WHAT ARE THEY?

Observations and Deductions of Scientists Concerning the Display of Aurora Borealts.

We have had recently several magnificent displays of Aurora Borealis, and a brief reference to our present knowledge of this phenomenon will be interesting.

As the movement of the aurora, as most frequently seen in the northern hemisphere, seems to orginate in the northern regions it is most commonly known as aurora borealis, a name signifiying the Northern Dawn, and more popularly still the phenomenon is known as the "Northern Lights." There is also a phase of aurora called Aurora Australis, or the Southern Dawn. In times not very remote the appearance of the aurora was regarded as the precursor of

not deal in this practical age. the earth.

SIR ROBERT BALL'S OPINION.

physicists are still at work, may be gathered | Ross " were admiring the extreme beauty "Story of the Heavens."

perfect parallelism between the intensity of of them. aurcral phenomena and the abundance of sun-spots." (This was well borne out by shire, Scotland, an aurora not more than aurora of March 30, 1894). "Besides these | 4000 feet above the sea level. "Sir W. R. general coincidences, there have been also Grove states that he saw an aurora some special cases in which a peculiar outbreak | years ago at Chester, in which the rays on the sun has been associated with came between him and the houses; and Mr. remarkable magnetic phenomena on the Ladd observed a similar case in which the railway, in order to

be well to speak of appearances. Professor | conclude that although in the majority of which frequently extends entirely across near the surface. the heavens from east to west and cuts the magnetic meridian nearly at right angles, -- in the Polar regions five such arches have been seen at once; thirdly, slender, luminous beams or columns, well defined and often of a bright light; fourthly, the corona, the centre of which is invariably near the magnetic zenith, but not always coincident with it; and, fifthly, waves or flashes of light."

If the horizon be examined carefully during an auroral display, there will be seen a dark, misty bank of vapor-you can scarce ly call it a cloud because stars can be seen through it-which forms a strong contrast with the auroral glow. It is asserted that in the circum-polar regions crackling sounds, like that which accompanies the brush discharge of an electric machine, are heard during the flashes; but this needs confirmation by competent observers.

DAYLIGHT AURORA.

Aurora has been seen in daylight, strange as that may seem, since it is generally associated with the darkness. Dr. H. Ussher, in the transactions of the Royal Irish Academy, 1788, records that noticing one day that the stars fluttered very much in the telescope at 11 a. m. he examined the sky and saw an auroral corona with rays to the horizon. The same phenomenon has been seen by others whose observations can be trusted. Sir John Franklin, the great Arctic explorer, who made a study of northern lights, says : "Upon one occasion the aurora was seen immediately after sunset, while bright daylight was still remaining. A circumstance to which I attach some importance must not be omitted.

"Clouds have sometimes been observed during the day to assume the forms of aurora, and I am inclined to connect with these clouds the deviation of the needle which was occasionally remarked at such times."

Mr. H. R. Proctor, the writer of the article in the Encyclopedia Britannica, says that he has seen aurora which could not be distinguished from clouds, till a further development of the display made their real nature evident.

It is well known that weather-men classify clouds. In their classification we found "cirrus" and "cirro-stratus." The former name is applied to a wisplike or curl-of-hair-like cloud, and the latter to a thin layer of cloud made up of such cloudlets. These two kinds of form appear to be intricately connected with the aurora; in fact it would seem as if occasionally the display merged into this form of cloud. Such clouds have also been noticed to present a sort of auroral display in themselves.

able aurora of April 15, 1869, says: "At 11 hours, 16 minutes, the phenomenon disappeared in a singular fashion. It appeared as if the columns of the aurora were still | wiping the perspiration from his face and visible, but the stars were hidden, and it bowing to the people before him. If I live soon became evident that fan-like cirrus clouds, with their point of divergence in get the ride that Frenchman gave me on the the North, had taken the place of the piano."-[New Orleans Times Democrat. aurora. Between 1 and 2 in the morning these clouds had passed the zenith, and let fall a very fine rain. Cn stretching out the back of the hand one felt a pricking of cold, and now and then there were minute scintillations in the nearest strata of air, like a hail of tiny crystals of ice, which afterwards turned to rain of larger and larger drops. At 4 o'clock in the morning the cirrus of the false aurora was still visible, but deformed towards the top, andpresenting a harry aspect. One interesting point is that the cirrus never appeared to replace the aurora either from the right or the left, but to substitute itself for it, like

the slow changes of a dioramic view." The same or ment observer also says pounds.

