Jordan was blazing away at the first D-7. Strange cast a look back, rolled hastily to the left. Two more Fockers were charging in—vague, slitting shadows beyond the searchlights. With a quick burst at the Germans’ machine, he pitched into a zoom. A jerk, and one of his parachute flares dropped clear. As it lit up, he went into an Immelmann. Two of the Fockersbanked hurriedly from under the flare. The third Fokker had followed Strange’s zoom. It closed in, Spandau flaming.

A black-dotted line ran crazily along the D.H.’s right wing. Strange kicked aside and the bullet lash tore through the side of the cockpit. As he threw himself back, smoking slugs gouged the instrument panel, the ship shattered into fragments, and the wooden panel became a splintered ruin before his eyes.

As though by a miracle, the German barricade abruptly ceased. Strange heard Jordan’s triumphant yell, then saw a blur and orange fire burst out and mantled the charging Boche. The German’s horrified face showed for a second as he beat wildly at the flames. Then his blackened figure went plummeting over the side, leaving a trail of smoke from his burning clothes.

Hot oil splattered back into Strange’s face. He wiped his smeared goggles, whirled the D.H. as another blast of Spandau lead pelted the ship.

Suddenly, both Jordan’s and the Germans’ guns ceased to hammer. He saw the nearest Boche step up with a look of amazement. Then Jordan’s shout cut through the roar of the Liberty.

“Good God! Look, Strange—look!”

The G-2 ace shot a glance upward. Then he, too, stared in astonishment.

Whirling out of the sky in a steep arc was a glass ball at least six feet in diameter. And inside that transparent shell was a living man!

FOR an instant, Strange all but doubted his senses. It was like some crazy dream from nursery days; for with the gray silence, and the world around, there was center, the sphere looked like a huge toy ball with a life-size mechanical soldier tumbling around inside.

But the frenzy of the doomed man within dispelled that fantasy. Though he had no flying power on earth could save him, he was fighting madly on the circular walls which enclosed him. As the ball spun down into the glow of the searchlights, it turned over and over, rolling the prisoner like a squirrel in a treadmill cake. Strange saw the man’s German uniform—then a stab of horror went through him as he saw that stark-white face more clearly.

It was Carl Deane—Milston’s missing team-mate!
He jammed the stick forward, dived after the glass shell. The eyes of the doomed wretch flicked toward him, and Deane flung out his hands in a frenzied appeal. Then as though his tortured brain finally accepted his fate, he mentioned with one hand off into the night in a wild signal.

It was only a brief gesture, a desperate effort that was cut short by the rolling of the ball. But it brought von Zenden and the others hurrying in with renewed fury. Tracers shot toward the glass shell, and holes appeared where the smoking lines connected. The ball whirled crazily as it plunged toward the earth.

Deane made an heroic attempt to finish his signal to Strange. One of the Fockers now drilled in, its Spandaus almost centered on the ball. Strange took grim aim. Like tiny bolts of lightning, the guns’ twin blasts struck into the German pilot. Two flashing bursts—and the Boche slumped dead in his seat.

The Focker shot on by, its wings almost touching the two-seater’s prop. Strange closed the throttle to avert a collision. By the time he could open it again, the glass ball had fallen away and the remaining D-7 pilot was closing to finish the man inside.

The tips of the Focker’s guns blosomed red. As Strange dived after the German, the light of his hastily-thrown parachute flare showed a weird tableau beneath. Hardly three hundred feet from the ground, the glass sphere was dropping to earth. Nosed down, directly over it, was the last D-7. As the Focker’s guns erupted, fragments of glass flew off into space.

Carl Deane pawed at his breast in sudden agony. Then the ball split open from a second barrage, and his crumpled figure fell away. Strange saw the body plunge through the trees beneath, followed by a shower of glass.

The Focker started to zoom. Strange raked it with a furious fire, and the Boche slashed into a turn. Jordan was whirling the Lewis when von Zenden’s ship plunged from the shadows above the drifting flare.

Phosphorous streaks lined past Strange’s head. He kicked away, half-rolled to catch the D-7. The Focker pilot dived out of his tracers, pitched beneath the two-seater, and the floorboards jumped under a savage burst. Strange pulled up in a dizzy climbing turn, and Jordan sent a double dose of Lewis slugs down at the twisting Fokker.

His first fusillade knife into the D-7’s right wing, sheared it off as though it had been cardboard. The Fokker turned on its side, dropped like a rock. Von Zenden’s spy-pilot loosed a venomous crossfire as he saw the D-7 fall. Strange rammed the stick forward, stood on the rudder. The D.H. howled into a diving turn, and the cowl guns’ fire blazed through the tail of the spy-ship.

Von Zenden nosed down, zigzagging to escape those piercing tracers. Strange stopped firing. The man in the rear cockpit was huddling over his guns, either dead or wounded, and it was plain that the Prussian was being forced to land. Twice, the spy-ship fell off and began to spin. Each time, von Zenden caught it and forced it back into a glide. He was now heading for the 41st Pursuit field.

Strange followed, his thoughts on that weird glass ball which had come whirling out of the sky. He seemed again to see the terrified face of Carl Deane. He looked back at Jordan, read the same horror in the colonel’s expression. Jordan leaned forward, clutching the edge of the pit.

“I still can’t believe I saw it!” he cried hoarsely. “What in Heaven’s name can it mean?”

Strange grimly shook his head. Jordan started to speak, but there came a sudden burst from the rear-pit guns of the spy plane. Strange hastily kicked aside. The other German was not dead, after all.

It was only a short burst, but it gave von Zenden his chance. He swooped down out of the searchlights before Strange could turn and drive him back. One of the beams switched across the Headquarters plane. Strange lost it in that few seconds. It was half a minute before he could see clearly again. His D. H. had swung around to the North during that interval of blindness. He sent it roaring back toward the 41st.

THERE were torch pots on the line, and he was just in time to see the other ship rolling to a stop. As it halted, a hundred feet from a dark hangar, he saw von Zenden help the other man out of the rear cockpit. He dived to a landing, but as he taxied swiftly toward the other plane he saw a blur of movement along the road, then a motorcycle shot away from the drome.

“Why don’t they stop him. The fools!” raged Jordan.

“He’s still made up as Thorne!” Strange shouted back. He cut off the Liberty, swung over the side as the D.H. ceased to move. But already the roar of the speeding cycle had diminished to a faint drone, and he knew that pursuit was useless.

“No use, colonel,” he said glumly, as Jordan started to run toward the transportation shed. “Three roads branch from that one, and they all lead through the woods. We’d never catch him.”

“By Heaven, when we do nail him—” Jordan broke off, and the haunted look came back into his face. “That glass ball—and Carl Deane! If I live to be a hundred, I’ll never forget—” his voice trailed off, and he shivered.

“It’s a hellish business,” Strange muttered. “There’s some terrible purpose connected with all this.”

“Build a glass shell and a living man in it,” exclaimed Jordan. “How did they fire it into France? And why would they do such a fiendish thing?”

Strange was silent for a moment. “It’s obvious Deane learned something, just as Milton did. The Boche caught him and—” Jordan recoiled.

“You mean this is some new way of executing spies?”

“No, it must be even more sinister that that,” replied Strange. “They’d hardly go to such lengths.”

He turned, stared about the field, as he suddenly realized the stillness of the place. No one had appeared. There were torch flares flickering in the breeze, but not a mechanic had come to roll the ship to the line. He and Jordan looked at each other, then the C-2 chief raised his voice in a shout. But only an ominous silence answered him.

“Something’s wrong!” exclaimed Jordan. “The place is deserted!”

CHAPTER IV

The "Corpsse" That Rose

“VON ZENDEN may have told them we’re spies and up to a trick,” Strange said in an undertone. Jordan shouted again, then they both started toward the line. There were six Nienports spaced close together. Strange peered at the third ship.

“There’s a pilot in that—” he stopped short, for there was something awful
about the face which stared over the edge of the cockpit.

"Lord!" whispered Jordan. "He looks like a corpse."

Strange ran around the wing. The man in the ship did not move. His eyes were open in a fearful stare, but his chalky face was like death. Strange touched the limp arm which dangled outside the cockpit.

"Cold," he muttered. "Must have been dead for—"

"My Lord!" cried Jordan. "His eyes are moving!"

He jumped back. It was true. The pilot's eyes were following him with a look of terror and desperation. His bloodless lips moved, but no sound came. After that first shock, Strange sprang to the side of the Nieuport. A hasty examination showed no trace of a wound. The pilot's dilated eyes followed his every move, but the rest of his body seemed completely paralyzed.

"What's the matter with him?" Jordan said huskily.

"I don't know." Strange was feeling inside the pilot's helmet. "His heart's beating too hard—too fast, though his body seems to have a normal temperature."

"But you said he was cold," objected Jordan.

"His hands and wrists are like ice," Strange replied. "So are his face and his throat."

With an exclamation, Jordan gripped his arm, and Strange followed the direction of his bulging eyes. He went rigid at the scene dimly revealed by the smoky flames. At least a score of pilots were sprawled in front of the squadron office. Some were in flying gear, and others still clutched their helmets and flying-suits as though they had been hurrying to their ships, when stricken. Stretching away, on both sides, from the office to the enlisted men's barracks, were still more men—all of them motionless on the ground.

Strange ran to the nearest one. Like the Nieuport pilot, the man's hands and face were cold but his twitching eyes showed he was alive. Strange examined two more, then hurried to Jordan.

"We'll have to get help—doctors—ambulances!"

"I'll call the base hospital at Cour- ennes!" said the colonel. He hurried into the office. Strange ran back to the man in the Nieuport. Leaning down close, he stared into the man's face.

"If you understand what I say, blink your eyes."

The pilot's eyelids fluttered weakly.

"Try to tell me what happened," said Strange tautly. He put his ear to the man's lips, but he could hear nothing.

"Do you know what happened?" he asked. There was no answering blink. Strange tried other questions, but without success.

In a few minutes Jordan returned.

"Learn anything?" he demanded.

"No," said Strange. He explained what he had tried. "Even if he could talk, he couldn't tell us anything. It's clear he hasn't the slightest idea what happened to him."

"What could it have been?" Jordan said helplessly.

"They look as though they'd been drugged," Strange said. "But I never heard of a drug with such an effect."

"And we'll have to wait almost an hour for help," Jordan groaned. "The Courennes-Dorcy road is blocked with supply trains, and the ambulances will have to detour."

Strange was gazing absently at the slumped figures along the tarmac.

"Something brought them hurrying out of their quarters," he muttered. "The entire personnel of the squadron must be out here. That means they must have been ordered—I've got it! Von Zenden! He was here before this happened!"

"But we already knew he was here," snapped Jordan. "He told us—"

"All that was a lie," cut in Strange. "He intended to make us think the bulb was merely a symbol. The socket story was invented for the occasion. There wasn't any light such as he described—he was only trying to muddle up everything to keep us from examining that bulb more closely."

"I don't see how that helps us," grated the colonel. "We still don't know what hit those men."

"No, but it's plain von Zenden was here as General Thorne. He knew this was going to happen, and he had a part in it. He knew he'd meet no resistance when he landed here just now."

Jordan swore savagely.

"And we let him slip out of our hands! If you hadn't played that crazy game with him back there—"

"I wanted to see what part of that Jordan. "There's still a war going on, in case you've forgotten."

The major flushed. "Surely one of these men can talk," he mumbled.

Jordan glanced at Strange. "We might find one, at that," said the G-2 ace. "But I want to look at that other D.H. It's possible that von Zenden dropped something in his rush."

He went to the spy-ship, while Jordan and Biddle began their search among the stricken men. Except for a special compartment built in the rear cockpit, von Zenden's D.H. was no different from any other. The compartment was in the form of a small cabinet under the hog-back which divided the two pits. The two hinged doors were held open by hooks, and on a shelf inside Strange saw a heap of make-up tubes and materials. It had evidently been dumped from the pigeon-holes at the back of the cabinet. He switched on two small lights which threw an even glow on the angle mirrors under the pigeon-holes. There was no sign of the metal box, but he saw tufts of gray cotton hair, still in the shape of Thorne's braid and mess dress. And the wig which von Zenden had worn was lying on the floorboards.

Strange looked vainly for a map, then climbed out and scrutinized the ground. But he found nothing to aid him in the vague theory he had evolved. He went back toward the office.

"Have you found anyone who could talk?" he asked Jordan.

"No," said the colonel, gloomily. "All the poor devils can do is stare at you as though they'd lost their senses. Did you find—"

"Colonel!" came a shout from Biddle. "Come here—quick!"

Strange and Jordan rushed to where the major stood. Biddle pointed a shaking finger at one of the men on the ground.

"Look!" he said hoarsely. "He's turning blue!"

Strange bent down. The man's right hand had become a mottled purplish blue. His left hand held only a trace of the peculiar, coloring, but his face and throat were deeply livid.

"He's dying!" whispered Jordan. "He's been poisoned!"

"No, he's not dying!" said Strange. His eyes held a queer excitement as he knelt beside the man. He locked his hands like a tourniquet about the man's right arm. In a few minutes he let go. The mottled color slowly began to fade from the stiffened fingers. He jumped up.

"I've been blind! Milton gave me the key to this with his last words!"

"What is it?" demanded Jordan.

"Raynald's Disease!" Strange wheeled to Major Biddle. "I'm going to the medical shack. Try to find a man whose hands aren't cold—at least not as cold as this one's. Try middle-aged men—they'll be the least affected!"

Colonel Jordin followed him to the dispensary. "If you've figured this out," he barked, "what's the answer?"

"I've guessed only a part of it," Strange replied. He hurried through the first-aid room into the surgeon's office.
"Now if only we can find it described—it's an obscure malady."

HE plucked a diagnosis manual from a shelf, ran through the index, then feverishly began to read from the reference:

Raynaud’s Disease, first described by Edward Raynaud in 1852. . . . disease of childhood or early adult life. . . . Raynaud attributed the symptoms to arrest of the passage of blood to affected parts, from a spasm of the arteries.

"But how on earth could all those men catch the thing at once?" rasped Jordan.

"Wait!" rapped Strange. He read on hastily:

First stage—local syncope, parts become bloodless, white, cold and anæsthetic. . . . After a variable time, circulation may be restored, or disease may progress to second stage: Local asphyxia. In this condition some part of the body, a finger, toe or whole hand or foot, is extremely painful, bluish-purple, or mottled, and extremely cold. Discoloration may deepen until the skin is almost black, tactile sense lost. . . . Acute stage, local gangrene. . . . Remedies, warm salt bath, brief use of tourniquets, application to part of trinitrine to dilute peripheral vessels—

The G-2 ace stopped as the electric light in the room began to flicker. Jordan stared up at it.

"It’s code!" he exclaimed.

After a startled glance, Strange set down at the surgeon’s desk and began to take the message. In a minute he looked up.

"We’re in luck!" he said swiftly. "It’s the Boche ‘D’ code we broke two days ago!"

"But how can that bulb catch wireless signals?" the colonel asked blankly.

"It isn’t catching them," Strange said jerkily between scribbling of letter-groups. "The squadron’s wireless dynamic must be hooked. . . . on the same circuit. . . . fluctuates the light."

Jordan jumped as though he had been shot. "Then there’s a spy right in the wireless hut!"

Strange nodded, his fingers flying over the paper.

"You idiot!" fumed the colonel.

"You’ll let him get away the same as von Zenden!"

He plunged out of the room.

"Hold on, colonel," Strange flung after him, but the door banged shut. After a second, the light ceased to flicker. Strange shoved the message into his pocket, ran after Jordan. As he came out on the dimly lighted tarmac, he saw the colonel stoop to take a pistol from one of the fallen officers.

When Jordan van toward the wireless hut, Biddle’s voice rang out from the darkness.

"Get ‘em up, damn you!"

There was a dull, popping sound, then the booming roar of a G-5 instantly followed. Strange saw Jordan jump into the shadow at one side of the machine shop. The next instant Major Biddle staggered into sight, a smoking pistol in his hand. Jordan raised his own gun, but the major pitched to the ground before he had time to take aim.

"Shot himself!" rasped the colonel, as Strange reached the spot. "Took the easy way out—the dirty traitor!"

He started toward the fallen man. Jordan felt one of the spattering torches flared up, and its glow revealed one side of Biddle’s face. A stream of blood was flowing down his major’s cheek. His face, except where the blood coursed, was oddly livid.

"Keep back, colonel!" Strange whispered, as he saw the leaden blue color. "Quick—get back in the shadows!"

"What’s the matter?" said Jordan, startled.

Strange answered without taking his eyes from the wireless hut door.

"Biddle didn’t catch that message. He was trying to catch the man who did send it."

"Guard this approach," Strange interrupted, but still in an undertone. "I’ll go around to the rear."

He circled the shack, keeping in the gloom. Several of the paralyzed mechanisms lay on the ground, white-faced as corpses and as still. He stopped over one of them, watching the rear door of the hut.

The door was open, and a light shone in. Strange remembered suddenly that he had no gun, but in the next moment he realized that the shack was empty. He took a deep breath, tiptoed to the doorway and peered around to make certain that no one was hiding. Then he went around to the front. Jordan was standing at the corner of the machine-shop, his pistol raised. Strange called out to him before he came into view, and the colonel lowered the gun.

"Find anyone?" he demanded.

"No, he must have escaped from the rear door just after Biddle came out," he barked up the wrong tree," snorted Jordan. "Biddle must have been working with von Zenden. He saw he was caught, so he ended it."

Strange beckoned for him to come closer to where the major lay. Then, silently, he pointed to one of the helpless mechanics. Jordan stared at the scalesmen’s leaden face to the increasing bluish color of Biddle’s flesh.

"The disease again?" he muttered. "But how in Heaven’s name could he catch it that fast?"

Strange was kneeling beside the major. "Must have been highly concentrated," he said, half to himself. "It killed him in a few minutes."

"That bullet hole explains his death, without anything else," said Jordan.

"It’s not a bullet-hole. It’s a cut—or two or three cuts close together—where the bullet was smashed in his face."

"Then why—" gasped Jordan.

Strange nodded grimly. "The same bulb that—Keep over on this side, Colonel! It’s probably blown away, but there’s no need to take chances."

Jordan hastily stepped back. "Then you think the bulb contains—Good Lord, Strange! Then von Zenden was the man who sent the message! He didn’t leave the field at all."

