

Parachute—A Friend in Need

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THERE are three types of parachutes: Attached, Soaring and Free. Parachutes are called "Attached" when the container, or pack carrier, is fastened to the fuselage of an airplane, basket of a balloon or car of an airship. A life line leads from the harness of the jumper to the shroud lines of the chute; the mouth of the container is closed with string, strong enough to hold the chute in place but breaking with the weight of the jumper as he drops away, allowing the chute to run freely into the air.

The Soaring Type: With the theory in mind that the jumper must surely be blown into the tail of a fast moving plane, several designers worked on a plan to throw him above and over the tail planes. Actual jumping has exploded this theory, and development of this type has been discontinued.

The Free Type: In the free type the entire harness and pack is on the jumper, and the rip cord is manually operated.

During the last year of the war, the necessity of using parachutes to escape from damaged airplanes became generally conceded. The Technical Division, at McCook Field, to whom belongs the credit for the present packs used by the U. S. Army Air Service, began extensive experiments with American, as well as Allied and German parachutes.

It soon became evident that the attached type for airplanes was not satisfactory, for the following reasons: It requires special provision in the airplane for carrying the chute. The life line can come to the aviator's harness on one side of the plane only, and it is considered practically impossible to get out of a ship on the outside of a spin. In case of a vertical nose dive with the wings gone, it is possible for the fuselage to attain greater speed than would a man, making it impossible for him to break the chute free from its container. There is also the chance of the long life line fouling on some part of the plane.

This last objection was well brought out in a demonstration of "Guardian Angel," designed by the E. C. Calthrop Company, England, at McCook Field, during the fall of 1919. Lieut. R. A. Caldwell, R.F.C., was killed because of the failure of his life line, when it caught on the rocker arm of the elevator control cables of a D. H. airplane, causing a free drop of several hundred feet.

With the pack on his person, the aviator may jump from either side, or in any manner he may choose, and as the other objections, mentioned above, are overcome by the free type, it was adopted for airplane use by the U. S. Army Air Service.

MANY objections had to be overcome, however, and it has taken more than four years, since successful jumps were made with the free type chute; to get the aviators of the Army Air Service to sit on them. And more time will pass before all these men become thoroughly confident in them and acquainted with their possibilities.

Some of the early objections were, that a falling man had no control of mind or muscle and would be unable to pull the manually operated rip cord. It is told of Rodney Lax, who made a jump at Kelly Field, in 1917,

from the wing of a Jenny, using an old balloon chute merely rolled up and carried under his arm, that he complained of falling so fast that air friction burned his face before his chute opened. We have all heard it said of a workman, falling from a high scaffold, that "He was dead before he hit the ground!"

These theories have been exploded. It has been demonstrated that a man can fall at great speed, with full control of his faculties, and if there is any difficulty in breathing, none of the jumpers has said anything about it. One man delayed pulling his rip cord for six seconds, just to get and give a thrill. He gave it!

More than objections had to be overcome; structural weaknesses had to be discovered and eliminated.

Almost none of the parachutes, then available, were strong enough to withstand

the shock of opening at high speeds. This was especially true of the attached types, which had primarily been designed for Balloon jumping. They were, and are, for the most part, built of cotton fabric with shroud lines made from clothes line. The balloonist jumps from a standing start, while at a speed of 150 miles an hour the airplane jumper has an initial momentum of 220 feet a second.

It was soon recognized that provision must be made to take care of the shock of opening at high speed, and a large vent was designed for this purpose.

The first practical airplane chute had a 48-inch vent. This vent took the form of a chimney, the top of which was



Official Photograph Army Air Service

Sergeant Clarey, standing inside the torn parachute with which a safe landing was made. Pulling his rip-cord before jumping, the chute caught in collars of the stabilizer brace and the tear occurred as his weight pulled it free. Author at left.

glued together with shock-absorber rubbers after the first rush of air in opening had passed through. This chute was constructed of Habutai (Japanese) Silk, with 40 strand lines, also silk-braided, with twisted cores. The strand lines had a breaking strength of 250 pounds each.

