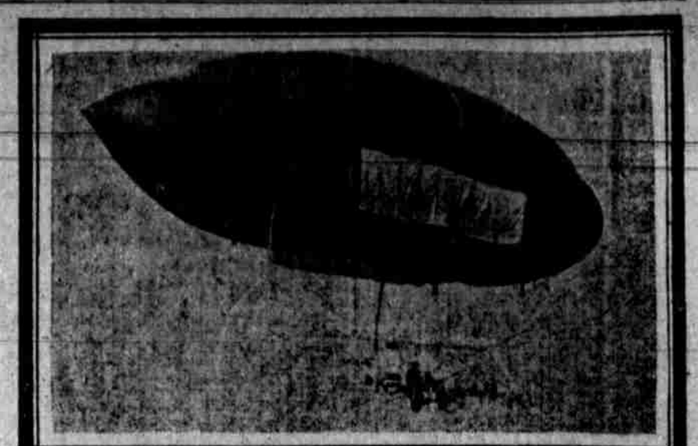
Balloons and Airships

Some Interesting Facts About Them

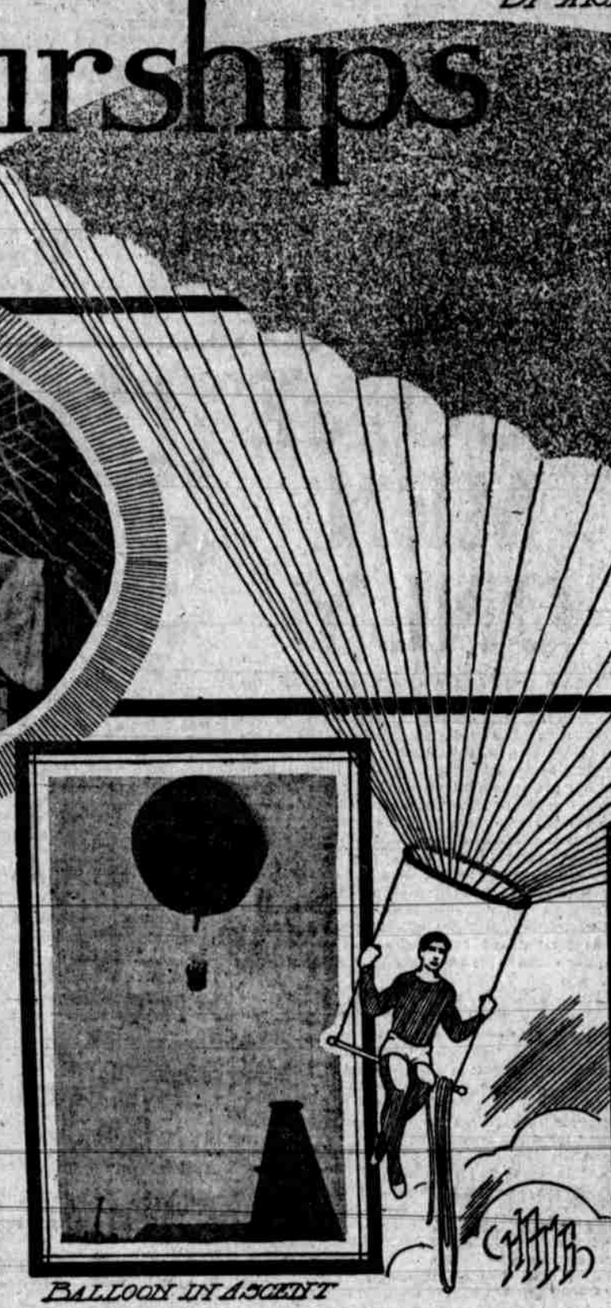
BY ARNOLD KEUCKMAN



"PEGASUS" FIRST AIRSHIP BUILT IN AMERICA

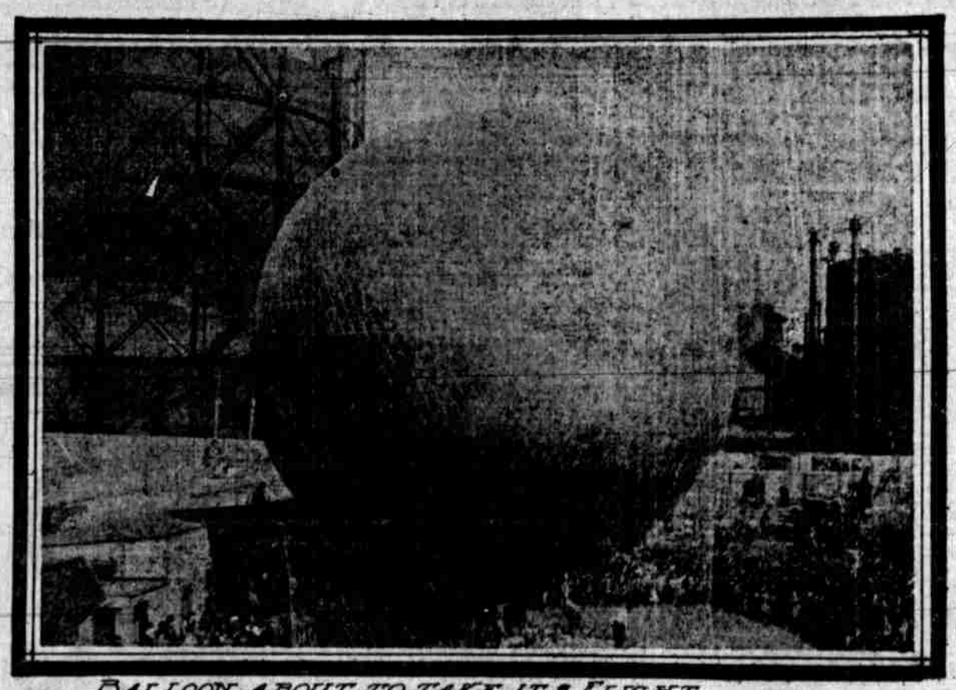
ABOUT TO MAKE AN ASCENSION

ENGINE AND CAB OF THE PEGASUS



BALLOON IN ASCENT

INTERIOR OF BALLOON FACTORY



BALLOON ABOUT TO TAKE ITS FLIGHT

YOU can hardly imagine a more ultra-prosaic spot on the face of the earth than Ninth avenue just above Twenty-third street in New York City. Foremost and above all else there is that hideous structure on which the elevated trains thunder by, casting a gloom on the mean street below. Mingled with the roaring of the iron monsters overhead are the shrill cries of the spawns of smudgy, half-dressed children who litter the thoroughfare underneath, and the unholy shoutings of the drivers and motormen who are forever fighting valiantly with their tongues. And out of the curiously assorted buildings emanate a medley of tepid, unsettling smells. Among these buildings there is none more unromantic-looking than the low-browed contraption on which I found a little black sign, gold-lettered:

A. LEO STEVENS,
MANUFACTURER OF
BALLOONS.

The sign was sandwiched among several others, indicating that besides the balloon factory there was everything in the place from a piano hospital to a brass foundry. I don't know just exactly what I expected, but in some manner aerial navigation had vaguely associated in my mind a certain degree of cleanliness and idyllic surroundings.

The balloon factory is on the very topmost floor. You climb a dingy, rough-hewn set of stairs and breathe dust and peeling kalsomine. Finally you walk directly into a long, narrow loft, where, as you see in the picture, there are heaps and heaps of yellow and white cloths and baskets and rope rigging and numerous mechanical instruments that your mind doesn't comprehend at once. I came up on a bright afternoon. A man, dressed simply in a blue cotton undershirt and trousers, perspiration pouring from his face, was industriously working over what seemed to be a thin oilskin, such as sailors' weather coats are made of, spread out on the floor. Off to one side sat a woman working at a sewing machine. I asked for Mr. Stevens. As I did so I had an intuitive sense that the workman was Stevens, and I was not surprised when he introduced himself.