that on a night of September, 1865: "A stormy cloud was observed about 11 p. m. in the N. N. N., and lightning was distinctly visible in the dark cumulous mass. Round this mass extended 'glories' of a To Deliver It in Canada Thirty phosphorescent whiteness, which melted away into the darkness of the starry sky. Round the cloud was a single and uninterru pted corona, and besides this, two fainter coronae, broken by rifts which corresponded wi h each other. After the cloud had sunk below the horizon the 'glories' were still visible. The light could not have been due to the moon or sny foreign cause. The rays showed great mobility, and a sort of vibration intermediate between that of the aurora and the 'brush discharge' of the electric machine"

AURORA AND CLOUDS.

Another was reckoned to be 100 miles,

A Mr. Farquharson saw in Aberdeen- of each agreement being that in the event lighthouse at Margate (England) was invis-"Before we begin to study causes, it will | ible through a ray." We may, therefore, Loomis enumerates five varieties of form cases the auroral display takes place at assumed by auroral displays: "First, a heights where the atmospheric pressure is horizontal light like the morning aurora, or | very slight indeed, yet there are instances break of day; secondly, an arch of light | where, beyond all doubt, it has taken place

THE POWER OF MUSIC.

How Jim Nelson, the Engineer, Made the Piano Go.

night," said Jim Nelson, one of the old lo- authorize this service, as well as an increase comotive engineers running into New on the Canadian Pacific railway, with little Orleans. "As I had nothing to do I drop- hesitation, as the extra expense to be incurped into a concert saloon and heard a sleek | red was only for service between the postlooking Frenchman play a piano in a way offices and railway stations, and the salarthat made me feel all over in spots. As ies of one or two additional mail clerks. soon as he sat down on the stool I knew by the way he handled himself that he understood the machine he was running.

"He tapped the keys way up one end, just as if they were gauges and ne wanted to see if he had water enough. Then he looked up as if he wanted to know how much steam he was carrying, and the next moment he pulled open the throttle and sailed on to the main line as if he was half

an hour late. "You could hear her thunder over culverts and bridges and getting faster and faster, until the fellow rocked about in his ple packages. seat like a cradle. Somehow I thought it was old '36' pulling a passenger train and getting out of the way of a 'special.' The fellow worked the keys on the middle division like lightning, and then he flew along the north end of the line until the drivers went around like a buzz saw, and I got

"About the time I was fixing to tell him to cut her off a little he kicked the dampers under the machine wide open, pulled the throttle way back in the tender, and how she did run! I couldn't stand it any longer, and yelled to him that he was pounding on the left side and if he wasn't careful he'd drop his ashpan.

"But he didn't hear. No one heard me. Everything was flying and whizzing. Telegraph poles on the side of the track looked like a row of cornstalks, the trees appeared to be a mud bank, and all the time the exhaust of the old machine sounded like the hum of a bumblebee. I tried to yell out, but my tongue wouldn't move.

"He went around curves like a bullet, slipped an eccentric, blew out his soft plug, went down grades fifty feet to the mile, and not a controlling brake set. She went by the meeting point at a mile and a half a minute, and calling for more steam. My hair stood up straight, because I knew the game was up.

"Sure enough, dead ahead of us was the headlight of a 'special.' In a daze I heard the crash as they struck, and I saw cars shivered into atoms, people smashed and mangled and bleeding and gasping for water. I heard another crash as the French professor struck the deep keys away down M. Silbermann, speaking of the remark- on the lower end of the southern division, and then I came to my senses.

"There he was at a dead standstill, with the door of the firebox of the machine open, to be one thousand years old I'll never for-

The ex-Empress Eugenie frequently uses the diamond pen with which the treaty of Paris was signed. This pen was used by tralian steamship line have been made to the fourteen plenipotentiaries who signed the famous document. It was a quill New South Wales, Victoria, New Zealand. plucked from a golden eagle, and is richly Tas nania, South Australia, Queensland and mounted in diamends and gold.