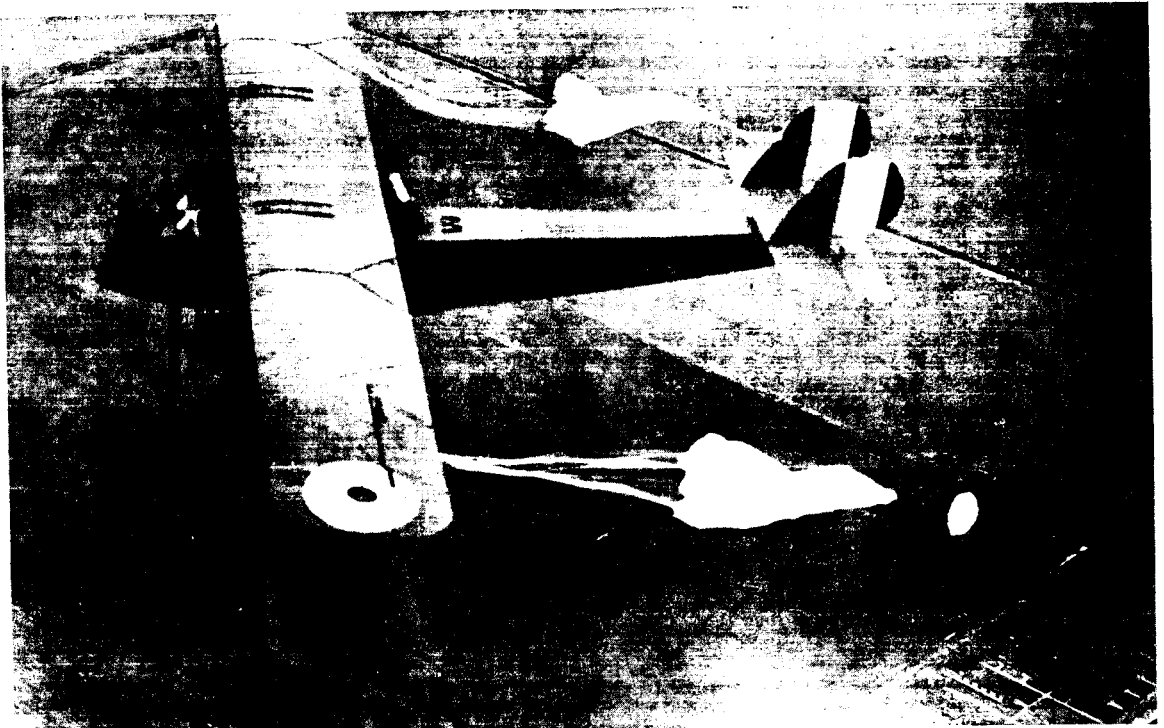
WITH the advent of this chute, parachute training was started at the Air Service Mechanics School, then located at Kelly Field, early in 1920. Several classes of officers and enlisted men took the course and made jumps.

Though perfectly safe for jumping this chute was designed as a back pack, and its bulkiness made it so inconvenient for the aviator that he could not be induced to wear it in regular flights. With this serious objection in mind, the Experimental Department began working

of a barrel roll, while testing a monoplane equipped with laminated wood wings. Lieut. H. B. Harris found the lamination ripping off at the wing tips. He started for a landing field, but traveled only a short distance when the entire lamination began leaving. The lieutenant took to his parachute, landing safely in a grape arbour. [Lieut. Harris has told this story in the March issue of U. S. AIR SERVICES.—Ed. Note.]

In January, 1923, parachute training began in earnest at the Air Service Technical School, Chanute Field, Ill. And a short time after the graduation of the first class an order was issued by the Chief of Air Service requiring all aviators to wear them.

About fifty enlisted men have been graduated as parachute riggers this year, finishing their course with a



Official photo Army Air Service

Martin Bomber used for training parachute jumpers. Two men are being "lifted off" the lower wing, while the third is ready for a straightaway dive from the rear cockpit; two others have dropped from the bomb bay, making five in the air at once.

on new lines, the result of which is a service seat pack to be worn by the pilot and a lap pack for use by photographers and machine gunners.

Changes in the design of the chute were worked out. It was found that a less closely woven silk was more efficient and gave a slower rate of descent. A saving in material could be made by cutting the silk at an angle of 45 degrees with the radius of the polygon. This bias construction stops rips in the fabric by deflecting them into the inner pannel seams. Strength has been increased to such an extent that there was not a single failure of silk in one of the latest parachutes, tested recently, at a terminal speed of 430 miles an hour. This chute was dropped from a Martin Bomber at an altitude of 18,000 feet, with the use of a time fuse for pulling the rip cord.

