A BALLOON ACCIDENT.

An ascension of the balloon Patrie took place from the Avenue de la Defense de Paris, at Courbevoie, at four o'clock on the afternoon of Sunday, August 31. Mr. Paul Leprince, the aeronaut, and Mr. George Dumuit, one of his friends, both of the age of 19 years, were in the car. The ascent was very rapid. The spectators who were present saw the balloon assume suddenly a peculiar shape. First it flattened out, then it assumed the shape of a spindle, then that of a ball. They supposed at first that the balloon was a dirigible air ship; but the real facts became apparent by the swaying of the balloon, and then by the awful drop that followed.

"The balloon has burst, and the poor unfortunates are lost!" cried the spectators. This is what took place, as narrated by Mr. Paul Leprince, who has been good enough to give us the facts of the case:

"There was nothing unusual about the inflating operations. For a moment, however, the balloon was carried by the wind against the branch of an acacia tree by the side of the road, but I only heard the rustling of the branches, and I did not think of the incident again. My friend and I embarked and in a short time reached an elevation of 1,500 feet, when we began to hear a peculiar whistling sound. I looked in the space about me, but seeing nothing, I climbed on to the ring and then discovered a tear of a few inches in length, partially filled by a branch of acacias which had penetrated the interior of the balloon. At this moment the sun dispelled the clouds and shone with all its luster upon the balloon. This produced such an expansion of the gases within that the gas was not able to escape sufficiently rapidly from the valve. The fabric was stretched to its utmost, with a dry, cracking sound, and I at once knew what would follow.

"George," I cried, "the balloon is torn and will not be able to bear the strain of the expansion, and will explode!"

I had scarcely uttered the words before the tearing of the fabric like the rustling of leaves could be heard, and a blue cloud appeared about the opening where the gas was pouring through in great volumes.

"We are lost!" cried George.

"The ballast!" I cried, "the ballast!"