Stevens is a broad-shouldered, muscular, undersized man. He has a broad, high, curving forehead, indicating the combination of imagination and practicability, together with an executive ability that he needs in his business, for he is the foremost aeronaut in this country. He is only 34 years old, but he has gone to the clouds in ships ever since he has been 18. He is the man who constructed the first dirigible balloon in this country, which he sailed in a test with Santos-Dumont in 1902 at Manhattan beach. If you can remember your newspaper-reading so far back as that you will recall that a man named Boise sailed the Santos-Dumont machine, and that Stevens created an intense sensation by sailing over, under and all around the French aeronaut, so arousing his ire by his surprising skill that the Brazilian permitted himself several ebullitions of anger that cost him the toleration of the New Yorkers and sent him back to France with a very sorry story to tell the Parisians about his reception in New York.

Stevens, in physiognomy and general bodily geography, bears a striking resemblance to Napoleon I. His dark eyes are deep-set and satisfactorily separated by a keen, strong, well-curved nose. His mouth is straight and thin-lipped, clenched firmly. His jaw is strong and resolute, and his voice has a vibrant snap and authoritative quickness. But he lacks the Napoleonic attribute of inconsiderateness. He is very patient and very courteous. I was very much pleased with his personality.

He was mending a balloon that had just come in from out in the country somewhere for repairs. There is only one balloon factory in the United States, and unless there is something radically wrong with the contrivance the balloonist who owns it makes his repairs himself. The rigging in this balloon had been torn and the envelope needed a new covering of rubber and varnish. In the course of our conversation Stevens told me that in his vocabulary there was no such word as impossible. He said that he had never yet found the circumstance that he could not master, and in watching him patiently working among that maze of small ropes, splicing and disentangling, carefully, but quickly and deftly, I readily saw why there was no such word as impossible in his vocabulary. The man's capacity for infinte attention to minute detail is wonderful. I called on him several times later in gathering the material for this article, and even as late as a quarter of midnight I found him working among his riggings, and I knew that he had been at it ever since early morning. Association with him is stimulating.

Naturally, most of the balloons shipped out of this factory are made for aeronauts at county fairs and for advertising purposes. These are the staples of Stevens' business. On his income from this source he depends to make his experiments in aerial navigation. He turns out something like 75 balloons a year for such uses. He sells these balloons for an average price of $135 each. They are made of a material similar to percale, which is varnished with a mixture usually composed of linseed oil, varnish and rubber. These balloons are usually filled with hot air, and have none of the safety appliances of the passenger balloons. I did not understand exactly what hot air was, so I asked Mr. Stevens. If you are as ignorant as I was, it may interest you to know that it is nothing more nor less than the heat emanating from any kind of fire built under the deflated balloon. This, as you know from your experiments with the Fourth of July paper balloons, has an ascensional power. When all the heat has been caught up in the bulky envelope, it rises and continues to float in the air until the heat turns into smoke. The aeronaut with any experience intuitively knows when this change is about to occur, and just before the heat turns into smoke and the balloon consequently collapses the aeronaut pulls a little tackle, which is cleverly attached to a penknife, which cuts the trapeze on which he sits from the dangerous balloon, and down he sails on his parachute. At balloon ascensions I had often witnessed the aeronaut doing what seemed to me to be the limit of human foolhardiness in performing trapeze acts while sailing through the air. He would swing from his uncanny perch on one foot and "chin" the bar and turn cartwheels, until, sick with apprehension, I would turn away. I asked Mr. Stevens about this. He said that these aerial performers are always secured so that they cannot fall. They are fastened to the trapeze by a belt which is three feet long. Most aeronauts work for some one who controls an entire company of balloonists. On the last Fourth of July Stevens had 40 men and balloons out working all over the United States.

The balloonist gets $5 for each ascension, and all his expenses are paid. The man who sends him out gets $125 for the service and is obliged to furnish the balloon and all the accessories. As a professional Stevens made his first ascent when he was 14 years old, and that time, he says, the man he worked for received as much as $2,500 for one ascension, while out of that he would pay him $400 or $500. And he made as many as five ascensions in one week. But the money was easy come and easy go, and the balloonmaker says that he would wind up the season just as poor as he was when he started, and he would go back to his home, in Cleveland, O., where his father owned an amusement park, which was then known as Beyerlies park, and later was known as Forest City. There he would get a position as shipping clerk in some mercantile establishment until the winter months were over.