The new service packs eliminate much of the inconvenience of the former types, and parachutes began to be worn by the test pilots at McCook Field. Coming out

carnival of jumping. Extreme care must be taken with the folding and maintenance of the chute; misplacing of a pannel may cause it to open in two lobes and greatly hasten its descent. Only the most painstaking men are picked for the course of instruction.

One class of fifteen officers also finished this course; they proved to be an enthusiastic class and every man made a cockpit jump. These officers came from every Field in the United States and have charge of the parachutes at their various stations, in addition to their other duties.

It has been found that a big rip in one or more panels does not materially hasten the descent. In most cases it really seems to slow it up. Oscillation stops altogether, preventing the air from spilling out of the bottom of the skirt. By exhausting through the tear, undisturbed air is picked up and it is thought that this gives added resistance.

FOR training jumps, two chutes are attached to the harness in such manner that one is on the jumper's back and the other in reserve on his chest. But in all the jumps made at this station, there has never been a failure of the first chute to function. The second chute is frequently released for the purpose of relieving the jumper of its weight in landing. Supported by the main chute, descent is slow, and lacking a rush of air the reserve may not open. More frequently it does, and in this case the chutes are crowded apart by the spill from the base of the skirts, to an angle of about 45 degrees. Due to this spill, the rate of descent is not greatly lessened.

When jumping was first started at this school, it was feared that in some cases fright or momentary lapse of consciousness might prevent the jumper from pulling his rip cord. With this idea in mind, a scheme was devised to pull him off a platform attached to the upper wings of a D. II. Gaining the proper altitude, the pilot signals to pull the rip cord and kicks the tail over with the rudder, so the way may be clear in the rear. The chute is partially open before the jumper leaves the wing. After making a "pull off," the student is allowed to step off the side of the fuselage.

More than 360 jumps have proved that there is little cause to worry over inability to pull the rip cord. It seems natural for a falling man to grab and hang on to the first thing available, and the rip cord is handily placed.

After making several jumps and gaining confidence, it is found that the student had rather leave in a headlong dive from the cockpit. This method of getting away from the ship seems to be a good one, for it can be quickly accomplished. Except the rip cord be pulled before actually leaving the ship, there is not the slightest chance of being blown into the tail planes, for the jumper has all the forward speed of the ship, and though his descent starts immediately, the sensation is that of going ahead, rather than that of falling. The rip cord may be pulled instantly after the jump is made.

In many jumps at this station, the chute has been fully open and supporting the jumper within 35 feet below the plane. The latest type chutes, freshly packed, will open in three-fifths of a second, at speeds approximating 100 miles an hour. And because of the speed the chute frequently opens parallel to the line of flight of the ship, but of course under it.

ONCE in the air and sitting pretty, the first thing to do is look down and see what you are over. By pulling down on the shroud lines on one side, air is spilled from the skirt on the other; the chute will slip to the side on which the lines are being pulled. Thus it is possible

to miss obstacles on the ground. It is estimated the chute may be side slipped 20 feet in a hundred feet descent. Side slipping hastens the descent and should be discontinued when close to the ground.

It is safest to land with the wind on the back—most sprained ankles are caused by landing side-ways—and the chute can be turned around by grasping the harness risers in each hand, throwing the body to one side, as if one were in a swing. When there is little wind, an easy landing can be made by pulling down on the risers at the moment of landing. The legs must be kept close together, and limp; no effort being made to take it standing up. Should the wind be blowing in excess of 20 miles an hour, it may be advisable to extend the feet straight ahead and slide in on the heels.

In an ordinary wind, a drag on the ground may be prevented by catching one shroud line and pulling in on it until the chute is spilled. However, if the wind is strong, it may be advisable to unsnap the chest and leg straps before reaching the ground. Once on the ground it is easy to get out of the harness with these snaps released.

The question arises as to what altitude the aviator might jump with the reasonable assurance that the chute would open in time to save life, it being understood, of course, that no one would care to jump at low altitude, except in case of emergency.

