

and then it was decided to put up lightning-rods on the spire and other parts of the buildings. Since that time it has been remarked, as a matter of fact, that the cathedral has been struck by harmless discharges only, which fall on the rods and followed the conductors into the ground, without the least deviation.

Many of our readers will doubtless remember how, a few years ago, one of the pinnacles on the western tower of the cathedral of Notre Dame in Montreal, was struck by lightning, and fell with a loud crash on the pavement below—but the lightning-rod has not followed. Lord Bacon's famous apothegm "Nature is only conquered by obeying her" is disregarded by the City Fathers and by the Sulpician Fathers; if they would but hear the voice of science the lofty towers of Notre Dame would no longer be allowed to remain without parapet-nerres.

Science must ever remain a debtor to the ingenuity of Franklin for proposing, at least, a partial protection against the dreaded effects of atmospheric electricity; let us mention the following instance, where, as Arago phrases it, "Nature was caught in the act." "On the 21st of May, 1831, during a very violent thunder-storm, the ship "Caledonia" was under sail in Plymouth Bay. From the town, the lightning could be seen darting toward the water, at but a short distance from the vessel. On the shore the lightning caused several fatal accidents. Surrounded, as it were, by these falling thunderbolts, the "Caledonia," protected by her lightning-rods, escaped all harm and sailed along as safely as though the sky had been clear."

The name of Franklin will ever be associated with electricity. His genius, like Lord Bacon's, lay in his power of swift induction, from moral and physical facts. What a man he was! what an example for our youth, who too often despise science! We read that from his parents he had received no inheritance except the noblest—a spotless example, a healthful constitution, a sane mind. He founded schools, libraries and various useful institutions in his adopted home, and at the age of forty-five he had become one of Philadelphia's most useful citizens. He occasionally uttered keen apothegms that live like the sayings of Solon, and sharp satires that want the bitter hopelessness of Diogenes. He taught young men that purity, honesty, and self-respect were better than wealth, luxury, or any other success. He combined in himself the philosopher and the moralist—the mechanic and the Christian. In his electric triumphs the first thought of his generous nature was how to make his discovery useful to his fellow creatures. If he has gained immortal renown by drawing down the lightning from the skies by presenting his iron-points to the thunder-cloud, he has also gained the everlasting gratitude of the world by the invention of his lightning-conductors, which render comparatively harmless the "nimble stroke of quick cross-lightning" which destroys life, breaks rocks and walls of stone in pieces, fuses metals, splits the "unwedgeable and gnarled oak," and makes lofty towers to topple.

The Philosophical Transactions will furnish the reader with a number of curious facts illustrative of the effects of the electric fluid (in the case of a stroke on a building) among the different substances it meets with in its course to the earth. He will find it here making no distinction of sect, or party, or of property sacred or profane—putting out the candles, upsetting the chalice and the paten on the altar amid the Roman Catholic congregation at Stralsund, (vol. i. 526); knocking down the steeple and dismantling the bells, and breaking and tearing out of their frames the creed and ten commandments in Anglican churches, (xi. 113, xii. 126, 610); entering the tabernacle in Tottenham Court Road soon after the great Whitfield had built it,—and on a Sunday too,—doing much damage there, and killing a man.

Thanks again to science, Wheatstone and Morse following up the remarkable experiment of Oersted's which formed the union of magnetism and electricity, and enlarging upon it, the electric flash is now busy day and night in doing the work marked out for it by modern magicians. It flies swifter than Ariel to do the bidding of Prospero; and like my gentle Puck, at the request of Oberon, "puts a girdle round about the earth in forty minutes;" and the thunder-bolt of Jupiter is everywhere toiling in the cause of human progress. A modern writer thus expresses himself:—"When we attempt to catch the idea of the electric spark, it still appears almost as superhuman and terrible as when it flashed fear into the hearts of Greeks and Romans. It obeys with scrupulous accuracy; it performs the most important tasks with equal care; it is as docile as was the genie to Solomon's seal; and yet it still remains shadowy, mysterious, and unpalpable. It still lives in the skies and seems to connect the material and the spiritual. Whence came these tongues of fire, these sharp shocks, these pale, ghostly lights that play around us and mock the master they obey? Who is that wields this electric element, which seems to be the very base and source of our existence?"

