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(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 648.

For the Week Ending June 2, 1888.

Price 10 cents. For sale by all newsdealers.

POSITION OF THE PLANETS IN JUNE.

MERCURY

is evening star. He reaches his greatest eastern elongation from the sun on the 12th, at 3 h. P. M., and on that evening, and for a week before and after, is visible to the naked eye under the most favorable conditions that occur during the year. He sets nearly two hours after the sun on the 12th, and must then be looked for three-quarters of an hour after sunset in the northwest, forming a triangle with Pollux and Procyon. An opera-glass will aid the observation. Mercury sets on the 1st at 9 h. 8 m. P. M. On the 30th he sets at 8 h. 1 m. P. M. His diameter on the 1st is 6".6, and he is in the constellation Gemini.

JUPITER

is evening star. He will lead the heavenly host during the month of June, being beautiful to behold as he makes his way across the sky. He is still retrograding or moving westward, as observers may see who note the increasing distance between him and Beta Scorpii, the star he seemed almost to touch in May. Jupiter sets on the 1st at 3 h. 51 m. A. M. On the 30th he sets at 1 h. 47 m. A. M. His diameter on the 1st is 43".2, and he is in the constellation Scorpio.

MARS

is evening star. He has now changed his course, is traveling eastward, or in a direct course, and will continue to do so until the end of the year. He passes near Uranus for the third time since the year commenced. The conjunction takes place on the 6th, at midnight, Mars being 47′ south of Uranus. Mars sets on the 1st at 1 h. 41 m. A. M. On the 30th he sets at 0 h. 2 m. A. M. His diameter on the 1st is 13".2, and he is in the constellation Virgo.

URANUS

is evening star. He is chiefly interesting for his third and last meeting with Mars on the 6th. The two planets will not be in conjunction again until Mars has completed another revolution and returned once more to the neighborhood of his brother planet. Uranus sets on the 1st at 1 h. 46 m. A. M. On the 30th he sets at 11 h. 52 m. P. M. The diameter of Uranus on the 1st is 3".8, and he is in the constellation Virgo.

SATURN

is evening star. He is moving eastward, and will pass Præsepe during the month, grazing the cluster in his passage. His light grows dim as he approaches the sun, and recedes from the earth. He must be looked for in the west, east of Pollux and Procyon. Saturn sets on the 1st at 10 h. 51 m. P. M. On the 30th he sets at 9 h. 8 m. P. M. His diameter on the 1st is 16", and he is in the constellation Cancer.

VENUS

is morning star. She rises on the 1st only 32 m. before the sun, and is of course hidden in his rays. Venus rises on the 1st at 3 h. 53 m. A. M. On the 30th she rises at 4 h. 15 m. A. M. Her diameter on the 1st is 10", and she is in the constellation Taurus.

NEPTUNE

is morning star. He is near Venus on the morning of the 1st. Neptune rises on the 1st at 3 h. 54 m. A. M. On the 30th he rises at 2 h. 3 m. A. M. His diameter on the 1st is 2".5, and he is in the constellation Taurus.

Mercury, Saturn, Uranus, Mars, and Jupiter are evening stars at the close of the month. Venus and Neptune are morning stars.

The Kansas City Elevated Railroad.

Mr. George H. Pegram, the engineer who designed the above structure, writing to the *Railroad Gazette*, says:

The road was built in the summer of 1886. Coming 10 years after the New York roads, the structure might naturally be expected to embody some improvements, and it is believed that it does.

The material is steel, used at stresses ordinarily allowed in iron, which gives it a large reserve strength. The standard span is 48 feet (about 20 per cent longer than in New York).

The main feature of the structure is the absence of cross ties. Each rail is supported in a steel trough formed of two channels, connected together with bent plates near the bottom at short intervals in the length. Upon these plates rest wooden blocks 1½ inches thick, and upon these the rail, confined by bolts passing through the blocks and tie plates. The blocks may be replaced from below without removing the rail. The wood is used only as a cushion, the amount in an entire span being but little more than is contained in one cross tie of the New York roads.

The trough carrying the rail forms the top chord of the longitudinal truss, which has an eyebar bottom chord and triangular web bracing, all connected with large pins, or in order to avoid secondary strains and to prevent wear.

The troughs are stiffened and braced laterally by angle iron diagonals riveted between them.

