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NEW YORK, SATURDAY, MARCH 19, 1881.

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For the Week ending March 19, 1881. Price 10 cents. For sale by all newsdealers,

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THE ZODIACAL LIGHT,

On almost any clear moonless night now this phenomenon recently decided, the jury returning a verdict for the plaintiff, giving him \$35,018.37, with five per cent. allowmay be noticed in the western sky. In the early part of such an evening, after the twilight has disappeared, a trianance. gle of faint light will be seen extending up into the sky. Its base will be found about the place on the horizon where the sun disappeared, and may be of considerable, though of varying and somewhat indefinite width. It will taper up. of this globe which receive the least popular attention are ward and gradually fade out about half way from the horizon to the zenith, although it has been observed extending through ninety degrees, and even entirely across the sky. Its edges are so indefinite that no two observers will agree as to just what its limits are. It is not generally noticed, because it looks so much like an extension of twilight that it is coldest, hottest, or driest air found in nature contains aquemistaken for that. But, as has been said, it is to be seen ous vapor. Water forms a large portion of many minerals, when the twilight has entirely disappeared, and its shape is in which by the giant power of chemical affinity it is diso different that any one can distinguish it. It is found to rectly combined or is locked up as water of crystallization. lie along the ecliptic, that is, the sun's path in the heavens. To adequately discuss all the natural phenomena in which The ecliptic is more nearly perpendicular to the horizon dur- some form of water is a factor, would require a volume; to ing the evening now than during the evenings of any other enumerate and describe all its industrial applications would part of the year. A glance at any celestial globe, or at a require a number of volumes. terrestial globe having the ecliptic marked upon it, will make this perfectly clear.

ern latitude, then turned over toward the west, it will be and often do become the vehicles of deadly poisons, which noticed at about eight o'clock that the ecliptic is nearly per- in densely populated countries and towns are liable to conpendicular to the horizon, and passes close by the zenith, taminate them. It is of essential importance that supplies the point in the sky directly overhead. As the zodiacal light of each needed for the support of animal life should be pure. always lies along the ecliptic, and is close to the sun, it is Air and water are the great natural distributers of heat clear that about the 1st of March affords the most favorable and cold. The climates of different parts of the world are evenings for its observation; it then extends farthest up into very materially affected by the hot or cold currents of air the sky. In the latitude of the north United States its path which flow over them, and by the analogous currents of does not run directly toward the zenith, for the ecliptic never water established by the action of heat in the great seas. runs through our zenith, but to a point a little way south of Proximity to large bodies of water also has a very importthat. In fact it extends up toward the noonday position of ant effect upon climate. Water slowly absorbs the sumthe sun in the longest summer days. The globe will also mer heat in very large quantity, and slowly gives it off show that at an hour or more before sunrise the ecliptic is again to the colder air of winter, thus tempering what would nearly perpendicular to the horizon, and hence rises highest otherwise be cold and freezing winds, and retarding frost. in October. The zodiacal light is thus seen best in the early morning in October. Except at these seasons it stretches chanical energy. The currents of rivers represent a portion along the sky so near to the horizon that it is generally un- of the mechanical equivalent of solar heat expended in raisnoticed. The present is, then, the most favorable time of ing the masses of water that flow through their channels to year for evening observation of this curious phenomenon, the clouds. The winds that propel our ships and wind and for several weeks any one may find it. It will not do to motors are the product of solar energy also. The chief and expect too close a resemblance to the cuts of the light usu most economical means by which the heat generated in the ally given in our text books. They make it more distinct combustion of fuel can be converted into mechanical energy and with sharper outlines than it will be found to have in for the propulsion of machinery is water, which this heat the sky, as well as too narrow for its ordinary shape. The converts into steam. cause of the zodiacal light is still uncertain. From its nearness to the sun, and its position along the ecliptic, its origin, globe, and forms a notable part of its atmosphere, is, as has must be sought for about the sun. Kepler ascribed it to an been well shown by Tyndall, the great conservator of terresatmosphere about the sun, and this view was generally held trial heat. Should this aqueous envelope be removed by until Laplace showed that its observed limits were far beyond any cause the heat of the earth's surface would so rapidly the point where centrifugal force would balance the force of radiate into space that every living thing would shortly the sun's gravity, and that it could not be an atmosphere be- perish. longing to and revolving with the sun in any such sense as our atmosphere belongs to the earth. Prof. Wright, of Yale rivers protects the life which exists in such waters. Were College, has shown by means of the spectroscope that the it not for this provision of nature these water deposits would zodiacal light is reflected sunlight. But this does not determine become solid masses, in which all their teeming life would the nature of the reflecting substance. It may be a cloud of be immovably imprisoned. gaseous matter, or possibly of small particles of solid matter, surrounding the sun and extending out upon all sides portion of ourland perform a similar service for the vegetatoward the earth's orbit. More probably it is due to immense ble life which lies dormant below. Without this protection swarms of meteoroids surrounding the sun, and thus reflect- the ground would be too deeply frozen, the frost would be ing its light to the eye. G. M. P.