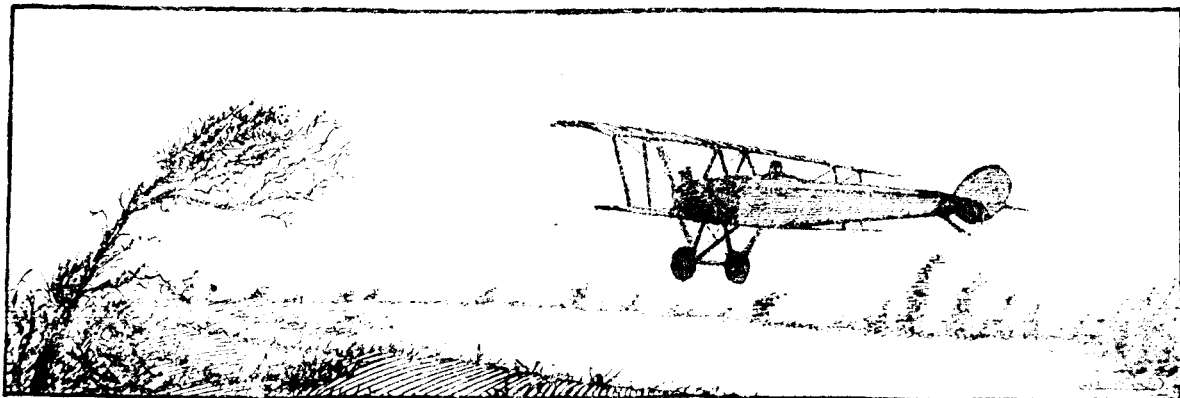
Speed of the ship and rapidity in pulling the rip cord are the big factors. Confidence, which only comes with knowledge of the chute and jumping experience, are considered essential for saving of life, at altitudes below 100 feet. Successful tests have been made with weights, at high speed, at 50 feet.

While not advising the pulling of the rip cord while standing in the cockpit, it has been done in two cases, and both men are living to tell about it.

In attempting an altitude record jump, at McCook Field, ~~the rip cord was~~ accidentally pulled while climbing out of the cockpit. He was pulled through the tail, taking with him the rudder, the balanced nose of which caught in his harness. His left arm was injured but he made a safe, though uncocious, landing. His arm got well!

Sergeant William Clarey, standing in the step on the side of the fuselage, pulled his rip cord before actually jumping. In opening, the skirt bellowed in between the brace and the stabilizer, catching on cotter keys and ripping two panels wide open. A perfectly safe descent was made in the damaged chute.

It is not claimed the parachute is a cure for all the ills of the airplane, but many of those killed in airplane accidents could have been saved by giving the chute a chance.



fied the requirements for an aviator's certificate. When that fact was reported to Washington, Lt. Lahm received a rebuke that matter-of-factly stated, "It is not the policy of the War Department to train enlisted men in flying . . . very few . . . are qualified to observe military operations or render accurate and intelligent reports of what they see . . ."

Vernon Burge was the first of more than 3,000 young enlisted airmen to earn their pilot's wings in the three decades that followed. And, in order to deal with the dilemma, the War Department wrote and rewrote the policies in an attempt to define who was eligible for flight training, the criteria for aviation pilots, and what kind of aircraft or cargo they could and could not transport.

On the more personal level, these young aviators directed the energies of engines lashed to fabric-covered spruce struts held together by bailing wire and piloted by guts. Getting up was one thing, the time aloft was the treat, but they frequently wondered if the damn thing would hold together when they landed.

Then, in the years between the world wars, a diversity of problems arose. Economic times were tough. It was a period of national uncertainty, and military programs came under severe scrutiny from an anxious Congress. The uniformed services were cut, airplanes were simply not available, spare parts inventories were not maintained, fuel was hard to come by, and aviation slots were reserved for the commissioned officers.

Despite the difficulties of the "roaring '20s" and the depression of the 1930s, aircraft were modified and used as ambulances and rescue vehicles. In response to the Air Mail contractors strike, the United States Army Air Corps' enlisted pilots flew the missions and delivered the mail. When the Alaskan-Canadian territory and the Great Smoky Mountains National Park were photographed and mapped, enlisted pilots were in command of some of the aircraft.

These young men were bound by one single purpose — they wanted to fly. Willingly, they performed the host

of mundane garrison duties as they anxiously awaited their turn in the cockpit.

The stories, their exploits and their accomplishments are legion. These young pilots were — in the modern vernacular, free spirits — with ice water in their veins and a devil-may-care attitude. Yet, their abilities as pilots were unmistakable. They were good. Damn good.