We must now answer the question which doubtless will be uppermost in most young minds who have followed our gossip thus far:—What is this electricity of the atmosphere?

The existence of it has been referred to various sources; the phenomena of animal and vegetable life, as well as chemical action, have been called in to explain its origin. Among others the evaporation of water, and other fluids, constantly taking place on the earth's surface may certainly be regarded as one of the sources of atmospheric electricity. The evolution of electricity by evaporation may be readily proved by placing on the cap of a gold-leaf electroscope a small metallic cup containing water, in which some common salt has been dissolved. On dropping into it a piece of hot cinder, the vapour will arise copiously, and carry off positive electricity, leaving the cup negatively electrified, with which electricity the gold-leaves will diverge. If water, containing a weak portion of acid, be substituted for the weak brine, the reverse will occur, the gold-leaves diverging with positive electricity, the vapour being negatively electrified.

Let us suppose an insulated conductor, consisting of a pointed iron rod, mounted on a glass pillar and receiving on its upper length, and on the inverted funnel through which this is made to pass whatever may fall from the clouds. At the approach of a shower of hard rain or hail brought by a nimbus cloud moving with the wind, the pith-balls of the electrometer open with negative electricity and gradually close again; as the first drops of rain or the hail stones touch the conductor, they open positive and this charge continues strong while the shower is passing over; but, the rain or hail gone by, the charge again becomes negative and dies away in like gradual manner as before; lastly, there is left behind a

slight positive charge. Those facts prove that the central part of the space occupied by the rain cloud is the focus of a strong positive electricity, concentrated by the diminution of surface in the water as the drops come together and increase in bulk. (See Howard's "Essay on Atmospheric Electricity" in Climate of London. Vol I., p. 137 to 153.)

Many of our scientific meteorologists are inclined to regard the evaporation of fluids as one at least of the sources of the electricity of the atmosphere.

The clouds, consisting of immense masses of aqueous vapour, are tolerably good conductors of electricity, and consequently contain a considerable quantity of the latter in a free state. There can be but little doubt that a cloud consists of an aggregation of minute vesicles of aqueous vapour filled with air.

Sometimes travellers have found themselves, and the horses on which they rode, electrified strongly by the air alone at the approach of charged clouds and showers—the brim of the hat worn by the rider, and the horse's mane and ears presenting little luminous points like those we see upon the comb of an electrical machine, or upon any point set upon the charged conductor.

Pliny, the naturalist, takes notice of these manifestations of the natural electricity occurring upon metallic points, exposed to a thundery air, as happening to the pikes of a Roman Legion. The points and angles of crosses on churches have been seen to exhibit very fine electric brushes. The same phenomenon has frequently been noticed by sailors, the mast-heads and the ends of the yards being apparently on fire. In proof of this see an account by Captain J. L. Winn (Philos. Trans., 1770) of a light and sparks proceeding for a space of two hours and a half from a place where the electric communication had been interrupted by the accidental breaking of the conducting chain of his ship below it.

Books on this and kindred subjects are now published at a marvellous cheapness, which puts them in reach of everyone inclined to know something about Natural Philosophy, perhaps none better or cheaper than Deschanel's Natural Philosophy translated by Professor J. D. Everett, D.C.L., who has done great service to the cause of natural science for having furnished to students such admirable translations; they seem to hit the mean between a dry school-book and a popular treatise.

Such books are good educators if they throw the imagination outwards by giving it a class of objects which may excite wonder, reverence, the love of novelty and of discovering, without heating the brain or exciting the passions." Such studies as that of natural history will prevent the imagination from being thrown inward, "producing a mental fever, diseasing itself and the whole character by feeding on its own fancies, its own day-dreams, its own morbid feelings, its likes and dislikes," even if it do not take at last to viler food, to French novels, sensational stories, and melodramas, wherein, instead of setting forth heroic deeds, the readers and playgoers are taught new possibilities of crime and new palliations for those crimes; when instead of purifying the affections by pity and terror it confounds the moral sense by exciting pity and terror merely for the sake of excitement; or again, instead of stirring a divine scorn of baseness, or even a kindly and indulgent smile at the weaknesses and oddities of humanity, learns to make a mock of sin,—to find excuses for the popular frailties which it pretends to expose.