There is the minimum obstruction to light, through the disuse of cross ties, and the tunnel-like appearance of the street under the structure is avoided. At the same time the greatest safety is insured. The wheels being in troughs are prevented from leaving the rails, and in the event of a broken axle the truck drops on what is in effect a pair of steel skids.

As was predicted, on account of the small amount of wood used and general character of the structure, the passage of trains is accompanied with very little noise.

Cholera on the Pacific Coast.

The recurrence of cholera in Chili will surprise no one who is acquainted with the nature of many of the South American cities and towns, and with the attitude of the Chilian and neighboring governments last year in imposing quarantine restrictions instead of commencing works of real sanitary improvement. During the three months ending March 17, the disease, which had been lying comparatively dormant during the cold season, broke out again, and led to a terrible mortality. The number of cases announced from official sources during the preceding twelve weeks amounted to 3,338, and of these 1,357 terminated fatally. But these statistics afford no true indication of the extent of the disease, and Dr. Gacitua has reported that between December 25, 1887, and March 3, last, there cannot have been many less than 5,000 cholera deaths in Valparaiso. No real abatement of the epidemic can under existing circumstances be expected until the advent of this year's cold season.—*Lancet.*

Nothing could be easier than transportation of this contagion from Chili to Panama, and thence to New Orleans, New York, and California. We hear of no precautions as yet taken.

Wood Fiber for Paper.

The extent of the manufacture of ground and chemical wood fiber for paper makers' use is not appreciated by those who have not investigated this industry. Certainly the Democratic members of the ways and means committee who have put this manufactured product on the free list, in the face of the fact that the duty now is only 10 per cent—less than it ought to be to protect the industry from Canadian and Norwegian competition—could not have fully understood the justice of such a step.

From a statement presented to the House by Congressman Dingley, it appears that wood fiber is manufactured in 21 States. The capital employed is about $20,000,000, number of men employed 22,000, tons of fiber made 225,000 ground wood and 112,500 chemical wood, value $12,375,000, cost of wood on the stump $1,235,000, and the remainder of the cost largely labor.

In Maine alone there are 84,000 pounds of ground wood fiber and 188,000 pounds of chemical wood fiber made daily. The ground wood fiber is made as follows:

Androscoggin Pulp Co., Brunswick	10,000
Indurated Fiber Co., North Gorham	12,000
Alvin Record & Sons, Livermore Falls	10,000
W. R. Shurtleff & Co., Skowhegan	4,000
J. S. Clapp, Snow Falls	4,000
Sebago Co., South Windham	18,000
Kennebec Fiber Co., Waterville	20,000
Total ..... Pounds,	84,000

The daily production of chemical wood fiber in Maine is as follows:

Poland Pulp and Paper Co., Canton	20,000
Somerset Fiber Co., Fairfield	20,000
Penobscot Chemical Fiber Co., West Great Works	40,000
Lincoln Pulp and Paper Co., Lincoln	14,000
S. D. Warren & Co., Cumberland	40,000
S. D. Warren & Co., Yarmouthville	40,000
Poland Pulp and Paper Co., Mechanic Falls	14,000
Total ..... Pounds,	188,000

The production and use of mechanical wood fiber began about 1868, and within a few years has rapidly increased. All the patents have expired except those on a recent process known as sulphite. The fiber has been greatly reduced in value, ground wood now bringing only 1¼ cents per pound, and chemical 3½ cents. The cost of paper has been reduced from nine cents before the war to about 4½ cents, in consequence of the development of the manufacture of wood fiber.

Before 1883, the duty on imported wood fiber, which is made in Canada, Norway, Sweden, and Finland, as well as in this country, was 20 per cent. In 1883 the duty was reduced to 10 per cent, and since that date foreign competition has increased. In 1886 there were imported 18,000 tons, in 1887 the importations were 32,000 tons, and this year about 53,000 tons will be imported. If wood fiber should be placed on the free list, as proposed by the Mills bill, our wood pulp mills would be speedily swamped by Canadian and Norwegian competition, as the labor costs only half as much in those countries.—*Lewiston Journal.*

The Sun an Incendiary.

