

Adventures of an Early Aeronaut

By L. W. DAVIS with CHARLES EARL HESS*

Charles Earl Hess was enjoying the luxury of sleeping a bit late on a July morning in 1905. He had just returned from Cleveland, Ohio where he had been working for the Peerless Motor Car Co. and trying to convince Barney Oldfield that Barney should take him along as assistant mechanic on the Peerless Green Dragons, but the sales pitch failed and Barney hit the circuit again without him. Somewhat disgusted, Earl quit his job and returned home to his widowed mother at 2017 Vermont Ave. in Toledo, Ohio.

About to awaken anyway, he heard his mother calling, "Earl, get up and see the airship." Earl got up and crawled out of his bedroom window onto the woodshed roof in time to see Roy Knabenshue flying his airship "Number One" from the Lucas County Fair Grounds to the roof of the Spitzer Building in downtown Toledo where he landed, then took off again and flew back to the Fair Grounds.

Earl looked at the airship droning along at the high speed of 5 to 15 miles an hour and said to himself, "If that guy can fly one of those things, so can I." And he did.

Claims have and will be made as to who built the first successful dirigible balloon, but regardless of the "firsts," airshipping did not amount to much before 1898 when Alberto Santos-Dumont started building a series of dirigibles which paved the way for those who followed.

His long, spindle-shaped dirigible No. 1, 82 feet in length and 11½ feet in diameter, was launched successfully from the Jardin d'Acclimatation in Paris, France, on the 20th of September 1898 after an unsuccessful attempt on the 18th. During this short flight it maneuvered in all directions but was soon forced to land due to insufficient gas pressure. (1)

This airship was followed by two others in 1899, the Santos-Dumont Nos. 2 and 3. All three of these dirigibles were powered with a two cylinder DeDion & Bouton, motor-tricycle engine of one cylinder design which was "twinned" by Santos-Dumont in an unusual manner. He located the second cylinder on top of the first, running a piston rod through the head of the lower cylinder to operate the upper piston. With this unusual arrangement he obtained 3½ hp with a weight of 66 pounds, which in 1898 he considered quite good. (2)

He continued with more powerful engines, however. With the Santos-Dumont No. 5, which was completed in early 1901, he adopted the triangular girder framework suspended under the gas bag and carrying the weight of the aeronaut, engine, fuel, ballast, etc. This long girder distributed the load over the length of the bag and prevented its folding up in the middle if the bag became flabby due to low gas pressure, a fault which plagued his Nos. 1 and 2. This girder framework was a feature incorporated in later American exhibition airships, as was his idea of "side suspension" which eliminated the traditional balloon netting. (3)

In Europe the airship seemed to create interest primarily as a potential military machine and its development there proceeded along such lines. In America the airship seems to have been regarded more as a scientific curiosity favoring the exhibition trend which developed in this country during the early years of the century.

Pedal-operated airships (4) had been built in the United States before the days of Santos-Dumont, but

their ability and that of the first power-driven airships of Leo Stevens and others, was limited. Not much stir was created until the veteran balloonist and parachute jumper, Capt. Thomas Scott Baldwin, appeared on the scene at the Louisiana Purchase Exposition of St. Louis, Missouri in 1904 with his California Arrow.

Considerable interest was created by the Arrow and other aeronautical exhibits at the Exposition, and that Winter Roy Knabenshue, who had flown the Arrow for Baldwin at St. Louis, (5) went home to Toledo and built his "Number One" which he flew to the Spitzer Building and other places during 1905. Baldwin on the other hand went back to California to build more Arrows, and in 1905, while Knabenshue was flying in the east, Lincoln Beachey was flying for Baldwin in the west, including an appearance at the Lewis and Clark Exposition at Portland, Oregon. However, as the year drew to a close, Beachey came east to Toledo with the idea of building an airship himself.

