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(Illustrated articles are marked with an asterisk.)

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For the Week Ending October 12, 1895.

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THE RETURN OF LIEUTENANT PEARY.

In the month of July, 1893, Lieutenant Peary set out on the second of his famous expeditions to the Arctic regions. On Saturday, September 21, the steam whaler Kite, which started on July 10 previous, with a relief party, steamed into the port of St. Johns, N. F., with the intrepid explorer on board. This was the second time that the Kite had performed this good service for the explorers. Lieutenant Peary's first journey was begun in June, 1891, and he was brought back by the Kite on September 11, 1892.

In the earlier expedition the Lieutenant had discovered and named Independence Bay, on the northeastern coast of Greenland. He proved by this discovery that Greenland was an island. His intention on his second expedition was to cross over the inland ice to Independence Bay, 650 miles distant, taking a route midway between his former outward and homeward tracks.

The bitter cold proved too much for the party; and after their return all of the members of the expedition except Peary, Lee, and Henson, Peary's servant, returned on the Falcon to America, in August, 1894. On March 22 of this year the intrepid party of three again started for Independence Bay: which point they reached with difficulty in June. Here he failed to find a food supply that had been left by the previous exploring party, and reluctantly his project of pushing on from this point to the far north had to be abandoned. The return trip was full of suffering and want. They had to shoot the forty-nine sleigh dogs, one by one, to maintain the strength of those that remained. They put themselves on reduced rations of one meal of pemmican a day. Too weak to drag the sledges, they threw away their instruments, rifles, and extra clothing. On July 25, "after having eaten every morsel of food, three starving men and one dog staggered into Anniversary Lodge after a journey of 650 miles, not having tasted a morsel of food for the thirty-six hours before arriving." It is considered by the scientific and geographical societies that the results of Lieutenant Peary's indomitable labors in these two expeditions are well worth the money and hardship that they have cost.

Although the second attempt at exploration added little to our store of geographical knowledge, it was rich in scientific results. The party that returned home in 1894 brought with them a large number of specimens that will add greatly to our knowledge in the fields of natural science.

THE NEW MAXIM GUN OF SOLID STEEL.

Mr. Maxim, whose versatile genius is just now displaying its power in the two widely different fields of aeronautics and heavy rifled ordnance, has lately produced a 5·7 inch 45 pounder gun that promises to revolutionize the art of gun manufacture. He proposes to manufacture guns from one solid integral forging, and thereby supersede the present expensive and tedious system of "building up." It is well known that the present "built-up" gun consists of an inner core or tube, which extends the full length of the gun, over which are shrunk successively a series of concentric "jackets" or outer tubes. This is done in order that the whole mass of metal in the thickness of the gun may be thrown into a state of tension, and may be ready to receive and resist instantaneously the bursting strain that is set up at the moment of firing. Were it not for this initial tension the bursting effect of the charge would all be thrown upon the layer of metal that was next the bore, which would be ruptured before the next outlying mass of metal could assist in resisting the strain. In the built-up gun, as a result of the initial tension, every particle of metal from the center to the circumference is firmly gripping the bore; and the shock of discharge is felt and resisted instantaneously by the whole mass of the gun.

In the built-up gun, the work of carefully boring out and shrinking on the jackets is tedious and costly. Mr. Maxim saves this large item of expense. In his system the forging is roughly turned and then annealed in a slow furnace. It is next carefully turned, smooth bored, and rifled. It is next mounted vertically in a special furnace and rotated slowly, and a current of coal gas is forced through the bore. The carbon in the gas combines with the steel of the bore, hardening it and improving the quality of the steel. "When the gun was red hot," says Mr. Maxim, "the coal gas was shut off and a very large stream of cold oil, under high pressure, was forced through the bore." This cooled the bore and the inside shrank to its finished dimensions. The outside body of the gun now gradually shrank upon the cooled interior portion, and was thus thrown into a state of high tension. It was found that the metal of the bore was compressed 0·02 of an inch.