The *Chemist and Druggist* (London) records the fact of a chemist shop just opened, at 16 High Street, with show bottles in the windows, which, acting as a burning glass, set fire to the store. It was discovered before much damage was done, but serves as another warning against placing show bottles where the sun can reach them in show windows.

Modern Fortifications.

The London *Times*, in a recent article on metallic fortifications, says:

The plan of fortresses at present adopted—unknown to the public, but the divulging of which can do no harm, as it cannot remain secret—is very peculiar and quite opposed to any æsthetic or artistic conception. A fortress is henceforth composed of an immense block of concrete of incredible thickness. It will offer to the eye only a square, oval, or lozenge shape, the outside being a mere block without projections or access. It is not yet settled whether this block shall be surrounded by a trench, but all competent authorities in Europe seem to hold that one or several sheeted cannon shall move round the block, and as powder will in future be smokeless, this cannon, always in motion and escaping the enemy's aim, will fire on a fixed point. This movable sheeting will make up for the absence of trenches. At the angles of the block, moreover, if square, or elsewhere if it is round or oval, there will be sheeted reducts, which will cover the base of the block and make assault impossible. Of course the interior of the block will contain the equipments of a fortress. The entrance is underground, on the side opposite that where the enemy can appear. There will be air openings in the interior, which is lit up by electricity produced on the spot or at a distance. The magazine of projectiles is in a spot inaccessible to explosions caused by shells coming from without. The stores of other ammunition and of victuals are similarly protected. The hiding places for the men, and, in short, everything that has to be under shelter, are underground, and so placed as to be quite protected from the besiegers. Electric wires, both for messages and light, as also telephones, beyond the reach of the besiegers, protect the fortress against isolation—that is to say, against abandonment and discouragement. The underground existence of the garrison may not be very lively, and it will be well to accustom as many men as possible to it; but that garrison will not exceed thirty or forty men per fortress.

A fortress thus equipped for resisting the enemy's attack and fire of course requires special means of repelling the enemy, preventing him passing, and doing him all possible mischief. These means are the plated turrets which form the second portion of the experiments at Chalons. The fortress will in general have two steel turrets, one on each side, which by their circular motion can fire in all directions. The frontier fortresses will be so arranged that their fires meet, which is easy with the wonderful range of modern cannon.

The turrets of Saint Chamont and of the Chatillon and Commentry company have just been undergoing artillery fire. The first part of the experiments was the firing from these turrets. The second consists in their being cannonaded and shelled. The Saint Chamont turrets are real turrets of cylindrical shape, with a rounded top, which gives no hold for projectiles. The Chatillon and Commentry turrets, while of cylindrical shape, are but slightly rounded at the top, the surface of about six or seven square meters being slightly convex, but nearly flat, thus giving more hold to projectiles if they are supposed not to burst immediately on contact with the cupola. The Saint Chamont turrets project 90 or 95 centimeters from the surface of the block fortress, and are thus visible to the enemy. They can be only equipped, morever, on account of the shape of their cupola, by cannon of 155 millimeters, styled "cannons 155 short," whereas cannons "155 long," which measure 4·40 meters, project 40 centimeters from the turret during three quarters of the time required by the rotatory movement—that is to say, during 45 to 90 seconds for each discharge. Both the Saint Chamont and the Chatillon turrets are rotary, showing their port holes and cannons only at the very moment of discharge. The aim is no longer taken after ocular examination, but each fortress has a plan of its entire range of fire, cut into divisions as numerous as is possible for the working of the cannon. The officer in command of the fire is stationed in an observatory inside, outside, or even, if necessary or possible, at a great distance from the fortress. He telephones to the officer inside the turret the numbered point on the plan from which the firing is to proceed. This order is transmitted to the pointer, and the cannon being placed on the point, the rotation begins. This movement to the point aimed at produces an electric shock, which makes the gun go off, while the turret continues to rotate, is again charged, and, altering its aim or not, begins a fresh fire.