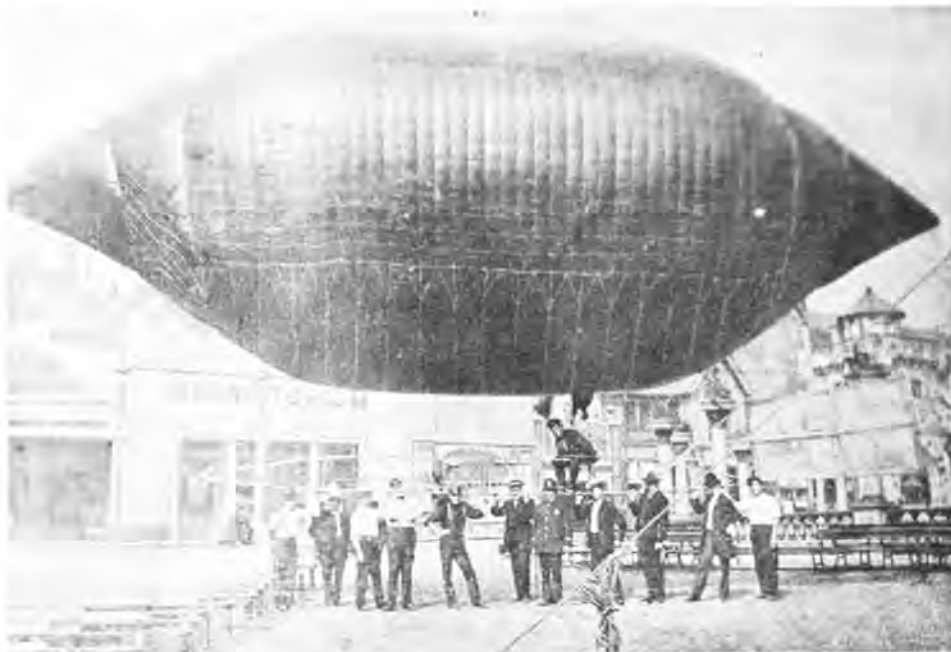
After Earl Hess climbed down off the woodshed roof, he headed for the fair grounds. There he made the acquaintance of Roy Knabenshue with the result that when Beachey arrived at Toledo, perhaps about the first of the year, Hess met him, too, and was engaged to help construct an airship.

The two went to work in a loft over a drugstore and laundry at the corner of Bancroft and Ashland in Toledo and next door to the Coliseum where Knabenshue was to finish the bag for his three-man ship in 1908. The building had previously been a street car barn. The part which had been converted into the Coliseum was open from floor to roof, but there was a second story loft over the drugstore and laundry. It was here that Beachey and Hess carried on their work.

First a quantity of silk had to be purchased, and a seamstress located to sew up the bag. For the bow and stern sections, the silk had to be laid out and cut to produce the more or less conical ends, and for this Beachey had light wooden forms which were laid on the silk so it could be cut to the proper shape and size. While the bag was being sewn up, a net of about five inch mesh was produced by weaving cords over a wood block about five inches square. The net was to cover the upper part of the bag and cap the ends so that the bag could not slip out of shape if the ship was pitched up or down at too sharp an angle. Along the main part of the bag, about half way down the side, the net ended and the cords were gathered in a series of delta connections from which heavier cords extended downward to the triangular spruce framework below, which carried the aeronaut, engine, propeller and rudder. (6) These suspension cords were tied to the frame at intervals of perhaps 15 inches. A clove hitch was used and the free end secured with a half hitch so it would hold securely, but could be readily loosened if it was necessary to make adjustments in the length of the cords to equalize the tension on the bag.

The frame was constructed of long pieces of spruce separated by shorter pieces and braced with piano wire.

(*) This article is the result of many conversations between Mr. Davis and Mr. Hess, covering a period of years. It is as factual as memory and a relatively limited amount of research have made possible.



The airship flown by Earl Hess, as he recalls it, at Hagerstown, Maryland in October 1906. This ship had a gas bag capacity of 6,000 cubic feet and was built by Lincoln and Hillery Beachey and Earl Hess. Construction of the airship took place at Pittsburgh, Pennsylvania with the initial construction being done by the Beacheys before Hess rejoined them and assisted in bringing the ship to completion. To the best of Earl Hess' memory, the airship was completed in the latter part of July 1906. It was then flown at an amusement area, Luna Park in Pittsburgh, by Lincoln Beachey. Shortly afterward, Hess took over the job of piloting the airship and so became a star aeronaut in his own right. (Photo - L. W. Davis)

In order to save weight, turnbuckles or wire strainers were not used, but the pieces of wire were carefully bent around two nails driven in a piece of board so as to be just the right length to reach diagonally across the bays in the frame--from one of the bolts holding the frame together to the other.