In the firing tests a 45 pound projectile was fired with a muzzle velocity of 2,200 feet and a pressure of 15 tons to the square inch. In the later proof charges a pressure of 22½ tons to the inch was reached. The guns stood the test excellently. One of them was 0·002 of an inch smaller after firing than before, showing that the enormous outside tension of the gun, assisted by the concussion of the discharge, actually compressed the bore to a smaller diameter. If such guns can be made without any undetected flaws in the metal, it is evident that heavy ordnance can henceforth be manufactured in half the time and at half the expense of the present built-up system.

THE OFFICIAL PHOTOGRAPHIC COMPANY OF THE COTTON STATES EXPOSITION.

We are the well wishers of the Cotton States Exposition; and, as such, we feel called upon publicly to express our surprise and regret that the management of this enterprise should have put a vexatious stumbling block in the way of publications such as the SCIENTIFIC AMERICAN, in the matter of illustrating the various buildings and exhibits of the Exposition.

It had been our intention to illustrate very fully the progress of the South as shown at Atlanta, and for this purpose we had sent our special artist to the grounds with instructions to illustrate freely the most interesting features of the Fair. We find, however, that our intention is confronted point blank with a cast iron agreement that must be made with a certain Official Photographic Company before a photograph or a sketch can be made in the grounds. It would seem from the wording of the blank "agreement" that the Department of Publicity and Promotion has leased the privileges of photography and illustration to what is styled an Official Photographic Company, "having certain exclusive photographic privileges on the grounds of said Exposition Company."

Before the illustrated press can make even so much as a sketch on the grounds, it has to make application to this photographic company, agreeing as follows: "That all pictures taken shall be submitted to the Official Photographic Company, which shall decide if it is the desire of said company to copyright such picture, which said company may do; that should we" (the press) "desire to purchase from said official company any" of our own "copyrighted photographs, we will preserve the same from any other use than that for which they are bought, to wit for illustrating said Exposition in the columns of said publication only; that after any negatives bought from said company have served the purpose of illustrating, all such negatives shall be destroyed; that we will not permit any such negatives to be used in any other publication whatsoever."

Now we had hoped that the blunder which the directors of the Chicago Exhibition made in this matter (and which they had the good sense later on to modify) would be avoided at Atlanta.

The lavish illustration of this exposition in papers with a circulation such as that of the SCIENTIFIC AMERICAN gives to an enterprise like this an amount of free advertising and indorsement that it could scarcely get in any other way, and surely the very least return that the directors could make would be to give the illustrated press every possible facility and assistance in their work of illustration. It seems to us that the mere promptings of courtesy would suggest such a course.

Instead of this, we are confronted with an impossible agreement, which we are supposed to enter into with a certain company, which has leased the photographic privileges for the sole purpose of coining every dollar possible out of the bargain.

The power of copyright, as mentioned in the agreement, is vexatious as it stands; but when it is supplemented with a provision that after illustration such negatives, pictures, et cetera, shall be destroyed, the matter verges on the ridiculous, and shows, at least, that the managers of the Atlanta Exposition are thoroughly ignorant of the working of an illustrated newspaper office. The provision that such illustrated paper "will not permit any such picture to be used in any other publication whatsoever" is equally ridiculous and impossible. There is not a day passes that we do not receive requests from all over the world for permission to reproduce our illustrations in other journals. It is certain that, for the mere pecuniary benefit of an Atlanta Exposition concessionaire, we are not prepared to place illustrations in our journal which will be closed against similar requests from our contemporaries in the future.

The revenue derived by the Exposition from this concession cannot be very large. Certainly it cannot be large enough to compensate for the serious curtailment that it will produce in the amount of space that will be devoted by the illustrated press to the interests of the Exposition.

Considered merely from the standpoint of finance, the policy is shortsighted, and defeats the very end at which it aims. At best the revenue derived from this concession can be but limited; whereas the free advertisement, both pictorial and written, by illustrated journals, such as our own, would interest the public and undoubtedly bring many thousands to the fair who otherwise, but for the suggestion, would stay away. It is evident that the revenue derived from such visitors would far exceed the paltry sum which this vexatious and ill-

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conceived concession will bring to the exposition exchecquer.