The Chatillon company has made an important change in the arrangements of the turrets by adding to the rotatory movement an eclipse movement. In other words, the turret not only turns on itself, but by a counterpoise mechanism of extreme simplicity it drops down after firing. It does not then project above the ground more than fifteen centimeters, and can be easily disguised. It offers no hold on the sides, but only on the cupola, which is flatter than the Saint Chamont one. As to accuracy of fire, the general opinion, confirmed by the recent experiments, is that the eclipse turret is twice as accurate as the merely rotatory turret. With the latter the fire is never fixed, seeing that to conceal the cannons from the enemy the turret is forced to continue its movement and to come back to the point of contact where electricity causes the discharge, whereas the eclipse turret, while rotative so as to fire in all directions, disappears after firing and reappears after being charged without rotatory movement—that is to say, with the precision of fixed firing. If, for instance, the electric contact during the rotatory movement has the slightest delay, the ball deviates, imperceptibly, it is true, at the starting point, but the deviation becomes comparatively considerable at the arrival point on account of the great distance. The eclipse turrets, moreover, are made of steel cast in a peculiar way, so as to be cheaper, more malleable, and consequently quite as resisting as other steel, being at the cupola fifty centimeters thick. The total weight of a steel turret is 120 to 190 tons, and it can fire every minute or every two minutes, according as steam power or manual labor is used.

Utilizing Niagara.

There have been so many false alarms about utilizing the wasted water power of Niagara Falls that one hesitates to accept rumors of new propositions as likely to be carried out. The latest one which appears to have any backing, though not altogether an original idea, is to tap the Niagara River at some distance above the falls by means of a tunnel driven along the side of the river. The water would be distributed by means of lateral underground conduits to turbines placed on the bank below the falls. These could give power direct to mills, factories, etc., and by electrical transmission, furnish light and power to Buffalo and neighboring towns. It is claimed that by adopting this system the scenery will not be disfigured, and that the amount of water drawn off will not appreciably lessen the quantity flowing over the falls. It has always been a source of wonder to those who have studied the ground that some plan has not long ago been adopted which would meet the engineering requirements without impairing the grandeur of Niagara. The first attempts were certainly not in the right line, the small power taken off by the paper mills, etc., being accompanied by a disproportionate injury.

Niagara is not to be measured by hundreds of thousands of horse power and millions of money, it is true; but the visitor's first impression is a vivid realization of the amount of waste perpetually going on, which might be avoided. The State and the country can afford to pay a good deal to keep up the show, but surely there is margin enough, without reducing Niagara to the condition of some of the smaller falls, where the water is turned on from a dam for the gratification of tourists who can afford the luxury.

Electrical transmission of power, which was thought not many years ago to be a mere dream of the cranks, is now shown to be of practical, economical utility. It has been adopted successfully in so many places and under such different conditions that it is reasonable to forecast a great future for it. So far as is known at present, it is the most promising mode of utilizing the natural forces, such as winds, currents, tides, and terrestrial electricity.—*Eng. and Min. Jour.*

Restoration of Faded Photographs.

The family album upon the drawing room table is a never-failing subject of interest to visitors, and among individuals who lack original ideas forms an agreeable subject of conversation in place of that of the weather. Of late years, however, there is more diffidence in placing it in prominent positions for the ready examination of waiting friends, the sad-colored pictures of "the hue of a November fog in Cheapside, or a bad piece of gingerbread spoiled in the baking," being at variance with average ideas of artistic elegance. A more serious aspect of the case is gradual discoloration or fading of the likenesses of members of the family who have passed away by death, raising the question in the minds of survivors what is to be done to preserve those lineaments for inspection, ere it be too late.

When the white parts of an ordinary photograph begin to turn yellow, that photograph is doomed unless immediate efforts be made to preserve it, and those efforts may not always be successful. Treatment with a weak solution of bichloride of mercury, under the hands of a skillful photographic practitioner, is one of the best methods of making the attempt. This may arrest decay, but will not restore the likeness to the condition of a first-rate photograph. Bichloride of mercury or corrosive sublimate is highly poisonous, and is best left alone by the uninitiated.

A better way of preserving the memento is to send the photograph to a platinum printing or carbon printing firm of photographers in a sufficiently large way of business to keep upon their premises artists skilled in the use of the brush and pencil. Their usual plan then is to obtain upon glass or paper an enlarged positive copy of the fading photograph. This copy is "retouched," that is to say, worked upon by hand, so as to remove obvious defects due to decay or to original bad work; a negative is taken from the perfected positive, and from this negative any number of copies may be printed by photographic means in permanent carbon pigments or in platinum black. To obtain the positive already mentioned, a primary negative has to be taken, so that two negatives are necessitated by the process, both of which, as well as the positive, are usually worked upon somewhat by the hand of the artist; the method of getting a good permanent photograph from a bad fading one is, therefore, complicated and requires skill.