After the bag was sewn up it had to be sealed with varnish to make it gas tight. For this, the aeronauts made their own varnish by boiling linseed oil out in a vacant lot until it was the right consistency and then added paint drier to make it easier to work. (Hess remembers that they lost one five-gallon can of oil in the process.) To start the varnishing, the bag was laid out on the floor in accordion folds and the varnish applied with brushes to one fold after another. Once the varnishing was started, it was carried on without stopping until the bag was sealed to the point where it would hold air for a reasonable time.

It was during this process that Beachey and Hess were almost overcome by paint fumes. They started varnishing on a dark rainy day in late Winter or early Spring. A few windows were partly opened to allow the escape of fumes but not enough, and they came to feel quite ill. They hung their heads out of the windows for a breath of fresh air and then went down to the drug store where the druggist administered a little relief, but the job was not completed, so they came back, opened all the windows, and went on with the varnishing.

A blacksmith's blower had been procured and as soon as the bag could be inflated, it was filled with air and then rolled back and forth on the floor while more varnish was applied to seal it. After two or three coats, it would hold air quite well.

Beachey did not fly the ship at Toledo but, when it was completed, shipped it to Pittsburgh, Pennsylvania where he flew at Luna Park, one of a chain of amusement parks scattered over the country. This left Hess out of a job, but he had begun to make a name for himself as an airship man and when Tony Nassr, the son of a Syrian fruit dealer in Toledo, decided to build a dirigible, Hess was again hired as an assistant. The Spring of 1906 found him at the Rideout farm on East Broadway, where Nassr had erected his aerodrome tent, following his now familiar occupation.

Nassr lacked the experience and ability of Beachey, however, and the Fall of 1906 found him still trying to get his ship off the ground, long after Hess had gone to greener pastures. After working for Nassr for a

short time, Hess had received a call from Lincoln Beachey to come to Pittsburgh where Beachey and his brother, Hillery, were at work on a new airship. Earl went to Pittsburgh, helped the brothers complete the new craft and was initiated in the piloting of airships.

Not long after he rejoined the Beacheys, Lincoln Beachey decided to quit the Luna Park people and Hess had the opportunity to become a star in his own right. When he was flying in Maryland, the Hagerstown Evening Globe, 8 October 1906, made these comments:

AIRSHIP MAKES SHORT FLIGHT ABOVE GROUNDS
AERONAUT EARL HESS DOES THE SKY ACT, WHICH WAS
CUT SHORT BY THE ENGINE BREAKING....

The airship on the Fair Grounds made a partially successful flight this morning at 10 o'clock. It started from the tent and flew over the grounds and then over to a vacant lot, owned by Milton Kohler, near the Broadway School building, where it descended. It was the purpose of the aeronaut to fly down town, but the engine broke down and it was necessary to make repairs. The ship will fly again this afternoon and may come down town.

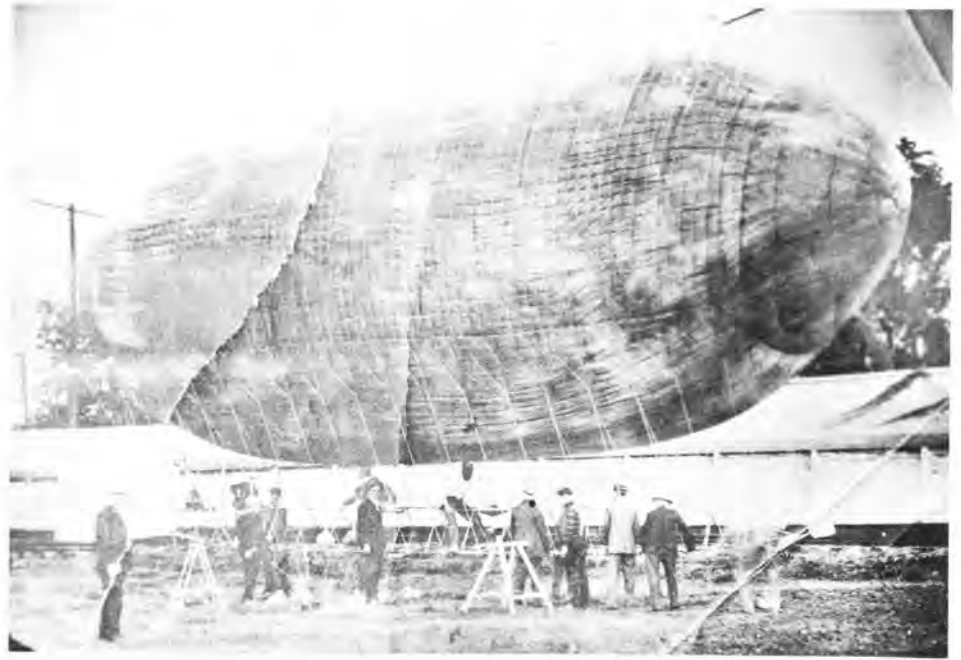
The ship was in the air about six minutes and rose to a height of about 250 feet.