The Cotton States exposition has opened auspiciously. The executive body has shown itself capable and, except in regard to the matter under discussion, possessed of good judgment. We hope that, following the example of Chicago, they will remove this embargo in full or in part, at least so far as to leave to the illustrated press representatives a free hand in their work.

THE RETURN OF FAYE'S COMET.

On November 22, 1843, at Paris, M. Faye discovered the comet which bears his name. Astronomers predicted that the periodic time of the comet would be $7\frac{412}{1000}$ years, and with precise regularity it has made its appearance at the predicted intervals.

The time for its appearance has again come round, and again the marvelous accuracy of astronomical calculation has been verified. On October 3 the following dispatch appeared in the New York Herald: "Kiel, September 28, 1895. The periodical comet of Faye was discovered by Professor Javelle, of Nice, on September 26."

At the time of its discovery by M. Faye, M. Leverrier offered the theory that it had been revolving in an orbit since 1747, at which time it may have passed so near to Jupiter as to have its orbit completely changed. Since its discovery, careful observations have been made at every return to perihelion, and it will receive very careful observation on this, its eighth observed visit.

In former ages the approach of a comet produced a state of superstitious fear in the minds of the people; the celestial apparition was regarded as a sure portent of disaster. In this later age the interest is unabated, but superstition has given place to science; and the strange visitant is welcomed as a possible teacher of new facts regarding the vast solar system to which our earth belongs.

Owing to their eccentricity of motion, and the remarkable beauty of their appearance, comets have always excited a widespread interest on their periodic return. Unlike the planets, they move in flat ellipses, having the sun near one end. They move in obedience to the law of planetary motion, their speed quickening as they approach the sun, and diminishing as they retire into space. What the actual composition of the comet is has never yet been definitely determined. They appear to be made up of a body or denser part, known as the nucleus, and a less dense and less luminous tail. The consensus of scientific opinion inclines to the theory that they consist of meteoric particles, varying in size from that of the largest meteors down to the finest meteoric dust. These particles are supposed to be widely separated from each other and to be each surrounded with an envelope of luminous gas. The head or nucleus is probably formed of the larger particles lying in closer propinquity, the size of the fragments diminishing toward the tail, where they are widely scattered.

THE AUTHORSHIP OF THE KEROSENE OIL SPRAY.

In the SCIENTIFIC AMERICAN of September 28, in the biographical notice of the late Prof. Riley, it is stated that "two of his studies have produced epoch-making results. One is his famous emulsion of kerosene oil, milk or soap solution being the emulsifying agent. Having found that this was an infallible insecticide, he had to devise means for applying it, and invented the 'cyclone,' 'eddy chamber,' or 'Riley system' of nozzle for spraying it upon trees."

A valued correspondent calls our attention to the decisions of the Commissioner of Patents, July, 1892, which show that these claims on behalf of Prof. Riley cannot be sustained.

The actual author of the inventions in question, as shown by the evidence, was Prof. William S. Barnard, and it was so adjudged by the Patent Commissioner. The patents are now held by Mrs. Barnard, and their validity is not disputed.

It further appeared from the evidence that Prof. Riley himself had at various times in the early history of the inventions freely admitted the authorship of Prof. Barnard, and had repeatedly given to him due and public credit therefor.

It is not denied that Prof. Riley did much by his writings and addresses to introduce the inventions and cause their adoption as the best known means of destroying noxious insects and saving crops and trees from their ravages, which sometimes entailed losses counted by millions of dollars. But, however useful and valuable Prof. Riley's labors were in this respect, the honors for the actual discovery of the method and the means unquestionably belong to Prof. Barnard.

Professor Elliott A. Rogers.

The New York World gives the following account of the demise of this talented man of science, which occurred October 2: "Elliott A. Rogers, instructor of chemistry at Harvard College, dismissed his class in Boylston Hall this afternoon in his usual manner and turned toward an adjoining room. A glass beaker containing some chemical was in his hand, and in the other was a piece of paper on which, as subsequently appeared, was written: 'It is as it should be.' Before the members of the class had all passed through the door Instructor Rogers uttered a groan and sank to the floor. His students rushed to his side to find him dead.