WHOSE BOILERS EXPLODE.

The records kept by the Hartford Steam Boiler Inspection tudes where they now abound. and Insurance Company show that 170 steam boilers exploded in the United States last year, killing 259 persons and wounding 555. The greatest number of explosions in any month houses where the sun's rays do not directly enter, except such tember and November, 16 each; the other months ranged from 10 to 14, the lowest number being in June.

The classified list shows the largest number of explosions in any class to have been 47, in sawing, planing, and wood-Paper, flouring, pulp and grist mills, and elevators, 19; rail. pensates almost wholly for disadvantages of position, causroad locomotives and fire engines, 18; steamboats, tugboats, yachts, steam barges, dredges, and dry docks, 15; portable itself. engincs, hoisters, thrashers, pile-drivers, and cotton gins, 13;

the protection of the property in his care. The case was

AIR AND WATER.

The two substances everywhere met with on the surface air and water. The latter especially is one of the most remarkable substances in nature, and exceeds in its pervasiveness even the air. Go where we will, on the most arid desert, the mountain top, the frozen pole, in the deepest cavern, we meet with water in some or all of its forms. The

Both air and water are essential to the existence of all known life. Our bodily health can only be supported by If such a globe be set for the 1st of March and for a north- our taking quantities of both at short intervals. Both may

Air and water are the great natural distributers of me-

The envelope of aqueous vapor which surrounds the

The ice cover which forms upon the surfaces of lakes and

The snowblankets which have spread this year over a large too late in leaving the earth in the spring, the growing season would be shortened, and many of the plants that now thrive in the temperate zones would cease to exist in lati-

Air and water vapor are the great diffusers of light. Were it not for our atmosphere no solar light could penetrate our was 25, in December. The number for January is 19, Sep- as might be reflected from solid objects. Everything not directly illuminated by the sun would lie in deep shadow. In the mid-day many of our apartments would require artificial illumination. Out of the direct sunshine only the lowest forms of life could exist. But the enormous diffusing, working mills. The other principal classes were in order: transmitting, and reflecting power of our atmosphere coming light to penetrate almost as universally as the air

Thus is illustrated the wonderful character of these comiron works, rolling mills, furnaces, foundries, machine and mon substances-air and water-so important to all animated boiler shops, 13; distilleries, breweries, malt and sugar existence, yet so heedlessly regarded by the mass of mankind. houses, soap, and chemical works, 10. It would be an interesting thing to have a statement of THE INDUSTRIAL CONDITION OF CANADA. thousand boilers in use in each given class of steam-using A couple of years ago our Cauatian account industrial stagnation, adopted a protective tariff in the hope relative frequency of explosion-the number, that is, to each of developing home industries. A return to a free trade STORM WARNINGS IN COURT. policy is strenuously insisted upon by many Canadians, On the night of March 24, 1877, the hull of the steamboat whose idea of national economy never rises above the sophistry of "buying in the cheapest market." In an argument for the policy now under trial the Industhis city. As the vessels passed Fortress Monroe the atten- | trial World of Montreal describes a very hopeful state of tion of the captain of the Wyanoke was called to the Gov- things as its first fruits, and points out the obvious condiernment Storm Signals, but they were disregarded by him. tions of the new prosperity: "Suppose, for instance, a factory is opened in Montreal, giving employment to 1,000 hands. what does this mean ? The owner of the Rockaway brought suit against the Old One thousand factory employes will represent a population Dominion Steamship Company to recover damages to the of at least 2,500. What would the closing of this factory the captain of the Wyanoke, in disregarding the storm loss of 1,000 to 2,500? Much more. These artisans require ass signals, failed to exercise due diligence and precaution for boot, shoes, hats, caps, meat, bread, roots, vegetables, medi-