Earl Hess is the aeronaut. He is only 18 years old. (7) Joe Weimer, owner of the ship, has made \$10,000 this summer, it is said.

The ship is the same one which flew over Washington this summer. Some of the parts are new, others have been repaired and the gas bag has been revarnished, but the gas bag is the same. Most persons when they look at the ship think it is a frail affair. One man said the car was made out of fishing poles and fastened to the bag with fishing lines. As a matter of fact, it is strongly built.... For an ordinary fly-around the aeronaut usually ascends to a height of some 300 to 700 feet.... The aeronaut sits astride the car, above the engine. When he wishes to ascend he shifts his position backward. When he wishes to descend he scrambles forward. He does not sit in an easy chair, secure, as many imagine. Sufficient ballast is carried to make the airship just a little too heavy to go up with the aid of the gas alone. The engine is set in motion and then up it goes. The aeronaut would be unable to descent at pleasure in case the weight

In a letter to the author, Hillery Beachey identified this airship as the one built by Lincoln Beachey and Earl Hess at Toledo, Ohio and used by Lincoln in his Washington, D. C. flight of June 1906. Both Hess and Hillery Beachey agree that the bag of the airship built at Toledo was about 60 feet long and that it was probably longer than the airship flown by Hess at Hagerstown. This is confirmed by a comparison of the photographs and a study of other photos taken by a staff photographer and published in The Washington Star of June 14, 1906. However, as far as the author has been able to determine, many of the details concerning this airship and its ultimate fate remain a mystery.

(Photo - L. W. Davis)



of the ship were lighter than the gas. The engine weighs but 52 pounds and the bag has a capacity of 6,000 cubic feet of gas. The airship was made by Lincoln Beachey, his brother Hillery, and Earl Hess.... Chas. O. Ward was stationed today at the tent and sold tickets, a dime each, to everybody who wished to see the wonderful invention.... Flights are not made when the wind has a greater velocity than 12 miles an hour.

Following this appearance, the airship went to Birmingham, Alabama, and a newspaper in that city published the following in October 1906:

All four of the ascensions of the airship at the fair grounds yesterday were made by Earl Hess, who bears the reputation of being one of the most daring aerial navigators in the country. Hess comes from Toledo, Ohio, where airship navigators are born, and has associated with Roy Knabenshue and other airship men of that city. His record for the season just ending is fifty-one successful flights.

Hess demonstrated to the vast crowd at the fair grounds that witnessed the flight of yesterday that at all times he had the ship completely under his control, said a man connected with the management. His last flight of Thursday was a series of maneuvers in front of the grand stand, and six times did he guide his frail craft back and forth before the thousands of spectators. Hess accomplished a great feat in airshipping. He succeeded in making a complete figure eight within a distance of one hundred yards. Captain Hess and his airship will attempt a trip into the business section of Birmingham today, the weather conditions permitting.

Weather conditions at Birmingham were very bad, however, and the flights mentioned were about the only ones made. This ended the 1906 season and Hess returned with the airship to Pittsburgh.