"The tragedy is a mystery. None of the students knew what chemical was in the glass beaker that he held in his hand when he closed the lecture. Nobody knows the significance of the words on the piece of paper which he held in the other hand. His friends scout the idea of suicide, and assert that the vapor arising from the unknown chemical must have affected his heart.

"It was noticed to-day that he was very pale when he entered the classroom, and it was commented upon by the students. He conducted his class as usual, however, and then took up the mysterious beaker with its deadly contents. It is believed by many that the words on the scrap of paper indicated the completion of certain experiments.

"It is known that Professor Rogers was deeply interested in quick-acting poisons. He knew thoroughly the action of every gas and poison and every chemical combination upon the heart. He knew just how many fractions of a second it would take to still the beating of the heart after the administration of the poison. So it seems highly improbable that death was the result of an accidental inhalation of poisonous vapors.

"Professor Rogers had been experimenting with cyanide of potassium, noting carefully its action on various metals. Whether or not he had discovered a new chemical action will probably never be known. He did not speak after being stricken. Death was instantaneous. Cyanide of potassium acts in just that way, so it is highly probable that that was the poison that caused his death. If that be so, it is doubtful if the autopsy will throw any light on the matter, for it is well known that this poison leaves but one slight trace of its work, and that is not always distinguishable. Examiner Durell will hold the autopsy to-morrow.

"Mr. Rogers was about thirty-five years of age. He came to the college from Worcester. He graduated in 1891, and since that time had traveled extensively in Germany and other foreign countries. He studied chemistry while abroad and was considered one of the shining lights in this branch of education."

Science Notes.

A New Standard of Light.—Mr. Violle, says the Revue Industrielle, has undertaken some researches upon acetylene that have led to the manufacture of a standard lamp that fulfills all the conditions required by the ordinary photometric measurements. Upon burning the gas under a slight pressure in a burner in which it is properly aerated and that spreads it out into a wide, thin sheet, Mr. Violle obtains a steady and very luminous flame of remarkable whiteness and of uniform clearness over quite a wide surface. In front of this flame he places a screen provided with an aperture that varies according to requirements, and obtains a source whose steadiness and brightness, comparable with those of the absolute standard, make a practical standard of it.

A New Steam Pipe.—Mr. Smillie, an engineer of Glasgow, has recently patented a steam pipe that is capable of resisting very high temperatures. Each pipe consists of a copper tube around which steel wire is wound in such a way that there is a perfect contact between the two metals. The soldering is easily effected by immersing the whole in a fusible alloy, whose melting point is higher than the elevated temperature of the supercharged steam.

Ancient Thermometers.—A short time ago, Mr. Maze described what was probably the first mercurial thermometer, and he now gives (Comptes Rendus, cxxi, 230) particulars of the first alcoholic thermometer used in Paris. During the year 1657, the Queen of Poland sent an envoy named Buratin on a mission to Italy, and he brought back numerous presents from the Grand Duke of Tuscany, among which there were several thermometers. One of these was afterward sent to Ismael Boullian, of Paris, and is described as being like the modern form, but with a somewhat flattened bulb. The alcohol was not colored, and the tube was exactly a decimeter in length, being graduated with marks in black enamel. Every tenth mark, however, was larger than the rest and in white instead of black enamel.

New Method of Soldering Lead to Lead.—According to the Revue Industrielle, Mr. Blondel solders lead to itself by making use of an amalgam of the metal. The two pieces to be soldered are first carefully cleaned by scraping. Then there is interposed between them a thin layer of lead, and an ordinary soldering iron is passed over the line of junction. The heat disengages the mercury of the amalgam, and the lead, set free in a state of minute division, enters into fusion and solders the two sheets in the same way as is done by the ordinary method.