Hoop-skirts first appeared in 1530. An iron cage was prepared and the skirts were stretched over it. The cage was tipped to one side, the lady crawled underneath and the cage was fastened to her waist by a strong leather belt. The contrivance often weighed as much as forty

Millions of Miles are Travelled.

Facts and Figures Respecting Toronto's Immense Postal Traffic-It is Double That of Montreal.

The annual report of the Post Office Department which has just been presented to Parliament is a most interesting document. It shows that on June 30 last the number of post-offices in operation in the Dominion was 8,477, which, taking the population according to the census of 1891, would give one post-office to every 570 persons. In This bringing the aurora down to the the United States the proportion is about region of the clouds may surprise some. one post-office to 925 persons, so that in The position usually assigned to it is "far respect to the accommodation afforded by away" in space. Such, however, does not the post-office to the people at large, Canappear to be the case. Professor Newton ada compares very favorably with the war, pestilence and famine, and of course a formulated a means of calculating the United States. On the 30th June, 1892, few coincidences strengthened such super- height of the auroral arch and found that there were 8,288 post-offices in Canada; stition. With this view, however, I need of 28 the range was from 33 to 281 miles. the increase during the year has therefore been 189. During the same period the What are these Northern Lights?-is a which is well within the limits of our at- mail routes have been increased by the admuch more pertinent question than, "What mosphere. In the paper on meteors, in dition of 2,313 miles of new routes, and do the Northern Lights portend?-although | this journal, it was stated that their visibil- | the annual mail travel, which in 1892 was that question has more than once been asked | ity depended on their ignition by the fric- 28,462,384 miles, was for the year ended me. Professor Newcomb in that most tion of passing through the atmosphere, 30th June, 1893, 30,495,723 miles. The valuable work of his, "Popular Astronomy," and that the height of these heavenly actual railway mileage in operation daily says: "We must include the aurora among | bodies at the time of ignition was not so | was 13,703; the actual service, however, those things in which modern observations very great. Twenty of those calculated covered 29,825 miles. Last year the inhave opened up more difficulties than gave heights varying from 40 to 118 miles crease in the annual travel as compared modern theories have explained." The The aurora, therefore, need not be regard, with the year previous was 884,425 miles; phenomenon is now regarded as finding its | ed as outside the air covering of the earth. | this year, in spite of the fact that the adtrue place in meteorology, rather than in although, of course, the density of the air dition of new lines of railway was less, astronomy. Whatever may be the primary at such heights approaches that of what is the corresponding figures are 1,461,cause, it originates in earth, and it affects ordinarily called vacuum. On several oc. 185 miles. The explanation of this casions, however, there is strong evidence is that on several of the principal lines the that the glow has been very near the obser- train service has been increased, and the vers. Captain Parry, in his third voyage to department, pursuing as far as possible its The gist of this paper, which cannot the Arctic regions, saw auroras very near policy of making the facilities for transmispretend to dogmatise on what is at present | the earth's surface. He says that while he sion of mails correspond with those offered a most question, and one on which eminent and Lieutenant Scherer and Lieutenant for travel, at once availed itself of the additional trains for the conveyance of mails. from a quotation from Sir Robert Ball's of the polar light," they all simultaneously This affords a convenient opportunity for uttered an exclamation of surprise at seeing pointing out the advantageous nature of the "The earth's magnetism is well-known a bright ray of the aurora shoot suddenly agreements between this department and to be connected with the phenomena of the downward from the general mass of light the Canadian Pacific and Grand Trunk rail- identical with that shown in Egyptian under estimated. There are men in Toaurora borealis, inasmuch as an unusual and between them and the land, which was ways for the conveyance of mails. Over the paintings 3500 years old. aurora seems to be invariably accompanied only 3000 yards distant. The ray or beam | whole of the Grand Trunk railway and the by a great magnetic disturbance. It has of the polar light then passed within a dis- principal part of the Canadian Pacific railalso been shown that there is an almost tance of 3000 yards, or less than two miles way, the mails are carried at a fixed rate per train mile per annum, one of the terms

REDUCE THE TRAIN TIME

of the railway company's finding it to its

advantage to increase its train service this

department obtsins the right to use all ad-

ditional trains without increase in the cost.