In the carbon process, carbon or other suitable permanent pigment is spread upon paper or glass along with solution of gelatine and of bichromate of potash or ammonia. Where the light acts upon this surface through the negative, the decomposition of the salt renders the gelatine insoluble; consequently, when the paper is afterward placed in warm water, the gelatine unacted upon by light dissolves off in company with its pigment, thus leaving the white paper exposed; but where the light has acted, the gelatine and pigment remain to form the shadows of the picture. These are the broad principles of the process, omitting various practical details which it would exceed present limits to particularize.

The other permanent process, in which the dark parts of the picture are formed of platinum black, gives the most durable pictures known, platinum being a metal which has more power than gold of resisting change under atmospheric and other influences; indeed, platinum black is infinitely more permanent than the paper upon which it is printed. In some cases, either from badly prepared sensitized paper or from faults in the photographic manipulations, platinum prints have been known to turn yellow in the whites under the influence of sulphureted hydrogen; such discoloration has sometimes been subsequently removed by the application of chemical reagents, without the dark parts of the paper having been affected all through the operation.

There are methods of taking photographs in silver which have exactly the appearance of platinotypes, so that an expert cannot always tell the difference without the application of chemical tests; these black and engraving-like silver prints are in all probability much more permanent than the ordinary photographs used for the stocking of albums.—*Chambers's Journal.*

Be Inventive.

There are few expressions we hear more frequently than that feeble wail of the cowardly or lazy mind, "I can't!" Every day we see people who permit their progress to be stopped by trifles which, instead of retarding them, should spur every faculty up to the resistive, conquering point. "I can't" and "I forgot" are two fatal phrases which should be scratched from the vocabulary of every young man or woman who is ambitious of being or doing anything in this world that shall deserve to be recorded.

Be inventive. Cultivate the creative side of your brain. Don't be stumped. When you seem to be cornered is the very moment to stir yourself and devise some way of making things work.

The Chicago *Herald*, a little while ago, printed some remarks of a drummer descriptive of a certain Yankee's ingenuity, which are pertinent to our present theme:

"Talking about ingenuity," said the drummer, "I want to tell you what I saw last winter out West. I was on a train that was snowed in for three days. The company sent us food, but they didn't send any cigars, and the train boy's stock was exhausted the first day. In the express car we found and confiscated a box of smoking tobacco, but there wasn't a pipe on the train. Among the passengers was a Connecticut Yankee who was just dying for a smoke. He got out in the snow and looked around for a weed, or something of that sort, which he might use in making a pipe, but couldn't find a thing. 'I'm going to have a pipe, anyhow,' he said. So he took a lead pencil, opened the wood, took out the lead, and, placing the two strips together again, wound them tightly with the tin foil which came off the packages of smoking tobacco, making them air-tight. Then he took an apple, hollowed a bowl out of it, stuck his lead pencil stem into it, and had one of the nicest pipes you ever saw. If you don't believe it, make one for yourself some time and try."

This was a common trick in the army, when we could get neither reeds nor corn cobs, and sweet pipes they made in every sense. When apples were unobtainable, which was not seldom, we fell back upon potatoes.—*Amer. Art Printer.*

A New and Powerful Gun.

General Maitland, of the Ordnance Department of the War Office, speaking at the annual dinner of the foremen engineers, held in the Cannon Street Hotel recently, said he had just designed a gun of 22 tons, on Mr. Longridge's wire principle, which had recently been fired at Shoeburyness, the projectile being 380 lb., the range 21,000 yards, or twelve miles, and the velocity 360 feet per second.

Innocent Wasp Stings.

W. L. Wilder imparts to the readers of *Science* the following, which he states to be a fact not generally known, which we can readily believe, *i. e.*, that, if one holds his breath, wasps, bees, and hornets can be handled with impunity. The skin becomes sting proof, and holding the insect by the feet, and giving her full liberty of action, you can see her drive her weapon against the impenetrable surface with a force that lifts her body with every stroke; but let the smallest quantity of air escape from the lungs, and the sting will penetrate at once. I have never seen an exception to this in twenty-five years' observation. I have taught young ladies with very delicate hands to astonish their friends by the performance of this feat, and I saw one so severely stung as to require the services of a physician, through laughing at a witty remark of her sister, forgetting that laughing required breath. For a theory in explanation, I am led to believe that holding the breath partially closes the pores of the skin. My experiments in that direction have not been exact enough to be of any scientific value, but I am satisfied that it very sensibly affects the amount of insensible perspiration. Who will test the correctness of Mr. Wilder's theory and report the result in behalf of science?