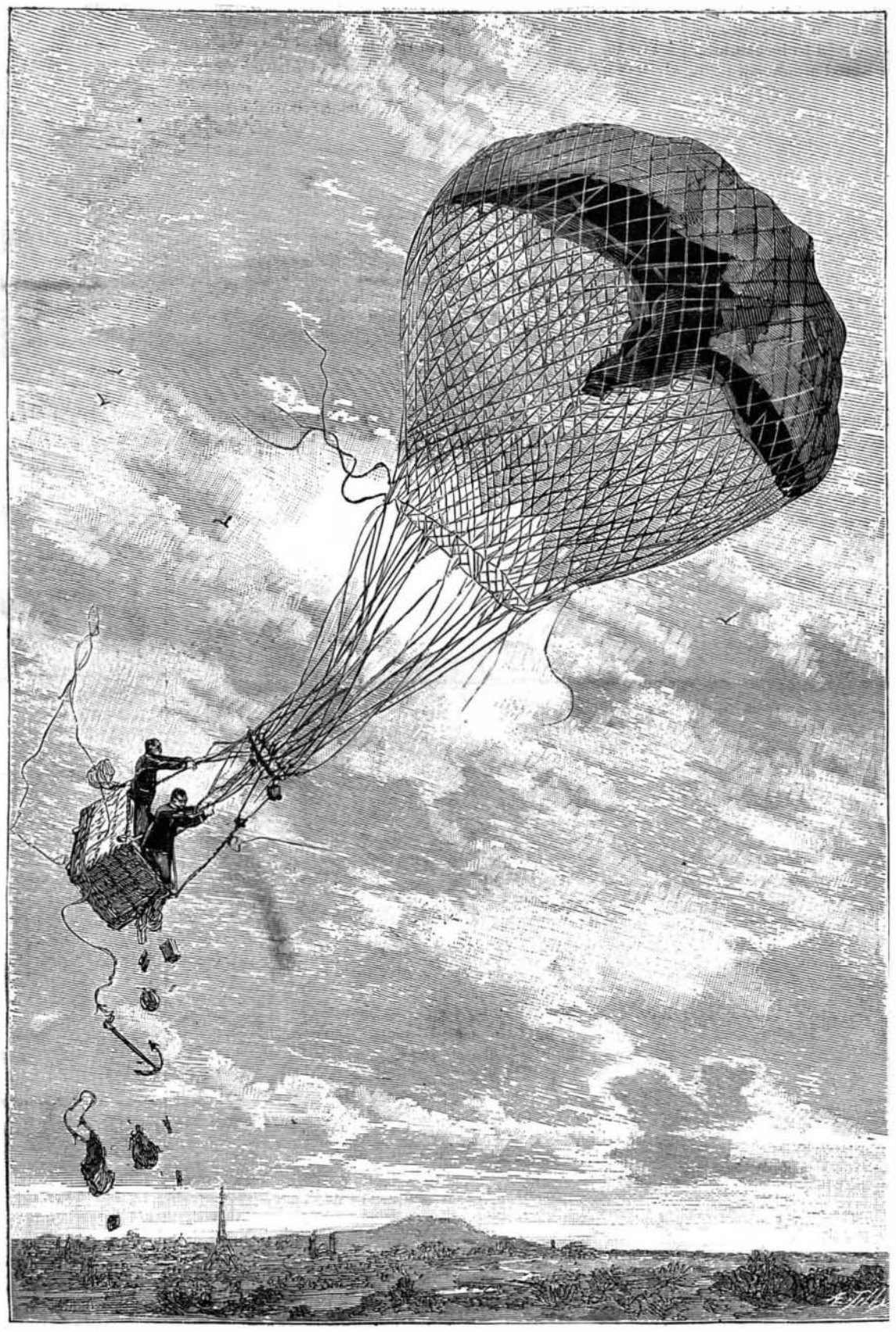
Fortunately he did not lose his head, and in an instant two bags were thrown out. I glanced at the barometer and saw that we were 4,740 feet from the ground, and the fall commenced.

Without losing an instant, and without relying at all upon my equipment, I cut off the anchor, I threw out the rope and my overcoat, in fact everything of any weight, and we prepared to throw off our clothes and to cling, at the moment of striking, in the netting above.

I notice that, fortunately, there is a strong wind blowing, which is carrying us along in an oblique line at the rate perhaps of 35 or 40 miles an hour. We were falling at an angle, and this perhaps would break the fall somewhat.

The balloon was violently shaken in its flight, and kept swinging and swaying in a horrible manner, but it was this that saved us. During one of the most violent of these swinging movements the lower part of the balloon was thrown to the upper part of the netting and rested there against the valve in the form of a dome, forming an immense improvised parachute. At once the fall was arrested sensibly. Still we were only about one hundred yards from the earth. I cried to Dumuit to throw out more ballast, and about 150 lb. more ballast in the form of sand was passed over the side. Now for our clothes. But there was no time. Scarcely had we reached the ropes attached to the ring when a terrible shock was felt, and we and the basket and the balloon and all were rolled over on the ground together. We were not injured, nor did we even lose consciousness. This fall of nearly a mile was accomplished in less than four minutes, during which period, as may be seen, no time was wasted.

I believe that our safety is due to the fact that neither of us lost our presence of mind. The conclusion to be drawn is that, even in an accident as serious as the bursting of a balloon in mid-air, the stuff out of which the balloon is made is likely to be formed into a sort of parachute by the upward current of air during the downward flight of the balloon. The other lesson is that however near death anyone may be, it is always necessary to keep one's courage. —*Paul Leprince, Aeronaut, in L'Illustration.*



A FALL OF NEARLY ONE MILE THROUGH THE AIR.

Snakes in Banana Bunches.

