

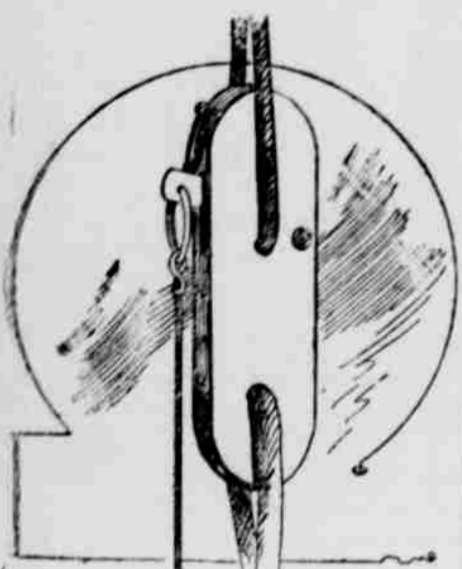
# HOT AIR BALLOONING.

## LATEST EXPERIMENTS IN AERIAL NAVIGATION.

W. L. McDonald, of New Haven, Conn., Has Made an Important Discovery—A Lesson in Optical Illusions.

For some time past an exhibition of much interest to those interested in aeronautics has been produced daily at El Dorado, a pleasure resort upon the top of the Fallasades on the Hudson river, just above Hoboken. It consists in the ascent of a Montgolfier balloon, to which a ribless parachute is attached. The aeronaut ascends with the two, and when a sufficient height above the earth is attained, cuts loose from the balloon, effecting his descent to earth in the parachute. We illustrate the principal features of the inflation, ascent, and descent with the parachute.

The balloon is made of sheeting. This is one yard wide, and in the balloon which we illustrate forty segments of it were required for the circumference. For 14 ft. from its top each segment was tapered nearly to a point. The next 15 ft. were untouched, and then the last 25 ft. leading to the neck of the balloon were also tapered to about one-fourth their width. The segments were sewn together, as in making a regular seam; a cord was then laid along the seam, and the dou-



The Cutting Loope Block.

ble edges bent over and re-sewed, making a felling. The top was made of double thickness. The sheeting was sized with a mixture of glue, alum, soda, salt and whiting, in water. At the mouth of the balloon a hoop eight feet in diameter, made of buggy wheel felloes is attached; from this hoop four ropes, called quarter guys are brought down, to which the parachute is attached.

The parachute in general structure represents the cover of an immense umbrella. When expanded it is about twenty-eight feet in diameter. It is divided by the arrangement shown in one of the small cuts. To the quarter guys of the balloon is attached a block of wood by means of a rope passing through a hole in it. Above this hole a knife blade is pivoted, and held out of contact with the rope by a rubber band. To the end of this blade a rope is attached leading down to the aeronaut's hand. By a second rope the parachute hangs from the same block. It is obvious that on pulling the cutting line the rope will be severed and the parachute detached. One more appendage remains to be noticed. Within the parachute, near its mouth, a wooden hoop 4 ft. in diameter is suspended, and by a proper system of guys is held in a horizontal position. The object of this is to insure the opening of the canvass.

The inflation is thus conducted: A trench about eighteen feet long, two feet wide is dug in the earth where the balloon is to be inflated, and, except a small portion at each end, is covered with iron, boards, and earth. Over one end of an iron cylinder three feet high and at its three and one half feet in diameter is erected. Around this cylinder barrel staves are placed with earth between them and the iron, forming a sort of rough lagging. On each side of the chimney thus provided, and as a good distance therefrom, two poles twenty-eight feet high are erected; each carries a pulley, and a rope is rove through the pulleys and carried through a ring on the top of the balloon. The mouth of the balloon is placed over the chimney, and, by means of the rope, the top is hoisted well up from the ground.

A wood fire is started in the distant entrance of the trench; this gradually

emptied into the glass a little water so that the water resembles a great drop in the interior of the part not cut. Look at the table cloth through this drop of water. You will be surprised to see how easy it has become to count the threads, for each one of them appears much larger than it is in reality. The fact of it is that the drop of water like the sample shown in the figure has taken exactly the form of a biconvex lens.

If this water does not take on its upper side the form of a swelling convex surface but its upper surface remains horizontal you will have a plain convex lens. These two kinds of lens are divergent. Both have the property of enlarging objects. Bi-convex lens used as enlarging glasses are called microscopes, and the modest drop of water permits of examining in detail the different part of a plant or an insect that can be seen with difficulty with the naked eye.