Within the ranks, they were heroes. They composed the few who wore the wings of an Army Aviator. And, if I had to pick a favorite personality in enlisted aviation, it would almost certainly have to be Sergeant Raymond "Uncle Chew" Stockwell. He was a huge walrus of a man with a neatly trimmed beard, a booming voice and piercing blue eyes. He was an aerial photographer and one of the most skilled pilots to ever operate on the Alaskan frontier. His work as pilot and photographer graced the pages of *National Geographic Magazine* and enabled the mapping of the Alaskan-Canadian Highway.

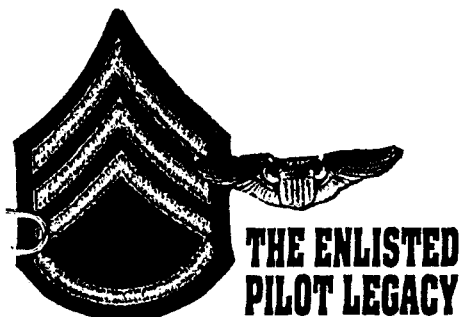
He was a man who definitely took some getting used to. His physical presence was intimidating and his appearance often did not fit the military "mold." Stockwell took particular pride in his mustache and beard, which he frequently described as "virgin hair" — it had never known a razor. While serving on the Alaskan frontier, he once encountered an astounded commander from the spit-and-polish stateside Army. The impeccably uniformed officer pointed to the NCO's beard and asked, "What's THAT?" Uncle Chew responded rather factually: "It's hair, sir. It grows there!"

Chew was also a gifted instructor pilot who maintained a possessive approach to his planes and his pupils. But, then, it took a dedicated sort of student to fly second seat in an open cockpit biplane with Uncle Chew — given the multitude of brown streaks of tobacco juice that adorned the fuselage from cockpit to vertical stabilizer!

Master Sergeant Ralph Bottrell possessed a different sort of commitment. He was one of the Army's pio-



Private Vernon L. Burge, at the time, and six other recruits, volunteered for "balloon duty" with the newly created Signal Corps Aeronautical Division in August 1907. (Photo courtesy of Marjorie Burge Waters).



neers in parachute jumping. At age 24, Bottrell had some 700 to 800 jumps to his credit either from balloons — he started at age 16 — or aeroplanes. Then in 1919, he jumped successfully from an aircraft in flight, employing a parachute with a D Ring and a ripcord device for the first time. The D Ring and the ripcord were his inventions and enabled endangered aviators the ability to exit an aircraft with some added measure of safety. His exploits and his near-brushes with death caused many an anxious moment and earned him a Distinguished Flying Cross in 1933.

Then in 1941, Congress halfheartedly funded Public Law 99, which provided some conditional training possibilities and gave "... enlisted flying students the title of Aviation

Students." Graduates of the program "... were awarded the rating of pilot and warranted as a staff sergeant."

By that time, too, much of Europe was teetering on the brink of, or immersed in, World War II. American public opinion was divided on the subject of whether or not to be aggressively involved in those hostilities. Within the uniformed ranks of the Army Air Corps, many enlisted men sought the coveted slots for flight school. Some prospective aviators were impatient and doubted if they would ever receive one of the coveted aviation appointments in the Army Air Corps. Rather than wait, they crossed the border and joined the Canadian Royal Air Forces. There, the candidates "enjoyed" the rigors of the Canadian flight training program, and the graduates earned the inverted chevrons of our ally. Many of those who earned the Canadian wings were then transferred to England and a number fought to repulse the German Luftwaffe in the Battle of Britain. While some did not survive, many others ultimately transferred back to the United States Army Air Corps follow-

ing the Japanese attack on Pearl Harbor. In fact, there were at least 145 staff sergeant pilots who transferred back to American service. They had the unique distinction of wearing the pilot wings of two nations.

In the earliest months of World War II, sergeant pilots did all that they were supposed to do and more. They provided a core of experience that could — and did — serve as a foundation to build the Army Air Forces. They were proven pilots of experience and longevity. They had indeed been around. Those pilots with chevrons winged their way to the various forays around the world in command of fighter aircraft, transports and bombers. They served with bravery, honor and distinction. Yet, official Washington still did not know how to cope with the concept that enlisted men could actually be trusted with aircraft. To put an end to the dilemma once and for all they called for new legislation.