"He undoubtedly sent the other man away in that motorcycle," agreed Strange. "I should have thought of that possibility. He probably hid where he could watch us, and then sneaked into the wireless hut while we were in the flight surgeon’s office. Biddle must have seen the lights flicker just as we did. He came here to investigate—von Zenden threw the bulb into his face—and Bibble missed him with that shot we heard."

Jordan gripped his .45 and glared around the dim-ill tarmac.

"For just one shot at that Boche devil—"

"You may have the chance later," Strange said tersely, "but right now we haven’t a second to waste. We’ve got to warn the whole front."

He broke off with a twisel cry of warning. Behind Jordan, one of the corpse-like figures had suddenly sprung to his feet!

CHAPTER V

BUBBLES OF DOOM

JORDAN whirled, but the other man already leaped. A Luger cracked against the Colonel’s wrist, and his nerveless fingers dropped the .45. He swung furiously with his left. The ash-covered figure alertly evaded the blow. The Luger whizzed down again, and Jordan went reeling as the barrel thundered against the side of his head.

Strange had jumped forward, but the Colonel’s bull-like rush had kept him from catching the other man’s gun. As Jordan staggered, Strange sprang in with the swift poise of a trained boxer. But the Luger was instantly flipped to cover him.

"Not so fast, my dear Strange," came the suave accents of von Zenden. "I can appreciate your desire to murder me, but unfortunately I have important work to do."

Strange stood motionless, trying to master his rage with an equal coolness. Von Zenden smiled through the ghastly make-up which had replaced the features of General Thedure.

"That is better. Now if you will move over so I can watch you and your estimable Colonel at the same time—"

"You butcher!" Jordan said hoarsely.

The Prussian looked mockingly at the swaying G-2 chief. "You have a hard skull, Jordan. I fixed as I intended to. I intended to keep unconscious. Now I may have to shoot you."

Jordan took a stumbling step toward him, fell to the ground. Von Zenden smiled ironically at Strange.

"They have weak hearts, these Staff officers. Even the thought of having to die almost frightens them to death."

"I wonder," Strange said musingly, "if you will face the firing squad with that mocking grin."

"Even if it should happen," returned the Prussian, "I regret to say that you will not be there to glory in it. Biddle for a trip to Germany when your plane lands?"

Strange calmly inquired.

Von Zenden’s eyes narrowed.

"So you decoded that message," he said curtly.
“Not entirely,” Strange was forcing himself not to look at Jordan, but from the corner of his eye he saw the Colonel’s hand move stealthily. “But I caught enough to—”

He hurled himself at von Zenden just as Jordan lunged at the gun on the ground. The Prussian tried to leap back and fire at the G-2 colonel. Strange crashed against him and they both went down. Von Zenden jerked the Luger from under him, frantically tried to aim. Strange hit his half-raised hand, and the gun blazed above his head. A sawed-off wrench, and the pistol flew from the Prussian’s fingers.

With a dextrous twist, von Zenden wriggled from under him. One arm shot out, and his tensed hand cracked alongside Strange’s neck. The blow sent a flood of pain down Strange’s right shoulder, and his head spun dizzy. Von Zenden flung his arm back for a second blow. Strange ducked, gritting his teeth against the pain. The Prussian half-sprawled as he lost his balance. Strange drove a stiff jab to the spy’s chin. Von Zenden’s head jerked back, and a snarl of anger tore from his lips. Strange threw his weight into a furious hook to the jaw, and the Prussian collapsed with a strangled groan.

Strange was on his feet in a flash, bending over the spy, but he saw at once that von Zenden was really senseless. He hauled hastily to Jordan, who had regained the .45 and was trying to stand up.

“Watch him, Colonel—I’ve got to decode the rest of that message!”

“I’ll take care of him,” Jordan muttered grimly. He tightened his hold on the gun. Strange hurried into the wireless hut, spread the code message before him. In less than a minute he came out, paused for a brief word.

“I’ll be back in a second—keep away from the light!”

He ran to the D.H. which von Zenden had flown. Snatching up the crepe hair browns and mustache which the spy had so carefully formed, he selected several make-up pencils and tubes, then hurried back to the wireless shack. Von Zenden still had not moved.

“What are you up to?” Jordan demanded. Some of his belligerent tone had returned with his strength.

“I’m playing a hunch,” said Strange. “If I got the right meaning of that message, there’ll be a Boche spy ship here to pick up von Zenden in a few minutes.”

“Then we’d better get ready for it!” exclaimed Jordan.

“No—the pilot mustn’t guess anything’s wrong. I’m going to take von Zenden’s place.”

Strange went into the shack before Jordan could object or ask further questions. There was a small, cracked mirror on the wall. He took it down, put it on the desk. There was no time for an elaborate bit of work. He swiftly drew in the lines which created the resemblance to General Thorne’s craggily features. The shaping of a putty nose took but a few seconds. He colored it hastily, smoothed in the places where it joined the sides of his own nose. He pressed the mustache onto his upper lip, was affixing the gray eyebrows when he heard the faint rumble of a ship gliding with engine idling. He jumped up, sprang to the door.

“Is von Zenden still out, Colonel?”

“Yes,” Jordan grunted, “unless he’s faking.”

“We’ll have to get him out of sight.” Strange helped him drag the unconscious Prussian around the corner of the machine shop, where the shadows were darkest.

“See here,” snapped Jordan, as they dropped von Zenden’s urgent, “I insist on knowing what you’re trying to do.”

“No time to explain that,” Strange answered tensely. “This is more important: After the ship takes off, call Chaumont. Have our two experimental voice-radio stations start sending in German and French. G-2 can rush agents there who speak both languages. Get word to French Headquarters—tell them to do the same thing. They can use the Eiffel Tower station, and their new experimental station near Senlis.”

“But why?” Jordan barked.

“Tough one for the squadron in this sector!” rapped Strange. “Maybe the whole Front!”

He spun around as a plane slid down toward the field. Then he stiffened. There was a second ship gliding down behind the first one. Both were Nieuport two-seaters.

“What now?” said Jordan, anxiously. “Probably only one will land,” said Strange.

They watched from the shadow as the first plane leveled off. It landed far out on the field and rolled almost to the trees at the East border. Suddenly two reports sounded above the low drone of the engine. The Nieuport lurched, almost went up on its nose. It stopped jerkily, and the pilot jumped out.

“What happened?” exclaimed Jordan.

“Both tires blew out.” Strange’s expression abruptly changed. “The glass from the ball! That would be it—”

The roar of the second Nieuport’s engine cut off the rest, as the other two-seater swept low over the hangars. The ship circled twice, while the pilot of the disabled ship waved hasty signals. Then it glided safely to the line of the hangars. Strange grasped Jordan’s arm.

“I’ll have to run! Tie up von Zenden—then tell them to get busy at those stations! Send anything—speeches—rhymes—same as the Boche did—”

He took the Luger he had seized from von Zenden, then raced toward the line, fastening his helmet and goggles so that they held his false eyebrows tightly against his forehead. The second Nieuport had stopped a hundred feet from the nearest flare. He saw the pilot, a short, chunky man dressed in a heavy flying-suit, warily searching the ground. The rear cockpit was empty.

The pilot jumped to the ground, a gun in his hand, as Strange approached. The G-2 ace holstered his own weapon, made an impatient gesture.

Dumkopf, why did you let that fool land in the enemy’s camp?

The pilot lowered his gun as he heard Strange’s fluent German.

“But I had nothing to do with it, Excellenz. Hiller is the senior man—”

“Hiller is a simpleton,” snapped Strange. His eyes flicked from the Nieuport to the allied ship. “Now we have lost one of the special plans.”

The Boche looked at his made-up face, then glanced nervously around the dim-lit field.

“What has happened, Herr Oberst?”

The message said only to land and communicate with the elephant.” Strange cut in, with a smileless snarl. “Ach! If the stupid Yankees ever dreamed what the elephant really is—” he motioned toward the ship. “We’re wasting time. Get in!”

“But what of Leutnant Hiller?” said the German anxiously. He pointed, and Strange saw the other pilot running toward them.

“Excellenz!” exclaimed Hiller, breathlessly, as he reached the spot. “Both my tires are cut—what shall I do?”

“Take one of the Yankee ships,” Strange ordered tartly. “Then return to Germany.”

“Ja, Herr Excellenz.” The man’s beady little eyes darted over Strange’s face, rested a moment on his loose-hanging leather coat. “Is everything all right?”

“I was caught,” Strange answered curtly, “but I managed to escape, and they learned nothing. Hurry and start the engine of that first plane.”

He watched the Boche go to the nearest single-seater. He knew the cause of Hiller’s curious glance. Von Zenden had worn a bulky flying-suit to create the illusion of Thorne’s big figure. Hiller had evidently seen the Prussian as he started on his rôle as the general, and the change to a leather coat had caught his attention.

Strange watched him a moment longer, but his mention of being captured had evidently satisfied the man’s curiosity. Hiller climbed into the cockpit of the smaller Nieuport and the other German swung the prop. The engine started after a second attempt, and the chunky pilot came back to where Strange stood.

“Then we’ll wait for him, Herr Oberst?”

Strange recalled the message von Zenden had sent. Not a second was to be lost, if he were to succeed.

“No,” he said shortly, “he can pull the chocks for himself. I want to get away from this place.”
The Boche looked at the sprawled forms along the tarmac. He grinned, showing yellow teeth.

"I do not blame you, Excellenz. They are not very pretty to look—"

"Keep your tongue in your head!" Strange said coldly. He climbed into the rear seat, and the pilot scuttled up into the front.

HILLER was getting out of the other plane to pull away the chocks as the two-seater swerved into the wind. Strange looked back, then turned his gaze to the ship in which he sat. The light was rapidly fading as the plane gained altitude, but he could still see the loop of heavy cable which protruded above the center-section of the top wing.

As the Nieuport soared up from the drome, he glanced back quickly at the gun turrell. There was a single lightweight Parabellum mounted on the ring. It was pitching skyward. He saw that the ammunition case was smaller than the usual type.

The field seemed to fall away, becoming only a blur marked by the smoky torches. The pilot climbed steeply, heading straight East. Strange bent over, dimly realizing that the rear control stick had been removed from its socket and was clipped at the side of the cockpit. Feeling his way carefully, he took out the securing bolt and then placed the stick in the socket. Once or twice it jerked as the Boche pilot moved the controls. The chocks were up. Strange waited till it was steady again, then inserted the bolt and the locking pin.

As he sat up he could dimly see the German's head and shoulders, silhouetted against a faint light down in the front cockpit. He edged his way up in the seat, so that he could see over the man's shoulder. The pilot was gazing down at an intricate looking chart. Before Strange could get a clear glimpse of it, the shielded light went out.

The Nieuport began to spiral upward in wide circles. In another minute it was in a cloud. The pilot's faces cleared up about the ship, swirling in the propeller blast. Strange slid down lower to keep his crepe-hair mustaches from getting soggy with dampness. He might not have to go through with the final step, but he might as well be prepared. While the two-seater dromed up through the mists, he swiftly went over the major developments of the evening.

The discovery of those unfortunate men on the drome had finally given him a link to connect the other bizarre elements. The mysterious bulge ... Raynaud's Disease ... the weird glass shells ... the gravity drop... all were connected, and that queer German codes gave a hint of the even more frightful thing back of the whole affair. If he was not mistaken, the "elephant" was...

He sat up, his thoughts swinging back to the present. The Nieuport had leveled out as it emerged between two layers of clouds. Through a few breaks above he could see moonlight and twinkling stars. But it was not this which had caught his eye. Off to the right, a red light was brightly shining. After a moment he saw its steady glow break into a slow flickering.

The pilot took a flashlight and pointed it over the edge of his cockpit. The red light flashed off and on several times, then burned steadily. The Boche flew toward it, banked sharply as he neared it. Strange tried to see what lay back of the light, but he caught only a vague outline. As the two-seater banked, the light began to lift upward and the pilot followed at a short distance.

A second layer of mist enveloped the Nieuport, its wet chill stiffening Strange's unslumbered hands. He watched them to keep them limber. The red light glowed eerily through the cloud, keeping about a hundred feet above the ship. Strange cautiously tried to move the turrell. The pilot jerked around and he turned the motion into an impatient gesture.

The Boche opened the engine to full speed, and the Nieuport bared on up through the murk. Gradually, the clouds became less dark. Moonlight began to shine through ragged breaks. The red light lifted more swiftly, and then the outlines of an observation car suddenly were visible as the thing came into a patch of moonlight.

Strange gripped the turrell release again. He could delay no longer. With a quick movement, he whirled the mount so that the gun was at his right. The pilot, staring upward, did not see, but as Strange pulled back the charging handle he abruptly looked around. He jumped as he saw Strange load the Parabellum.

THE G-2 ace dropped the machine-gun grip and clawed at his Luger. Brightening moonlight fell across the cockpit. The German howled out an oath as he saw the pistol, and the Nieuport lurched in a violent skid. Strange was thrown against the side of the pit. He lunged at the pilot, and the Boche struck out wildly at the Luger. The Nieuport was wobbling in a near-stalled position. Strange clutched the stick, pushed it forward. The Boche was hurls up from his seat. Strange aimed a blow at his skull. The pilot flung himself back, threw the flashlight into Strange's face.

Strange fended it off with the Luger, but one end struck his goggles. The right lens cracked but did not shatter. He whirled the pistol down in an arc. The German tried to duck, but the weapon came too fast. Strange felt it crunch, then the man tumbled down in his seat.

Strange shoved the gun into his holster, took the controls. The red light, which had lifted out of sight, was now descending, flashing as it came. He banked away, saw the observer's car swing toward the Nieuport. Then both ship and car emerged in clear air above the spars.

In that first flood of moonlight, Strange saw only the car and the winking red light in its rounded nose. The car seemed to be floating in mid-air, for its suspension cable was invisible. He gazed up quickly, and a thrill shot over him. That was a Zeppel.
No, but I think he has a cracked skull," said Strange. "One of the damned Yankees struck him a fierce blow."

The other man's heavy eyelids lifted in alarm! "Himmel! Everything must have gone wrong?"

"No, just enough, but enough," muttered Strange. "Come over here while they get Franz out of the ship, I can tell you what happened."

"You had better see General Brundt, Herr Oberst," the other man said nervously. "He is already in a bad temper about this.

"You can give him the report," Strange interrupted. "I must get back at once, to make sure the secret does not become known."

He had hardly finished when a buzzer at one side of the platform snarled in insistent signal. The Rittmeister stepped to the phone.

"Jo, Herr Brigade-general, it is he ... Jo, I will tell him."

He hung up, turned hurriedly to Strange. "He says you are to come at once to the control cabin."

"Very well," grumbled Strange, "but I want the plane ready. A few wasted seconds may mean life or death later."

One of the Germans had climbed down and was fastening a rope under the senseless pilot's shoulders, preparatory to hauling him up. The Rittmeister had started with Strange toward an inclined passage which led up to the catwalk.

"What of Hilfer?" he asked suddenly.

"Will he be back to hook on?"

"No," said Strange, "he is flying back to the Fatherland."

The Rittmeister paused, beckoned to one of the mechanics. Strange noticed that man had a small oxygen kit slung around his neck on a strap, as did three or four others.

"Put out the light as soon as you get to Lewinnant Franz on the platform," ordered the dark-skinned officer. "Schneider you will take a few men and see if they need any help hooking on the two Fokkers."

Strange's eyes gleamed Briefly, but he hid his satisfaction as the Rittmeister rejoined him. It was working out better than he had hoped. If only the Boche had been able to see through his scheming.

"I could not talk freely in front of men, Herr Oberst," the voice of the dark German broke in on his thoughts. "But the general is most eager to know if you succeeded in catching the spy who escaped from Malmsakh.

"He is dead," Strange said brusquely. He was silent a moment, as they started forward along the shadowy catwalk.

"But dropping the man in that shell was an insane idea. It might have given away the whole plan."

The Rittmeister had given an exclamatory exclamation of the shell. "You saw it fall?" he asked hastily. "Where did it strike?"

"In the little lake to the West of the Bois d'Autre," lied Strange. "The ball broke into a thousand pieces."

"Gott sie Dank!" breathed the other man fervently. "Then there is no chance of the Allies learning anything from that. The Yankee was probably battered to pieces, also."

Strange looked grimly at the German's back. "We have nothing to fear from that angle," he said. "But just why was it done?"

"It was General Brundt's order," said the Boche, in a lowered voice. Strange just then realized how still the Zeppelin was. "He was in a rage," the German continued, "when they found what the spy had done. The man had crawled out on top of the ship near its objective on the rack holding the first shell on the starboard side. He used one of the oxygen masks to keep from breathing the concentrate, and chopped a hole in the shell. Of course, the pressure blew everything out, and some one heard the sound."

"When we caught him he was working on the second shell. We brought him down below, and then we also found he had fouled some of the releasing cables. You can see for yourself— he pointed ahead, on the right, and Strange saw that a number of cables ended in the framework of the dirigible, splitting small wire cables which ran from a small control board up into the gloom at the top of the ship. There was a second control board on the left, in a recess between two hydrogen cells. He pointed to a large cable sheathed in a ring, and that numbers designated the rings for orderly release of the shells."

"How long will it take to repair the other cables?" he asked the Rittmeister.

"Perhaps half an hour. Now you can understand, Herr Oberst, why the general was so furious. The message from Nauen had come, telling us about the other spy's stealing one of the bulbs from the laboratory, and flying to the Bois d'Autre station. Then this Yankee was caught. The General ordered the locking-ring of the first shell opened, and the spy put inside the ball. I tried to get it opened, but he was not interested in anything, but he would not listen. He was like a madman. Are you sure it is all right—no one else saw it fall?"

"A Yankee pilot saw it," Strange replied curtly. "But he may not have guessed the meaning."

They had reached the main cabin. Just as the Rittmeister opened the door, Strange glanced aside and saw two rows of big storage batteries at right and left of the catwalk. Heavy, insulated wires ran down to the Number 1 and 2 engine nacelles, and he heard the faint whir of electric motors. He slowly understood how the huge ship was able to maneuver unheard. In the first two nacelles, at least, there were electric motors instead of Maybach engines. The Zeppelin was probably flown over at a great height on its engines, then was propelled only by the electric motors after getting near its objective. This would also explain its comparatively slow progress, hinted at in the code message which mentioned the "elephant."

The rear part of the cabin was given
over to quarters for men and officers, though the cubby-like rooms were now deserted. Strange looked back as he closed the door to the catwalk. A flashlight was spotting the narrow walk, back near the passage to the hook-on post where he had left the Nieuport. Men were carrying the wounded Franz forward. That meant he would have to move fast, for the man might recover his senses and tell the truth.