Next to books on meteorology and cognate sciences the best way of learning these matters is by classes, in which men may combine and interchange their thoughts and observations. The greatest savans find this, and have their geological, botanical, astronomical, royal societies, British and American associations for the advancement of science, and what not, in which all may know what each has done, and each share in the learning of all; for, as iron sharpeneth iron, so a man sharpeneth the face of his friend.

## Art and Literature.

George Eliot has received £3,000 for *Middlemarch*, the highest sum ever paid to a lady for a work of fiction.

Mr. Edwin Weedon, whose nautical sketches in the *Illustrated London News* are familiar to the public, is dead.

Professor Tyndall has given the Yale Scientific Club \$250, as a tribute of good-will and a token of his good wishes.

Sir John Lubbock is about to introduce a bill in the Imperial House of Commons for the preservation of historical monuments and antiquarian relics.

Mr. Randolph Rogers, the American sculptor, has been elected a member of the Roman Academy of Saint Luke. He is the first American sculptor upon whom this rare and distinguished honour has ever been conferred.

The *Musical Gazette* of Milan publishes a curious article on the cannon considered as an instrument of music, from which it appears that the first to originate the idea was one Giuseppe Sark, an Italian, who composed a *Te Deum* at St. Petersburg in 1738, to celebrate the capture of Fort Otzakow by Potemkin.

Holman Hunt has completed a new picture, which will probably be exhibited in the approaching show of the Academy. The subject is much the same as that of Millais' "Carpenter's Shed." Joseph's son (not as a boy but a man) is resting from his work in his father's carpenter's shed, and as he raises his hands his figure throws the shadow of a cross on the wall.

Mrs. E. M. Ward is painting an incident from the boyhood of Chatterton, of his having been discovered by his foster-mother, Mrs. Edkins, in the act of concealing the earliest specimens of the so-called "Rowley Poems." The scene is in the garret of the house of the family at Bristol. There are three figures in the composition, that of Chatterton's grandmother being included.

OUR DIGESTIVE ORGANS.—The result of much scientific research and experiment has within the last few years enabled the medical profession to supply to the human system, where impaired or ineffective, the power which assimilates our food. This is now known as "Morson's Pepsine," and is prescribed as wine, globules, and lozenges, with full directions. The careful and regular use of this valuable medicine restores the natural functions of the stomach, giving once more strength to the body. There are many imitations, but Morson and Son, the original manufacturers, are practical chemists, and the "Pepsine" prepared by them is warranted, and bears their labels and trade-mark. It is sold by all chemists in bottles 3s., and boxes from 2s. 6d., but purchasers should see the name

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## Our Illustrations.

SHROVE TUESDAY AT THE VICTORIA SKATING RINK, MONTREAL.

The fancy-dress entertainment given at the Victoria Skating Rink on Shrove Tuesday, though in every way a successful affair, was of course not to be compared with that held some time ago in honour of the visit of H. E. the Governor-General. Still the ice was thronged, and a goodly number of spectators were present. There was little new to remark among the costumes, but this is a complaint that has not only been made this season. Perhaps the character who attracted the most attention was the African snake-charmer, shown in our illustration. The illusion he produced with his toy-snakes was at first really startling, and his attentions to some of the lady-spectators were the cause of much pretty shrieking and exclamations of fright among the fair recipients, among whom the opinion seemed to be very generally shared that the swarthy Adonis was a "horror."

A biography of

LIEUT.-COL. STRANGE, R. A.,

is given on the preceding page.