Banana bunches brought from tropical America sometimes contain snakes of the family Boidæ tightly wound round the central stem. A specimen of this kind was taken in Savannah, Georgia, and was sent to the United States National Museum. I identified it as the *Epicrates augulifer*, a native of Cuba. More recently a snake was found in a similar situation in a lot of bananas in Chicago, and was sent by Dr. J. L. Hancock to the National Museum. Dr. Stejneger has identified it as the *Boa imperator*, the common species of Central America and Mexico. The specimens are always young, as adult boas of the genera named could not be concealed in so small a space.—*E. D. Cope.*

Dying Usually a Painless Experience.

The signs of impending death, says the *Medical Journal*, are many and variable. No two instances are precisely identical, yet several signs are common to many cases.

Shakespeare, who observed everything else, observed and recorded some of the premonitory signs of death also. In the account of the death of Falstaff the sharpness of the nose, the coldness of the feet, gradually extending upward, the picking at the bedclothes, are accurately described.

For some time before death indications of its approach become apparent. Speech grows thick and labored, the hands, if raised, fall instantly, the respiration is difficult, the heart loses its power to propel the blood to the extremities, which consequently become cold, a clammy moisture oozes through the pores of the skin, the voice grows weak and husky or piping, the eyes begin to lose their luster.

In death at old age there is a gradual dulling of all the bodily senses and of many of the mental faculties, memory fails, judgment wavers, imagination goes out like a candle. The muscles and tendons get stiff, the voice breaks, the cords of the tabernacle are loosening. Small noises irritate, sight becomes dim, nutrition goes on feebly, digestion is impaired, the secretions are insufficient, or vitiated, or cease, capillary circulation is clogged. Finally the central organ of the circulation comes to a stop, a full stop, and this stoppage means a dissolution. This is the death of old age, which few attain to.

Many people have an idea that death is necessarily painful, even agonizing, but there is no reason whatever to suppose that death is a more painful process than birth. It is because, in a certain proportion of cases, dissolution is accompanied by a visible spasm and distortion of the countenance that the idea exists, but it is as nearly certain as anything can be that these distortions of the facial muscles are not only painless, but take place unconsciously. In many instances, too, a comatose or semi-comatose state supervenes, and it is altogether probable that more or less complete unconsciousness then prevails. We have, too, abundant evidence of people who have been nearly drowned and resuscitated, and they all agree in the statement that after a few moments of painful struggling, fear and anxiety pass away, and a state of tranquillity succeeds. They see the visions of green fields and in some cases hear pleasing music, and so far from being miserable, their sensations are delightful. But where attempts at resuscitation are successful, the resuscitated persons almost invariably protest against being brought back to life, and declare that resuscitation is accompanied by physical pain and acute mental misery.

Death is a fact which every man must personally experience, and consequently is of universal interest, and as facts are facts, the wiser course is to look them squarely in the face, for necessity is coal black and death keeps no calendar.

To clean iron parts of machinery, tools, etc., two to three cents' worth of paraffine chipped fine are added to one liter petroleum in a stoppered bottle, and during two or three days from time to time shaken up until the paraffine is dissolved. To apply it, the mixture is well shaken, spread upon the metal to be cleaned by means of a woolen rag or brush, and on the following day rubbed off with a dry woolen rag.

Photographic Dyeing and Printing.

In the section of chemical science at the recent meeting of the British Association a paper was read on the action of light on the diazo-compounds of primuline and dehydrothiotoluidine. It was prepared mainly by Mr. A. G. Green, with the aid of Messrs. Cross and Bevan.