Look now at the under part of the glass through one of the sides that are cut. At this spot the glass is concave at the interior and concave at the exterior; we have then a bi-concave lens like that in the figure or a plain concave if the cut were straight instead of being round. Now far from being enlarged the thread of the cloth, the insect or the flower appears much smaller than they are in reality, which shows that a plain or bi-concave lens has the property of reducing the apparent dimensions of objects.

The glasses in spectacles for farsighted people are bi-concave with thick edges while those for nearsighted people are bi-convex with thin edges.

So you see a drop of water in a glass has just given us a lesson in optics.

An Expensive Recreation. Jinks—Going to camp out this year? Winks—No. Costs too much. Jinks—Where's the cost? Winks—Doctors' bills.

Linon handkerchiefs finished with three to five very narrow tufts and scalloped edges.

Commencing to inflate the Balloon.

breaks the trench and smoke stack, the draught at first being about as much one way as the other. After a few minutes, however, the draught begins to tend strongly toward the chimney, which is encircled by the mouth of the balloon, the sides being held well out from the center by a corps of assist-

ants. From time to time a little kerosene is thrown on the fire. All this while an attendant stands within the balloon, by the side of the chimney, armed with a circular board to act as fire screen, and with a pail of water and a cup near him to throw water upon the cloth should it become ignited. The balloon gradually feels the buoyant effect of the heated products of combustion, and as it tends to rise, more and more cloth is fed out, the assistants shifting their hold lower down upon the sides of the balloon. After ten or fifteen minutes the suspending rope is cast off and pulled away from the balloon, and four guy ropes leading from its top are used to keep it in position. It swells continually, and the canvas rises until only the hoop rests upon the ground. A number of the assistants now stand upon this hoop.

The last heating remains to be done. At short intervals kerosene is thrown upon the fire, by this time largely consisting of a mass of very hot embers. The oil is at once volatilized and runs as a gas into the balloon, within which it suddenly bursts into ignition, producing a great sheet of flame, plainly distinguishable through the cloth. This is repeated over and over again, each addition of kerosene producing a great flame as it ignites, almost with explosive violence, within the expanded canvass, now straining violently upward. The upper end of the parachute during the inflation has been attached to the balloon, and the aeronaut, Mr. M. L. McDonald of New Haven, Conn., professionally known as "Daring Don," stands off to one side, as the balloon is nearly ready, grasping the concentrating ring. When all is prepared, the word is given, and the balloon is released. The chimney is covered, and, as the balloon rises, the aeronaut walks or runs forward under it, and is carried up clinging to the parachute ring. A loop of rope is attached to the ring, and, when some distance up, he steps into this loop and thrusts his head up through the concentrating hoop, so as to leave his hands free to manipulate the cutting ropes. When a sufficient height has been attained, and he deems himself over a favorable ground for a descent, he pulls the cutting rope and severs the connection between himself and the balloon. He commences to drop with accelerating velocity until the air, catching the parachute, suddenly opens it just as an umbrella is opened by hand. The velocity of the descent is checked. With some oscillation the earth is approached quite rapidly; in half a minute or less the surface is reached. The object of the ascent is in the center of the parachute is to make these oscillations as slight as possible. The earth is struck with some violence, about as if the jump was from six or eight feet elevation, indicating a velocity of about twenty feet per second. The deserted balloon capsizes, owing to the greater weight of its top, the hot air and products of combustion with considerable smoke escape, and it collapses and rapidly falls.

As the ascent is made, the entire distance from the top of the balloon to the aeronaut hanging to the parachute is about 175 feet; the inflated balloon is about 40 feet in diameter.

# A WOMAN ON HORSEBACK.

## The Horse as a Thinker—Rain or Shine Riding—A Rider's Observations.

The horse is generally believed to have but little activity of the brain. It is stated that four hours' sleep out of the twenty-four are all that he requires. The fact that he seems to need but little sleep is brought forward to prove that he has little mental activity. He is generally, in point of intelligence, compared unfavorably with the dog. We must not forget, however, that the dog is the companion of man, received into the house and accustomed from his earliest years to the society of intelligent people. His mind has been by this means developed, his mental activity increased, and the cumulative effect of heredity must not be overlooked. The dog has been in an atmosphere of education for thousands of years, but the horse has been left to the care of ignorant and brutal men, whose only idea of enforcing obedience is by means of a loud, harsh word, a blow or a kick. When he is left in peace he is fastened generally with his head to a blank wall, where he can see nothing to interest him. Sometimes he must stand for long spaces of time in this way, the interminable, colorless day being broken only by the process of cleaning and his three feeds. When his nervous nature under this strain invents some way of amusing himself, and making time go a little more rapidly, he is roughly bidden to stand still, or is forced to stop his little play by the lash, and earns the title of a vicious brute. If a dog were subjected to the same treatment, how long would it be before he would require also only four hours' sleep by reason of a "low mental activity?" The Arabs make companions of their horses, and they get in return the service of willing and intelligent friends.

