

called the ripping cord. By pulling on this cord, the aeronaut can tear a clear rip down the entire length of the balloon, thus opening it and allowing the gas to escape as rapidly as possible. This means, of course, a rapid descent; but, as I have explained, this descent is usually not sufficiently precipitate to involve any danger to the balloonist.

An interesting experiment along this line was that planned by John Wise, one of the pioneer aeronauts of this country. Wise had become convinced that with a properly constructed balloon there was little or no danger to be apprehended from either the bursting or the ripping of the balloon, even if it was at a great height. In order to make clear the truth of his theory, Wise had constructed for him a balloon, specially provided with ripping cords, which, instead of opening up a tear down the side, would make great rents in the top, so that the gas would escape with greatest possible rapidity.

On the occasion of this ascension, Wise took with him in the car a cat and a dog. The cat was attached to a small parachute, and was dropped out at a height of about two thousand feet. The parachute oscillated from side to side, but the cat reached the ground in safety. The dog was placed in the car of a small balloon, which was a miniature facsimile of the one in which Wise was making the experiment. Before being dropped, this balloon was punctured at the top, just as Wise intended to rip his own balloon, and was then dropped from the car. The small balloon with its canine aeronaut sailed easily down to the ground, which the dog reached in perfect safety.

The balloon which Wise was using on this occasion, being constructed specially for the purpose in view, did not have at the bottom the opening usually provided for the escape of gas, which always occurs as the balloon rises into the higher and more rarefied air. On being released, the balloon had risen rapidly to a height of about thirteen thousand feet. At this point, the air in which the balloon was floating had become so thin and the atmospheric pressure so light that the balloon was distended to a point which Wise felt to be dangerous. To complicate the situation, there occurred at this moment a severe thunder-storm in the strata of clouds just below the balloon.

#### An Accidental Parachute

**T**HE balloon rose higher and higher. In this extremity, it appears that Wise lost his head and did not know what to do. The experiment, however, performed itself: for at the height of fourteen thousand feet the silk bag, distended beyond its endurance by the expanding gas within it, burst with a terrific explosion.

Within ten seconds, according to the aeronaut's calculation, all the gas in the balloon had escaped. The entire apparatus began to fall toward the earth with alarming rapidity. Presently, however, the lower part of the bag, doubling upward and inward, exactly as the aeronaut had planned, formed a perfect parachute, in which the daring sky traveler descended safely to the earth.

Another interesting balloon explosion is that which occurred during an ascension made by two well-known aeronauts of England, Albert Smith and John Gypson. The ascension was made at night from Vauxhall Gardens. The account of London, as seen at night from an elevation of four thousand feet, as given by Smith is most interesting.

"In the obscurity of the night, all traces of houses and their inclosures were lost sight of. I can compare the view to nothing else than floating over a dark-blue and boundless waste, spangled with hundreds of thousands of stars. These stars were the lamps of the city. We could see them stretching over the river at the bridges, edging its banks, forming the squares and long parallel lines of light at the streets and solitary parks, farther and farther apart, until they were altogether lost in the suburbs. The effect was bewildering."

On arriving at an altitude of about eight thousand feet, it was discovered that the balloon was becoming too tense, and the aeronaut in charge pulled the valve rope in order to allow the escape of gas. Owing to some entanglement of the rope, however, it was impossible to open the valve, and a few moments after the first attempt had been made, "we heard a noise similar to the escape of steam in a locomotive. The lower part of the balloon began to collapse rapidly and appeared to fly up into the upper portion. The balloon began to fall with appalling velocity, the immense mass of loose silk surging and rustling frightfully over our heads. The suggestion was made to throw everything over. I had in my lap some sand bags, which were cast away. Several large bags of ballast and some bottles of wine followed.

"The wind still seemed to be rushing up past us at a fearful



rate; and to add to the horror, we came among the still expiring discharge of fireworks, which floated in the air, so that little sparks attached themselves to the cordage of the balloon. How long we were descending I have not the slightest idea, but two minutes must have been the outside. We now saw the houses, the roofs of which appeared advancing to meet us. The next instant we dashed by their summits. We were all violently thrown out of the car along the ground; but, incomprehensible as it may appear, nobody was seriously hurt."