It has long been observed by Mr. Green that the diazo compound of primuline is very sensitive to the action of light, being readily decomposed thereby and losing its property of combining with phenols and amines. On this fact has been founded a photographic process by means of which designs can be produced in fast colors on cotton, silk, wool, linen, and other fabrics. The process can also be applied to wood, xylonite, celluloid, paper, or to gelatine films upon glass, thus affording a very wide range of employment. The process, which is a very simple one, merely depends upon the fact that if a material containing diazotized primuline be exposed to light under a design, those parts which are acted upon by light will be decomposed, while the parts protected from the light will remain unaltered, and, consequently, on subsequent development with a phenol or amine will produce colors, while the decomposed portions will not. The details depend somewhat upon the material to be treated. As an instance, the production of a design upon cotton cloth, cotton velveteen, etc., was taken. The material is first dyed with primuline from a hot bath containing common salt until the required depth is obtained. It is then washed and diazotized by being immersed for a quarter of a minute in a cold bath containing about one-quarter per cent of sodium nitrate, and strongly acidified with sulphuric or hydrochloric acid. The material is washed again, and exposed damp (or if preferred after having been dried in the dark) to the action of light beneath leaves, ferns, flowers, or other natural objects, or beneath glass or transparent paper upon which may be painted or printed any design which it is required to copy. Either the arc electric light or daylight may be employed. In the latter case the time of exposure will vary with the intensity of the light; under half a minute is required in bright sunshine, and nearly half an hour in very dark, cloudy weather. When the decomposition is complete, which may be readily ascertained by means of a test slip exposed simultaneously, the material is removed from the light, and either passed into the developing bath at once or kept in the dark until it is convenient to develop it. The developing bath consists of a weak solution (one-quarter to one-half per cent) of a phenol or amine made suitably alkaline or acid, the phenol or amine employed depending upon the color in which it is required to produce the design, thus—

For red, an alkaline solution of *b*-naphthol.

For maroon, an alkaline solution of *b*-naphthol-disul-sulphonic acid.

For yellow, an alkaline solution of phenol.

For orange, an alkaline solution of resorcin.

For brown, a solution of phenylene diamine hydrochloride.

For purple, a solution of *a*-naphthylamine hydrochloride.

If it is required to produce the design in two or more colors, the respective developers, suitably thickened with starch, may be applied locally by means of a brush or pad. After development the material is thoroughly washed and requires no further fixing. Linen, silk, and wool are treated in exactly the same way. Paper for copying drawings, etc., is coated on the surface with primuline by means of a brush or roller. For the production of galatine films upon glass the primuline is incorporated with the gelatine before being applied to the glass. In place of ordinary primuline the homologues already mentioned may be used. For silk and wool the primuline may be replaced by dehydrothiotoluidine-sulphonic acid, by means of which colorless backgrounds may be obtained. Concerning the reaction which occurs when the diazo-primuline or the diazo-dehydrothiotoluidine is decomposed by light, nothing definite can yet be said except that the diazo group is completely destroyed, for on treatment with sodium hydrosulphite (true hyposulphite) it cannot be converted into the amido group (re-forming primuline or dehydrothiotoluidine). The reaction may consist in a replacement of the N_2 group by OH or by H, or may be even more complex. The diazo compounds of this group of bodies possess an extreme susceptibility to light, far greater than that of other diazo compounds, while at the same time they are far more stable to heat. It is thus possible that this property may depend in some way upon the sulphur which they contain.