A Queer Animal.

In the report of the superintendent of the Zoological Society of Philadelphia, read at the annual meeting of the members on the 26th of April, Mr. Arthur E. Brown stated that perhaps the most extraordinary animal ever shown in the collection was the echidna (*Tachyglossus hystrix*), purchased on the 12th of April. As is well known, the lowest mammalian group, the *monotremes*, to which this animal belongs, possess structural peculiarities strongly indicating relationship to birds and reptiles, and additional evidence of the closeness of this connection has lately been given by the apparent confirmation of the previously suspected fact that both the echidna and its relative, the ornithorhynchus, lay eggs from which the young are hatched outside of the body of the mother, as in birds and many reptiles. The rarity as well as the remarkable nature of this animal caused it to be of great interest to zoologists, and it received as much observation as its subterranean habits would permit. Its native food being altogether of ants, and the structure of its mouth preventing it from taking solid food in any quantity, it was necessary to feed it on milk and eggs, on which it survived only some six weeks.

RUSSIAN MOUNTAINS AT PARIS.

The Russian mountains, which were formerly the delight of our fathers in the Beaujon and Delta Gardens, and in a large number of public places at Paris, disappeared in consequence of some serious accidents that happened through a defect in the construction of the plant. After long oblivion, these "mountains" made their appearance in America a few years ago, where they are very popular, and where they are called toboggan* slides, and in England, where they figured in 1886, at the Liverpool exhibition. They have likewise been operated in France at public fetes, and we now see them returning to the very heart of Paris, in an establishment which has just been founded on the Boulevard des Capucines, and which is now much frequented.

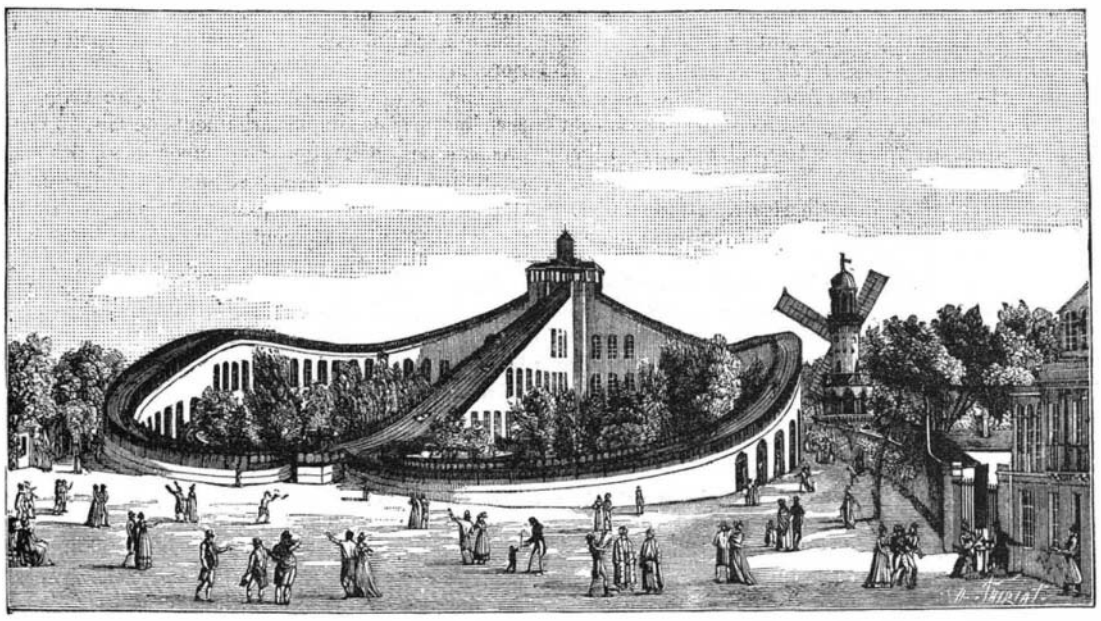

Fig. 1.—RUSSIAN MOUNTAINS OF THE BEAUJON GARDEN (1821).