"Beerizing" Process By MIGISMUND BEER. What wood really
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III. MEDICINE AND HYGIENE-Arsenical Wall Paper and Arti-	
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Rockaway, built at Norfolk, Va., was taken by the steamship Wyanoke, of the Old Dominion Line, to be towed to ... 4338 Subsequently the storm became violent, and the Rockaway

likewise each of the new or additional industries which they the Capitol costing annually upwards of \$110,000, the city inaugurate or add to in all its various forms, require the same things. So that each thousand artisans probably adds, in one way or other, 5,000 additional to the population. Have our free trade friends ever considered this? What emptied one-fifth of the houses of Montreal under the late regime? The closing of the factories. What stunted the growth of the city during that dark era? The impediments which the tariff raised to the establishment of new industries gate the project, which is, at all events, a "brilliant" one. and the development of diversified labor. All the artisans employed in the factories of the metropolis wanted homes. It required carpenters, joiners, bricklayers, painters, plasterers, roofers, glaziers, workingmen of all kinds to erect these houses. It required vast quantities of agricultural produce to fill the stomachs of the various craftsmen which the tariff furnished with a purchasing power. And although to-day the same clouds float over us, the same sun, moon, and stars light the heavens by day and night, in the language of Webster, How altered! and how changed! Of 2,000 notes falling due on the 3d of February in the Bank of Montreal, not one was protested ! 1 Among the thousands of vacant houses in Montreal in '78, not an empty place is to be found, and the demand is for hundreds more. The market is flooded with money for investment. Canada fours are worth more than Canada sixes were formerly. Our alms mandibles of a crab. These are hinged to the sinker, and the Society of Arts. houses, except for the old and infirm, are empty, and the soup kitchen is now a matter of history. The railways are unable to carry the freight offered to them, and the demand for increased accommodation is met by the employment of thousands of able hands, working night and day to meet the public wants! Never was there an era promising greater prosperity for Canada. Bank stocks have appreciated 371/2 per cent, and all securities have become correspondingly improved in value, and the prospect of a £1,000,000 surplus for the financial year ending July 1, stares us in the face to terrify usinto a free trade policy! If it is a bad policy to swap horses while crossing the stream, we think it would be rather imprudent to risk a change from prosperity, under protection, to one of promised increased (?) aggrandizement under free trade."

ARTIFICIAL DAYLIGHT.

The lighting of large interiors from without-that is, by surrounding the space to be illuminated with powerful lamps, so placed as to fill the air with diffused light-is certainly a bold, though not entirely a novel, proposition; yet, either to attract attention or to establish an important economic principle, the Northern Electric Light Company is begging Congress to allow them to light in that way the Capitol at Washington. At first they asked Congress to appropriate money enough to defray the actual cost of illuminating the Capitol and the grounds about it to the brilliancy of broad day, thus making interior lamps unnecessary. But no disposition being shown by Congress to encourage the experiment, the friends of the project subsequently offered to assume the risk of failure, and to furnish the means for making such a crucial test of "artificial daylight," on condition that the government would agree to accept the innovation in case it succeeded, and the saving in the cost of lighting the Capitol should prove in three years equal to the cost of the system. This proposition appears to have met with no greater favor than the first, whether from suspicion as to its purpose or feasibility, or because the expiring Congress had larger and more pressing interests to consider, does not appear.

The plan proposed contemplated a crown of electric lamps, 150 in number, surrounding the dome of the Capitol, and so arranged as to shine into the skylights in the roofs of the wings of the building.

In addition, at various points about the Capitol grounds, it was proposed to erect six iron towers, to be surmounted by circular conical lanterns, 11 feet in diameter, and from 125 to 200 feet above the ground, or 50 feet higher than the roofs of the wings of the Capitol. Each lantern was to contain 50 electric lamps. The 450 lamps upon the dome and in the tower lanterns were designed to be about 6,000 about that of 200,000 average gasburners. This light, it is

cine, clothing, houses, wood, etc., almost ad infinitum, and repairs, is \$60,000 a year-the present means of illuminating paying \$60,000 more for street lamps. The aggregate illumination promised by the new system is twenty times that of all the outdoor lamps in Washington and all the lamps in the Capitol building combined: or a light equivalent to bright moonlight throughout the city, and diffused daylight in and about the Capitol.

Perhaps the incoming Congress will have time to investi-

New Instrument for Sea Sounding.