THE ROCKING STONE,

shown on page 143, is a huge granite boulder naturally poised with such nicety that by using a sapling for a lever it may be made to rock to and fro, each end in turn ascending and descending like the balance of a scale. In length it is about 25 ft., with a maximum breadth of 15 or 16, and it is said to weigh between two and three hundred tons. The spot where the stone lies is an open space in a forest, about five miles and a half from Halifax, on the other side of the North-West Arm. In summer this is a very favourite meet for pic-nics. It is supposed by geologists that this rock was deposited where it now lies at a period in the earth's history when Nova Scotia and Canada were under the sea and immense icebergs—many of which contained great masses of rock—were floating down from the northern regions. On reaching warmer latitudes the icebergs melted, the imprisoned boulders were set free, and were deposited on the face of the earth. Nova Scotia shows visible signs of having been at one time under the sea, and of having had at another enormous glaciers passing over it, the rock-surfaces being frequently polished and grooved by the action of these ice masses, as in Greenland and among the Alps.

THE VIEWS IN QUEBEC

are familiar to many of our readers, and need no explanation.

A SINKING CITY.

Over this title we give three views in the town of Iserlohn, in Westphalia, showing the gradual sinking of the houses, due to the falling in of the thin strata which lies between the upper surface of the earth and a mine, over which the town is built.

## Dramatic Notes.

Charlotte Cushman has been playing at Washington.

Mr. Robinson's "Bridge of Glass" has been dramatized.

It is now stated that Nilsson will sing in New York next October.

Miss Fanny Janansek opened at the Boston "Globe" on the 21th ult.

Minnie Hauck has signed a three-years' engagement at Vienna.

A Spanish version of "Hamlet" has been brought out at Madrid.

Aimée has been playing at New Orleans with an Opera Bouffe Company.

A new cantata, founded on Longfellow's "Evangeline," has been brought out at Brighton.

A dramatized version of Dickens' "Message from the Sea" has been produced in London.

An Italian composer named Filoni has composed an opera, the scene of which is laid in Paradise.

Milla Tiffens has been suffering from a severe attack of bronchitis which has prevented her singing.

Nilsson and Faure appear together in "Hamlet" next month at Brussels, Liège, Ghent and Antwerp.

"The Long Strike" was recently produced with great success in Paris, under the title of "La Dépêche."

A Vienna kapellmeister has composed airs to a medley of advertisements from a German paper. *Cui bono?*

An adaptation of Charles Reade's "Clouds and Sunshine" has been played at the Boston Theatre under the title of "Rachel the Reaper."

Mme. Arabella Goddard made her last public appearance in England on the 11th ult. She was to start early this month on a tour through America and Australia.

Albani will sing in London during the forthcoming season. She has added two new parts to her list of rôles, in both of which she will appear, viz., Ophelia in the "Hamlet" of Ambroise Thomas, and Elvira in Bellini's "Puritani."

The late Mr. Balfe left a MS. opera called "The Knights of the Leopard," the libretto by Mr. A. Mattheson, based on Sir Walter Scott's romance. Madame Nilsson-Rouzeaud having expressed her readiness to play the principal part, the Queen of Richard Cœur de Lion, it is proposed, if time should permit, to produce an Italian adaptation at Her Majesty's Opera, Drury Lane, during the forthcoming season. The score was left uncompleted by Mr. Balfe, but Sir Michael Costa has kindly edited it, and added a finale, at the request of the widow.

Offenbach's "Braconniers"—the Poachers—has been having a great run in Paris. In its plot it is a good deal like "Les Brigands"—not in its principal feature, however. The chief of the poaching gang is a young girl, Ribletto or Ribletta, accordingly as she appears in the garters and *carminole* vest of the inveterate poacher, or in her real character of a very pretty girl, the true proprietor of the woods in which Ribletto and her brave men poach out of revenge to the Marquis de Las Coueres, who has robbed her of her rights. The most successful air, loudly encored, was Ginetta's duet with her husband, in which every verse ends with Ginetta's "Je ne me souviens plus," sung each time with a different shade of expression. The quintet of the second act is admirable, as is the dashing, vigorous finale of the whole—a sort of parody of the eccentric duales in the old Italian style.