It was then decided to send him to Mexico, D. F., and leaving Pittsburgh February 4, 1907 he arrived in Mexico City on the 9th. When the airship arrived later, he set to work to increase the length of the bag and frame by 20 feet to gain gas capacity to offset the loss of lift due to the high altitude there. He had the ship ready to fly by the first of May, but failing to get

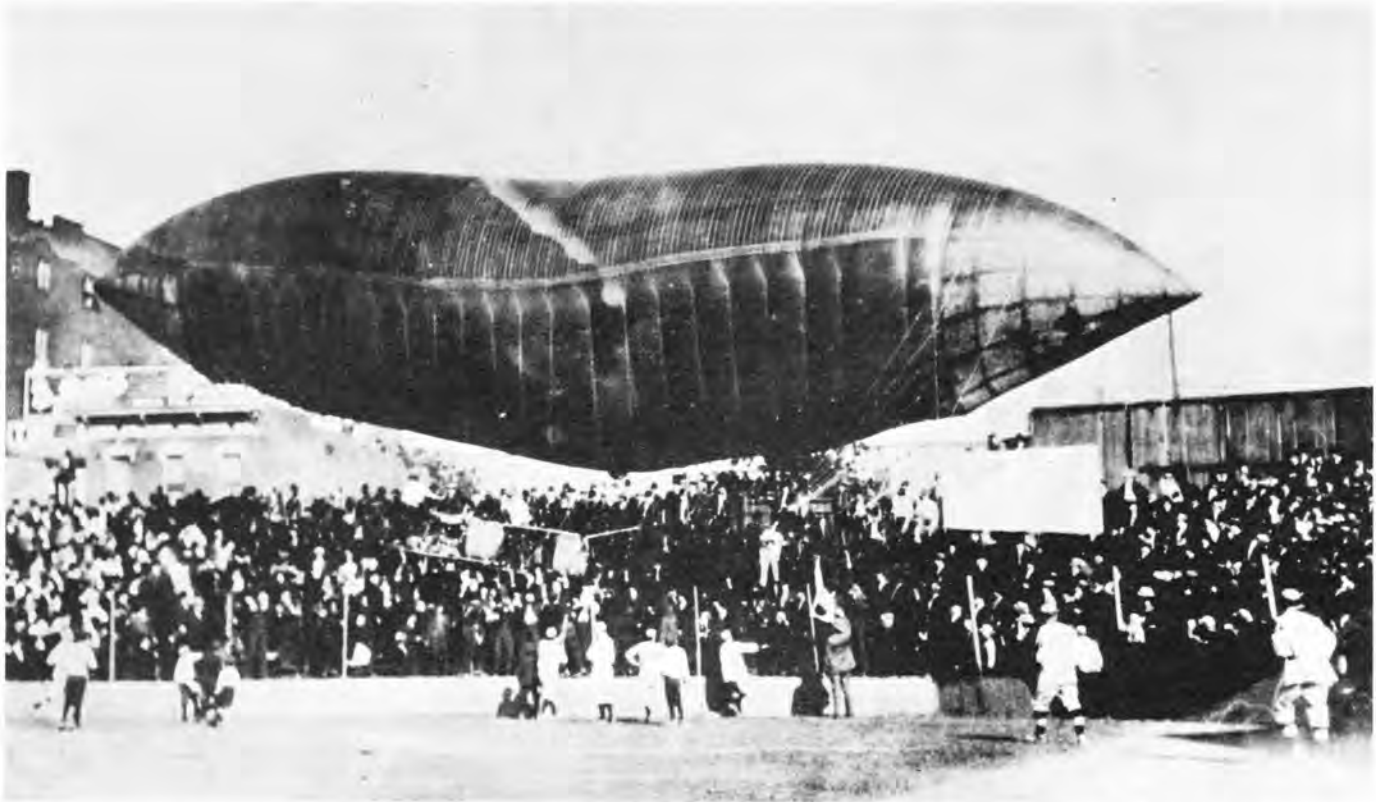
a satisfactory contract, he never made gas, but returned to Toledo. A day or two after returning home he signed a two year contract to fly for Roy Knabenshue.

He filled an engagement at Hartford, Conn. before the end of the month and followed with flights at Providence, R.I., Worcester, Mass. and London, Ontario, Canada. These flights were made with Knabenshue's "Bag Number Three" which was equipped with a two cylinder, two cycle engine with the fly wheel being a circle of scrap iron laced to the hub with bicycle spokes. This engine was equipped with a maxing valve instead of a carburetor and was quite tempermental in operation. While flying at Providence, the engine stopped in flight but Hess, hanging from the bottom frame rails by his legs, and holding to the top rail with one hand, was able to reach under the frame and restart the engine by pulling on the rim of the flywheel.