Mr. Lucas, engineer to the Telegraph Construction and Maintenance Company, London, has invented an instrument for sea sounding which he styles a "nipper-lead." The old plan of ascertaining the nature of the sea hottom, by bringing up a specimen of it in a tube, let into the bottom of the sinker and armed with tallow, is open to several objections. For instance, the specimen is apt to get washed out in rising to the surface, and when it is safely brought on board it is usually so smeared with tallow as to be objectionable. The nipper-lead of Mr. Lucas, on the other hand, retains what it catches and renders it up in a pure state well fitted for preser vation. The bottom of the lead or sinker in question is provided with two hollow claws or spoons, not unlike the open out against the resistance of a stout spiral spring which is contained in the body of the sinker. When fully opened out they are kept apart by a locking device, consisting of two crossbars which meet end to end and fit iuto each other The points of the open claws, however, in striking upon the bottom, spring this lock, and the claws snap together with great force, nipping up a specimen of the bottom at the same time, and from their hollow shape this specimen is retained. So effective is the nipper-lead that the claws will nip a sheet of paper off a table, and they have been found to raise a specimen of the bottom from 2,000 fathoms.

.... A Rich Man's Work Room.

The owner of the great Cornwall iron estate in Pennsylvania, Mr. Robert Coleman, has a fine mechanical taste and pays much attention to mechanics and engineering. To facilitate his investigations he has constructed a circular railroad with a double line of steel tracks, inclosed in a large building. The length of the track is about 150 feet, with two sidings. Patent safety switches, electric crossing signals, safety frogs, and the latest methods of fastening rails are employed. The turntables of the miniature round house operate automatically. The three small locomotives comprise every piece of mechanism, every rod, bolt, screw, lever, spring, tire, cock, pipe, and pump of the largest machines. The boiler-jackets, rods, and drivers are nickelplated, and some of the bright work is silver-plated. The cabs are of solid walnut, and the boilers proper and the fireboxes are of wrought steel. The tenders are of copper, and their water supply is taken by scoops from vats on the roadway while the locomotives are in motion.

The locomotives are about four feet in length, including the tender, and are models of beauty. They are of English design, so far as high driving wheels are concerned, otherwise they are advanced American mechanical ideas and have many original appliances of Mr. Coleman's invention.

The locomotives are fired up and set in motion. Around the tracks they go, while the millionaire owner watches the movements of the miniature machinery. Hours are thus pa sed, all sorts of experiments are tried, high speed and low speed are compared to determine the comparative effects of friction, and other questions of railway economy.

A Remarkable Fish.

candle power each, aggregating something like forty times teeth, and in general appearance was somewhat like a shark, the light power now employed in and about the Capitol, or but what is most singular is the fact of its being uncommonly well supplied with respiratory organs. It had not only a estimated, would not only illuminate the interior of the mouth, but gills, nostrils, and blow holes. While on exhi- a retort and a vacuum is created in this retort by means of building as well as daylight, but would furbish a surplus bition at Lynn the fish was examined by several scientific an air pump, and the retort is placed into or in connection

SANITARY ARRANGEMENTS IN HOUSES

The Society of Arts, London, have just announced that they will award three medals for plans showing the best sanitary arrangements in houses built in the metropolis, such plans to be exhibited in the society's rooms, Adelphi, in June, 1881, and to be sent in on or before May 12, 1881: The conditions of the competition are as follows:

1. One silver medal will be awarded for the best sanitary arrangements carried out and in satisfactory working in a house let out in tenements to artisans for which a weekly rental is paid.

2. One silver medal for the best sanitary arrangements in actual satisfactory working in a house of the yearly rental of from £40 or less, to about £100 in value.

3. One silver medal for the best sanitary arrangements in actual satisfactory working in a house of the yearly rental value of £200 and upward to any amount.

4. The houses must be open to the inspection of judges, who, in considering their award, will be guided by the suggestions of plans for main sewcrage, drainage, and water supply, made under the Public Health Act, 1875. The houses must have been in actual occupation within the last three months, and a certificate must be given by the occu piers, on a printed form, stating the satisfactory working of all the sanitary arrangements, such form to be obtained at

5. The houses may be old, fitted with modern sanitary arrangements, or may be new. They must be within the metropolitan area of the Board of Works.

6. The sanitary arrangements must include the conditions for good water supply, drainage, warming, and ventilation of the house, and precautions taken against frost.

7. The medals may be awarded to the occupiers of the houses, or the lessees, or the owners.

8. The plans must consist of a ground plan and sections, to the scale of not less than 1 inch to 5 feet; details not less than 1 inch to the foot. The plans may be accompanied by specifications.

9. The names of the architects, surveyors, or sanitary en gineers who directed the sanitary arrangements should be given, and certificates will be awarded to those whose plans obtain the medals

French Electrical Exhibition.