In a preceding article, we gave a *resume* of the history of Russian mountains at Paris, and described the great installation at the Beaujon Garden, which was wonderfully successful in 1817 and for many years after. Since the publication of that article, we have been enabled to procure some new and interesting engravings of the time, that give a more complete idea of these ancient affairs, and we reproduce them herewith. Fig. 1 gives a general view of the Russian mountains in the Beaujon Garden. The inclined plane in the center allowed the travelers to ascend to the upper starting pavilion. The vehicles were drawn up this slope by cables. The cables were actuated by a horse whim. On reaching the upper pavilion, the travelers descended undulating slides to the right and left, which were about 1,300 feet in length.

The Russian mountains of this garden had imitators, and there soon appeared the Egyptian mountains of the Delta Garden, and the "Niagara Falls" of the Ruggieri Garden (Fig. 2). In this last installation, the starting kiosks were reached by an easy slope, and the passenger got into a smallsled that seated but two persons. This sled slid down a very firm wooden inclined plane, and traveled about 160 feet in six seconds. We may now just as well say a few words regarding the origin of this sport, which has always succeeded in amusing the public.

Russian mountains are very ancient, and, as their name indicates, were first used in Russia. Precise historical documents seem to be rare and little known. In Fig. 3 we reproduce an old colored lithograph, and it is the only picture that we have been able to procure. It was made from an original drawing by Sauerweid. It is accompanied with the following text, which perfectly explains the organization and operation of the Russian mountains on the Neva:

"On the frozen surface of the Neva there are constructed two frames 40 or 50 feet in height, and 800 or 900 feet distant from each other, and inclined toward each other by a rapid slope of 55°, but not exactly opposite, in order that the descending sleds may not meet. Each descent is soon converted into a mountain of ice by the torrents of water that are poured on to it, or by the blocks of ice that are placed one after another over its entire length. The sled descends with fearful rapidity, and, with the same speed, traverses the level space between the two structures. This exercise is the principal amusement of the Russians during winter."

It will be seen that these Russian mountains were

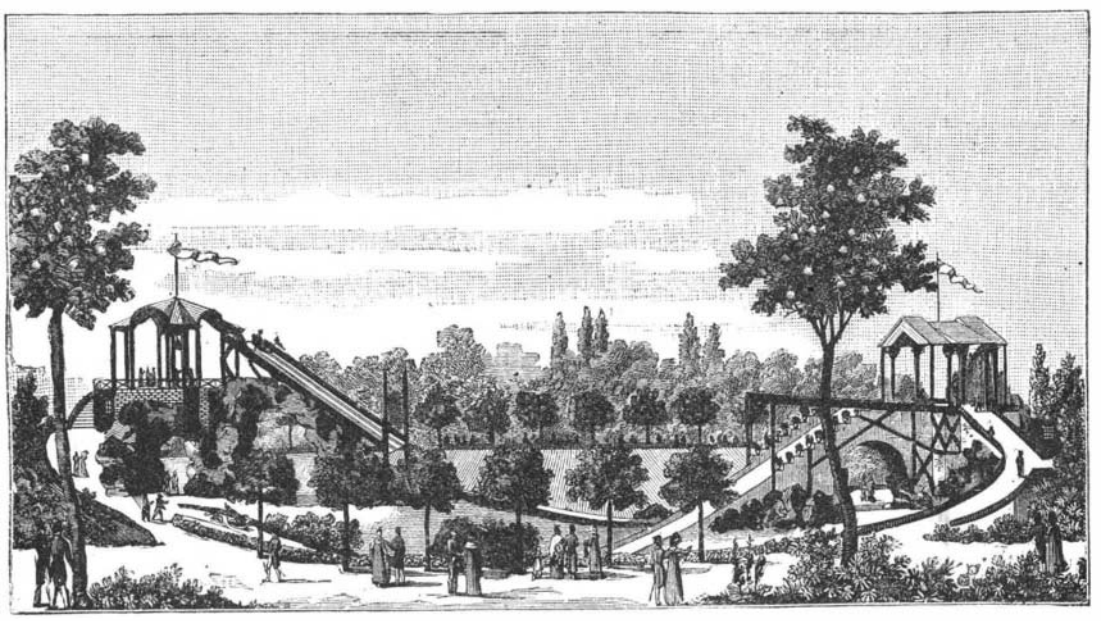

Fig. 2.—THE FALLS OF NIAGARA OF THE RUGGIERI GARDEN (1824).