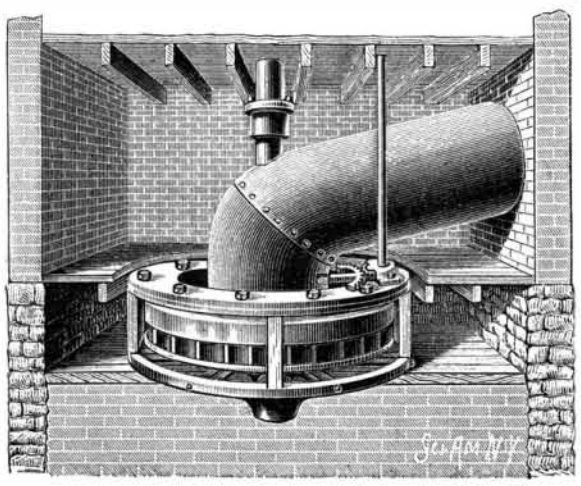
Mr. J. Spiller said that Mr. Green had kept him informed of the progress he had made since he discovered primuline, and he (Mr. Spiller) had worked on the paper basis a good deal. He found that he was dealing with a material which was extremely sensitive to light; indeed, he should be inclined to describe it as sensitive as the ordinary chloride of silver. At one time he thought it would be worth while to endeavor to use it in the camera, but his patience became exhausted when at the end of ten minutes he failed to secure the images. Of course, unless it was sensitive enough to take an impression in that time, it was not of much use in that direction. It was, however, interesting to find that when leaves and ferns or any object from which copies could be made by transmitted light were employed, according to the length of the exposure impressions either merely surface deep or which penetrated the whole paper were obtained, and the impressions were wonderfully permanent. They were not destroyed or injured in any way by the vast number of chemical bodies to which he had submitted them. He had tried almost everything he could think of, and nothing would destroy the impressions except the hydrosulphates to which Mr. Green had referred. He should like to hear whether Mr. Green and his colleagues had succeeded in getting a white basis by employing some agent to dissolve the unaffected portion of the material operated upon.

The president (Professor Thorpe) remarked that Mr. Green's discovery was another instance of history repeating itself. The old process of reproducing architects' and engineers' plans on a blue background with white lines was likely to be run very hard by the one they had unfolded to them by Mr. Green. When Sir John Herschel occupied the post he (Professor Thorpe) now filled, on the occasion of the previous meeting of the British Association in Leeds, the blue background process was in full vogue. Now they were likely to have another in its place.

Mr. Green stated that as yet he had not succeeded in getting absolutely white background, but he believed that it would ultimately be obtained.

THE NEW "PATRICK" TURBINE WATER WHEEL.

A water wheel of inexpensive construction, which cannot easily get out of order, and which is designed to give the greatest possible percentage of power from the amount of water used, is shown in the accompanying illustration, and has been patented in the United States and Canada by Mr. Adolphe Patrick.



THE NEW "PATRICK" TURBINE WATER WHEEL.

In this wheel the principle of outward horizontal discharge is combined with an upward discharge, and to this end the water is conducted into the inner or central portion of the wheel, whence it flows between fixed partitions and intermediate regulating gates, by which it is directed against the buckets of the wheel immediately outside of the guides. The mode of regulating the flow of water on to the buckets of the wheel is simple, avoiding all interfering mechanism and giving the way clear to the water from the penstock into the wheel case, whence it flows out between the partitions and the regulating gates on to the buckets of the wheel. The latter is supported by a central pivot which carries both the wheel case and the penstock, which is attached to it.

This turbine has been largely employed in Canada during the past three years, and is said to have given the greatest satisfaction to all parties using it. For further information regarding it address Mr. J. A. Grenier, Manager, Patrick Water Wheel Co., No. 204 St James Street, Montreal, Canada.

New Zealand Flax.

The purchase of New Zealand flax by the United States, in 1889, largely exceeded that of any other country. It is really a species of hemp, and costs, laid down in this market, from 5¼ to 6⅜ cents per pound for good Wellington and Auckland brands, as compared with 9c. for manila, 6c. for sisal and 6½c. for American hemp. It is used extensively by the cordage mills in mixes with sisal and manila hemp in making low grade rope and binder twine. The flax for export is usually cut from the swamps, marshes and river banks. It is in its wild, uncultivated state, and it is cut down and run through the machines without any attempt at selection. The persons usually employed to cut the green flax are paid by the ton, and, in order to get as much weight as possible, they cut as close to the ground as possible. The lower end of the leaf is thick and fleshy, containing a large amount of gum and vegetable matter, and weighs heavily as compared with upper portions of the leaf; besides, the fiber obtained from the butt end is very much inferior in texture.