The Rittenmeister led the way into the navigator’s compartment. Strange shot a glance around him. The space had been enlarged to include space for three wireless operators. All three operators had fallen asleep before them. Numerous bearing-lines had been drawn on each map, and he saw that the lines extended across the Front. The navigator, an elderly, sallow-cheeked man, hovered over the operators occasionally transferring new bearings to a master chart on the wall.

The men looked up briefly, went on with their work. Strange gazed anxiously at the clock as he followed the Rittenmeister toward the control cabin. Jordan had had time to get word to Chaumont, but it was obvious that no intercept streams had begun. The operators were still receiving their peculiar codes from the three German stations. He had surmised the purpose, after suspicion of a Zeppelin dawned upon him. By using three separate languages, and keeping up a constant flow of words from the three, it was easier to work out the accurate bearings from three directions and know the exact position of the big dirigible at all times, even on this clouded night. With ordinary wireless, there would be a danger of tuning in other stations, German or Allied, and leading the Zeppelin from its intended course. This system enabled the Germans to use the observer only at the last moment, to signal for dropping the shells, instead of relying solely on him for the difficult task of guiding them at all times.

As the Rittenmeister opened the control cabin door, Strange braced himself for the test. He purposely lagged a few steps behind. A fierce voice boomed out the instant the Germans entered the cabin.

“Then! Where is von Zenden? I told you to bring him here at once!”

“He is right behind me, Herr General,” faltered the Rittenmeister.

Strange entered with an apparent calmness he was far from feeling. There were several men in the cabin, but he looked only at the general. Brundt was a big, heavy-set German, muffler, and hat, which at first gave him a benevolent appearance. Seen from the side, he was almost like a Santa Claus. But as he wheeled, the resemblance was gone. His mouth was like a steel trap, hard and merciless, and his blue eyes were cold and hard.

The only light in the cabin came from that in the hood above the compass. The rudderman and Brundt were in the reflected glow, and the other men stood in shadow. Strange halted a trifle to one side, thankful for the concealing gloom.

“Well?” snarled Brundt.

“Very well,” replied the Rittenmeister.

“You will have to change the operating plan,” Strange said crisply.

“Why?” demanded the red-faced general.

“Because of that silly trick, dropping the man in the shell,” Strange answered coldly.

Rittenmeister Ochen gasped, and Brundt seemed about to explode.

“Why, you verdammt insolent—” he choked off in a stuttering fury.

“There’s no time for quarreling,” Strange said incisively. “A Yankee pilot saw the shell fall into a lake. I tried to shoot him down, but he escaped. They may guess the truth, after finding these men on the 41st Pursuit field.”

“What of it?” fumed Brundt. “We’ll be through before they can act.”

“It would be wise to shift operations,” Strange insisted. He watched the general with a relieved anxiety. He had counted on von Zenden’s importance in espionage. Ordinarily, the Prussian’s power was far greater than his rank of colonel warranted. And he knew from experience that von Zenden had no respecter of rank. But this time the situation seemed different.

Brundt glowered at him several moments, then grudgingly nodded.

“Perhaps you’re right. But I want a full report, before I decide. We have to wait for the releasing gear to be repaired, anyway.”

Strange idly plucked a few crepe hairs from his upper lip as he answered. “I killed the spy who escaped with the bulb, but it almost cost me my life.”

“A ridiculous idea, those bulbs, in the first place,” growled Brundt. “Even if they could have smuggled them into France as they planned, they could only have killed a small number of the accused Allies. After tonight, there won’t be any need. But I still don’t see any sense in changing our plans.”

“I was only trying out the American Intelligence section,” Strange said a bit sourly. “I managed to escape, but I found out they had caught the ‘zebra and elephant’ message—the one which was repeated. If that pilot who saw the shell tells them about it, they may guess the truth. There are nine Yankee and French squadrons within a radius of thirty kilometers of that station. They could have an armada hunting for us inside of thirty minutes.”

“But if we hide in the clouds as planned and let the observer tell us when we are real sure of us, what harm can they do us?”

“The clouds are breaking,” rapped Strange. “And with two hundred planes—”

“Very well,” Brundt gave in, scowling.

“‘We’ll reverse the attack order and go to the other end of the sector.’” Brundt closed the navigator’s compartment, jerking his head for Strange and Ochen to follow. Strange’s heart turned cold as he saw the full details of the master map. The Germans meant to wipe out every squadron in the sector, and then to drop their deadly shells on a six-mile stretch of the Front. An army could pass through that gap by morning.

“The wind is still Southwest,” grunted General Brundt. “With the bacteria so heavily concentrated, we can space the shells about half a kilometer apart and they will be as effective. There’s no need to kill their pilots and soldiers—as long as they’re too weak to fly or pull a trigger. Our troops will take care of the rest.”

Strange forced a glowing smile.

“Ja, it will be simple. I can see the stupid Yankees lying there helpless, and waiting for our order to come.”

“They will not watch long,” said Brundt savagely. “The last orders were for our troops to use the bayonet on them. By dawn we will have the entire sector opened up, and our troops will be flanking both right and left. But what of this change? If we begin with the French 69th Escadrille, will that be—”

“Herr General!” one of the wireless operators suddenly broke in excitedly.

“There is something wrong. There are two stations sending in French!”

Strange drew a long breath of relief. Jordan had not failed. Brundt and the others were staring in dismay at the operator.

“Are you certain?” rasped the general.

The man pulled off his ear-phones. “They are even on the same wave-lengths! I cannot tell which is the right one!”

“It must be our new station at Schellburg,” said the navigator nervously. “But they were going to use it only in case—what is it?”

One of the other operators had jumped to his feet. “I am hearing three sets of signals! All are in English words!”

“Lieber Gott!” groaned the navigator. “The Allies have discovered the secret of the codes!”

Brundt whirled fiercely to Strange. “It was your idea, these codes! Now see what has happened!”

The idea was good,” Strange snapped. “How was I to know they would let Yankee spies run wild and wreck it all. If you had not dropped that shell—”

Brundt cursed him furiously, turned and dashed back into the control cabin. Strange and Ochen followed.

“We’ll go ahead, anyway!” the general was raging. He snatched at his telephone, jabbed a button. “Onward! The radio-direction plan has been upset. We shall have to go lower and let you guide us the whole time.”

There was a brief pause, and Strange could hear the faint crackle of the ob-
server's voice in the phone. Brundt swore.

"I don't care if it takes you clear to the ground! Do what I say or I'll cut you lose!"

He spun about, snarled orders at the men in the cabin. Strange caught a loud-er hum of motors, and the Zeppelin's sprints crescendoed. As it nosed down, he stepped quickly to Brundt's side.

"I have an idea, Herr General."

"If it is no better than the others—" Brundt began angrily.

"It is a scheme to offset all this," Strange interrupted. "If they have got us in the air, Zepplin, they will probably be assembling several squadrons to attack the ship. If I can find where they are meeting, you can—"

He stopped. A look of absolute amazement had come into Brundt's red face. He was staring toward the doorway to the navigator's room. Strange turned.

There in the entry stood Karl von Zenden!

CHAPTER VII

HOLocaust

ALL of the Prussian's make-up had been removed, revealing his coolly ironic face. He smiled over the levelled pistol he held.

"Surprised, my dear captain?" he said softly.

Brundt burst forth with a roar. "Gott im Himmel! Then who is this Teufel?"

"You lying Schatten's eyes!" Brundt belled. He reached for the .45 from Strange's holster, but von Zenden hurriedly intervened.

"Wait! This man is my personal pris- oner."

"I'll have no spies on my ship!" snarled Brundt. "He dies now or he goes out the door!"

The Prussian coldly shook his head.

"The Kaiser himself has ordered the capture of this man—alive!"

A baffled look came into the general's eyes, then he sullenly nodded.

"All right, but the lying pig has almost wrecked our plans."

"What do you mean?" inquired von Zenden sharply.

Brundt glared at Strange. "The Allies are duplicating the messages from our guide-stations. It is obviously his work."

For an instant, a venomous gleam came into the Prussian's eyes.

"That thick-skulled colonel!" he mut- tered. "He must have escaped from Hiller."

"What are you talking about?" de- manded Brundt.

Von Zenden tersely explained how Strange had tricked him at the G-2 sta- tion, and what had followed.

"The man, Jordan tried to tie me—I had been knocked senseless," he added with an ugly look at Strange. "But I had recovered my senses by that time. I overcame him and signalled Hiller. We pulled the ruptured tires from the Nieuport's wheels, and I managed to take off on the rims. I told Hiller to fasten the colonel on the wing of one of the Yankee ships and take him to Germany. I knew Strange must be on board here, so I signalled the aft hook-on station not to report when they saw me, that there was a spy on board. I was afraid he might be double if he had a hint he was trapped."

"Why didn't you kill that swine of a colonel?" fumed Brundt.

"He is Chief of American Intel- ligence," said von Zenden. "A valuable prisoner—"

"And now he is free! Free to tell everything he learned!"

"He doesn't know the entire truth," said the Prussian. "I overheard Cap- tain Strange telling him about the codes, but Hiller and Franz landed before he could explain the rest."

"Brundt let out an explosive breath. "Ach! Then we go ahead now." He looked toward the navigator, who with two of the operators was watching from the chart-room doorway. "What is our position, as near as you can tell?"

"We were seven kilometers southeast of the American 41st Pursuit, just be- fore our messages were jumbled up."

"Keep on trying to distinguish our own stations," directed Brundt. "Change wave-lengths, and see if you can get bearings on other stations."

The navigator shook his head dubiously, but disappeared with the two operators into the side. The moonlight began to fade as the Zeppelin sank into the top of the first cloud layer. A light blinked on the telephone switchboard, and Brundt plugged a connection.

"Ja, keep down to your full limit," he said harshly. "Let me know when you break through the bottom clouds, and we will haul you up so the car will be almost hidden."

Strange had stood impassively from the moment of his capture. Von Zenden's manner was negligent, but he knew the Prussian was on his guard. Brundt turned from the phone, scowled into the mists which closed about the cabin.

"I like this not," he said. "I like to see where I am."

"Why don't you go down in the car?" said von Zenden drily.

"I dare not play the joke on you for humor," Brundt replied acidly. "And get your prisoner out of here before I change my mind and shoot him."

The Prussian motioned with his gun, but the door of the chart room was hastily opened before Strange could get there. The navigator plunged into the dimly lighted chart room.

"General Brundt! We just intercepted a wireless message from the Yankee station in the Bois d'Aute. We caught the words 'Raynard's Disease—'

"'Grosser Gott!' roared Brundt. "Why didn't you switch on your transmitter and drown the message?"

"But we did!" cried the other man. "One of the operators is still holding down his key, so be sure they will not get it through."

"What was the rest of the message you heard?" von Zenden broke in sharp- ly.

"It was only part of a sentence—'germs of Raynard's Disease in shells believe Germans drop'—then we cut them off."

THE Prussian's face hardened. "Jor- dan sent that message," he said swiftly to Brundt. "After he escaped from Hiller, he must have taken one of the squadron cars and raced and the G-2 base. He's figured out the rest of the secret from what Captain Strange told him. You'll have to strike quickly—drop a shell on that station."

"But in the meantime he'll be tele-phoning the warning!" groaned Brundt.

"No, the lines were cut in three places, and sections thrown away. They haven't had time to repair them yet."

"Then they're as good as dead!" snarled the general. "We'll drop the shell."

He whisked to give an order to the rudderman. The man turned his head. It was the moment for which Strange had been tensely waiting. He leaped, and his fist crashed into the compass light. The cabin was instantly thrown into darkness. He sprang toward the doorway as a chorus of shouts arose. One of the Germans had lunged to cut him off. His fierce charge sent the man hurtling across the cabin.

As he jerked open the door, a gun blasted from behind him. He raced into the shelter of the rudder. The navigator had jumped up from a wireless set, but as the pistol bullet ripped into the bulkhead beside him he dived for the floor. An- other shot roared out. Strange dashed into the compartment used as quarters. A startled lieutenant was just coming out of the cubby where Pranz lay on a bed. Strange slammed the door, and the man's chin, and the Boche slammed back into the tiny room. Again, a gun roared as his pursuers tore after him, then he heard Brundt's furious bellow.

"Stop shooting! You'll set us on fire!"

Strange had reached the door to the catwalk. He ran at top speed along the narrow walk. If he could reach the first hook-on position . . .


A ray of the gloomy interior, a light flashed on. Strange saw two more go on, and men rush up from the side passages to nacelles and hook-on posts. His heart sank. He could never reach a plane now.

He was almost to the two control-boards for the glass shells. A wild idea seized him. He could release those dead-ly glass balls all in one spot. Even if they struck a drome or a village, it would be better than the thing the Ger- mans planned.

But even as he swerved toward the
board on the right, a Boche jumped from the shadows, dunged at him like a bear. Strange leaped aside. The man stumbled, grasped at Strange as he fell. The G-2 ace was dragged to his knees. He drew back his fist, drove it into the German's face. The man lost his hold and rolled from the catwalk. There was a ripping sound as his weight broke through the fabric envelope of the ship. With a terrible scream he dropped into space.

That last jerk had taken Strange off the edge of the narrow walk. He caught at the nearest girder, the mists swirling in through the jagged hole beside him, the rags from his weave still echoing in his ears. It seemed minutes, but it was hard

ly a second he clung there, shivering. The hoarse shouts of Brundt and the others awoke him swiftly to his peril.

He started to jump to his feet, though he knew he was caught between the two groups. Then in the vague light he saw a jagged hole in the fabric. It was tightly secured to a longitudinal girder, and it ran up on the outside of the huge ship. He knew in a flash that it must be connected with the starboard rack for the shells, probably one of the brace lines used to keep the racks from falling when the ship was heeled.

He caught at it with both hands. A cold perspiration broke out on his forehead as he let his feet drop from the catwalk. If his hands slipped, he, too, would know the horror of that headlong fall to eternity.

For half a second, feet dangling in space, the jagged hole just above his head. Then the sound of Brundt's raging voice set him to climbing desperately. The rope was beginning to dampen, but its strands were coarse, and the pressure against the side of the ship helped him in his task.

He had climbed about ten feet when the faint rays of a flashlight shone through the hole below him. He froze, fingers locked on the rope. The light grew brighter.

"Gott!" he heard Ochen say in an awed voice. "They both fell through!"

THE flashlight probed around for an instant. Strange held his breath. If he moved, the rope would quiver. His hands were about to slip ... "A frightful end," he heard von Zen- den mutter.

"For what he deserved, the Yankee Schwein!" grunted Brundt. "Come, we have no more time to waste. Rittmeister Ochen, take Friedland's place at the release controls. Pull Number 12 when I give the signal. If I call for two drops, pull Number 13."

The German's answer was unintelligible. The flashlight swerved from the hole, and there was silence. A minute passed. Strange's arms were aching, his hands slowly losing their grip. One glance up the vast, rounded side and he knew he could never make it. He started to descend his second ladder, but his hands slipped on the damp rope. His heart leaped into his throat. He was sliding past the hole—under the belly of the ship!

He kicked out frantically, caught his foot in the ladder opening. The fabric ripped a wide gash, but saved his fall. He hung there, breathless, expecting to hear a shout of alarm. None came. He worked his foot toward the girder, hooked it and pulled himself in. A second later he was inside the Zeppelin.

He twisted around, grinned the edge of the catwalk and lay there, catching his breath. There was no one at the release-boards, and the emergency lights along the catwalk had been switched off. He was about to stand up when he saw one who was hurrying aft from the main cabin. He drew back as far as he dared.

Boche halted at the release-station on the starboard side, and then Strange saw why Ochen had not been at his post. The Rittmeister was securing one of the oxygen kits around his neck. Evidently the Germans took no chances of a shell's breaking as it left a rack, perhaps splintering Boche and spraying the deadly bacteria into the Zeppelin.

Ochen was fastening the strap as Strange silently got to his feet. He reached for the breathing-mask, then unexpectedly glanced toward the break in the fabric. His heavy-lidded eyes drew wide as he realized the horror. His mouth opened, but Strange's hands shot out and clutched his throat before he had time to scream. He made a vain attempt to get at his pistol, then clawed frenziedly at the hands locked in his throat.

It was over in a few seconds. Strange lowered the German to the catwalk, took an anxious look in both directions. No one was coming, but the dark mists outside the hole were dissolving and he knew they had reached the open space between the two cloud layers. Brundt could easily strike from this altitude. For the observer's car must now be under the lower clouds.

The huge ship leveled out as he began to shed his leather coat. He threw the coat aside, quickly took off the Rittmeister's flying-suit. Somewhere, a noise startled him, then he heard the low rumble of a winch. They were hauling the observer's car up so that it would not be seen. He hustled into the flying-suit, pulled off the gray eyebrows and wiped off the make-up as well as he could. The breathing-mask would hide most of his face, and he would have to trust for the rest.

He took Ochen's pistol, then handed the German to the side of the catwalk, wedged him down in the place where he himself had lain. Fastening the mask loosely over his face, he ran toward the first hook-on position. One of the Fokkers was situated there, and two more were standing on the platform.

Both wore oxygen masks.

"Was ist, Herr Rittmeister?" one of the men said, lifting his mask.

"E m e r g e n c y orders!" snapped Strange. "Get ready to launch this plane!"

"But we have already received the order, Herr Rittmeister," said the Boche. "I thought you were the Oberst."

Strange conceded a start. Von Zenden was on his way here! "Is everything ready?" he asked swiftly.

"Ja, we have only to trip the hook. The engine has been primed."

The Boche turned toward the ladder, keeping his gun hidden at his side. Suddenly von Zenden's voice rang out from up on the catwalk.

"General alarm! Rittmeister Ochen has been killed! Captain Strange is still on board!"

The roar of the Germans jumped back in consternation.

"Hilfe!" one of them shouted. "The spy is..." the cry died in a moan as Strange rammed his fist into the man's stomach. The other Boche turned to flee. Strange drove him back at gun point.

"Keep still!" he ordered fiercely. "Get over to the trip cord!"

THE frightened mechanic obeyed. Strange seized the rope ladder with one hand, went down hastily, keeping the man covered. Altho, when the man fell, he could hear some one running toward the passage. He dropped into the cockpit, rumbled for the safety-belt. Just as he fastened it, von Zenden dashed down the incline from the catwalk.

"Trip the hook!" Strange rapped.

The mechanic gripped the cord with a trembling hand.