In late 1942, Congress enacted the Flight Officer Act — Public Law 658. As a result, "... those sergeant pilot produced by the Staff Sergeant Pilot Program were promoted to flight of



Sergeant Ralph W. Bottrell, standing beside a DH-4, displays the parachute "D" ring he designed. The "D" ring enabled the jumper to open the parachute at his own discretion. In 1933, Bottrell was awarded the Distinguished Flying Cross in recognition of his part in the development and testing of parachutes. (USAF Museum photo).

RETIREMENT OF A PIONEER PARACHUTE JUMPER

BOTTRIELL

Master Sergeant Ralph W. Bottriell, world famous Air Corps parachute pioneer, retired March 31st at Kelly Field, Texas, pursuant to orders from The Adjutant General. The veteran parachute expert and daredevil jumper terminated his 30 years of service with the Air Corps after more than 500 daring parachute leaps.

Sergeant Bottriell is undoubtedly the "dean" of all parachute jumpers, besides being the leading parachute technician in the Air Corps. He made most of his leaps at a time when flying itself was considered extremely hazardous but parachute jumping downright dangerous. On entering the service, Sergeant Bottriell undertook the daring mission of establishing confidence in parachutes and of proving to the world, especially aviators, that parachutes could be relied upon. He repeatedly jeopardized his life to this end.

Sergeant Bottriell made his first jump from a hot-air balloon when only 16 years of age, on the fourth of July, 1902, before a carnival in Nashville, Mich. This was when the Wright Brothers' airplane was still only a dream. The Sergeant, then only a boy, ascended with his 'chute attached below his balloon. Once in the air, he had no other means to return safely to terra firma except to cut himself loose when he had gained the desired altitude. Thus, when he joined the Service some seven years later, he was already a famous parachute jumper, having more than a hundred leaps to his credit.

His most outstanding jump was on May 19, 1919, at McCook Field, Ohio, when he was the first Army man to jump with the manually operated free type parachute which he himself developed. This was the first 'chute that could be opened after the jumper had cleared the plane, and was the direct forerunner of the modern parachute used in the Air Corps today.

Sergeant Bottriell realized the hazards of the old attached-type parachute, which was fastened to the plane and opened when the jumper left the ship. It was quite possible for the shrouds to become entangled in the tail section of the plane. In 1919, after years of work, a free-type parachute was completed and was ready for the big test.

For this jump and the many others that he made perfecting this parachute, he was awarded the Distinguished Flying Cross on July 1, 1933, with the following citation:

For heroism while participating in aerial flights. On May 19, 1919, at

McCook Field, Dayton, Ohio, Sergeant Bottriell made the first jump to be performed by Army personnel with a manually operated, free type parachute. At this time, parachute jumping of any kind was extremely hazardous. In spite of this, Sergeant Bottriell repeatedly jeopardized his life while making parachute test jumps from airplanes flying at various altitudes to perfect this parachute. By his untiring effort, fearlessness, and disregard of personal danger, Sergeant Bottriell aided materially in proving the free-type parachute not only possible but practical for airplane use."

In recommending Master Sergeant Bottriell for the award of the Distinguished Flying Cross, Brigadier General Henry C. Pratt, then Chief of the Air Corps Materiel Division, stated that "for the valuable scientific data which this noncommissioned officer aided in securing for the Air Corps, for his bravery, skill and splendid spirit shown in volunteering for such work, it is felt he exemplified the finest Army traditions and is deserving of the highest praise. The success of the Army parachute and the number of lives it has saved is the most potent proof of the value of his work," and, further, "Sergeant Bottriell's service.... has been honorable and he has ever through his efficiency, loyalty, skill, and manly conduct been a credit to the Air Corps of the Army. Such work as his raises the standard of work and morale throughout the service and is comparable to the finest acts of bravery during time of war."

Sergeant Bottriell's most spectacular jump was in 1920, when he was attempting to establish a record for a high altitude descent. After climbing to 20,000 feet, which was the maximum ceiling of his plane, he was preparing to jump when his 'chute opened prematurely and dragged him through the tail section into space. He was rendered unconscious by the blow, and his left arm was nearly torn off. A panel in his parachute was badly torn, but the 'chute lowered him to earth slowly enough so that luckily he regained consciousness in ample time to open his second safety 'chute. The total descent required 22 minutes, during which time he very nearly bled to death from his wounds. With the elevators, rudder, vertical and horizontal stabilizers of his plane practically demolished, and with no parachute, since Sergeant Bottriell was wearing the only two 'chutes available at that time, the

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Pilot of the damaged plane was in almost a more serious plight than the Sergeant. Fortunately, the pilot managed to land his plane safely and was uninjured.