To imperfect machinery and carelessness in the selection of green plants may be ascribed the coarseness and inferiority so often complained of in the flax exported from certain portions of New Zealand. But with improved flax-dressing machinery and proper care in the selection of the raw material, our consul at Auckland states that a very superior article can be produced. The hand-dressed article prepared by the natives is as fine as silk compared with the modern machine-dressed flax of to-day, which demonstrates the fact that the fiber may be reduced to a much finer quality if an improved machine can be invented, but the requisite machinery is lacking.

Many who profess to understand the toughness and durability of the fiber believe that if it could be properly reduced, it would enter largely and successfully into the manufacture of valuable textile fabrics. It is thought that the plant (*Phormium tenax*) would flourish in many parts of the Southern States.

Some Uncommon Metals.

There are quite a number of metals which are very sparingly distributed over the earth, and which few people have ever seen, but which have some exceedingly useful applications in the arts, and, in small quantities, are in almost constant use. Hydrogen, the lightest of all the elements, was discovered by Cavendish in 1766, and is considered by the best authorities to be a gaseous metal, just as mercury is a liquid metal at ordinary temperatures. Very few persons have ever seen solid hydrogen. Mercury becomes solid at —40°, but, according to Professor Pictet, hydrogen gas requires a temperature of —140°, and pressure of over two tons to the square inch, before it liquefies even. By suddenly removing the pressure from this liquefied hydrogen, the cold produced by its evaporation is so great that a part of it solidifies into a state resembling metallic grains, which remain visible for several minutes. Its metallic nature is also rendered probable by its directly uniting with a metal resembling platinum, and known as palladium, to form a sort of alloy. The weight of a single molecule of hydrogen has been calculated not to be greater than one ten-thousand-millionth of a gramme, and a cubic centimeter of the gas contains at least twenty-one trillions of such molecules. Although these figures are quite incomprehensible to the human mind, they must be approximately correct, and represent actual and existing magnitudes.

Lithium is a quite rare mineral, which occurs in some varieties of mica, and also in small quantities in the waters of certain mineral springs. It is considered to possess a distinct medicinal value by some physicians, and is probably taken into the system, at least, as we have detected it by spectroscopic analysis in the blood of a person who had been drinking a strong lithia water.

Barium is a metal closely allied to calcium, the metallic base of lime. It is never used in the metallic state, but the sulphate of barium is quite extensively used—either honestly or dishonestly—as a substitute for white lead in paint. It is cheaper than white lead, and is not changed in color by the sulphur compounds often present in the air, but possesses less covering power than lead, and is less permanent in other ways. The peroxide of barium is used in the preparation of peroxide of hydrogen, and the phosphorescent sulphide of barium is a constituent of some varieties of luminous paints. The green fire used in pyrotechny is also due to the presence of this metal in the form of a nitrate.

Selenium is not a metal, but belongs to the sulphur group of elements. We must mention, however, the wonderful property by which its electrical conductivity varies according to the amount of light falling upon it, just as the chemical relations of silver are altered by the same means. By this power Professor Bell was enabled to construct an optical telephone, and actually transmitted words and sentences between two distant points which were not connected in any way except by a beam of light, which faithfully carried the vibrations of his voice to a selenium disk, by which they were transformed into electric energy and reproduced in an ordinary telephone. Whether we shall ever be able to see our friends at a distance, as we now talk with them, is exceedingly problematical; but if we ever do so, it will doubtless be through this mysterious connection between light, electricity, and the element selenium.—*Popular Science News.*

To give a brilliant white light, a lamp needs a thorough cleansing every little while. The oil should be poured out of the fount, leaving no dregs on the bottom. The fount should then be washed in strong soapsuds, rinsed in warm water, and dried. It should then be filled with fresh oil. The burner should be boiled in soda and water until the network that crosses it is freed from dirt and dust. If the wick has become clogged with the sediment, replace it with a new one.