"Stop!" cried von Zenden. His gun spurted flame as the terrified Boche started to pull the cord. The mechanic gave a convulsive jerk as the bullet drilled through his body. There was a crash, and the Fokker plunged down into the night.

The drop threw Strange up against his belt. He saw von Zenden's gun blaze futilely after him, then a rattle of shots sounded from one of the engine nacelles. He switched on the Mercedes, kept the ship's tracks of the Zeppelin, and steered the Fokker down toward Spandaus.

M o o n l i g h t shone down through ragged breaks in the upper cloud formation. Its pale light reflected from the bare masts on the other side of the ship. Strange climbed with his motor wide open. Tracers fanged after him from three directions. He bent over the stick, thumbed out a quick burst to warm the Spandaus. The snarl of the guns was grim music to his ears. He roughly shook his head, and the Zeppelin's tail. Half a minute more, and he would be ready to dive.

A flitting gray shape dropped from under the death-ship, and the second D-7 came zooming up after him. A cold smile came to Strange's lips. It was probably von Zenden—but he was too late. The broad back of the dirigible was almost in line. He shoved the stick forward, and the Fokker roared down with Spandaus flaming.

A machine-gun on top of the Zeppelin answered his fiery challenge. He steadied the rudder, and the smoking tracers from the side of the fighting ship. Strange poured a furious blast into the mighty raider. Its massive back was barely ten feet from
his wheels when he kicked off to the right.
He backstecked in a cold fury. That burst should have done the work. If the next did not . . .
Br-r-r-t-t-t-t-t-t! Phosphorous streaks shot through his wings, and the Fokker shook under a vicious attack. He rolled hastily, stared back. He had purposely dived to the side away from the zooming D-7. Then he saw that the attack came from the Nieupoort which he had flown. There were two men in the ship, and the rear gun was swinging to catch him as he turned. He swore savagely. The Zeppelin was pulling away—all his engines suddenly brought into action. His chance would be gone in a few seconds more.
Those fiends would finish Jordan and the others at the G-2 station, and then be free to complete their ghoulish task.

The thought brought him to a pitch of desperation. His stick and rudder moved, his cheeks flamed, his D-7 revedered with a screech like a tortured soul. The Nieupoort was for an instant broadside before him. Straight into the fire of the man in the rear, he hurled the shrieking Fokker.
A hail of lead tore through the upper works. He closed his eyes and clammed his rudder, and the gunner fell, ridged through the head. He stood on the rudder, and a raking fire shot over the man at the stick. Two dead men rode the Nieupoort down.
The Zeppelin was a glistening mass against the cloud below. In a second more, he would be on his back, dead from sudden attack. Strange rammed the stick forward, and the Fokker went helling down the sky. Two red lines crossed his path, as the other D-7 plunged to cut him off. He stormed through them as though they had been ribbons. The Zeppelin seemed to spread before his eyes. He saw his tracers strike and tear deep into the monster's vitals.
Closer! Closer! In five seconds more he would crash into the ship! But the damming up of fuel had suddenly brought about his chance.
Then, suddenly, a bright orange spot gloved there under his sights. It swelled, became a seething billow of flame. With a strangled cry, Strange pitched his ship to one side and raced beyond the inferno.

HENGEY after him came the other Fokker. As he twisted around, he saw von Zenden glaring over the owl. All the suave mockery of the great Prussian was lost in a snarl of hate. Strange pulled up in a fast chandelle. For a second, the magnificent honor of the burning Zeppelin lay below him. As he stared down at the holocaust, he saw the huge glass balls breaking in the heat. Like bubbles they burst and were gone as the fire swept over them.
Pygmy figures leaped into space and fell from view. He thought he saw Zenden's white-bearded face, but a gust of flame hid the man's writhing figure before he could be sure.
The blazing ship shuddered in its death-throes, then a terrible explosion shook it from end to end. The D-7 was tossed upward like a leaf in a gale. Strange fought the buffet of ship to one side. Below him, the blazing thing had literally been blasted apart by the explosion. He saw two masses of flamming wreckage plunge toward the Bois d'Autre. One half of the Zeppelin fell in the western edge of the woods, and the other struck on the shore of the lake.

In the tension of the moment, Strange had forgotten von Zenden. He looked around quickly, then saw the Prussian's ship in a spin. It came out at a low altitude and raced away to the East. Strange closed the throttle and pointed the Fokker down toward the G-2 station.
He was suddenly very tired .

**

COLONEL JORDAN put down the phone, nodded across the desk at Captain Philip Strange. "Those men at the G-2 station will never see you again—not even in your dreams. You had the right dope on the disease."

Strange's weary face lightened.
Thank God for that," he said. He looked curiously at Jordan's left eye, which was swollen and yellowish-purplish. "You haven't explained the beauty mark. Was it Hitler?"

"No!" grated Jordan. "And if I ever lay hands on von Zenden again—" he slowly got up from his chair.
The door had opened, and there stood a gray-haired brigadier.
"By Heaven," Jordan muttered, "I wasn't fooled again!"

He reached out, with determination, and gripped the shaggy mustache of the startled officer. General "Wild Bill" Thorne gave a howl, then a profane and sulphurous outburst shook the walls of the shack. Strange grinned at the flushed colonel's face. "No!" He didn't go any farther. It would take a German thirty years to learn to swear like that!

Wings of the Viper

(Continued from page 24)

"I have sent out two small flights of scouting planes to attempt to contact vessels that may be in the vicinity. Another three-ship flight has been sent to San Diego direct in hopes of getting some government tugs to assist us."

"You think they will get there?" demanded Buzz.

"I hope so."

"I doubt it, after what I saw over there."

Admiral Blanchard went white:

"And here we sit absolutely alone on the Pacific with a ship-load of Navy planes and no ships to move."

"At least eighty planes, eh, Admiral?" said Cressford.

"At least."

"Eighty planes, in the wrong hands, flying on the wrong side would just about put the tin hat on any naval en-

counter. The United States is concerned, wouldn't it?" Cressford said. "You don't know where the rest of the Atlantic Fleet is, do you? They might have been sent on toward Hawaii to engage the enemy well away from the United States coast."

Admiral Cressford pulled out a short black briar pipe, stuffed the bowl full of heavy Navy cut, and applied a match. He sucked away until he had it operating under forced draft. Then, spreading his legs wide apart he said:

"What do you two birds say?"

"Well," said Buzz, walking away from the Vought and the group of mechanics who were servicing it on the lift platform, "there is no question in my mind. That place over there simply has to be cleaned out. This Viper you speak of is no doubt the works in this mess now. He has something hidden away there that in some way is causing this radio blank-out. In addition, it is quite possible that he has a number of pretty good planes at his command, and if he has played his cards right, there is every reason in the world to believe he plans to capture the Yorktown and swipe the flying equipment. Can you figure what would happen if in the heat of a naval engagement eighty planes bearing American markings were to suddenly appear and start work on the decks of the American vessel?"

"I hate to think of it," Admiral Blanchard muttered between his clenched teeth. "You got any ideas, Maxstead? The more the better."

"It is my suggestion," Maxstead said in a strange tone, "that since Mr. Benson has been to this mysterious point, he might return again as soon as it gets dark and make a thorough investigation. I suggest that he land somewhere a few miles north of this point
and work his way down. Then he can see if there is anything that would justify our pulling the long bow, so to speak.

Benson caught the elder Crossford's eye and realized that he, too, was suspicious of the strange Flag Officer. But he decided to play his game, and agreed that it was a sound plan.

"I'll go with you," buzzed young Crossford from the rear. "I'm small and I could probably creep through places that would be too narrow for a full grown man."

"You'll stay right here and annoy the Admiral," snapped the elder Crossford. "I'm going with Mr. Benson this time. You've had all the fun so far," he added with a soft-soaping tone that did not fool young Crossford at all.

"I'll go up to the radio cabin," Maxstead said, "and see if there is any change in the atmospheric situation."

"And I'll see what the chances are of getting some sort of a jury rig put up that may give us some headway," Admiral Blanchard said. "We have put up bulkheads in the stern, the pumps are working well, and there is no particular danger from that quarter."

AND for the next few hours, as the sun began its downward swing towards the west, the docks of the Yorktown were alive with officers and men attempting to rig a jury sheet that would give them steerage way and aid them in their limping gait toward San Diego.

By four o'clock, there had been no report from any of the three small flights that had been sent out for assistance. The radio staff was working at feverish speed in an effort to convert a set into a two-way tuning affair in hopes that they might be able to pick up something that would give them an inkling of what was going on in the Pacific. All they could get were snatches of garbled commercial programs from Cocos, a news item to the effect that the Japanese were extending their American public consumption broadcast by boot-leg stations located along the border in Mexico. There was not a word from any of the official U. S. stations and apparently little chance of getting any until this mysterious blip could be overcome.

In the chart room, Admiral Blanchard, Buzz and the elder Crossford sat over detailed charts and maps, trying to work out a solution to their problem. They figured that they were now at least seventy-five miles from the coast of Japan and fully ninety miles from San Diego.

They realized by now that they were living in a small, steel buttressed world of their own, drifting on at the will of the wind, facing death at the hands of a monstrous power with little or nothing to combat him. Admiral Blanchard could not help but think of the Viper, as he did all things that were red, and as the story was unfolded, both Buzz and Crossford realized that they were facing one of the most desperate characters in the world.

"I don't know how he pulled that disappearing act out there," the Admiral went out, "but I have seen some of his tricks, and he'd make the most blasé Indian fakir rub his eyes. In all probability he used trick lights or giant mirrors to do it, and you'll never know how until he is forked out of there. He is a marvelous engineer and boasts that he has been through two American universities. He can fly like a Bendix racer, and as for stunts, he probably would make this chap, Udet, look silly."

"We're in for a swell time, I can see that," Crossford grinned. "Who started all this, anyway?"

"You did, you monkey," stormed Buzz. "You and your fuel economizer cantering across the Pacific with half of the Japanese naval secrets."

Crossford laughed: "You forget that kid of mine. There's the real guy in this ointment."

"There aren't any more Crossfords loose in the country are there?" asked the Admiral, packing his black pipe again.

THE Yorktown was close-hauled into the wind and held there on her hook. They had managed to get a sail of sorts up that flapped and strained against the control-land structure. Once they had her around, they payed off chain and eventually one of the hooks held and they brought the Vought on deck again. They reeled the sail in and cleared a space while Buzz and Lauren Crossford prepared for a take-off—and a non-flying one. The control-land lay and did not ask to be taken along. Instead he haunted the steps of Flag Officer Maxstead. No matter where Maxstead went, Lonny was on his track, asking questions and getting answers.

Both Buzz and Lauren spotted this and winked.

"Well, that will keep him busy anyway. I was afraid he'd hide away in one of the ammo boxes before we got off," Buzz said under his breath.

"No, he'll be here in about half an hour," the elder Crossford added. "I'm going to make certain some one has him on the end of a chain before we take off."

They started the motor and peered about the sky. It was getting dark now, and there was little time to be wasted. They tried out the radio, but there was no change in the atmospheric conditions, for the garbled static came over just as stiff. Crossford slammed the head-set back on a padded hook and swore softly.

The O.D. came down and gave them a last-minute position check which Crossford jabbed down on his map. The control-land, the elder Crossford, Maxstead, came up and stood about with a helpless scowl on their faces. The Rear Admiral was not quite certain now whether he should allow Buzz and Crossford to take off at all. Somehow, he was afraid that they would stay aboard. He had come to distrust the elder Crossford that had taken off earlier in the day—and which had failed to return.

As the Yorktown began to sway in the current and threaten to pull her hook, Buzz and Crossford decided to make a quick get-away. They clambered in, loaded with kit and pack chutes, keeping one eye on young Lonny, who was white as the Viper, and as the story was unfolded, both Buzz and Crossford realized that they were facing one of the most desperate characters in the world.

(Continued on page 76)
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“Give him another!” yelled Cressford, “he may be pulling a dummy!”

“Not that lad,” replied Buzz. “He’s got all he can manage.”

They circled carefully and watched the M.T.B.-1 wallow in her death struggle. Finally she went shuddering off into a side-slip, then hit the water below and now she was echoing bang askew.

Buzz followed her down and tried to make out how much damage had been done, but it was impossible to see with any degree of certainty, so they drew away again, and sat pondering on what all this might mean.

“Is this all it was?” Buzz asked.

“No, not as far as I can see,” Cressford replied. “There’s so much Navy stuff stowed down there it is impossible to figure out what was hit. How does the boat feel?”

“All right. Nothing sloppy, anywhere.”

“Let’s go!”

They went, hell bent for leather toward the mainland again, climbing as they flew and keeping a more careful watch than before.

It was another half hour before they came within sighting distance of the mainland, and Cressford, using his night glasses, scoured the coastline for the point young Lonyy had so carefully drawn on the back of his map. “Any sign of you to say that?” Cressford asked, suddenly. “Over there where that spire of rock looms up. Looks like the outline Lonyy drew.”

Buzz turned the Vought slightly, peered ahead. Finally he caught the spire Cressford was referring to. He checked it with another shorter spire and added, “That’s it. Right on the nose. Let’s take a chance on a quick look at the rock face first. They might miss us in this light for the bozo we shot down.”

“I’m game,” agreed Cressford.

They wheeled over carefully and Buzz set her for a slow easy glide. They came up to the cruel spear-head chunks of rock and caught the blink of two lights that seemed to be hidden somewhere in the ground further inland. Then Buzz let her drop even deeper, and took a wild chance on scraping his starboard wing tip against the weather-grashed face of rock.

Suddenly he pulled away and eased into the clear again. He climbed her for safety and turned around to Cressford. “How do you figure that?” he demanded, his big grey eyes shining.

“What? I didn’t see anything.”

“I mean . . . Say, that can’t be right. The place we saw that guy disappear into the rock is now under water. It’s high tide!”

“Well, tides do happen,” argued Cressford.

“I know, but if there is an opening there, the whole place must fill up. How can they keep planes and men in there? Don’t you see,” argued Buzz, “if this Viper guy has a fleet of planes in there, it must be a cave of some sort. And if it is, and it’s below the level of high tide—”

“It must be a swell place to hide,” broke in Cressford. “No one would ever find them.”

“But,” argued Buzz. “It doesn’t make sense. How can they live under there?”

“Why don’t you stop all this chit-chat and find out?” laughed the man in the back seat.

“Don’t worry. I’m going to!”

And with that, neither said another word until Buzz had planted the Vought down on a long stretch of beach a little more than a mile south of the two spires. They ran the ship into a hidden opening between two wind-carved sand-dunes and clambered out.

“What’s the time?” demanded Buzz.

“About 10:20.”

“When is it low tide again. Got a tide table for this area?”

“You’re some sailor,” grinned Cressford. “It will be low tide about 4:30 if it is full high tide now.”

“I want to know for certain. Got a table of tidal constants there?”

“Oh, you do know something about it,” laughed Cressford flipping the pages of a small thick book. “Here it is. Look it up in the San Diego area. 10:02. That means low tide will be about 4:15 in the morning. You got a little over six hours to wait.”

“Good, we can do a lot in that time.”

“Let’s go.”

“Six hours to go—for what?” mused Cressford.

“Six hours from now, the tide will be low and that guy down there can get his stuff out, and the fun will begin.”

“What about that fellow we shot down?”

“He was evidently doing a show of some sort, and was probably sent up there to keep things lined up. He was to have returned when the tide got low enough for him to get through that rock wall again.”

“But the place must be full of water,” Cressford argued.

“But I’ll bet it isn’t,” snapped Buzz.

“That swine has some trick system in there.”

“I’ll bet they know that ship has been shot down. Those birds would have told them what was happening—somehow.”

“They would if they can get stuff through this jam someone is putting up.”

“They probably can. If this Viper guy can do all this, he is not leaving himself out of the know.”

“Well, there’s no way of finding out, sitting here chewing the fat. Let’s move.”

And they went, armed with machetes, two automatics each, a prismatic compass and unencumbered with useless clothing. The ground was sandy and tangled with a thorny gorse. Here and there weather beaten Spanish cedar, interlaced with nameless ferns and runners, blocked their path and forced them to double back at times and seek easier going between the yucca trees and cacti sentinels.

“Know what the Mexicans call this peninsula of Lower California?” Cressford asked suddenly, holding his machete poised over a tuna plant which in the daytime gleamed with scarlet flowers.

“What?” said Buzz. “I can think of a swell name for it.”

“They call it El Brazo Descarnado de Mexico, which means ‘the fleshless arm of Mexico.’ That Viper guy certainly picked a swell spot.” Cressford went on plunging through the tangle of thorny underbrush.

“The fleshless arm of Mexico, eh?” added Buzz. “The fleshless arm cuddles the Viper.”

It was nearly midnight before Buzz and Cressford reached the area behind the spear-shaped rock. They were weary, but anxious to carry on. They lay together behind a patch of dried mesquite, got their breath, and then attempted to check their position with the prismatic compass.

“Don’t you sense something queer?” Cressford asked suddenly, as he squinted through the eye-piece of the instrument.

“If I do,” answered Buzz. “I’ve been feeling it for some time. Weird, eh?”

“It’s an electric feeling of some sort. I can sense a slight buzzing in my ears, too. We’re not very high, are we?”

“Not over 400 feet, if that,” said Buzz. “Listen!”

They lay there for some minutes, burying their eyes in the crooks of their arms and listened.

“It’s over that way,” said Buzz finally.

“Come on!”

They crawled along carefully through the stubble and searched for some time. Finally Cressford gave a light “hiss!” and Buzz turned and cut over toward him.

“Look here,” said Cressford quietly.

Buzz looked and saw a large mushroom-shaped concrete dome that stood a few inches above the ground. He crawled up close to examine it. The concrete dome extended a few inches above a large hole that seemed to be made of cast-iron piping fully three feet in diameter.

“What is it?”

“A vent pipe of some sort. Probably ventilation for something below.”

They lay close to it and listened. From below came faint sounds, indistinguishable sounds, that at times sounded metallic and at times vocal. Buzz felt around again, trying to figure the distance between the top of the pipe and the inside of the concrete cover.

“Too small. We couldn’t get under there,” he said quietly. “But we might be able to go down and see what it’s all about.”

“We’d better off trying to roll a bomb down,” said Cressford with a low growl.

“That’s an idea,” agreed Buzz, thoughtfully. “We’ve got forty six-pounders back there.”

“Yes, but we couldn’t drag one of them back here in time. It will be light soon.”