This nearly fatal accident did not restrain Sergeant Bottriell in the least, as might be expected. As soon as he was on his feet, he made a long tour throughout the United States, demonstrating, by actual jumps the new free-type parachute. Thus, in 1926, when he made his last jump at Brooks Field, San Antonio, Texas, he had accomplished his mission. He had developed a safe parachute and by complete disregard for his own safety had built up complete confidence throughout the world in the life-saving silk. Without this confidence, the parachute would be valueless, for no pilot would dare rely on it.

Sergeant Bottriell joined the Army in 1905, enlisting in the Cavalry. In 1917 he joined the Air Service at Kelly Field, Texas. He has served at Brooks Field, Texas; McCook Field, Ohio; and in the Philippines, but Kelly Field claims Sergeant Bottriell as its own. He began his air service at Kelly Field, made his first jump from an airplane at this field, and has been in charge of the parachute department of the Air Corps Advanced Flying School at Kelly Field since its organization. He has personally instructed thousands of graduates of the Air Corps Flying School in the use of the parachute. Three-quarters of his 20 years' service has been in San Antonio. There is hardly a town in all of eastern Texas that has not watched Kelly Field's Sergeant Bottriell come down out of the heavens to land in the middle of the local fair grounds.

Sergeant Bottriell's contribution toward safeguarding flying is a most outstanding one. Aviation owes this brave and fearless noncommissioned officer a debt of gratitude, the measure of which is illimitable.

Sergeant Bottriell's home was formerly in Grand Rapids, Mich. He will make his future residence in Los Angeles, Calif., where his parents now reside.

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The 7th Reconnaissance Squadron, France Field, Canal Zone, was well represented on the recent flight to Lima, Peru, mentioned elsewhere in this issue. The Squadron furnished 3 planes of the 12-plane formation, and officers of the Squadron piloted them, those making the trip being Capt. Guy F. Hix, 1st Lts. Henry K. Morley, Donald M. Weckwitz, 2nd Lts. J. D. Moor-J. D. Barry and W. E. Boyd (Air Ros.).

All members of the flight reported a very interesting and a most delightful time as guests of the Peruvian Government.

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Ex McCook Flyer Given Award for Chute Tests

Master Sergt. Ralph W. Botttriell, formerly of old McCook field and at present stationed at Kelly Field, Tex., has been awarded the Distinguished Flying Cross of the war department for his bravery in performing the first free parachute jump and for his numerous subsequent jumps in connection with experimental work in the development of the parachute.

The citation of award reads: "On May 19, 1919, at McCook Field, Dayton, Ohio, Sergt. Botttriell made the first free jump to be performed by army personnel with a manually operated, free-type parachute.

"At that time, parachute jumping of any kind was considered extremely hazardous. In spite of this Sergt. Botttriell repeatedly jeopardized his life, while making parachute test jumps from airplanes flying at various speeds and at various altitudes to perfect this parachute.

"By his untiring effort, fearlessness and disregard of personal danger Sergt. Botttriell aided materially in proving the free type parachute not only possible but practical for airplane use."

Sergt. Botttriell began his parachute test jumping under Maj. E. L. Hoffman, present chief of the equipment branch, Wright Field, and the foremost man in the United States in the development of the parachute, while the latter was still at old McCook Field.

In speaking of Sergt. Botttriell Maj. Hoffman stated that he was absolutely without fear, and would make a jump under any conditions for test purposes. Maj. Hoffman related one instance in which Sergt. Botttriell had gone through the tail of a plane, cutting his arm severely. It was a high altitude jump, and in the descent Botttriell drifted from over McCook Field to a point on the old Springfield pike. Botttriell had had to prop his arm up in the rigging to prevent too much loss of blood while coming down, but the experience made him none the less dauntless.

Sergt. Botttriell made his first parachute jumps in 1910 from a balloon at various county fairs. Up until 1918 he had made more than 700 jumps from balloons. In 1920 he made a safe jump from a plane at an altitude of 20,600 feet, establishing a high altitude jump



SERG. RALPH BOTTRELL record that existed for some time.

In the latter part of 1919 Sergt. Botttriell was appointed instructor in the first army parachute jumping school. His last jump was made at Brooks Field, Tex., in 1926.