The manner in which he became a balloonist is amusing and exciting. As a boy he loved to tinker around machinery. He was eminently practical. One day his teacher gave him an Appleton's children's library volume which narrated the adventures of two children who in some manner got into a balloon and were borne away. When they were sailing in the empyrean blue they did not know what to do. Eventually, however, as always happens in all children's stories of well-regulated morals, they came to earth safe and sound in limb and body. But the moral was that they had not been self-possessed, for if they had they would have remembered that some one had once explained to them that to lower the balloon all they had to do was to pull a small rope which all the time had dangled in their reach. Stevens thought that the children were very silly not to have discovered the rope for themselves, and the story, generally speaking, aroused his contempt, but it set his mind to running upon aerial navigation, though naturally that phrase was not in his vocabulary at this time. The fact that a balloon could be made to rise or sink at will was a revelation to him, and the idea of traversing the air as easily as he sailed the water with his boat fired his imagination. He determined to become an air sailor, and in all seriousness he broached the subject to his father. Ironically the paterfamilias informed him that he had no objection at all; that if he ever managed to find his boat to sail away in he would be glad to see him off.

There came to the park about this time a man named Warden from London, who was advertised to make an ascension with his balloon. Young Stevens zealously cultivated the aeronaut's friendship and helped him work about his balloon, thus learning a great many things concerning it.

The following Sunday he announced to his father that he was going to make a trip in the balloon. His father, thinking it was but the idle boastfulness of a 13-year-old boy, told him to go right ahead. In fact, he urged him to do so. Piqued by his father's sarcasm, the youngster picked up his father's jack knife. Watching until he saw that there was no one around the huge bag he stole up the hill on which it was anchored. He clambered into the car and leaned over and cut the rope which held it down to earth. In a second he shot up into the air with a rapidity that bereft him of his wits. Shutting his eyes tight, he crouched in a corner of the car, clenching the open jack knife in his hand. How long he remained there he himself does not know. Finally, however, his native spunk came back and he stood upright in the car. He looked around him and saw strange, terror-filling masses of clouds. When he gazed below he could only faintly distinguish clumps of blackness and streaks of something shimmering. And as he gazed he received a new fright. He seemed to be going higher and higher. The earth was rapidly fading from his sight. He says dear old Mother Earth never seemed so good to him as at that moment. He perceived that the time had come for some tall and quick thinking, and he did it. He was mortally afraid that he might sail right up to the moon. While the prospect had its allurements, he didn't know how long it might take to get there, and he felt that he might starve en route. So he wondered how he might get down.

Suddenly the story of Appleton's library burst on his mind. He remembered the rope that the children did not have sense enough to pull. He looked up, and behold! there dangled, away beyond his reach, a small piece of rope. He determined that the only to get that rope was to clamber up on the side of the car into the rigging as far as he could get and pull it down. Up he went, and finally he reached it. To his fearsome astonishment, a part of the balloon that seemed to be tucked away in the interior somewhere unraveled as he tugged at the rope. Swinging up there, his breath coming with some difficulty on account of the altitude, he looked about him. It made him shudder. He frantically determined to pull that rope, come what might. He felt that far worse than a fall might happen. But in his eagerness he yanked it too hard. He had laid hold of the proper rope all right, but he opened the valve so wide that the balloon came down with terrific velocity. At first the boy did not notice the speed of his descent. But when he struck a tree the force of the fall was so great that he bounded through the branches like a cannon ball, taking the boughs with him. After he struck the ground he rolled until he lay at the very edge of the canal. Here the people who came running from all directions found him, ruefully sitting up surveying his wrecked clothing and his bloody arms, legs and hands. The town of Canton was only a few moments away and there he was taken, cleaned, bandaged and fed and set upon his way back to Cleveland. His father was among the throng to meet him at the railroad station. But the father was so incensed that he whaled the little fellow until the police interfered. The story of his adventure, naturally, was telegraphed around the world, and during the next weeks he received fabulous offers to go with different shows.