“That’s true. Let’s look around further. There might be another opening somewhere.”

(Continued on page 78)
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—They Advertise—Let’s Patronize—
"I still sense that electric business," Cressford muttered, starting about.

"They've got something down there, all right. We've got to find out what it is, too."

"Let's knock on a door somewhere and tell them we've come to read the meter," snirled Cressford.

"And get properly ventilated," snapped Buzz. "Come on, here's another opening . . . bigger."

They started to crawl toward another concrete dome affair when suddenly the top raised and out stepped two men in drab uniforms. In their arms they cradled light machine guns. There was no need to move or draw a gun. They had to submit without a struggle.

No word was spoken. They were herded into the open port and roughly directed down a flight of narrow concrete steps. The mechanism which had raised the concrete slab whirred, clanging beneath them.

"What, no escalator?" demanded Cressford, and Buzz knew he had a good man with him.

"Not even carpets," added Buzz.

"No, but you two guys will certainly be on the carpet when you get down below on the barred bars," buzzed Buzz.

Cressford stopped, looked at the man.

"Ah, you're one of the turncoat boys, eh? Say! Things must have been tough during that depression—or was it the police system that drove you out of the States?"

"Never mind, bozo. On your way. I know which side my bread is buttered on and they ain't taking me for no sledge ride. I did my stretch and even then, I wasn't in the clear. A guy's got to eat, and this is a pretty good perch when you know the right things."

"Like what?" gabbled Cressford.

"Like Navy codes, radio, and wave lengths."

"I get it," said Buzz. "Shove on, Cress. Let's go down and look at the rest of the reptile cage."

"You'd better button up that lip when you get down there, buddy," the renegade Navy man barked. "The Viper will take one hoss at you and there won't be enough left to put between a roll."

"Him . . . . halitosis as bad as that, eh, and with all the advertising that goes on," chuckled Cressford.

"This is goner be good," the turncoat gabbled. "You two guys is just what the Viper ordered. He likes 'em perky."

"Lead on, Macduff! We'll do our best," said Buzz.

Relieving the prisoners of their guns, the uniformed men now shoved them through a steel door that opened on another set of stairs. This time the stairs were wider and led down to a gigantic room. It was evident that this retreat had been carved out of a natural cave, but so well had the work been done and so elaborate were the fittings that one might have mistaken it for a giant factory floor.

Buzz and Cressford stood a second or two and stared amazed. Below them, with their wings folded and carefully parked, stood fully fifty planes, mostly M.T.B. types which glittered and threw off effective glares from their polished dural bony wings and parts. Great lights were set in rows along the ceiling, and on one side stood banks of lathes and other machinery. At the back was a line of benches decked with vices, tool chests, and rows of precision instruments. Long pipes with flexible hose outlets crossed back and forth, evidently providing fueling facilities at all points.

"Shove on, bozos," their talkative captor prodded. "Down the stairs and don't look about too much."

The men started and were then made to turn to the right. Under the stairway was a wide metal door and the Jap member of the captor twosome went up and rang a bell. Three short rings, and then a white light gleamed out above them.

"Stand still, the ex-Navy man ordered.

Their other guard, a Japanese, now jabbered something into a box nearby, and the light flooded down on them brighter.

In a moment, the light was diffused and a voice ratted out from something above: "Hello!"

The door opened noiselessly, and Buzz and Cressford were directed into a massive chamber which was sumptuously decorated with expensive tapestries. The polished wood floor had a large Oriental carpet in the middle, and two very fine pieces of the overhead light, they gradually caught the full picture before them.

There was a long refectory table near the wall, across which was thrown an expensive embroidered Byzantine cover. Two ancient Chinese flintlocks were placed on it and a polished and a polished Yataghan sword gleamed in the center.

At each end stood a ramrod-backed guard, dressed in the flowing robe uniform of a Tartar headman. Both Buzz and Cressford blinked in an effort to adjust their vision to the mad splashes of color, and then for the first time saw the Viper.

Rear-Admiral Blanchard had intimated that the Viper was a tall man, but his description had fallen well short of the actual mark. The man was a giant in stature, breadth of shoulder, and move or draw a might. His face has been carved out of a massive chunk of amber, but with a cruel blade wielded by a maniac sculptor. His eyes were wickedly piercing, the mouth a narrow slit that seemed to be graced with no lips at all.

His address had a presuming claim to personality in spite of it all and Benson found himself fascinated by the man. No one spoke for what seemed minutes, then Cressford broke the ice with: "I wonder where they wind that monkey up."

There was a flash, a thud, and Cressford was gone over on his back as the result of a swift blow from the flat side of a broad bladed Maharrata sword which caught him full in the throat. Buzz made a quick gesture to aid his partner but was stopped by one of the guards who stood behind him.

Gasping and fingering his throat, Cressford got to his knees, glared up at the Viper. He tried to say something, but his vocal cords refused to respond. Buzz made another move to assist him, but again he was rewarded with the swift rush in the back from the muzzle of a sub-machine gun.

"Your concern is commendable," the Viper said, "but I would not risk a like reward."

"That was a cowardly action!" Buzz roared.

"It's a cowardly statement," the Viper answered. "There is no defense for the spoken word delivered in derision. It pierces even the stoutest armor."

"But leaves no mark on a proud spirit," reminded Buzz.

"You are again dallying with words," the Viper snapped up, "you are again taking advantage of my position. But enough of this, you may help your friend to his feet—and I trust you will warn him to curb his rapier remarks."

The Viper flipped a finger and the guards stood back. Buzz stepped over, held Cressford up to "All right?" Buzz whispered.

Cressford nodded, steadied himself and stood up, sending a glance at the Viper that spoke volumes.

"Take it easy," warned Buzz.

The Viper nodded to the two men with the machine guns, and they led Cressford up and there now approached and faced him, again taking the opportunity of studying this amazing character. They had found time to look him over completely now and saw that he wore a Kwan Yin war god costume, a richly embroidered full-sleeved, and with gold epaulettes trimmed with gold braid. On his head to crown this unbelievable costume rested with jaunty certainty a triangular head dress set with precious stones that glittered and flashed with every move.

Not until they caught the full detail of that head dress did they see the origin of the man's malignant name. For there, coiled inside the high band of the head dress, lay a serpent, its grim head, bearing cruel flashing eyes, upraised.

Buzz and Cressford stared amazed.

"I would not gaze on Kwan too long, if I were you," the Viper said with an oily smile. "He does not care for that sort of adulation. As a matter of fact."

But before the Viper could explain, there was a low hiss and the snake lurched forward. Buzz stepped back in horror.

"You see Kwan fears for my safety," the Viper said smiling again and flicking the reptile back into position with his long forefinger.

Cressford was making low choking noises, evidently trying to speak.

"Take it easy, Cress," Buzz warned again. "Now then," he snapped at the Viper. "What is it you want with us?"
"Me with you?" queried the giant. "It is you who should explain."

"But you have taken us by force," retorted Buzz.

"Only after you trespassed on my property," the Viper answered. "And what did you do to that plane a short time ago? We have had no report from Stekotina since he engaged a U.S. Navy plane. You, of course, were flying the opposing plane.

"We were attacked," reminded Buzz. "Of course, and now where is the plane you flew. The new Vought scout-bomber?"

"Oh, no," the Viper lied, "we put that somewhere in safe keeping." Buzz replied with a smile.

"It is unfortunate that you did not do the same with yourselves."

"You mean," Buzz came back, "rather than poke around and discover the secret of the Viper's nest—and the reason why it is almost impossible to use the radio in the low frequency bands?"

At that the Viper stiffened. Then he spoke with a hiss through his tightly compressed lips.

"You have not discovered that secret, and you never will," the Viper taunted. "You happen to have stumbled on a certain way—but you do not know how the Viper feathers his nest and brings his vultures back to his eyrie.

"We know enough," added Buzz, with a sly grin at Cressford.

"You know nothing!" spat the Viper, as the two comrades made a move toward Benson. "You are trying to find out, but you won't. You will be dead, trapped in this tomb, long before any of your tribe realizes what has happened."

"Are you going out with the next tide, Buzz?"

"The Viper hissed again, sucking in his breath. Then he gracingly bowed: "Yes, with the next tide. To lead the attack on a blinded defense—the U.S. Navy."

"So you really think that your trick has cut off all communication, eh?"

"Parried Buzz again.

"We can assure ourselves of that. I can quickly give you an example of the state your Navy men are in."

"Never mind," snapped Buzz, "we know you can listen in on the higher wave lengths."

"Also to what they are trying to say over the lower," the Viper added. "You see, we were prepared for that sort of thing. I might tell you that we have gone further in the study of cosmic rays than any other power."

Instantly, both Buzz and Cressford saw through it all. The normal ether hands had been jammed by the use of controlled cosmic rays, an astronomical secret that had puzzled Occidental scientists for years. It meant that some Oriental scientist had solved the mystery and that the Viper had utilized the secret to attempt to bring destruction on the American nation.

"Of course," Buzz quickly said, "we knew what you were using; and since the recent flights into the stratosphere by the National Geographic Society and the Army Air Corps, we too have discovered the secret. The Planetsimal hypothesis has thus been revisited by a

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"Neither will you," spat the Viper, backing up further. "When you lifted that sword from that table, you signed your death warrant. It released a light switch—as you now see!"

The Viper pointed over Benson's shoulder. Buzz turned an instant, saw the double doors wide open. Blocked in from side to side stood at least ten men in uniform, each cradling a light machine gun.

"Okay!" grunted Cressford, "but it was fun while it lasted."

"Take them away!" ordered the Viper, "where they can see and hear—but be unable to do anything. You know my system."

They were hustled from the chamber, out into the great hangar. They saw a small but sturdy cell that had been carved out of the rock directly in the center of the hangar space wall. And now its heavy steel door swung wide and they were shoved in by two giant Tantalus prisoners without a bar on the door.

"There you are," the ex-Navy man growled out one corner of his mouth. "You'll be able to see everything that's going on. That's what you came for ain't it?"

"Buzz off," snarled Buzz.

THEIR cell was small, square and unfurnished in any manner. The door was solid and secure. A small opening, heavily barred, offered a full view of the interior of the main chamber. They could see dozens of men, presumably industrial workers. The engines of the M.T.B. planes. They were industrious workers and once the guards left, they gave the cell door no further attention.

"What a great guy you are to play with," Cressford said quietly. "Going around scaring up people—and snakes—like that."

"You were not so delicate in crashing that bird's skull in, either," grinned Buzz. "What do we do now?"

"What was that line you were giving him about the Planetesimal hypothesis?" Cressford asked.

"You've got me. I don't know any more about it than you. All I know was what I had read about that stratosphere flight and some bunkum about cosmic rays. I fooled him though and he gave the show away."

"What's the meaning?"

"Well, it looks as though they have something in this cosmic ray business, which is evidently what they are using to blank out ordinary radio signals."

"I see, but what can we do about it?"

"We've got to get out of here and bust the business up. They evidently have some high power electrical equipment in action somewhere about here, which is what we sensed outside. If we can get to it and put it out of action, the Navy can carry on and reorganize in time to stop the attack. This business, I bet, is only intended to be in action long enough to let them get through and attack the coast. Once they make a landing, they'll raise hell."

"And all we have to do to stop it is to get out of here and bust something?"

"That's all. I wish we had that kid of yours here. He'd think of something daffy—but effective."

"Yeah, but he's aboard the Yorktown and that tub is about to be captured. What a mess!" moaned Cressford.

"What's the time?"

"About two-twenty."

"And low tide is when?"

"Around 4:15—about two hours."

"That's when these guys will start out of here—when they can get out. They must have some kind of a steel air-lock door that keeps out the water."

"That's right, we're still below the water level, aren't we?"

"Does that give you any idea?"

"Wait a minute. Let me think."

"Go ahead, think. I'll look the dump over and get the general layout."

And while Buzz peered out of the small opening and studied the big cave, Cressford sat on the floor, his back to the dank stone wall, and stared at the wall. For a minute.

In about five minutes he made a low cry. "Look up above," he whispered.

Buzz looked and to his amazement saw a four-inch pipe running through the cell. Directly above them was a gleaming cut-off valve.

"What the devil is Buzz looking back through the small aperture, "that's at least an idea."

"Where does it go to? Can you see outside there?"

"No, but it's probably part of the water system. What have we got left to work with?"

They both fumbled through their pockets, brought out pencils, pocket knives, and bits of string. There seemed to be nothing that could be used wrench fashion.

Finally Cressford grabbed the two knives and opened them to their largest blades. Then he made a loop of a length of cord and slipped the points of the blades inside.

"You're lighter than I," he explained to Buzz. "You get up on my shoulders and try to work on that valve nut. If we can get it open we can take the valve apart and flood the joint."

"I'll try," muttered Buzz staring up at the big valve, "but it's probably hopeless."

That shows you were never a plumber. Get up here and try it."

Buzz took another look outside, saw that the activity about the planes was increasing. "Looks as though we've got to work fast. I hope you got those tide times right," he said. Then he clambered up on Cressford's shoulder and steadied himself by clinging with one hand to the pipe. He fastened the blades of the two looped knives around the top bolt of the valve. The valve was very new and very clean; the threads that could be seen below the collar of the nut were still bright. That at least, raised Benson's hopes. Buzz adjusted the blades in position, pressed the handles together, and put on a gentle pressure. Gradually and with care he started to twist the crude wrench. There was no response. He adjusted the blades again, put on more
pressure. Again he twisted slightly—and the nut began to turn!

"All right, I've got it started," he whispered down to Cressford. "What now?"

"It's an ordinary globe valve, isn't it?" Cressford whispered back. "Unscrewed all the way down so that it rests against the wheel. See what I mean?"

"Sure, I've got it all the way down. What now?"

"All right, I'll move over a little, and you hang on. Now twist the wheel so that the stem of the string goes ... to the left. Then jump clear so you won't get drenched."

Buzz now twisted the valve stem as Cressford had explained. Then, before he knew what had happened, a stream of pungent liquid spurted out, ramming the valve stem out of the socket and snapping Benson's hand away so sharply it almost sprained his wrist.

Almost instantly, they realized the mistake they had made. "Disgusting!" gasped Cressford. "Shove that damn thing back in quick!"

But Buzz had lost his balance and was clutching at the overhead pipe. Then the valve stem dropped to the floor. Almost instantly it was lost in the semi-darkness and splashing spray of the volatile fluid. Cressford had to jump clear leaving Buzz hung by both hands above him. Finally, Buzz dropped to his toes in the flood of gasoline.

"That was a great idea," growled Buzz. "But maybe"

"... the damn place will be flooded out in a minute," broke in Cressford. "We'll be suffocated."

"Get to risk that a few minutes. Get over here and shove your boot through this floor window."

They both floundered through the splashing gasoline, held their faces near the door grill. Then they both gasped, for directly ahead of them they saw the secret portal of the Viper's cave unfolding before them. A long narrow slit of light seemed to stand up in the wall of rock. They could hear the whirl of machinery, and gradually the slit of light became a great square that looked out into an outer chamber beyond which could be seen sharp angles of rock and a string of lights that evidently directed the way out to the cave.

"Get it?" said Buzz almost overpowerd with the fumes of the gasoline which was now well up around their ankles. "He's going out early."

"Sure. This place is under water at high tide. The tide is going now and they are going out to start the fun. Poor old Blanchard," moaned Cressford.

"Those great doors are probably steel and can be closed watertight. Look! They're getting three ships out. There go the VIPs. We'll be able to get one of them. Hold on a minute more."

"I won't be able to stagger out of here in another minute."

"By all that's holy, hang on," pleaded Buzz.

"I'm hanging," moaned Cressford, clapping his hand over his nose.

"These guys aren't going to get away with this," Buzz growled. Then he saw the renegade Navy man hurrying across the hangar.

"Hurry!" he yelled. "Come over here. Something is leaking."

The ex-Navy man, who had given up his sub-machine gun for a heavy automatic which was slung at his hip, came over, puzzled.

"Get us out of here!" Buzz pleaded. "A place is leaking somewhere."

The renegade waded through the gasoline which was now seeping under the door. He sniffed, stared about.

"What the hell happened?" he demanded, peering in.

"Let us out quick. There's a pipe burst in the ceiling—gasoline," yelled Buzz.

"Holy Moses!" the ex-Navy man gasped, reaching for the bolts that secured the door. Then he thought better of it, looked in again. Cressford was hanging on, apparently about to go out.

The Navy man yrolled over his shoulder, tugged at the bolts. "No funny business, you guys," he warned as the heavy door creaked.

"Say, we're all in, sailor," Buzz moaned. "Step on it!"

The last bolt was drawn back and the door swung open. They went splashing out, the gasoline surging after them in a cascade. The glinting liquid ran wild across the hangar floor, swished past the planes.

The ex-Navy man stood helpless, staring at the source of the stream. Then in an instant it all came to him.

"Why you lousy pair—"

But he got no further. The staggering Cressford was now off his feet and hurled himself at the renegade guard who was now drawing his gun.

"Look out, Cress! No shooting! No shooting!" screamed Buzz.

But it was too late. The Navy man, hit in the chest by the catapulating Cressford, went down.

There was a flash, a report, then a thunderous explosion. A sheet of flame swept the天花板, mushroomed the ceiling. Benson hurled himself past it, avoided the rush of several mechanics rushing after him. He came upon Cressford and the guard, wrretched at them. But Cressford was trying to pull himself clear from the screaming renegade.
Behind them a gigantic lake of burning gasoline was streaking long fingers of flame through the folded wing bombers, licking through the pontoons, spreading down the aisles.

"Come on, Cress. This way," yelled Buzz, "Bring that mug with you.

They came up with the guard's gun in one fist and the man's coat collar in the other.

They heard screams, shouts and loud explosions all around them, but they shoved on, ramming the scared ex-Navy man before them. Up the first wide flight of stairs, when the shots were heard somewhere behind them.

They came to the first door. "Open it, you lug," bawled Cressford. "Open it quick!

The Navy man, white and jabbering, pressed back against the wall behind a panel, pressed a panel in the wall. The door opened and they darted through it as another loud explosion boomed and echoed through the cavern. Men shouted and more shots rang out.

Cressford pushed their captive on.

"Go on, Bug! Lead the way out and no questions.

They went up the narrow flight of stairs which led into the small pill-box sentry box at the level of the ground.

The ex-Navy man turned and gasped: "You'll have to get up through there. Those Mongols up there will drill the lot of us.

"That's better than burning to death," rasped Buzz. "Go on, lead the way.