In this case, as in the others mentioned, the balloon had burst, and, considering the great height at which the accident occurred, the escape was a narrow one.

Among peculiar accidents of air travel, I may mention an adventure of a young aeronaut, Carl Nordstrom, who was operating a so-called dirigible balloon. The apparatus consisted of a gas-bag, cylindrical in form, to which was attached a light-steel framework supporting two aeroplanes, and a bicycle seat, with pedals by which they were to be operated. In a word, the machine was, in a less finished form, an application of the same principle which in later years has been utilized by Santos Dumont, Zeppelin, Knabenshue, and others. The machine was not provided with ripping apparatus or ballast, since it was expected that the aeroplanes would control both height and progress.

#### In Imminent Peril

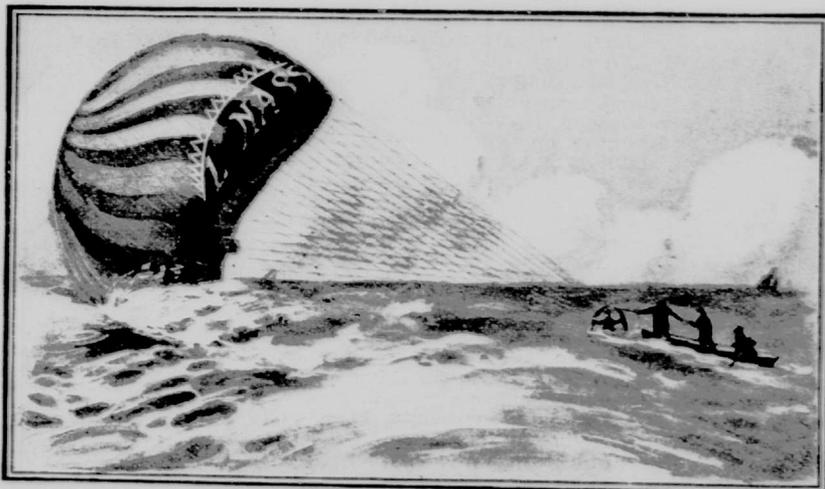
**O**N being released, the apparatus rose rapidly, and as there was little wind it remained for a time under control. Presently, however, Nordstrom discovered that the large aeroplane under the framework, by which the height of the machine was regulated, had ceased to revolve. Up to that time, the revolutions of this aeroplane had kept the machine near the earth, but upon its stoppage the whole apparatus shot rapidly upward. In a few minutes, the machine had attained a height of over nine thousand feet. At this altitude the resistance of the atmosphere had become reduced to such a point that the silk bag was cracking and seemed strained almost to the point of bursting. The bursting of this cylindrical apparatus in the air would have occasioned a fall so rapid as to mean inevitable destruction.

Nordstrom realized that he must descend at once. This he thought would be easy, since all he had to do was to pull the cord attached to the valve at the top of the gas bag. The opening of the valve would allow the gas to escape, reduce the pressure upon the silk bag, and allow the machine to descend. On pulling the valve cord, however, the aeronaut discovered to his horror that it would not yield. He pulled harder—pulled wildly.

The cord broke, and falling from his hand circled rapidly toward the earth. Something must be done. The instrument measured over ten thousand feet. It was growing intensely cold. Nordstrom's hands and feet had grown icy cold, and he began to feel that peculiar sensation of tension and fullness which is known only to balloonists and mountain climbers. He felt that he must descend quickly or die. He must get the fan beneath the machine to work; for its revolutions would counteract the ever-increasing buoyancy of the gas bag.

In this extremity, the daring young fellow cut a piece of cord from the rigging and with it bound his leg firmly to the framework. He then lowered himself, head downward, and investigated the machinery. He found that the revolutions of the aeroplane had stopped because of a projecting screw-head. This was quickly adjusted, the balloonist climbed back to his seat, the fan was started, and a safe descent was effected.