During the past year the Canadian Pacific

between Montreal and Vancouver, was obliged to leave a number of the less important stations to be served by supplementary trains, and the result was that by the use of these trains all the more important offices obtained a semi-daily service, instead of the daily which they had up to that time. On the Grand Trunk railway, between Toronto and London, it was found that an improvement might be effected in ed by peeping through a chink in the wall the transmission of registered and other of his mother's room at a clock in an ad matter by employing a second daily postal | joining apartment. "I was loitering around the streets one | car, and the Postmaster-General was able to

MAILS TO CHINA AND JAPAN.

During the year there passed between Vancouver, B. C., and post-offices in China and Japan 143,578 letters,42,800 papers and 39,997 miscellaneons packages, an increase of 34,467 letters, 7,900 papers and 16,556 miscellaneous packages.

From June 8, when the direct service with Australia was established, to October 21, 1893, there passed between the Australasian colonies and Canada 16,297 letters, S,260 newspapers and 2,039 book and sam-

The amount of mail matter which passed | nish noise at their feasts. between Canada and the West Indian follows: Letters, 11,722; papers, books, commonly worked by two women. etc., 3,768; parcel post baskets and bags, 139, showing that the West Indian mail service is progressing satisfactorily.

FREE DELIVERY

The figures of the free delivery by letter carrier are as follows:-

Totals	Winnipeg	Toronto	St. John	Quebec and St. Sauveur	Þ.F	Montreal, including Hochelaga, Point St.	HalifaxHamiltonKingston'	OFFICE.
36,361,130	1.454,591	15,548,454	1,106,025	1,727,200			1,079,516 2,358,221 1,266,052	Letters and Pos Cards.
36,361,130 12,891,403 49,258,533	1,126,638					714,232	102,987 946,957 638,959	Newspapers.
49,258,533	2,581,229		4.5	3.11	198	014	1,182,533 3,305,178 1,905,021	Letters. Pos Cards & News papers.
381	20				_	1	2528	Actual De-
191	18 53	1212					955	Including 3.5

The net revenue for the year was \$2,773 507 and the expenditure \$3,421,203. The arrangement which was made for a direct exchange of parcels with St. Lucia was put into operation on the 1st October,

Propositions for a direct exchange of par cels by parcel post by the Canadian-Austhe Post-office Departments at Hawaii, Fiji, Western Australia, and it is hoped that the necessary arrangements will soon be completed.

Proposals have also been made for a direct exchange of money orders with the Hawaiian islands, Fiji, and the Australian colonies.

HOW LETTERS DISAPPEAR. Major John Walsh, superintendent of the

dead letter branch, gives an interesting account of the operations of the branch. As an instance of the extraordinary way in which correspondence sometimes disappears, the following extract from a letter written by Mr. Adam Brown, postmaster at Hamilton, Ont. is given: "A few days ago one of our letter carriers dropped a letter through the slit of a door, rang the bell and walked on. When a short distance away the door was opened and the occupant called him back, asking if he had rung the bell. He through the slit.' 'Well,' said the woman, enough neither there was. The carrier, up as a promissory note." however, being sure that he had delivered behold! he discovered an opening between the stone sill and the flooring, and, peering in, saw the top of a letter-pulled it out-

it, this very letter happens to be one of the of three. I have reported its delivery and how it was found."

GENESIS OF INVENTION.

Circumstances Under Which Things We Are Familiar with Came into Use.