"You'd better get us out of here, or you'll never pull another trick," snarled Cressford, ramming the gun in the man's back.

"Come on!" snapped the renegade.

They went up the concrete steps and the ex-Navy man reached into another wall panel and pressed a button. It worked, and the steel door slowly opened. At the top in the pill-box well stood two men with sub-machine guns.

The Navy man tried to yell, but Cressford fired first and one fell to the floor. Then he pulled himself up, and Cressford and Buzz hurried behind their captive. There was a tangle of bodies, the cruel rattle of a machine gun and then an explosion from somewhere below that blotted out everything.

They all went down in a wild heap as a black blast thundered up the stairway, bringing the steel door below with it. A belch of flame and a blinding column of smoke followed. They huddled together.

"That finishes that dump," muttered Buzz into his elbow. "The main fuel tank must have gone up.

He snatched at the bodies, pulled Cressford clear. Above them a pale gray sky was flecked with streaks of scarlet. The ex-Navy man struggled with them, crawled over the dead Mongol machine gunners. They reached the member of the Viper's gang went they could not tell. Together they crawled up the last few steps and staggered out into the open.

"You all right?" demanded Buzz of the ex-Navy man.

"Sure. I'm all right. I guess . . . . just as you said ... I'll never pull another trick. I got mine, pal. Shove off, I can lose pretty good, too."

They grabbed him as he swayed in the strange scarlet glare that marked the edge of the cliff.

"Shove off, shipmate," the ex-Navy man muttered, blood running through his fingers as he pawed at his mouth. "You win, guys . . . I . . . I lose. Besta luck!"

And with that, he fell forward on his face and died.

"Pocono!" snapped Buzz.

"Lucky we got him," said Cressford. "If we'd called any other guy, they'd have left us in there."

They turned, stared at the flame streaked panorama before them. Spoils of flame jetted out of great holes that had been blown out of the cave. Smoke billowed up and the stench of burned gasoline was wafted toward them.

"Well, we did a nice job of it," muttered Cressford.

"What's the game?"

"Just 3:10 a.m. Golly, I didn't know we were in there that long.

And neither did they know that at 3:05 every commander in the U. S. Navy logged the following: "Atmospheric conditions which had prevented use of radio throughout regular channels, suddenly lifted and normal communication continued.

"Well, there's no use in hanging about here. I'll bet that Viper guy got away. At least three of the M.T.B.'s were in the outer channel trying to get clear.

"Holy mackerel! I forgot all about the Yorktown. She'll be in tow by now, and as soon as something goes wrong, that phoney destroyer will put a torpedo into her and buzz off."

"Come on," snorted Cressford.

They found the Vought in remarkably quick time, and were soon aboard and running into the clear of the beach.

"Listen," Cressford snapped, gripping Benson's hand. "Don't forget one thing, in all this mess."

"Lonny is still on board the Yorktown?" said Buzz.

"Right . . . and thanks, Benson. Let's go!"

The motor caught quickly and they let her warm a few minutes while they set the plane in order. Cressford made certain his guns were loaded and that the tuggles to the bomb releases were secure and trim. Buzz checked their fuel and his gun-timing device and they exchanged grim glances through their grotesque goggles.

"Shove off!" yelled Cress.

The Vought seemed to be charged with the spirit of the chase and they were not long in getting good height and settling the racing Mongol bombers. Buzz fed the sauce to her and they batted along at close to the 250 mark.

Suddenly Cressford tapped Buzz on the shoulder, bellowed into his ear-flap.
"Think we ought to tip Blancheard off?"

"No! Don't do that. They can get your line as fast as Blancheard—probably faster, as it will have to be relayed from the radio shack to the bridge. As soon as they figure anything is off, they'll stick a torpedo into the side of the Yorktown so fast she'll sink before they know what's up."

"I guess you're right," agreed the worried Cressford.

"We can get that fake-American despatcher to cut loose from their tow—if we get through the Viper and his mob."

"I think you're right—and you'd better be," added Cressford.

"I'm right. You'll see."

The buzz hardened through the night and Cressford took up the ear-phones and jacked them into the set to listen. He caught the change at once, and realized for the first time that they had completely cleared the other for the Navy. All sorts of messages were flying in the messages and all the Navy wave lengths. No longer was the Viper's cosmic ray device flooding the air with its blank-out waves.

They settled to their task now, keen and anxious, peering in all directions and checking everything.

"Say," growled Cressford, "we ought to be coming on them soon."

"If we don't, we'll have to figure that they have pushed off in another direction. I wonder how the Viper guy shielded the entrance to that cave?" Cressford went on.

"We'll never know now, unless we go back some time and look the place over. And I don't think we'll be doing anything like that for some time. As for me, I never want to see that place again!"

"I'll even hate the smell of gasoline, after this," added Buzz.

Then as they pondered on the events of the night, Cressford suddenly let out a low cry.

"Look down there, skimming just above the water!"

Buzz glanced down and saw three planes flying in trim formation not fifty feet above the water. They were M.T.B.'s heading westward.

"Let's go!" yelled Buzz. "All set?"

"And how!" cried Cressford.

The Vought wheeled, poised a second or two, then Buzz nosed down. They hurtled down at breakneck speed and slammed into the middle of the three-ship formation.

Buzz pressed his trips with a lead on the leader, and through his telescopic sight he thought he saw the outline of the Viper's shoulders and massive frame.

Cressford poured the lead to an outer ship and watched it struggle to get clear. A burst from one of the enemy ships slammed into their tail assembly, making the Vought stagger. Buzz hurled the fighter-bomber up, gave Cressford a full shot over the tail. Cressford hammered lead into the leading bomber and made it turn. In an instant Buzz whirled over, nosed down, and caught one of the other raiders full in his sights. His burst slashed into the cockpit. The M.T.B. rolled, and flame suddenly swept over the wretched pilot and observer.

"Number one!" yelled Cressford. Hardly had he uttered his cry when Buzz yanked the speedy Vought through a lightning Immelman and slammed back, unmindful of the splashing flame and debris from the stricken M.T.B. He rocketed the scout-bomber past the very nose of that plunging ship. Then his guns spoke again, to hurl a hail of death into the vitals of the second Mongol raider—into the ship he took to be piloted by the Viper.

Buzz now sidleslipped to evade a terrific return burst from the silver ship's gunner. Now the two machines were streaming toward each other at full tilt. Benson held his fire, trebled his pedals carefully, then ducked behind his wind screen and tripped this triggers at the last second.

The guns sang out—and two perfectly aimed bursts picked the head of the huge pilot clean off his shoulders! Buzz saw him jerk, and knowing what would happen, he shoved his stick forward quickly. Completely out of control, the M.T.B. slammed over them with a roar, missed their tail only by inches. Cressford gave them a parting shot, saw the gunner throw up his hands as the Mongol craft stalled, burst into flame, then plummeted downward.

"Maybe that wasn't the Viper," murmured Buzz as he raced after the remaining M.T.B. "Maybe he fooled us at that. There were a lot of big guys there."

"Get after that other ship!" screamed Cressford.

"I'm getting," yelled Buzz, putting his nose down and banking tightly. There was a mad race. Minutes passed, with both Buzz and the remaining M.T.B.'s gunner spraying the sky with lead.

Then Buzz suddenly saw the riding lights of the Yorktown not a half mile away.

He shot gas to the Vought, tried to close the gap between the Vought and the racing M.T.B. But their quarry abruptly sidleslipped, then plunged down in a roaring power dive. It was obvious that it meant to run out on the show. And at that very moment a crash of steel echoed about the pursuing Vought. Archie! One puff after another splashed against the sky. The fire was from the destroyer that had the Yorktown in tow.

BUZZ slammed into the maw of fire and yelled. Cressford stood up, peered through the bomb sight, and waited. They soared down at the four narrow stacks and into the billow of smoke that they belched.

Cressford yanked twice, closed his eyes and hung on as Buzz ripped his wheels over the top of the stacks.

DOODIE: All is forgiven. Your mother is very ill. Please write im-

___THEY ADVERTISE—LET'S PATRONIZE___
were two grunting explosions and the Vought danced in the concussion. Buzz, blinded by the smoke and almost choked, banked around again, came back.

Cressford hung on and ducked twice when the 3-inchers barked at them again. He tried to use the sight, but there was nothing to see but smoke, so he pulled on instinct and in return was rewarded by two low bellows. Then a monstrous explosion blasted the vessel below.

**BRRR-OOM!**

As the Vought staggered like a drunken sailor, she went bash into a flying curtain of debris. There was another crash, and the Vought came out minus a wing and with a stub prop ripping the engine out of its bearers.

"Hang on," Cressford yelled, reaching for the wing-tip flare cord.

The cords came back and a splash of garish light sparkled out behind the only wing they had left. They could see the water below them now, almost close enough to do a jack-knife dive.

Both men had to switch the switches, and covered his face with his arms. They fluttered into a flat-spin. Then there was a thud, a geyser of water that seemed to be going the wrong way, and finally a crash that wrenched them out of their seats.

They pushed right out of it, hanging to the flat wing, gasping and grunting while the phosphorous flare spluttered and glared in the water nearby.

"Okay!" yelled Buzz.

"Perfect! I haven't a stitch on. What the hell happened?" yelled Cressford who actually was naked except for a shoe, his flying helmet, and a coat sleeve. They were drifting along, clinging to the fuselage.

At last they could see a skiff being rowed toward them, and in the stern stood Longy, who was hold off. A broad-beamed C.P.O. fished for them with a boat-hook, hauled them aboard.

"What's the idea of bombing our tow?" he growled.

"Yeh!... Your tow, eh? Take a look at 'em," snapped Cressford, grabbing the blanket Lo ory shoved toward him.

Buzz pointed out across the water. Three bodies were by on the swells and they were all in Japanese uniforms.

"But the guy who came aboard was an American," the C.P.O. said coldly.

"Sure, or you wouldn't have passed him a pawser," snapped Cressford. "I hope you've cut it by now."

"That damn kid of yours did—with an axe, before we knew what had happened."

Both Buzz and Cressford laughed at that.

"Yeh," the C.P.O. said quietly as he ordered the skip to return. "That ain't all he did. Wait until you get it straight from the Admiral."

**THEY** were hauled aboard amid the mad goings-on that were taking place on the flight deck. They saw the gobs and Marines working like mad to save a few of the crew members of the plane destructor. But their boat was so well placed that ahead, in the smoke and gloom, they could see the vessel sinking by the head. Her screws were flashing in the last of the flame and she was gone down before Admiral Blanchard could do much about it.

They were now escorted to the Admiral's quarters and given warm blankets and hot coffee. Lo ory fluttered about like a wet hen, asking crazy questions but caring for his charges with all the tenderness of a young mother.

They were probably tired of the Admiral in terse sentences, bringing their story up to date.

"When you killed that sneke of his," the Admiral explained, "you must have scared him, broke his luck, or something. He probably stared before the tide was all the way down.

"Yeah, but it was low enough, evidently," muttered Cressford.

"Still, you're not certain yet that you actually got the Viper?" the Admiral asked. "You say one of the planes got away?"

"Yes, the third plane gave us the slip. The pilot in the second plane, true enough, looked like that devil. And we certainly got that one. But who knows?"

"Well, never mind, you have done one thing anyhow," the Admiral beamed. "We're in normal communication with the Admiral and the Skip is converging on—we, never mind. I'm afraid to say anything to anyone any more."

Buzz and Cressford looked puzzled, but Lo ory let out a low chuckle.

"What happened?" asked Buzz. "And by the way, where's your pilot-fish, Maxstead?"

"He's gone for good," said Blanchard, "thanks to your young cyclone here."

"Lo ory?"

"Yes, Lo ory."

"What's the game?" asked the elder Cressford.

"He jumped overboard," Lo ory said, gravely.

"You chased him over," Blanchard snorted, with assumed gravity. "Well, he came down. Bowman. When you left, Lo ory here trailed Maxstead until he had him crazy. He followed him into the radio cabin when Dooling—he's top sparks man now—was taking the first real message we could get through."

"What happened?"

"He walked up behind the radio man when he was taking the message and did something to the switch," Lo ory explained. "The radio man leaped up and started to argue, but Maxstead pulled a gun and said something about resisting an officer on the high-seas—and fired."

"Holy Moses!" gasped Buzz.

"Well," continued Lo ory, "I saw it all through the port-hole. I ran to the door just as Maxstead came running out. I guess he was excited, for he fell over me and his gun fell on the deck. I was nearest, so I grabbed it and then I made him stand up."

"Too many movies," wailed the elder Cressford.
News of Model Meets

(Continued from page 59)
a total of 99 points. Then, in the senior group, winners were as follows: Leonard Zeladow won first place in the outdoor stick event with a time of 22 minutes and 10.6 seconds. Zeladow comes from Binghamton, N. Y. In the fuselage R.O.G. event, first place was won by Ira Fralick, of Syracuse, with a flight of 33 minutes and 10.2 seconds. Colin Edwards, of Oswego, N. Y., won the glider event with a sustained flight of 3 minutes and 30 seconds.

The winners in the junior group were: Outdoor stick event, first place, Geo. De La Mater, Oneonta, N. Y., with a flight of 3 minutes and 27.4 seconds. Then Carroll Moody, of Hornell, N. Y., won first place in the fuselage R.O.G. event. The glider event brought first place to Raymond Wells, who turned in a sustained flight of 44.4 seconds. Wells is from Auburn, N. Y.

The highest point in the senior class was scored by Joseph Caliolo, 18, of Albany, N. Y. His score being 10 points. In the junior class, the high point winner was Geo. De La Mater, age 14, of Oneonta, N. Y. His score was 12 points. Caliolo was awarded a gold trophy for permanent possession. De La Mater received the permanent Edward Model Club Trophy.

In the special gasoline powered event, which was open only to the senior class, Edward B. Guth, of Syracuse, N. Y., won first place with a time of 42 minutes and 30 seconds. Second place was awarded to Joseph Caliolo, of Albany, N. Y., his time being 23 minutes and 49 seconds.

There were five places in each event. The award to each first place winner, senior and junior, was an engraved plaque. Second place winners received gold medals, third place winners received silver medals, fourth place winners were awarded bronze medals, and fifth place received a box kit. All classes were allowed to compete in the gasoline model event. Bruno Marchi won first place with a flight of 7 minutes and 45 seconds; and second place went to Ed. Romiens, Windsor, Ont., his time being 2 minutes and 18 seconds.

In the junior division of the stick model event, Bert Norman, of Vancouver, B. C., won first place with a flight of 10 minutes and 15 seconds. Joseph P. Matulis, Jr., of Chicago, an adult, won first place in the senior division, his time being 12 minutes and 40 seconds. The winner in the indoor fuselage event, which was open to all classes, was James J. Haffey, of Toronto, Ont., a senior. His time record was 9 minutes and 59 seconds.

The flying semi-scale event was judged on the point system. The following were the winners this past: In the junior division, Clarence Dunn, of Hamilton, Ont., scored 218 points with a flight of 2 minutes and 20 seconds. In the senior division, Paul Ver...
Modern M. G. Marvels

(Continued from page 28)

next cartridge. The Bren gun fires as long as the trigger is held back, with the automatic movement continuing until the magazine is empty.

If firing is prolonged and the barrel gets unusually hot, a new barrel can quickly be fitted in. A handy barrel-locking nut just forward of the magazine makes this possible.

A very nice weapon!

Scrapy Birthday

(Continued from page 16)

strange missiles hit the tarmac of the Ninth. They broke up with loud plopping sounds. Yellow smoke began to roll over the field. Sergeant Casey got a whiff of it and clamped both lunch hooks to his bread basket. Three groundmen did likewise. Captain Howell got his bellows choked with the obnoxious stuff and his chaps turned green.

"Uh-ugh!" gulped Bump. "I'm sick. I'm dyin'—it's gas! Git me to my hut, Carbuncle. I gotta write the folks. Oh-h-h, the dirty—!"

The meat wagon rolled out onto the field when the vapor had lifted. But the memory lingered on. One of the drivers turned as pale as a stiff bosom at an opera and let go of the wheel.

"Cripes, am I sick! Oh-h-h!"

KERWHACK! His ambulance hit the ammo shack and folded up like a camp stool.

It was quite a coup for the Kaiser's boys. Two hours later Major Rufus Garrity took an inventory. Howell and six other pilots were laid out in the big mess room of the Fog farmhouse crying for stomach pumps. Lieutenant Gillis wanted to know how long it would take him to die.

"Haw!" guffawed Phineas, "you're all sissies. You should've lived near a pigsty once like I did outside of Waterloo, Iowa, one time. Boys, that stuff the Krauts sprayed us with is lavender bags soaked with attar of roses compared to the aroma that comes from a porky's boudoir. But, gosh, I wonder what it was, huh?"

A groundman, whose head was wrapped up in a suit ofilly dungarees, trotted in and handed the Old Man a tin can. He said it had been dropped from one of the Kraut battle wagons. After much difficulty and a stream of blasphemy, Major Garrity took out a folded paper. He read it, then threw it at Phineas Pinkham. The Boonetown wonder deciphered it out loud, elaborating upon the contents in true Pinkham fashion—

Dear Herr Leutnant Pinkham: You only have it der tricks maybe, hein? How is it der smell yet, hein? Do not forget your Kamerads will die, but even ein sickness will be der Dankbons for maybe drei days, ja! It gifis wud in der eyes.—Hauptmann Hans Rudolph von Spieler.

"That's enough!" howled the recipient of the insulting letter. "They asked for it. You wait you big hunk of faggot, Pinkham! Where's a Spad? Where—?"

Major Garrity staggered into his sanctum, shut the door. An hour later the wires began to sizzle. The telephone kept up an insistent buzzing until the Operations Office sounded like a hive. When the Old Man came out a few of the pilots were nibbling at their mess.

"Anybody die yet?" he growled.

"Nope," Phineas answered promptly. "I went over to see the burns before I put on my dinner clothes. Bump says he's the pur-poseful type like taking constitutional than he does. Howell's pan is the color of a bullfrog's back and Casey keeps hollerin' for somebody to start operatin' on him. Boys, that was some stuff, haw-w-w-w!"

"Yeah," the C. O. howled, "and it happened on three air dromes this afternoon. Right in this sector, too. There's something cock-eyed—!"

Outside, brakes squealed and the Major wilted into a chair to wait for the visitors to barge in on him. They turned out to be up to his worst expectations—a brigadier, a colonel, and a major.

"They forgot a captain somewhere," Phineas chortled. "Haw!"