It is of interest to note that while exhibition men such as Knabenshue did receive as much as a thousand dollars a day for putting their airships in the air, at this time, there were considerable expenses besides that of building the ship. One necessary item was a large tent of special construction to house the airship while on the ground. It consisted of a series of tall poles



Earl Hess on the frame of Roy Knabenshue's "Bag Number Three" at Hartford, Connecticut during May of 1907.



The wreck of Knabenschue's Three Man Ship in the bleachers at Swayne Field, Toledo, Ohio on May 23, 1908.

which were erected in parallel rows and guyed at the top. These were set through holes in the roof of the tent while it was lying on the ground. After the poles were erected, the tent was raised to provide an open span shelter for the airship. Gas generating apparatus also had to be provided, as well as numerous other accessories and these, together with the aeronaut and necessary crew of helpers, had to be transported from place to place wherever exhibitions were held.

At the end of an engagement, the airship was deflated, the tent struck, and all the apparatus along with the personnel, loaded into a Railway Express car (which might be obtained at theatrical rates) and transported to the next site. Then came the unloading, transportation to the place of operation, erection of the tent, followed by the inflation of the gas bag and other preparations for flight. The hydrogen generating equipment, in this case, consisted of two round wooden tanks about five feet in diameter and three or four feet high with a brass-trimmed porthole in the top center for charging iron chips and water, a flanged lead pipe at one side (which could be stopped up) for the introduction of sulphuric acid and, on the opposite side, a hole to which a varnished cloth tube could be attached to carry off the gas. In the line between the gas generators and the airship, was a slightly smaller box containing lime and straw. This acted as a filter for the removal of some of the impurities from the gas, including acid fumes which would damage the bag.

To get the thing going, it was necessary to go out and buy a ton or so of drill chips and lathe turnings and about the same of sulphuric acid. Then it was necessary to tend the generators for perhaps 9 to 12 hours until the bag was inflated.

From the above, it can be seen that a fairly high revenue was necessary to make such a venture profitable, a fact which helps to explain the decline in airship operation when public interest began to turn to the airplane in 1909. Probably an all time low was recorded in 1912 when one aeronaut was making flights from an eastern

amusement park for \$50 per week. In this case, however, he was based at one location for the whole season and had no transportation problem.

After the London, Ontario engagement, Hess went back to Toledo for a new bag on which the suspension cords of 210-pound test Irish linen were attached to gromets set in a strip of canvas sewn into the side of the bag after the fashion of the "side suspension" practiced earlier by Santos-Dumont. One of the first flights with the new ship was at Greenville, Ohio on the 27th of August 1907. The ship was based at the fair grounds about three miles from the center of town and had been grounded all day by high winds. Between 5 and 6 o'clock in the evening the wind died down and Hess went up, circled the field and started for town. After passing the center of town he circled back and headed for the fair grounds, but the wind had risen again and the cooler air of evening caused the gas to contract, leaving him with a flabby bag. Because he was running at full throttle trying to make headway against the wind, the nose of the bag would collapse inward, the ship would come almost to a standstill, and Hess would have to swing off across the wind until the nose popped out again. This action had been repeated two or three times when the bag ripped along the canvas suspension strip and dumped all the gas. The ship began to fall rapidly from a height of about 800 feet, when the end of the bag, which had not ripped open, caught the air and checked the descent. The ship then parachuted toward the ground with the frame pitched at a sharp angle.

Hess has no clear recollection of the impact, in which one end of the frame struck the rear of the Frank Hayes' residence on Morrow Street, knocking off an eave trough and a few shingles, but when he became fully conscious of his surroundings again, he was sitting in the Hayes' flower bed with his legs straight out before him. The frame of the airship was across his lap, and the balloon bag was settling down over his head.

The lady of the house came out and pulled the bag off of him, and after trying first one leg and then the

other to see if they would still work, he forcibly unclenched his hands from the frame rails, got up and walked to a water pump in the back yard. There he took the tin cup and pumped a drink of water, splashed some on his face, and decided he had made a successful landing.

By this time, the curious had begun to swarm in, trampling not only the Hayes' flower bed to ruin, but the neighbors' flower beds as well and, with all, bringing a damage suit on Knabenshue. However, before bedtime that night, a seamstress had been located to repair the torn bag and the second day after the fall, the ship was in the air again with Hess at the helm.