When I began to write this article I purposed to describe simply a balloon factory and to tell something about balloons and ballooning in this country, but I find myself constantly recurring to Mr. Stevens, for his history and the story of ballooning as a pastime are as closely interwoven as the rigging of a balloon is woven into the basket it carries. While it was not his definite purpose to create a market for balloons outside of the regular show trade, his ceaselessly intelligent work and unconscious exploitation of the subject by his own enthusiasm began to interest that class of Americans who take to automobiling for the danger there is in it, and when Stevens saw that the people were beginning to regard the balloon as a medium of sport for amateurs, he set his restless brain to work upon its improvement and to make it less hazardous and more comfortable. For the first 10 years of his professional life he was a show balloonist pure and simple. He was the third person in America to make a parachute leap. He lived most of his waking life up in the air. The business in spite of its hazards, however, began to be overcrowded, and the compensation grew smaller and, moreover, the novelty of the show balloonist was wearing away, and his services were not in such great demand. All these things were apparent to Stevens when he became a manufacturer in connection with his performances. During the first year he was in business as a manufacturer he told me that he made as many as 600 balloons a year, and had large crowds of aeronauts working for him in all parts of the country. During all this time he was studying aerial navigation, following the experiments of the aeronauts abroad closely, and making endless tests in his own workshop. He spent all his earnings on devices to make balloons safer and more adaptable for pleasuring. He sent to France for his engines; they cost him hundreds of dollars apiece, but out of the first consignments the ratio that he could use was about one out of ten. Whenever he arrived at a solution that seemed thoroughly good he patented it. Consequently he holds today every patent on balloons and airships issued in America.

When I converse with the average person I do not find that I am very much more ignorant of things that lie outside of their immediate ken than they are, so I do not suppose that I am so very stupid to have assumed that all there is to a balloon is simply a gas bag and some ropes to hold the basket underneath. My idea as to the manner of landing was simply that the balloon dropped when it got ready to do so, and thus the daring persons who rode in such foolish conveyances found terra firma again. After analyzing a a balloon with an expert I can readily understand that comparatively it is just as safe a manner of locomotion as the automobile, and a sensible understanding of its construction and manipulation has engendered a very ardent desire to ride in it.

Such a balloon as I saw in the course of construction in the workshop is put together according to a scientific plan that is figured down to the minutest detail on paper. A balloon-maker like Stevens knows the location of each rope and each templet and each toggle, and this part of the valve and that part of the ripcord, just as an architect knows where he has placed the different things that go to make up the house he is building. And, like an architect, the balloon-maker has his plan always before him. He works exactly according to his scale to the most infinitesimal detail. He begins by cutting the material of which the bag, or envelope, as it is technically called, is made, usually of silk or several varieties of cotton or linen. The material is cut into many pieces shaped like bricks. These vary in size according to their location. Then the templets, as each piece is called, are sewn together; each edge is folded in six thicknesses. This is done so that if by any accident the templet should be ripped out or the seam give, only the particular templet in question is affected, and the opening in the balloon is not sufficient to cause serious trouble. And in this connection the balloon-maker explains that it is impossible for an accident to happen through the bursting of a balloon in the air. He shows that even if a templet should give and all the gas dissipate, whatever way you look at it the balloon has sufficient area to form a natural parachute, which would lower the passengers safely to some landing.

But this is ahead of the story. When all the parts have been carefully sewn together, looking somewhat similar to bricks placed one upon another in a wall, the entire envelope is bathed in a mixture of linseed oil, varnish and rubber, which I have already mentioned. In the meantime, while the envelope is drying, taking on that yellow oilskin appearance, the basket, or car, is being finished. This is simply an enlarged square clothes basket, built of very strong rattan and other reeds. But in the basket is woven a maze of strong ropes, which are specially manufactured for ballooning. On the end of these ropes are exceedingly strong catches made of wood, which are called toggle. These slip into loops that suspend from the load ring, which is that little ring you usually see just above the head of balloonists in pictures. This ring is the connecting link between the car and the envelope. The ring is made of hickory or a similar tough wood. Meanwhile the netting which goes over the envelope has been put together. This is one of the nicest problems in the balloon-maker's work. The ropes must be so netted that as the lines converge toward their meeting point at the load ring the bottom lines must be just as many times stronger as there are lines around the equator of the balloon, and the lines of the netting must be adjusted to an exact nicety over all.