The works for the Paris Exhibition of Electricity will soon begin. A viaduct is to be built for the English electrical railway by Siemens, which will convey visitors from the Place de la Concorde to the Palais de l'Industrie. The internal a rangements will only be made at the end of the Art Exhibition, which takes place from May to July. The French exhibitors of the electric light have come to an agreement in order to combine for the illumination of the nave and other parts. They are trying to obtain from the city an indemnity for their working expenses.

Simple Fire Escape,

The netting which trapeze performers use to break their fall, in case of accident, the Fireman's Journal suggests. might furnish a valuable hint to Fire Department officials. Such a net could easily be carried in a small compass attached to the hook and ladder truck, and could be readily and securely fastened by ropes to lamp posts, telegraph poles, awning posts or the like, in front of the burning house, or in case of need be upheld by dozens of sturdy and willing arms. It would, no doubt, help to save many lives of persons compelled to jump from upper windows. Such a device has been tried in Germany with good results.

Marking Salmon.

The Fish Commissioners of Maine have adopted the plan of marking salmon to obtain data with regard to the develop-There was lately on exhibition in Boston a fish caught ment and migrations of these fish. Several hundred salmon about twelve miles from the Isles of Shoals by Wallace lately set free in the Penobscot River have been labeled Wright, of the fishing schooner Jennie P Phillips, from with light metal tags, the number on each being recorded. Swampscott. At the time of its capture it was 15 feet long. The Commissioners ask that whoever catches a labeled and weighed 2,430 pounds. In its stomach were found a salmon in any waters of the State will forward to them the codfish weighing 50 pounds, two smaller cods, and two fish, for which they will pay an extra price, or else forward coots. It had a large mouth, containing seven rows of sharp the label and whatever they know about the fish that wore it.

Rectifying Alcohol.

If a quantity of 40 to 50 per cent alcohol is placed into

sufficient to remove the need of street lamps anywhere in the gentlemen, but no one has been able to classify it. city.

To generate the electric current there would have to be supplied not less than three dozen large dynamo-electric machines, capable of absorbing the power of four steam engines of 300 horse power each. The cost of the system was estimated at \$350,000, distributed as follows:

Thirty-six large dynamo-electric machines, at \$3,600..... 129,600 Four 300 horse power steam engines, twelve boilers, and the requisite fixtures and shafting 40.000 Houses for boilers and machinery 25,000 Six iron towers-two 200 feet high, two 150 feet high, two 125 feet high, including lanterns, reflectors. elevators, and foundation8..... Setting up machinery and apparatus, including cost of subterranean wires

Land..... Engineering and contingencies....

> \$350,000 Total

The estimated running expenses of the system, including present owner lives in Stark Courty, Illinois.

----Improved Lace Machine.

A machine for making laces hitherto produced only by hand work is reported in France. Even old styles of laces, the art of making which has been lost, can readily be reproduced. The machine employs from 1,800 to 2,000 spindles. Four hundred and fifty 6,000 candle power electric lamps, at \$80, \$36,000 and from 200 to 300 pins. The Moniteur des Fils et Tissu speaks in high terms of the machine and its products, which are said to be fully equal to the best hand-made laces.

A Big Cow.

....

Posey County, Indiana. claims to have raised the largest 80.000 cow in the world. Her name is Lady Posey; breed, mixed Durham and Big English. Her measurements are: Greatest 15.000 height, 5 feet 10 inches; girth, 8 feet 9 inches; length, 10 15,000 9,400 feet 6 inches, or including tail, 17 feet. Her form is good; employés, in order to test their eyes. More than one-

with the cooler of an ice machine, the alcohol will be evaporated. As the evaporation of the alcohol causes the temperature of the retort to drop below the surrounding temperature, the warmth of water at an ordinary temperature will be sufficient to evaporate the alcohol, and the same can be rectified without the use of fuel.-R. Pictet, in Revue Univ. de la Brass et Dist.

BLEACHING ALBUMEN BY MEANS OF ELECTRIC LIGHT .--The albumen, from which the blood corpuscles have been entirely removed, is subjected to the action of an electric light. the rays of which are properly collected by means of lenses, etc., and will be bleached within twenty-four hours. The albumen may be in a dry or fluid state.-L. Manet (Monit. prod. Chim.).

An examination has taken place at Brussels of the railway and, though not fat, she weighs 3,000 pounds. Her color is twentieth of them have been found defective. and consered and white, red predominating. Age, six years. Her quently will be discharged as being unable to fulfill their functions with a sufficient security for travelers.