"Shut up!" barked the C. O. in a stage whisper. His fingers slid suggestively toward a heavy milk pitcher. Aloud he yipped: "Attention!" and got a snapped over-the-shoulder "Get out!" The evening, gentled to hell, was just getting started.

"Mighty strange thing," the brigadier groaned. "Fifty-two flyers incapacitated, Garrity. Nobody dead yet?"

"We ain't sure," Phineas Pinkham interjected. "But if we started to bury
Lieutenant Gillis right this minute, he would not complain, ha-w-w-w!"

"Pinkham, get out of here!" roared Garrity.

"Tessir," The Boontown pilot left the mess and walked outside. Near a window he paused to get the low-down.

"Muffled noise—manicured," the brigadier crowed. "Men show no symptoms of poison—lungs are all right. Just makes 'em blasted sick. A ruse to keep a lot of Allied machines out of the air for a day or two. Well, there's nothing to worry about. The Huns are preparing for a new attack on the Mihiel—throwing up sandbags—putting in concrete pill boxes. That's the reason for the activity around Mont Sec. Naturally, they wish to keep bombers and strafing planes out of the air over that spot. Chaumont's certain that nothing unusual is going on over there. Well, I'll be going along, Major. Good evening."

And the parade of officers sallied forth. Phineas had quite a task to evaporate quickly enough. Though Old Man sighed heavily, then yelled at Glad Tidings Goomer, mess attendant: "Bring me a bottle of cognac!" When the sad-eyed dough shuffled out of the kitchen door he cracked: "Well, that's something off our minds—that Mont Sec scare."

"Huh," muttered Phineas on his way to his hut, "that's what the bums at Chaumont think! How did they git to be officers anyway? A Pinkham is not so guilty. Well, I got to git to work."

All during the night the Boontown worker of miracles hustled himself in one dimly lighted corner of "B" Flight's hangar. He seemed to be wrapped up in wire when a mechanic came in and looked at him. Promptly Phineas told him to scram "trays, veet," and the much desired he was told with alacrity, for fear he'd be enlisted into the Pinkham private war. Alongside of Phineas was a paper box filled with big deep sea fishing hooks and a smattering of heavy lead sinkers. At dawn the Boontown Major got his mission to go out and salvage the Spad he had left close to the lines. Garrity told him to get right ahead and not to remember the bottle of nitro that might providentially break loose.

"Haw-w-w-w, they believe everythin' I told them these bums," Phineas chuckled as he hied to locate the Equipment Officer. From that gentleman he chartered a mechanical bug. He borrowed Sergeant Casey's best mechanic and the grease monkey had to sit in the tin bathtub holding a big wooden box in his lap all the way to where the Spad had been forsaken.

The Spad turned out to have been un molested. In fact two or three doughs had been detailed to stand watch over it. The pilot from the Ninth put those patriots to work, too, and in about an hour everything was righted. The Spad was honeycombed with heavy wire. Seven or eight wires trailed behind the em pennage. On the end of each were heavy sinkers and great fish hooks.

"Well, that's a good job done," Lieutenant Pinkham commented. "I'm the guy that put the 'hook' in hockey. It calls for cigars all 'round, haw-w-w-w!"

Six smokes came out of his pocket and he passed them around. The doughs accepted eagerly but the mech screwed up his face and dropped his stokey to the turf.

"Says the prop!" Phineas hollered next. "I'm on my way for a solo over Mont Sec."

"Fish hooks — wires — the guy's screwy," observed the grease monkey as he swung the heavy prop. The Hisso turned over and the doughs scattered. They did. And old Spad was a thousand feet up before they put the cigars into their mouths.

"You're a lot of suckers if ya light them things," the mech opined. "They'll blow your bugs off. That crackpot's Loquacious Pinkham."

"Yeah? I git it now," said one of the doughs, grabbing the cigar out of his teeth. He broke it in half and tossed it away. The others promptly followed suit. Then a patriot wearing a corporal's star made a dive for his discarded styx and examined it carefully.

"Why this weed's okay," he hollered. "Look at the band—a Corona—of all the fatheaded Spad nurses! Get him, guys!"

"Lissen," pleaded the mech, starting on the double, "how did I know? Lissen, guys—"

Bop! Splat! Whang! The mech hit Mother Earth on his angel bones. One of his eyes felt as if it had exploded. He felt a perfectly good molar slide down his throat and his jaw buttoned like a piano that a moving man had let fall out of a third story window."

"Oh-h-h-h," he groaned, "that bum when he does things right, it's wrong. Well, if I see a chance to do it, I'm gonna fracture his skull. I will bide my time 'n' keep an anvil handy."

Phineas Pinkham went to Mont Sec. There were only two Boche planes in the skies toward Germany. "Haw-w-w," he enthused, "the Heiney Herr Obusts are firing their stink bombs. But better than they really are. Huh—" He peered overside, spotted a huge tent marked with a red cross. He pointed the Spad for the limoined and dived down to within a hundred feet of the ground. At that altitude he straightened out, opened up the Hisso, and then gradually pushed the stick away from him.

With one eye on the two soaring Huns and the other on the big canvas tent, Lieutenant Pinkhamheed. He sliced over the rolling canvas with his thumbs almost kissing it. At the right time he zoomed. The Spad halted in its stride. A strut gave way. The Yank gulped and looked back. A great hole yawned in the canvas tent. He got up to a thousand feet and winged over. When he looked back again, Krauts were running as if bill collectors were after them.

"Huh," Phineas yipped, "there aren't any nurses down there. It's filled up with boxes of stuff—hospital, huh? If it is a hospital, then Notre Dame..."
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BUTTERFLIES filled the Pinkham cranium and the manager of that skill of tricks had an idea he was on the way West as he felt himself rise toward the ceiling. Ten minutes later somebody dragged him off the Milly Way and dumped him into the Big Dipper. Phineas opened his eyes and felt around with his hands. He contacted metal that quivered. Ten more minutes passed before he had put all his screws back in place. When his nerves had been pacified, he flung his respective cubbyholes, the wandering Yank found that he had been dumped into the tin bathtub on the side of a motorcycle. And what was more, the thing was moving. Up ahead was another Krant mechanical bug. Phineas emitted a long-drawn howl that made the bugs sputter and stop moving.

"Ach Himmel, alife yedt, he ist. Hermann—"

"Gooten afternoon," Phineas tossed out and pulled himself erect. "Where am I?"

"In der zoop," a Heinie chorused.

"Soon it giffs der shtone vall mit der blindfolds—ha ha!"

"Heh! heh!" echoed Phineas weakly. Then he regained his self-confidence.

"Awright, you buns," he breathed. "I'll show you how a Pinkham gives up its all. Hurry up! You buns don't smell like no lilies of the valley."


"Himmel!" belched the other square-head.

"Ja, dit giffst you also der officer's woks, hein? Mack Schnell, Franzi Schnell!"

It did not take the Pinkham gray matter long to interpret that mixture of Heinie and Yankee English. "So the big bum von Spieler is going to give me to the Kaiser for his birthday, huh? Well, I ain't shot yet, you walking limoners. So this will be my birthday, huh? Is his wife yunin' him a new Napoleon hat?"

"Ich giff der gut mind to kill him yunce right now," the bigger of the two mechanical bug strutters replied.

"Vunce would be juiste too much for me," Phineas gritted. "Keep goin' as the geburstday will be oifer."

At a cross-roads the Huns stopped to recite some passwords. Three trucks were standing there, too. A big Heinie Ober-Leutnant had the drivers in the road while two lesser Huns went through their pockets. One of the "pipes" was found stuffed in a liqueur bottle. For a summer squash on a truck driver. He handed it to his superior and the Hun brass hat smashed it against the stone wall.

"Dumbkopf! Das ist verboten," Phineas heard him guttural. "Eins mit!—"

The Boontoon pilot could see into one of the trucks and it was choked with wooden boxes. Pipes verboten, eh? The Yank had an idea why and also that the stuff in those boxes was on its way to Mont Sec. He was quite certain that it was not whole wheat flour.

IN twenty minutes Phineas was dumped out of his portable bathtub in Ars. The place was palpitating with expectancy—Heinie flags fluttered everywhere. On top of the garage there was a fat-headed, smirking Clubs callin' Kitties around a free lunch counter. The doorway of a big house was draped with bunting and predominating over all was the coat-of-arms of the Hohenzollern breed. The news of Leutnant Pinkham's capture spread like a rumor of divorce in a quiet town. Herr Pinkham would be the piece de resistance of the Kaiser's natal day—they would present the captive to Kaiser Bill and await a handsome reward.

Hauptmann Hans Rudolph von Spieler nodded down to a guest space on the outskirt of the Lorraine foundry site and lost no time in hotfooting it to the square where the prisoner was on display. It was a trying time for our hero. Townspeople made faces at him and gestured threateningly toward the Pinkham jugular vein.

"Ach," gurgled von Spieler, "der vorm has turned, nein? You bist kaput—mein freund! Lader der Kaiser he looks at you—also der Crown Prince—von der Puchen! You was ist like der Svisch cheese, ha ha!"

"Haw-w-w-w!" laughed Phineas. "I can insult anybody now as you can't do anythin' worse than send me West. I been wishin' the Clown Quince would come, too, as I want to die laughin'. Get it? Just skip it, then, as who could put anything inside your thick square domes? Will the Kaiser be ridin' his wooden horse, ha-w-w-w?

"Oopstardt!" blustered von Spieler. "Insults by der Emperor, ja! You should get at der flink synod already yedt. Gott!"

"Hold der vase shudt," clipped an Herr Oberst. "Der Kaiser should maybe be talk yunce mit der verdammt Yangkee, ja."

An Unter-Offizier came running up to a pompous and boiling Herr Oberst, "Ach, Herr! You got a nice polecat! Der brizonn fur der brison!"

"Verwarts!" growled a Kraut and three sharp points concentrated on the Pinkham tail assembly.

Von Spieler laughed with enjoyment, poking his face close to the Pinkham prop boss. "Ich habe gesehen der blaue
where you get locked oop, mein freund, ho ho! Efen der eel itd igea vayn seis. Fur vunce ve make itd sure uf der vamos Herr Lieutenant Pingam. Auf Wiedersehen, Schweinwundl! Der medals I jetd itd."

Don't try to lock up the barn before the horse gets out, lieutenant tossed at him, "A Pinkham never gives oop until he is der skeleton, Pop. Boys, I can't wait to see the Clown Quince! Does he hemstitch fast?"

"Schmutzig Yankee Schweinwundl!" exploded the Von, growing a rich beet shade.

"Tsk! Tsk!" Phineas admonished him, "Is it what they teach you at Heidelberg? Haw-w-w-w, here's the 'brizon,' fancy that!" The Yank's heart, however, did a nose dive when he looked at his cell. It was an ingenious contraption. The boards of the floor of a deserted house had been ripped up to leave a hole about eight feet long and three feet wide. The ground beneath the floor had been scooped out and Phineas Pinkham's prosciutto twitched like a rabbit as he scented flowers and heard horsy. This was a sight."

" Ach, efen das Pingam von'dt geot out uf here, nein. Der boards heitt at mit und then only isn't trapdoor in der middle mit ein cover, ja. Der trap door shuts and zo ist das! Ach, das is der Tag! Der Kaiser sees Herr Lieutenant Pingham. Ve is in der crosses mit iron. Mack Schnell! In he goes, der verdammt Yankee!"

Phineas was deposited none too gently into the pit. On his back, he looked up into the leering faces of the Krauts. Von Spieker scooped down at him while the wooden hatch was being slid over the rectangular pit.


"Go shave a pig, you fathead!" retorted Phineas from the depths of his prison as the wooden cover blotted out the daylight. "Haw-w-w-w!! Tell the Kaiser not to take it too hard if I ain't here to meet him." The last sentence was muffled by the pounding of hammer heads against the hatch.

The captive Yank squirmed and did things to his joints. He began to get one knee twisted up close to his ear. The trap door, he judged, was just about over his middle. "Huh—uh—boys, this is—tough—there was nothin' "horse guts" into it, if I couldn't get a guy could—get out of—I'm goin' to look —for—my dough—back—ugh—ugh—ugh!" Each grunt marked a step in the Pinkham progress. If he could get that knee up against the trap, he could kick it loose. Then with the other knee up to his chin, the hatch was shaved off his undercarriage by the time he got both knees into place. His whole double-jointed fuselage and undercarriage ached like an old maid's heart at a Valentino flicker.

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**PHINEAS lost all track of time. It seemed as if he had been in the hole long enough for the Hohenzollerns to die out—yes, even the next generation of the Kaiser's brood. The Boometown exponent of trickery suddenly gave a prodigious heave. The trap lifted—and fell back with a thud. Phineas tried three more times his legs were sticking out through the opening in the floor. He waited breathlessly. It was getting dark inside the house. When nobody grabbed at his feet, Phineas began to use his hands. He hitched his,)[g]angly frame out of the hole until he could stand on his big paws. Then, like a wrestler getting clear of the mat, he gave a violent leap and got his body half out of the hole. One more convolution and he was lying on the floor, bruised and skinned from his arches to his heels.

"Boys!" the liberated Yank sniffed. "I hope I didn't bend my legs all out of shape."

He got to his feet, wobbled to the door. It was locked. He was peering out of the window when he heard a voice yelling. Boho! Little Heinie staff car hove into view. Two officers stepped out. Then came an imposing figure in a long cape. A young, round-faced officer with his eyesight garnished the glowing face. Just behind came a string-bean figure with a profile that reminded Phineas of a parakeet. A visored cap rode atop his noggin.

"Boys, it's the Kaiser and his adjutant, the peeper, "Will you, the Herr Obusts stiffen up! We're going to get it out."

Boots scuffled against the trapdoor in a lock. The head of a Kraut sentry was shoved into the room, and the double-jetted Pinkham arm encircled his neck like a python. The Teuton gullet closed up and a Pinkham fist jolted against his chops. Phineas promptly dragged the Heine in and eased him to the floor.

"It's a caution how these Krauts under-estimate me," he chuckled, changing clothes with incredible speed. "Now they said the Spad was out there and I was goin' to be handed to the Kaiser. If you—w-w-w!" As the peeper from Iowa buttoned up his Kraut overcoat he looked out the window.

Kaiser Bill, the Crown Prince, and three field generals at least were holding a powwow. Hauptmann Hans Rudolph von Spieker was with them. When Emperor Bill suddenly slapped the Kraut pilot on the back, Phineas gulped that it was time to go.

"Haw—w-w-w!" he guffawed. "If everythin' goes right, he'll be pattin' von Spieker on the back with a gun butt oer long. Let's awat, Pinkham! Make history!"

Phineas, slipped out of the door, ducked around a corner of the house. All other squareheads were staring bug-eyed at the All Highest from Potsdam.
Dusk was slipping into Ars when Phineas emerged stealthily from an area-way to stare at his Spad which was getting ready, not far from his own, for the battle baggy on the outskirts of town. He stopped suddenly, grinned when he saw that the Hisso had been spun into action. The Boche were getting the Yankee crate ready for the Kaiser’s inspection. Setting his big buck teeth, the Yank strode toward his Spad. Just before he reached it he passed von Spieler’s grim sky chariot. Two objects were hanging from the pit. They looked like cocoanuts with the husks on! In Ars a pandemonium broke loose when a Herr Oberst and Hauptmann, von Spieler looked at the open trap door in the house where Phineas had been deposited so unceremoniously. On the floor sat a Hun in his flannel undersuit, his eyes glassy, and a vague expression on his face.

"Gott—Himmel!" yipped von Spieler.

"After der deffel—macht Schnell! Donnerwetter—how ist das he gets oudt?"

"Dunkoofles!" spat out Kaiser Bill.

"Ach, always he makes it der monkeys from you yeedt! Bah! I go—der chokete is dufuf biel biert das Pimpham."


"I show idt to you Spad, ja?"

"Ja, Mach Schnell!"

The All Highest from Berlin did not get back to his big bomber before the Sky Bobber Hess began to shake with the rear of a Hisso. Hauptmann von Spieler froze in his tracks and his lower jaw sagged almost down to his insteps.


"Gruence!" howled a Herr Oberst. "Expression in his amascher lieber is a diving. It suddenly zoomed and plopped into the square jet Plunk from the Hohenzollerns."

"Ach, von Spieler squealed, "he steals idt der Krogelon boms. Der nose you should biff idt, Your Highness. Unjust to kiffen der sickness. Such a shmelm, ja?"

The Crown Prince set up a howl and clamped both hands to his head. But his visored skypiece was skirling away, nagged by one of those fishhooks that trailed frog Pinkham’s hatted but efficient Spad. Another hook slid down the cab of the Oberg, and dug a neat trench. The Crown Prince flattened himself on the ground holding to an ear. He sucked the horrible odor of the Krogelon bomb into his ample bugeye and turned green. Papa Hohenzollern was trying to keep his head. He was only seen as a small white wraith on the Knappen’s back. The whole spent throngs to the brass hats spread out around him. One officer heard very clearly and wondered how he would look in a private’s suit.

Upstairs Phineas Pinkham was in fine form. "There’s the Geburtspace present, Bill. Boys, it’s no bottle of lilac juices, either, is it? Haw-w-w-w-w! How careless of the Hop Man—leave them bilious drops hangin’ on his crate! That was two bits well spent—that confor-

mation book. If I only had gone the whole hog an’ sent for Flubb’s Liniment, too, I feel like I had crawled through heaven."

Four Heinie sky hellions were now hard on the Yankee knight’s tail. He looked at his gas gauge and his teeth ratted. It was pointing to a region near zero which indicated Phineas’s poor chances of getting over to the Yankee side.

"Huh, there ain’t enough gas in this tank to drown a moth," he thought out loud. "Well, I’ll coast in the last three miles. Now I lay me down to sleep, I pray—huh, I can’t think of what comes next that Sophronia was right—she said I should’ve kept up Sunday school."

ON the drome of the Ninth Pursuit those pilots who were not still gripped in the talons of acute disillusionment, were walking around in tight circles like canines padding down their beet. With a loud Bump Gilla, that Car hcuncle Pinkham had been knocked off, the Scott’s face did not change its vacuous expression.

"Go way—lemme die in peace," he said weakly.

Sergeant Casey, propped up in bed, just nodded. Grit away from me. Do you happen to have some arsenic about ya? I’ll give ya all my francs for a shot of it. No? Well, just go ‘way an’ leave me.