When the envelope is dry the valve is placed at its very top. This valve is made of wood, and is so contrived that it opens precisely as the navigator wills. But besides the valve there is sewn into the side of the balloon for emergencies an oblong arrangement called the rip-cord. The use of this will be apparent immediately.

The balloon is now ready for an ascension. The statuscope, which indicates the altitude, and the barometer, which indicates the atmospherical pressure, is adjusted in the car. The neck of the balloon is fastened in its place and the globe is ready for inflation. It is weighted down and filled with hydrogen gas. This is the best gas for ballooning, because it is lightest. It is manufactured by placing in a large caldron sulphuric acid over iron. The resultant fumes are conducted by means of pipes into another caldron, where they are percolated through three inches of water into another pipe, which conducts them through lime, and then they enter the balloon. It costs about $10 to inflate an ordinary balloon.

The balloon is now soaring in the air. It is supposed to be at the mercy of the air currents. This is not entirely true, says Mr. Stevens. You can take a palm-leaf fan and steer it almost anywhere you desire. It is extremley susceptible to any vibration whatsoever. There is one thing that is surprising to a novice. The higher you go the swifter is your ascent. The explanation for this is that the air at the surface of the earth gives the most resistance, and the higher you mount the less resistance there is. When your statuscope warns you that it is wise to descend a bit you put your hand up to a little white bag at one side of the car and pull the rope-end you find therein. This is the valve rope. As soon as you pull it a certain amount of gas escapes through the opening of the valve doors at the very top of the balloon, and you immediately notice that you begin to fall. The descent does not cease, although it modifies, when you close the valves. Your next step to stop the descent is to take a little wooden spoon and ladle out your sand ballast until you notice that the balloon floats steadily. But suppose in the meantime something has happened making it imperative that you should get down to earth just as quickly as possible.

You put your hand up to a little red bag on the other side of the basket and give a hard yank at the rope-end you find therein. This rips a segment which is sewn in the side of the balloon and permits the gas to dissipate with much greater rapidity than the valve. Should the gas escape entirely the envelope will form a perfect parachute and deposit the passengers with very little jarring upon the ground. There you have the story of a balloon pure and simple. Such a balloon costs from $500 to $1,500. There are about 18 to 20 of these balloons owned by amateurs throughout the United States. If you are a member of the Aero Club of America you will insist that every amateur shall have on board an expert pilot. This pilot is licensed by the Aero Club of France. He is put through an unusually rigid examination, and is supposed to have some acquaintance with the treacherous wind currents which are admittedly largely uncharitable as yet. The man who knew them best is the man who lost his life in proving his theory concerning them. That was Nocquet, the sculptor, who died such a sad death last spring on Long Island. There are only five or six professional pilots in this country. Their fee is $50 and all expenses paid, and if they attend to the detail of inflation you pay $40 more.

The difference between a balloon and an airship is that one simply soars in the air without any steering gear or machinery, while the other generates its own gas and is steered by a rudder and a propeller that is driven by an engine. "Pegasus" was the first successful airship to navigate with power applied in this country.

Mr. Stevens showed me "Pegasus." You can see its shape in the picture which was taken during its first flight on September 15, 1902. The silk of which the envelope of this balloon was made is a Japanese silk that was woven especially for this purpose. It cost the owner $3,500. The only steel that he could use for the car was brought from England. The engine, a Bouton, was made in France. Altogether, the machine cost Mr. Stevens $19,000 when it was finished.

The envelope contains 28,000 cubic feet of hydrogen gas. This lifts a total of 398 pounds, which is calculated to be equal to one person and 250 pounds of ballast, minus the weight of the car. The car is built of steel. Just above, a little to the rear of the operator, there is a tank of gasoline. The oil flows into the carboreter, which is the mixer of the air and gas and electricity which injects the motive power into the engine. The engine is built forward, and all the instruments necessary for manipulation are well within reach of the operator. In front is the propeller, and in the rear the rudder. Just underneath the operator, on a long bar running the length of the car, hangs a torpedo-shaped water tank. This tank can be shifted by a sliding movement anywhere the operator desires. This is the medium that balances the car. When the ship is to shoot up in the air the balance is thrown to the rear of the car. When it is to descend the position is reversed, or if it is to ride level the tank is simply shifted to the center.

(Continued on Following Page.)