* The Algonkin Indian name for a sled.

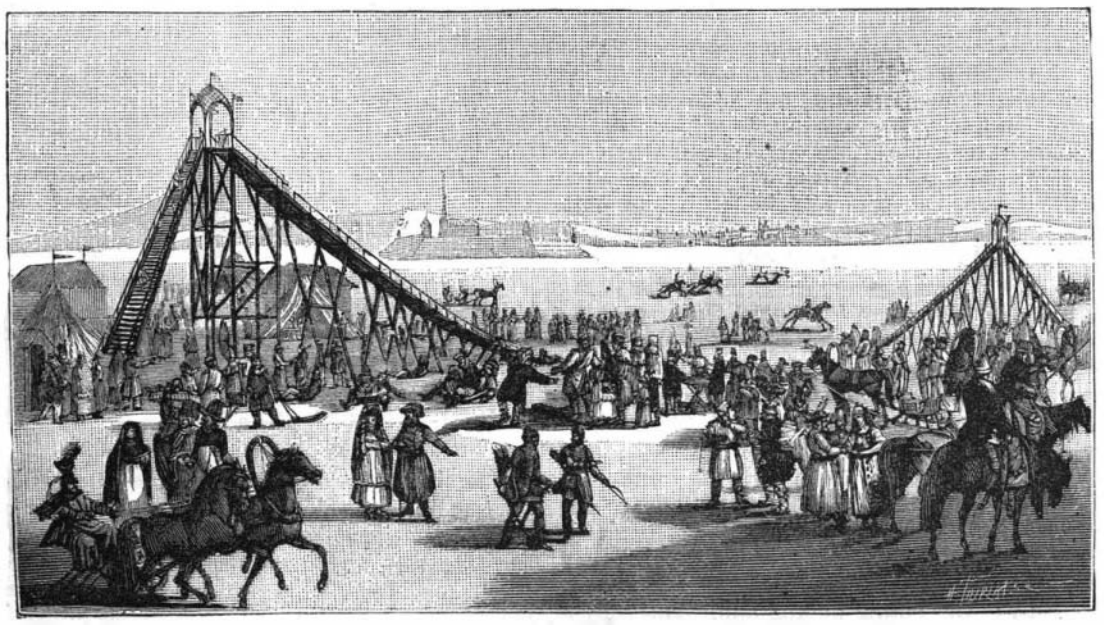

Fig. 3.—RUSSIAN MOUNTAINS IN RUSSIA.

formed of a simple inclined plane covered with ice. Small sleds, seating one person, slid down these, and the speed acquired naturally slackened on the horizontal surface of the frozen river. The Russian mountains of the Beaujon Garden consisted of an undulating slideway in which there were ascents succeeded by rapid descents. The "Niagara Falls" had more resemblance to the genuine Russian mountains, but the vehicles, instead of being sleds, were cars mounted upon wheels that revolved in hollow rails. Such are the characters that distinguish the different systems of Russian mountains formerly constructed. We now come to the new installation of the Boulevard des Capucines, which has permitted us to recall these old souvenirs of the past. The organizer of these Russian mountains has dispensed with the wide spaces used by our fathers in the spacious gardens that existed in the center of Paris, and has had recourse to a court left free between two houses. A roof 275 feet in length protects the plant, which, at night, is very brilliantly illuminated by the electric light. The cars are provived with five benches, each seating two persons. The entire car therefore holds ten passengers. It runs, through wheels, over metallic rails provided with guard rails that render derailment impossible. The car travels with great speed down the undulating declivity, and rises and descends in succession, as shown in Fig. 4. The space passed over is about 260 feet. On reaching the end of the route, the passengers alight, and a gang of men pulls the car on to a turntable and directs it to the return track. Then the passengers resume their places and return to the starting point. The trip from one end to the other does not take more than twelve seconds, as has been ascertained by a