The horse has always done more reasoning than he has had credit for. Has he not a clear idea of the flight of time when he called you out to the stable to give him his dinner just at noon? How does he find his mistress' house among a whole street full of houses precisely alike, and never miss stopping at the right door? As to intelligence and power of acquiring knowledge, there can be no doubt, and that implies attention, and also an appreciation of the laws of association. The horse certainly can distinguish some colors, for he is afraid of a red lantern when he does not mind a white one. I think there is no doubt that he also distinguishes green from red. In color knowledge he is not, then, so far behind the Greeks of Homer's time as judged by Mr. Gladstone. He has certainly great power of invention, and of adaptation of means to non-existent ends. And he does not fail in cunning, nor, I think, in a sense of humor. The same excitement which moves us to honorable action also stirs his nature; the same discouragements lower his ambition, and precisely the same treatment is necessary with him as with children in educating them. We must never forget that in the case of animals the pupil cannot rise higher than the teacher, and that the teacher must be thoughtful and intelligent. He must not only feel a kinship with his pupil, but he must recognize in him an individual character, and must adapt himself to that. No two horses are alike in character any more than two people.

There is no need of losing a ride because of rain, and there are more pleasures given by a ride in the rain which the "fair weather rider" never can know—pleasures of sight and of smell, new aspects of otherwise perfectly familiar scenes, which are almost like a new creation. Nor need our coldest winter weather deter any one. A woman has decidedly the advantage over a man in winter, for her skirts act the part of a muff, and she need never fear cold feet. In fact, she need fear no suffering from cold except in her hands. There are no gloves which will keep them warm while they hold the bridle, but a vigorous beating on the horse's elastic quarters well behind the saddle will soon send the warm blood tingling through the fingers to their very tips, and after that they will give no trouble for a long time. As to ears, they will never resist a rub and a quick trot, and once warm, they will always stay so, as indeed would the hands, were it not for the enforced cramped position of the fingers. It is of great advantage here to be mistress of two bridle hands instead of one.

A warm double breasted overcoat should be worn, and then I know of no more exhilarating thing than a fast trot or a rapid gallop over the crunching white carpet, while the loose dry snow, flung up by the hoofs, or dashed from the trees by the wind, lies in the face like the white foam of the sea, and every muscle of the horse responds to the tingle of the nerves in the sharp, stinging air. The whole atmosphere is cleft through and through by the shafts of light; the bare trunks and boughs of the trees are like beautiful sculptures against the blue; the pines bear at the tip of each branch, as it were, a great white blossom, while the hemlocks wave heavily under their snow burden, and we ride through all the glory.—"A Woman Who Rides" in Harper's.

Natural Seal Skin. An almost indescribable color is that of the seal skin before it is dyed. It is silvery gray, furry brown and two or three other things, all at the same time. But it is strikingly pretty, and here in the east is so seldom seen that those girls wearing the undyed skins may feel pride at having something unusual and individual. A young Californian who came east only a short time ago received on Christmas from a friend on the Pacific coast a cape and muff of the skin in its natural color, and had great fun listening to acquaintances guessing what the animal was. By actual count eight women and one man made each a different guess, and, strange enough, the man was the only one to name the skin in the first time. But he had hunted seals in his earlier days, and so he ought to have known.—Exchange.

An Incurable Child. It is a little hard sometimes to teach small children to be humane. A little girl stepped purposely upon a beautiful caterpillar on the porch, and crushed it to death. Her aunt took her in hand.

"Dorothy, dear," said this relative, holding her by the arm, "don't you know that God made that caterpillar?"

"Well," said the child, looking up archly, "don't you think he could make another one?"—Boston Transcript.

It is now announced that Dr. Koch, the distinguished German scientist, has discovered a positive method of averting phthisis and also of arresting the disease when already in progress. It is the inoculation method, such as Jenner applied to smallpox and Pasteur to hydro-

phobia.

OBEDIENCE TO THE DEATH.

A Delectable Anecdote of Napoleon, the Czar, and the Prussian King.