The mold-board was first placed on a plow in Gaul. At first two mold-boards were used, to throw both right and left.

whorl, is the same the world over and

The Roman legionary troops were a sort of knee breeches. The signs of tunic and

The earliest spade-shaped instrument is found in the Egyptian monuments; it is a stick with the point flattened and broaden-

The discovery of iodine was accidentally made by Courtois, a French soap maker, who found the new substance in the ash of The power of steam was discovered by a

The famous Tyrian purple dye was rediscovered by a lover who desired to gratify his sweetheart's desire for a dress of a new

shade of color. Vaucanson's inventive genius was arous-

the modern Colt's revolver, was in use in England during the war of Charles I. and his Parliament. The descriptions given by Strabo, of the

osier houses of the Gauls and Britons, might be applied to human habitations in Central Africa to-day. Hoes made of clam or oyster shells, tortoise

shells, flint obsidian, and even of the teeth of various animals have been found in many parts of the world. The "House of Fame," by Chaucer, is a

the poem was written. The germ of the trumpet, and all instru-

horn, used by savages as a signal or to fur-The hand-mill, composed of two flat cirislands by Canadian steamships from 1st cular stones, was in use almost all over the

October, 1892, to 1st October, 1893, was as | world until the fifteenth century. It was For many ages the Chinese have had an irrigating machine, consisting of a trough

and an endless chain of buckets which car-

ry the water up an inclined plane. Berthollet made the discovery of a new bleaching process by accidentally noticing the corks with which he had stopped the bottles containing his chlorine gas.

LATE FOREIGN NEWS.

An English football player was sunstruck in the end of last March.

An exhibition of gold ores and of precious metals and stones is being organized at St. Petersburg by the Russian Technical Society. The date of opening has not yet been arranged.

Exhaustive experiments in the cultivation of tea are soon to be made in Russia. The Czar is personally interested in the plan, and experts are arranging for the cultivation of the plant in the western limits of the Caucasus, where the temperature is much the same as that in which the plant grows in China.

tolerant toward the foreign element, increased its strength by a gain of some thirty seats. This will give the Government strong support against the anti-foreign factrouble of late.

Automatic slot machines for the supply of hot water were put up in the streets all over Paris a few months ago, but they have not proved a success. Their purpose was the supplying of hot water to people too poor to afford a fire in their homes at all times. For one cent the machine was supposed to deliver fourteen pints of water at a temperature of 140 degrees Fahrenheit. But the machines have mostly delivered cold water, and often nothing whatever. proprietors to put them in order or remove them from the streets.

in 1545. Before that time the female Toronto Telegram. coiffures were held in place by fine wooden ! skewers.

On the body of a notorious brigand recently killed in Turkey was Found \$16,000 and a note book which showed he had murdered 192 men.

AND SIGN DECEPTIVE NOTES.

How The Lightning-rod Agent Gets in His Deadly Work- The Barn Passing Faktr And His Little scheme.

"A couple of slick-looking individuals are working on farmers in Essex county. They receive permission from a farmer to said he had and added, 'I put a letter paint a sign on his barn and then ask him to sign a document stating that the work 'there is no letter on the floor,' and true has been done. Later the document turns

The above paragraph, clipped from an the letter, shut the door, when, lo and exchange, contains a whole host of information about the credibility and gullability of the Ontario farmer. City people laugh at the idea of a man in his senses signing his then he discovered another, and finally a name to a document without first examinthird, all of which he brought to the sur- ing it closely, just as they laugh every face. One of the letters being postmarked | time it is reported that a granger has been in August, I sentup one of my mento-day to found almost asphyxiated through blowing make a thorough examination and he found out the gas in a hotel room. Frequent are there a mouse's nest and he brought back | the accounts in weekly newspapers of haynibblings of envelopes; so that I have no fork men and lightning rod agents going in doubt Mr. and Mrs. Mouse and family have triumphant raids throughout the rural dishad nice beds out of letters which the occu- tricts and reaping a harvest of promissory pants should have got. Of course all the notes which will materialize in tenfold the letters would not go to the mouse's chamber, amounts which their makers really intendonly such as tipped over at a particular ed. The solution of the stupidity of farmers in matters of this kind will be found in "After we made the discovery I got de. | the method of his " raising," or early train. partmental enquiry No 6,552, book 19, for a ing, and his environment. The first lesson letter posted at Marshall, Mich., 26th Au- a child receives in the country from anxious gust, containing \$1, and would you believe parents is to be respectful, especially to men