It will be noted that trouble at different times due to insufficient gas pressure within the airship envelope has been mentioned. Santos-Dumont provided against this by having an internal balloonet which could be inflated with air to counteract gas leakage or contraction due to temperature change, but in his Nos. 1 and 2 he failed to provide a blower of sufficient capacity. The American exhibition airships, however, were not provided with balloonets as a matter of simplification and economy and due to the fact that they were seldom in the air for longer than 15 to 30 minutes and therefore did not particularly need such a provision.

The aeronauts would keep track of their gas pressure by pressing their hand or punching their knuckles against the bag at intervals. If it became too slack they would cut short their flight; or if it became too tight, due to being overheated by the sun, they would untie the appendix, which was kept tied with a soft cord or piece of webbing, and allow some gas to escape. While on the ground, an external balloonet was sometimes used as a storage vessel and if the bag became too tight due to overheating, some of the gas would be transferred to the balloonet to relieve the pressure.

After the end of the 1907 season, Hess helped in the construction of Knabenshue's Three Man Ship which was designed to carry passengers as well as fly exhibition. The bag had been sewn up in Knabenshue's new barn at Toledo, but was taken to the Coliseum for varnishing, near the loft where Beachey and Hess had constructed their ship two years earlier.

The big ship, with a gas bag 105 feet long, was completed in the Spring or early Summer of 1908 and on the 23rd of May it was taken up for a trial flight with Knabenshue as engineer, Charles K. Hamilton as rudder man and Earl Hess as runner or elevator man. The three were flying nicely when the fulcrum pin came out of the carburetor float and the engine choked up and quit. They immediately lost their dynamic lift and, in maneuvering as a free balloon, dumped their ballast, threw a spare can of gasoline into a vacant lot and came down on the bleachers at Swayne Field, where the ball game between the Toledo Mud Hens and the Indianapolis Indians was in the last half of the seventh inning.

The frame struck the top of the bleachers with Hess out over Ontario Street and broke in two, as did the ball game. The airship was lifted off the fence and deflated. After being repaired, it was taken on tour by Knabenshue and Hamilton. It was later destroyed by fire at Des Moines, Iowa as the aftermath of a storm.

(8)

As a result of this misfortune and perhaps other causes, Knabenshue's exhibition business fell off for the next few months. Having little activity during the 1908 season, Hess quit flying and in 1909 joined the Union Supply Company of Toledo, servicing Indian motorcycles through eleven counties in northern Ohio.

In early Spring of that year he spent some time at the Indian factory at Springfield, Mass. where he rode with Charles Spencer, testing new Indian twins on the board track at Springfield. Returning to Ohio, he raced on dirt tracks as a factory-sponsored rider at Toledo, Cleveland, Columbus, Sandusky, Fort Clinton, Bowling Green and Findlay; and at Fort Wayne, Indiana; Chicago, Illinois; Detroit, Michigan and other places.



Earl Hess, second from left, at Mexico City in 1907 with the airship he had flown at Hagerstown and Birmingham.

The year of 1909 ended his exotic career, however, and the remainder of his life was spent largely in the glass manufacturing business from which he retired as a sales executive with the Libbey-Owens-Ford Company in 1950. He now lives in Florida.

FOOTNOTES

(1) HOW I BECAME AN AERONAUT AND MY EXPERIENCE WITH AIR-SHIPS, by Alberto Santos-Dumont in McClure's Magazine for August 1902.

(2) Ibid.

(3) MY AIR-SHIPS, by Alberto Santos-Dumont. The Century Company 1904. Page 83.

(4) See - Professor Ritchell of Hartford, Connecticut, in THE WORLD IN THE AIR Vol II, page 46 by Francis Trevelyan Miller, and "Carl E. Myers of the Balloon Farm" in New York History, Vol. XLIV, No. 4, October 1963.

(5) See - Photograph of Knabenshue flying the Arrow at St. Louis in the Wing-Foot Lighter-Than-Air Society Bulletin, Vol. II, No. 6, April 1964.

(6) See - "How to Construct and Operate a One-Man Air-Ship", by Capt. Thomas S. Baldwin, Scientific American, February 29, 1908.

(7) Hess was actually older but may have looked 18 due to his rather slight build.

(8) It was reported a few years ago that Roy Knabenshue had written his memoirs in which many of the incidents of his flying career were set forth. As far as the writer knows, this manuscript has never been published, which, if true, is a matter of regret and a great loss to the history of exhibition flying.