The editor of Gil Blas vouches for the truth of this story: Napoleon I was entertaining the Czar Alexander and the Prussian king at breakfast in Tilsit, when the conversation turned on loyalty.

"My soldiers obey me blindly," said the czar.

"And mine are anxious to die for me," added Napoleon.

At the suggestion of the Prussian king a test of devotion was agreed upon. The royal party were breakfasting in the fifth story of a building that faced a paved street. Each member was to call in one of his soldiers and command him to jump from the window. Napoleon made the first test.

"Call the Gardiste Marcu," he commanded, and Marcu appeared.

"Will you obey any order I give you?" asked Napoleon.

"Yes, sire."

"Blindly, whatever it is?"

"Blindly, sire."

"Then jump out of that window."

"But I have a wife and two children, sire."

"I will care for them. Forward!" And the Gardiste Marcu, with a military salute, walked to the window and leaped out.

"Call a private of the body guard," ordered the czar, whose turn came next. The soldier came.

"What's your name?"

"Ivan Ivanovitch."

"Well, Ivan, just throw yourself out of that window."

"Yes, father," answered the guardsman, and he did it.

"Command the bravest of my soldiers to come here," said the Prussian king to his servant. A six foot uhlán, with a row of orders across his breast and a scar on his forehead, entered.

"My friend," explained the king, "to show their loyalty a French and a Russian guardsman have jumped at command from that window. Have you the pluck to do the same?"

"Is it for the fatherland?"

"No."

"Then I refuse to do it."

Gil Blas thinks this anecdote contains a fine lesson for German army officers of the present.

# A THOUSAND YEARS AGO.

## In the year 900 after Christ what was the state of Europe? The Goths, the Vandals, the Franks, the Huns, the Normans, the Turks and other barbaric hordes had invaded and overthrown the Roman empire, and had established various kingdoms upon its ruins. Reading, writing and ciphering were separate and distinct trades. The masses of the poor and rich alike were wholly unacquainted with the mysteries of the alphabet and the pen. A few men known as "clerks," who belonged to the priesthood, monopolized all learning and set themselves up as special artists. Kings did not know how to even sign their names. When they wanted to sign a written contract, law or treaty, which some "clerk" had drawn up for them, they would smear the right hand with ink, and slap it down on the parchment, saying, "Witness my hand."

At a later date some genius devised the substitute of the seal, which was impressed instead of the hand, but often beside the hand; hence the law phrase, "Witness my hand and seal." At the date of which we write every gentleman had a seal with a peculiar device thereon. There were no chimneys in use; the fire was built in the center of the house, smoke escaping through a hole in the roof. Chairs were unknown, knives and forks were unknown. Even the nobility sat on boxes and blocks and ate meat with their fingers.—St. Louis Republic.

Manufacture of Gauze. In the ordinary processes of the loom the warp threads are always kept parallel in whatever way the weft threads may be twisted around them. But in making gauze two adjoining warp threads are completely twisted around each other between the two rows of the shuttle or casts of the weft. Some peculiar appendages of the loom are required to effect this. One consequence of the mode of interlacing is that the texture is light, the weft threads being further apart than would be practical in other webs. In appearance, as well as in mode of producing, gauze occupies a kind of medium position between plain weaving and plain lace or bobinet.—New York Telegram.

She Will Marry. Miss Sarah Watson, of New York city, who for the past two years has taken high rank as professor of music at Vassar college, is about to resign her place to marry the Danish composer, Joachim Anderson. Miss Watson is highly regarded by the profession as an artist of unusual merits. After a four years' course under Professor Ritter she studied abroad, and as a pupil of Scherwenka at Berlin carried off many exalted honors. An unconquerable nervousness materially interfered with her success as a concert performer, and abandoning all notion of the stage Miss Watson had set herself to adorn a professorship when the gallant Dane claimed her as his own.—Exchange.

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# TREES.

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J. C. Davis, Rector of St. James' Episcopal Church, Eufaula, Ala.: "My son has been badly afflicted with a fearful and threatening cough for several months, and after trying several prescriptions from physicians which failed to relieve him, he has been perfectly restored by the use of two bottles of Bo-

An Episcopal schee's German Syrup. I can recommend it without hesitation." Chronic severe, deep-seated coughs like this are as severe tests as a remedy can be subjected to. It is for these long-standing cases that Boschee's German Syrup is made a specialty. Many others afflicted as this lad was, will do well to make a note of this.

J. F. Arnold, Montevideo, Minn., writes: I always use German Syrup for a Cold on the Lungs. I have never found an equal to it—far less a superior.

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