Method of Verifying the Quality of Alcohol.—According to Cosmos, Dr. Coiffier has recently made known a very simple process of quickly verifying the quality of alcohol. The process consists simply in igniting in a saucer twenty grammes of the alcohol to be tested and in attentively examining the different phenomena that occur during the combustion. The purest alcohol burns with a uniform blue flame without smoke, in disengaging an agreeable odor, and without leaving any residue. Now, there is none of the substances used for sophisticating alcohol that does not modify the method of combustion of the latter. Thus the inferior alcohols, the ethers, the fatty acids, all oleaginous substances, essence of turpentine, benzine, etc., even in extremely minute quantity, cause the appearance in the blue flame of long white or yellow fugacious trains of light that stand out clearly from the blue ground of the flame. The presence of foreign substances in alcohol also renders the flame of the latter smoky, as may easily be seen by holding a cold saucer over it. If the alcohol is supercharged with foreign substances, the saucer will become covered with a more or less abundant carbonaceous deposit.

Nitrogen and Phosphorescence.—Mr. G. Seguy has discovered that a phosphorescence similar to that caused by the electric discharge in tubes containing rarefied oxygen may be produced, in the case of nitrogen and its compounds, in the presence of the vapor of a metallic bichloride, as, for example, that of tin. The light emitted by the nitrogen tube is rose colored during the discharge; while with oxygen it is dull violet. The phosphorescence, which persists for some time after the interruption of the current, is of a milky whiteness.

Novel Galvanic Cell.—Mr. Morisot makes a new battery cell as follows: The positive pole is a plate of retort carbon placed in an external vessel containing a mixture of sulphuric acid (1 volume) and water previously saturated in the cold with potassium bichromate (3 volumes). The porous cell contains a dilute solution of caustic soda (density about 1·05), but the amalgamated zinc plate is placed in a smaller porous cell containing a concentrated solution of caustic soda, which is situated inside the first. The e. m. f. of the battery it at first 2·5 volts, and it is maintained above 2·4 volts for ten hours. The internal resistance is about 0·8 ohm, but varies, of course, with the thickness and material of the porous diaphragms. Employing 600 c. c. of the depolarizing liquid, 130 c. c. of weak soda solution, and 110 c. c. of the stronger solution, the intensity maintained was very near 0·423 ampere for an interposed resistance of 5 ohms and 0·22 ampere for a resistance of 10 ohms (Comptes Rendus, cxxi, 251).

Cycle Notes.

The lightest wheel is not always the fastest. Lack of rigidity will often tend to decrease the speed of a machine far more than the addition of a few pounds to its weight. Only machines of the highest grade can with safety be made very light, and even then a very light machine is only to be recommended to a careful and expert rider who will nurse it over rough roads and bad ones. Light wheels, even though they may not break down in one season's riding, will not last so long as heavier ones of the same quality, and are more easily damaged by falls. The minimum weight which can be safely ridden depends upon the character of the roads upon which it is to be used, as well as upon the weight and skill of the man who is to ride. Beginners will find safety and comfort, too, in selecting a wheel which weighs a few pounds more than the lightest. Too much weight is bad; too little weight is much worse.

The registered number of wheelmen in the city of Rochester, New York, is 13,500.

Bicycles are part of the equipment of many cruising yachts nowadays. They are utilized by the yachtsmen when ashore.

Bicyclists in the region round about St. Johns, Mich., have a queer but substantial grievance. The fields and farms thereabout are bounded and guarded with quickset hedges instead of by fences. At this time of year the farmers trim their hedges, and as a consequence the roads are strewn thickly with boughs full of briers, sharp slivers of tough wood, and short snippings of hedge points, which puncture bicycle tires.

Miss E. S. Hutchins, of Big Rapids, Mich., has devised a tire which consists principally of rubber, but is grooved to allow a heavy leather cord to encircle it and take the heaviest wear.

A citizen of Denver suggests that "inasmuch as it costs each bicycle rider $70 a year for a new wheel, let the bicyclers organize a bicycle factory, subscribing $100 each. Each wheel costs $20, the profit the factory would make would be $50 per annum on each wheel, and each of the shareholders would be sure to buy wheels. In this way the annual cost would be reduced from $70 to $20, and the latter amount to be distributed among our own people."

For twenty-five cents any English wheelman can telegraph the British weather bureau and receive a telegraphic reply giving the weather probabilities for any desired district.

The newest term for wheelwomen is "cyclestrienne."

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