EDUCATION AND GOOD PRESENCE,

and this class is exemplified by the school teacher and the district minister. This is all very well provided the child were tanght to be respectful also of himself. This lesson is seldom or never taught and hence the bashfulness and timidity so often observable in country boys and girls. The result of such training is that the children grow into men and women likely to be abashed in the presence of sharp-looking strangers who The hand spinning, with spindle and have a gifted command of the English ronto to-day who were raised in the country districts who confess that it took years of residence in the city to remove the impresbreeches makers have been found in Pompeii. sion that good clothes indicated worth in their possessor. This being the case the hay-fork man has half effected his sale the moment he crosses the threshold of the farmer's doorway. His manner is politeness itself and the smile he wears makes suspicion fly before it. It is just about noon and he asks if he can purchase his dinner. He is told that he is welcome to dinner without the pay, and the farmer's wife bustles about and prepares an extra Florentine officer, who was idly experiment- good meal while the guileful hay-fork agent ing with a glass bottle and a few drops of reads a pocket bible or shows the children his gold watch calling them "pretty dears," " merry prattlers" and other such captivating names. He finds out the old man's politics and even outrivals him in emphatic condemnation of Mowat or Thompson as the case may be. He gives them all the latest news, asks a blessing at the table and talks a little on religion. After dinner he incidentally mentions that he

PAINTS SIGNS ON BARNS

A repeating petronel, on the principle of or is agent for the Jupiter Lightning Rod Company, or the latest improved hay-fork. The price he names is low and he does not appear at all anxious to sell at first. He is simply on his way fo another neighborhood where he expects to sell forty or fifty in a week. He mentions names of purchasers well-known to farmers as men of probity and shrewdness. Finally he presses home a bargain on his victim, and the rustio cannot find it in his heart to refuse. He hasn't ready money, but this nice, religious agent will wait. A note at six months will curiously accurate description of the Crystal do the trick, and the next harvest will Palace, London, built over 400 years after probably be abundant. So pen and ink are produced, and the farmer is told to "sign here!" He knows but little about business ments of the trumpet family, was the cow's forms and does not scrutinize the note too closely. Even if he did his suspicions could be lulled to rest in two minutes by his smooth tongued deceiver. He signs his name and fears no injury. He has absolutely no suspicions of wrong whatever. There is to him but one type of man in all the world and that is the plain, honest type of farmers, his neighbors, with whom he has associated all his life and who certainly wouldn't beat him out of money by such misrepresentation. The agent secures this note, bids all a good-bye, kisses the baby and proceeds on his way. A few weeks later there arrives at this farmer's household a dray-load of hay-forks or enough lightning rods to protect a country town from comflagration. Protests are useless; the note shows that he has ordered the whole outfit, and they are unloaded there and then, while the note has been discounted in a neighboring town. The goods delivered

ARE PERFECTLY USELESS

and half a dozen times more than he needs, even if they were useful, and he sits down on the wood-pile to tear his hair and curse the day he learned to write his own name. The proceeds of a year's work are swept out of sight, and neighbours point at him the finger of disdain. If the hay fork dodge is played out in any one section, the barnpainting fake is almost sure to give good financial results. Nearly all the barns in the country lack paint, and the farmer has not the slightest exception to a sign or ad-At the general election in Japan the first | vertisement. In fact, his untutored of this month the Liberal party, which is intellect thinks a sign painter a wonder in the realm of art. And when it is all completed in red and green and yellow what more natural than that the farmer should sign a document to prove to the signtion, which has been making considerable painter's employe that the work has been done as a voucher for payment. And when this same document turns up as a promissory note the farmer in good sooth wishes he were dead, but will do identically the same thing next year, provided the right man comes along to deceive him. The hay-fork man will thrive, the lightning rod agent deceive and the barn-painter make money just as long as the farmer has the idea in his cerebellum that a man who wears good clothes is better than himself. After he evolutes from that notion he will The Municipal Council has ordered the probably take down the shotgun from the wall when the city man enters the lane. Until such time, however, promasory notes will be given unwittingly and fall due in their season, and be liquidated in soo many Wire hairpins were invented in England cases by mortgaging the homestead .-

> About 40,000 tramps, it is estimated, are travelling over Germany all the year around. There are twenty-one law firms in the

United States that are conducted joint'r by husbands and wives.