Major Garrity sat on the steps and chewed off one side of his mustache. His men were gnawed to the quick and his nerves were even more of a shambling.

"Who told that fathead to go over Mont Sec? I told him to get his Spad and bring it back. Oh, that cock-eyed, lam-brained—"

He got up and left the farmhouse. "Howell," he said, "can we get some flowers around here. Ha! ha! Kind of silly, ain’t it? But after all, Pinkham was a flyer an’—he hasn’t got to have a funeral."

"I know where there’s some poison ivy," Bump said helpfully, "an’ some thistles!"

The Old Man swore, went back to the mess hall and sat down. He wiped off a slice of bread with his napkin and spread butter on his plate. When he took a bite at it, he heard his protest. Swearing, he threw the plate across the room and almost broke Glad Tidings Gramer’s jaw.

"Huh, I didn’t do nothin’," the mess attendant complained. "I was just standin' here an’—"

A Hisso sang overhead. It stopped, then started to gurge. Major Garrity jumped up as if a tarantula had nipped his right big toe and rocked back and bumped into a group of greaseballs who were pouring gas over the ground. One tossed a lighted match into it and a fiery snake flared on the tarmac. The Spad zoomed over the house about fifty feet above the Old Man’s head. Something caught in his coat collar and lifted him right off his feet. Part of an ear was shredded by the time the C.O. sat up against a rain barrel. A big fishhook dangled from his

rumpled locks and the Old Man looked at it crossedly.

"By-g-g-y—f-r-e-r-i-pipes!—By— that makes me wonder about that fathead fooling with wires an’ hooks. Wait until he gets down! I’ll—oh, that nitwit! An’ I was feelin’ sorry because he—blow his eyes, I tell.

The Spad did not light very gently. It bounced into the air three times before it stayed put near the trunk of an apple tree. Phineas, garbed in a Boche great coat and coal scuttle hat, got out of the mashed crate and ripped his goggles loose.

"Bong sour, bums!" he chirped. "Did ya miss me much? Where is Rufe? Oh—haw-w-w-w-w! There ya are. Ya goin’ fishin’, Major? That hook would catch a pibgoat. Well, it’s quite a time I been—"

"Lookit!" yelped a grease monkey, picking up something. He brought it over to the Old Man. "It’s a Heinie’s hooch—gimme that!"

"What?" howled the Major, snapping the skypiece from the gaggle-eyed mech’s hands. "Why—there’s a name in it—Crown Prince—HRH Prince Wilhelm—the Prussian eagle—Pinkham, how did you get—"

—when I guess I picked it up in passin’—" Phineas stammered.

"Lemme see—huh, look, there’s some thin’ inside it. A hunk of paper—why, it’s a map—and it’s Mont Sec! Boys, it shows where they are diggin’ tunnels. And—plantin’ powder and dynamite. Why, the dirty h — to blow all the doughs to—when they got there to take it over in the fall. Why—haw-w-w-w-w! Now why wouldn’t that map be safe inside the Clown Quince’s hat? It would if a Pinkham wasn’t in France, huh? Let’s go inside and have a snort of vanblank!"

All kinds of brass hats percolated into the drome of the Ninth Pursuit Squadron to look at the evidence of Teuton deviltry. A brigadier harumphed, snorted, and then pumped out: "I am convinced—I shall show its appreciation, Garrity—"

"Huh?" Phineas sniffed. "Maybe I was sittin’ here playin’ pareschi during the Kaiser’s Geburtspace party, huh? Who was it scotched at the idea that the squareheads were only hauling and bags? It was them hooks that ripped the top off that Heinie tent—it was them hooks that got the Clown Quince’s skypiece! It was me who saw Kraut truck drivers getting fleeced of their duedee—pipes to you, sir. That mean the Heinies were haulin’ dynamite and I’m a good old man that’s worth that wasn’t for dame’s faces. That is the way—a guy who sits on his—"

"Now, Lieutenant, you misunderstand me. I er—meant the squadron would—look after you, haven’t you ever been taught any discipline? I’m a brigadier general—"

"It ought to be," countered Phineas.

"It ain’t never been used, haw-w-w-w! Go ahead an’ bust me. Just try. Call up Pershin’ and tell on me. Boys, I know when I’m in the saddle!"

"He’s a little hysterical, sir," Garrity floundered, glaring at Phineas.

DECEMBER, 1936
I Dabbled With Death in Russia

(Continued from Page 34)

around midnight from the Russian Officer's mess, there was Stepan all smiles and in his hands a polished, grinning human skull!

"Stepan, you rascal," I ejaculated, "what have you there?"

"Your tobacco jar, sir, I boiled it and varnished it. And see how nice the top lifts off? But my saw was awfully dull and -"

A tremor of revulsion shook me.

"And where did you get that - that thing?"

Stepan pointed to the unexploded grenade I still had. "From the gentleman that threw that. He was after the price on your head but he was stupid - no brains. Now he'll at least have tobacco where his brains belong and -"

I snatched the ghastly thing from him, tossed it out a window, and roared, "Get out!"

But early the next morning I retrieved the grim "humidor" from the flower bed - and I have it in my collection to this day.

ONE PLANE AGAINST AN ARMY

IT was 11 p.m. and not quite dark. A loud scream overhead, a dull thud - then a terrific explosion on the outskirts of the town!

A heavy shell! Here at Pinega we had no artillery and so far neither did the enemy. Well, boy, they certainly had something now!

While I was wondering what to do a group of Russian officers unceremoniously burst into my room. I thought of revolts and all sorts of things. As I sat up in bed the quiet of the night was again shattered by a resounding explosion that rocked the house.

"Quick, Lord," said Colonel Nikitoff of the Russian Staff, "the Bolsheviks have been our patrols in from all sides. They have a six-inch howitzer mounted on a barge which they have towed up the river and are now in range. They are advancing with infantry along the bank. Unless you can stop this they will be blown off the map by morning."

"Well, what's the matter with your infantry?" I wanted to know.

"Hopelessly outnumbered!"

My landlord's entire family burst in on us crying and screaming that they would all be murdered if the town was captured. And that's just what would happen.

My plane had been called on for many strange missions, but I had never been called on to lick a whole army before.

"Hey, you," I pointed to a young British infantry officer, "who are you and where'd you come from?"

"I just got here today, sir. Lieutenant John Collins is the name. Preparing quarters for British brigade arriving soon."

"All right, Collins. Ever handle a Lewis gun? Ever flown?"

"Yes, sir. France. Seventeen months as machine gunner. No, sir, never been near an airplane."

"Well, you're going to be near one now. And you'll have to be both a good gunner and observer if you want to get back."

We rowed to the island airport. While Collins familiarized himself with the Lewis gun and the observer's cockpit, I attached my last precious - three twenty-pound Coopers.

Now we could hear sporadic rifle fire and the hammering of machine guns. The enemy was drawing closer. Another shriveling overhead and a geyser of water as a shell exploded in the river near us.

While the motors was warming up I showed Collins how to swing the Lewis gun on the Searff mounting. I told him that whenever I banked steeply he was to fire earthwards whether he saw anything or not in the semi-darkness. I could see things he would miss.

Now a load of empty bottles arrived and I tossed them into Collins' cockpit. For a moment, but they might help. Better than nothing.

We took off, made a circle of a few miles, and approached the river from the enemy side of the lines. Next we circled over their three chief towns.

Most of the windows showed lights which meant only one thing - there was plenty doing this night. I circled the towns at 500 feet with motor throttled down so I could hear whether I was being fired at and possibly gauge the number of troops. Only once in the next 15 minutes was I fired at.

I reached Pocha which was their most advanced town. It was situated high on a bluff at a junction of two rivers. Here, I discovered a pontoon bridge had been erected in the last few hours. It was swarming with cavalry heading toward our lines. They made no attempt to hurry as I circled them at 200 feet.

My first bomb was a direct hit on the bridge, my second missed. Men and horses were tossed into the air. The
bridge was severed and drifted downstream. Panic-stricken horses bolted with their riders.

A MILE further along the river and toward our lines we flew alongside a column of infantry. Collins raked them with his Lewis and they scattered for the cover of the forest. They replied with rifle fire and scored a number of hits on the ship—not surprising as we were very low and I had to fly perfectly straight. But my hastily initiated ob-server forgot my instructions, and after I had bailed several times he became so confused that he was actually shooting at the sky instead of the ground.

Very near Pinega we came on quite a concentration. A barge was moored along the bank and on the bank was the bowser we were after. There was also a wagon train, a troop of cavalry, and crowds of infantry.

I dropped my remaining bomb on the gun and then from 100 feet machine-gunned the transport and troops until Collins signalled he had no more ammunition. But we had done enough;

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and forget all about it. We appreciated the kindness of our Japanese correspondent and were glad to run the feature and the pictures. After all, that's what FLYING ACES is for.

As things stand now, there is no reason in the world for us to be unfriendly toward any nation. I am quite sure that we could get like articles from Germany, or any other country, we would be more than glad to present them.

We do hope that those fellows who kicked will see our side of this situation and at least attempt to live up to American traditions. And if you want to know why we are tenderfoot. We can learn much from the model-builders and aviation enthusiasts of other countries and we must not allow prejudices created by fictional stories to warp our sense of justice.

The writer feels this point personally, because he is probably one of the worst offenders in developing fictitious villains for stories out of imaginative Asiatic gentlemen, and it is none too encouraging to learn that these "storybook" bad men are distorting true conceptions.

Perhaps you can devise a way out for me. Perhaps you can tell me of a new race of men who will fit the villain role in aviation adventure stories, and thus lift a load from the shoulders of the Nipponese, Russians, Germans, Mexicans, Frenchmen, Englishmen, and Chinese, and others who have had to bear the brunt of this for years.

As a parting slant, it's worth remembering that during the Great War many an Allied military expert figuratively took his hat off to the efficiency of the Kaiser's war machine. But that didn't imply any liking for the Germans or for the motives the Fatherland was fighting for. Not by any means. And

then again, you may not appreciate the Chinese because you once got sick on chop suey—but by gad you've got to lift your lids to them.

For Our British Readers

We often get letters from readers scattered about the British Empire, inquiring about prices and costs of model kits and other items advertised in our pages. Many of them can't seem to fathom the values of American money in terms of English pounds, shillings, and pence.

Believing that they would like to know they can purchase items from American manufacturers, we offer an easy system for converting English money into dollars and cents.

The American cent, the basic coin of American currency, is equal to the English half-penny. Again, a pound is equal to twenty shillings and a penny. Any amount quoted at one dollar (100 cents) is roughly worth 4 shillings and 2 pence.

Hence, an article listed at $2.35 (two dollars and thirty-five cents) is worth, or equal to, 9 shillings and nine pence half-penny (9/9½d). To clear up the rest of the mystery, a nickel is five cents (two pence half-penny), a dime is ten cents (five pence), and a quarter is twenty-five cents (one shilling and a half-penny). In amounts under one pound you need not worry about the slight fluctuations in international exchange.

In addition to this, of course, you will have to consider the customs duty on certain articles imported into Great Britain which in general is approxi- mately twenty-five per cent of the value.

The Rebels Raid Madrid

(Continued from page 17)

state; but from inside information, we learn that both sides are getting new planes every day, and the world may be witnessing the major dish of aerial warfare of the decade. We have been told that a number of American Douglas transports (presumably built in Holland) have been added to the Rebel forces. Italy is said to be trying to get more of her Capronis across the border to the Rebels. And it's rumored that several other European govern- ments are secretly shipping fighting planes to both sides.

As to who are flying these planes, we have no exact information. One news item declares that some German airmen are openly flying with the Rebels. A few adventurers, of course, will never be found on both sides. Anyhow, we certainly will not envy their position if they're forced down behind enemy lines; for there are no sane rules in a civil war.

Air Race Thrills and Threats

(Continued from page 18)

seriously injured Benny and his wife. And then there was Byron Armstrong's "Delgado Maid" which was reported to have exploded in mid-air, but which in reality threw a connecting rod in its Curtiss "Conqueror", forcing Armstrong to take to the tills.

Then there was a report that the U. S. Army Air Corps would have an entry—a new Seversky fighter. But at the last minute the Staff put the "No" on the proposition. Then Howard Hughes, whose streaking racing job still holds the world's land-plane record of 352 m.p.h., did not see his way clear to enter. And so his speed craft was not able to compete for Uncle Sam.

All in all, Detroity had things pretty much in its own hands with the National Races; and still the world does not know what terrific speeds his racer can actually do under pressure. There was a little hula-haloo for a time about the entry of such a professionally designed

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Flying Aces Model Laboratory

(Continued from page 53)

Figure 4, and it will be noticed that the thrust will have a tendency to pull the nose of our ship up, and the lift will tend to oppose this, while the wing drag will act in the same direction as the thrust. Since the weight and parasite drag are acting through the center of gravity, it produces no pitching moment.

Now if we know the value of the thrust drag and lift, it is possible to compute the pitching moments of each. If our ship is to be able to fly, then one condition which must be satisfied is that all the forces or pitching moments acting clockwise must be equal to the pitching moments acting counter-clockwise. If we just consider the forces that we have been studying acting through the center of gravity, we will, in all probability, discover that there will be an excess of pitching moment, either up or down, depending on the magnitude of the forces. For our ship to be longitudinally stable it is obvious that we must counteract this pitching force with a force of sufficient magnitude and acting in the opposite direction. This force, as you are probably aware, is applied at the tail. The accurate tail load can be obtained by a

Fascisti land, and Mussolini is always eager for his pilots to show their stuff to the world. Remember Balbo’s “show across the Atlantic—and back”?

Detroyet has promised to return to 1937 and defend his laurels with a new Caudoir racer which will be capable of 450 m.p.h. (Play that one on your Bazooka!) There will also be a two-man French team using the new 1,000 h.p. Renault engine in machines similar to the one flown by Detroyet this year.

But America won’t stand still!

Major de Seversky has intimated that he will create a racing version of his sensational Army fighter which will be capable of 350 m.p.h. at least. Turner’s racer also should be ready this fall and he hopes it takes to the field on a flat car. Keith Rider is working hard on a 1937 racer which is said to be even more sensational than his others that performed so well in the past.

The crack European nations plan to turn up with racing machines which in reality are nothing but flying advertisements for their military and commercial jobs, it is reasonable to assume that such firms as Vultee, Doug- las, Boeing, and Curtiss will take up the challenge and spend a little money on racing planes to meet them. It’s all in good clean fun, of course.

Anyhow, when one considers that the prizes will run well over $100,000 at Cleveland next year, not to mention the fact that there must be much prestige to be gained, it won’t be surprising if all the marks are shoved skyward.

Monseur Detroyet certainly started something!

—THEY ADVERTISE—LET'S PATRONIZE—
graphical solution of simultaneous equations.

On first consideration for determining the tail load required to balance the ship, it would appear that all you have to do is divide the excess pitching moment by the tail moment arm—and that would be the tail load necessary. The fallacy in using this method becomes clear if we consider this example:

Suppose our model weighs 10 pounds and it is found that a load of 1/4 pound in a downward direction is required to balance the ship. It now becomes quite apparent that the wing which was supporting 10 pounds at first, must now support 10 1/4 pounds. This change will then alter the lift pitching moment. However, while this fact must be taken into account in large aircraft designing, it may be possible to neglect it if the tail load is extremely small.

For any body to be in equilibrium it must satisfy three conditions: First, all the forces acting up must equal all the forces acting down. This is expressed by Equation 1 in Fig. 4. Second, all the forces acting forward must equal all the forces acting backwards. This is expressed in Equation 2 of the same figure. The third condition is the moment summation, where all the moments acting clockwise must be equal to all the moments acting counterclockwise. If our airplane is found to satisfy these three conditions, then it is considered longitudinally stable. It is by using these three equations simultaneously that we solve for our tail load.

Once we have solved for the tail load, the next step is to adjust the stabilizer so that it produces the required air load. Strange as it may seem, the tail is not set with reference to air stream, as is the wing, but with respect to a down wash angle. This angle is formed by the air coming off the wing. It has been found that it greatly affects the stabilizer. On some airplanes, while the stabilizer is set at a negative angle to the thrust line, it is actually producing a positive load. While the stabilizer is not a lifting surface it incorporates a symmetrical section whose characteristics are known. From this it is possible to determine the proper tail angle, provided of course that the angle of down wash is known.

Our discussion has been centered up to this point on lateral and longitudinal stability. Of these two, it is needless to say that longitudinal stability is by far the most important. Lateral and directional stability are usually taken care of in the design of the ship, as both are induced by its symmetrical nature. Directional stability can be obtained to a greater degree by using a sweepback wing. However, it is found that its use on a gas model is not necessary.

WITH the closing of this article on gasoline model stability I hope that in the building of your next job you will give more consideration to the aerodynamics effecting stability. Gas models are not toys, and hobbying with horse power is no kid’s play. For this reason the model builder who attempts to construct his model haphazardly is bound for failure. This department has long believed that it is high time model builders should know something about the actual designing of a gasoline job so that they may turn out craft in a scientific manner. If you are one of those builders, why not drop us a line and let us know if you would like our Model Section to publish a complete course in gas job design.

The Douglas XFD-1
(Continued from page 48)

If the model is to be a prototype of the Navy ship, the regulation naval colors and insignia should be used. This consists of the familiar blue circle which may be a white star in the center of which there is a red circle. The struts, fixed portions of the tail surfaces, and the metal sections of the fuselage cowling should be painted Navy gray. The wing flaps are also finished in gray as are the wheel covers.

All fairing covered portions should be finished in silver, with the exception of the upper surface of the wing which is chrome orange. Serial number, designation, and other lettering, black.

For further details, a study of the accompanying photographs of the actual plane will be of aid. Of course, if your model is to be of the export ship the color scheme will depend upon the nation to which it is to be sent.

That's the story, fans. And now how about a photo of your completed Douglas XFD-1 for use on our With the Model Builders page?

Make the Vought SB2U-1
(Continued from page 49)

It will be found that for a flying model, the diagonal construction is more rigid and obtains the same strength for less weight. Cement is added to the fuselage and add balsa fillets.

Landing Gear

The landing gear consists of two parts: the wire assembly and the wheels, which take up the shock of landing; and the aluminum fairing, which is rigidly attached to the wing and is not affected by landing stresses. First bend the wire which forms the axle and is the fundamental part of the landing gear. Cement it to the front spar; and after applying two coats of cement to the joint, add the two 1/16" balsa braces which hold the wire against the spar. These pieces are...
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NOTE. These are actual photographs of models built from AIRCRAFT kits.

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