Another rather peculiar incident, which occurred to one of my assistants, illustrates the uncertainty



and variety of accidents to which the air traveler is subject. We were experimenting in a large open field near which was a clump of tall elm trees. The wind was light and the machine under good control. Gradually, however, the force of the wind increased, and the apparatus drifted over toward the trees.

My assistant stood in his little car looking toward me. He had his back toward the obstruction. I shouted and gesticulated, but could not get him to look around. At last, however, he turned his head, and saw that the balloon was trailing rapidly toward some of the largest trees, now only about thirty yards away.

Realizing his danger, Judson stooped down to throw out some ballast; but it was too late. The balloon had reached the trees, passing over them at perhaps a height of one hundred feet from the ground. The car was too low, however, to clear them, and was dashed violently against the upper branches. Judson was thrown bodily out of the car, and then, to my horror, he shot toward the earth. The little balloon gave a jump upward and stopped with a jerk. And then I saw Judson hanging head downward, apparently in mid-air, over one hundred feet from the ground, while the balloon was slowly descending in the lee of the elm trees.

Judson's miraculous escape was due to a mere chance. I have always made it a rule to secure the end of a valve cord to the rigging by a knot which sailors call a double half-hitch; and in this case the rest of the cord had happened to drop outside the car, forming a loop. As he plunged downward, Judson's leg had caught in this loop. The weight of his body on the valve cord opened the escape valve at the top of the balloon and caused an escape of gas, and therefore a rapid but perfectly safe descent.

By the time we had reached him, Judson had shinned up into the car and greeted us with a wide grin and the careless remark, "Pretty close shave, wasn't it?"

Good little Judson! His cleverness and grit have carried him to a good place in another profession equally difficult, but less physically hazardous than air navigation.

Some years ago in Dublin an aeronaut named Hampton made several daring air voyages. On one occasion he made an ascension, notwithstanding that there was at the time a strong wind blowing straight out to sea. The balloon rose rapidly to a height of about six thousand feet, and then, owing to skilful manipulation, made an equally rapid descent.

#### Descent Into the Sea

**A**LL went well until the gas bag had descended to within about a hundred feet of the earth. It was then caught by a strong current of wind and whirled along just about on a level with the house-tops. Directly in his course there happened to be a house which was on fire. The inflammable gas in the balloon became ignited, the silk bag exploded with a tremendous report and began to burn, making a spectacle which the observers have described as being "unspeakably grand and impressive." Hampton made a quick jump, and by a most remarkable chance escaped with a few burns and bruises.

Speaking of narrow escapes reminds me of the close call of Leo Stevens not long ago. Stevens is one of the cleverest aeronauts in the world; a cool, quiet young fellow, with the jaw of a prize fighter, muscles of iron, and nerves of steel.

The ascension was made from the upper part of Manhattan, New York, and the wind took the balloon in a westerly direction. All went well until the balloon was over the Hudson River. At this point the aeronauts encountered a cold, heavy cloud. This cooled the gas and decreased the buoyancy of the balloon to such an extent that from a height of about three thousand feet it fell with a downward slant directly toward those jagged towers of rock known as the Palisades.

Straight up against the wall plunged the great unwieldy bag, pushed by the wind behind it, and with ever-decreasing buoyancy. In vain had the aeronauts thrown out all their ballast, even valuable instruments, in order to enable them to clear the bluff. But the big unwieldy bag of silk, caught in the grip of the wind, was pushed firmly against the rugged wall, bumping with affectionate intensity. Bang! bang! bang! went the frail basket against the jagged rocks. Only by the utmost care and agility, plus the kindness of Providence, were the aeronauts saved.

Gradually the balloon settled down, until finally it dropped into the river, from which the balloonists were rescued unhurt by Dr. Thomas, a well-known patron of air navigation.

On being questioned about the experience, Stevens laughed and said, "There wasn't any danger. We got a bumping and, of course, had to keep our heads. It is all in the day's work to be a balloonist.

It takes nerve to be a balloonist