Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

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VOL. XLI., No. 4. [NEW SERIES.] *Thirty-fifth Year.*

NEW YORK, SATURDAY, JULY 26, 1879.

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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 186,

For the Week ending July 19, 1879.

Price 10 cents. For sale by all newsdealers.

THE AMERICAN POLAR EXPEDITION.

On the afternoon of July 8 the steamer Jeannette sailed from San Francisco for a cruise in the Arctic Sea by way of Behring's Strait.

The Jeannette is a bark rigged steamer of 420 tons register, 200 horse power, and admirably constructed for meeting the perils of Arctic navigation. She was built in 1862 by the British Government. She was then known as the Pandora, and made a voyage to the Arctic seas. Last year she was purchased by Mr. James Gordon Bennett, and by special act of Congress registered as an American vessel under her present name. Lieutenant Geo. W. De Long, U.S.N., was, with the approval of Secretary Thompson, placed in charge of her and took her out to San Francisco, where, at Mare Island, she was thoroughly overhauled and put in order for her polar voyage. Her bows were filled in with solid timber, and her hull was materially strengthened by bracing. The engine was thoroughly overhauled, two extra propellers, duplicates of all parts of the machinery likely to break, and a complete set of machinists' tools with stock being also provided.

She has a steam launch, five strong whale boats rigged with sails and boat covers, and a folding boat that can be used in the water or upon runners on the ice. The sails, including rolling topsails that can be furled from the deck, are all new and stout; the spread of canvas is 6,858 square feet.

In the outfit are included eight Arctic tents, each 6 feet by 9, a suit of spare sails, and a number of ice saws with which ice from 10 to 15 feet in thickness can be cut. A deck house roofed over and fastened together by mortises and screw bolts is provided, which can be taken down and put up at will. The cabin and forecastle are padded inside with several thicknesses of felt, and the poop deck is covered with three thicknesses of stout canvas painted over. The ship will be heated by stoves burning soft coal.

The officers of the ship and the scientific members of the expedition are eight in number: Lieutenant George W. De Long, U.S.N., Commander; Lieutenant C. W. Chipp, U.S.N., Executive Officer; Lieutenant John W. Danenhower, U.S.N., Navigating and Ordnance Officer; G. W. Melville, U.S.N., Engineer; Dr. J. M. M. Ambler, U.S.N., Surgeon; Jerome J. Collins, Meteorologist and Chief of Land Parties and Sledging Expeditions; Raymond L. Newcomb, Naturalist; Captain William Dunbar, Ice Pilot. The crew, including seamen, machinists, carpenters, firemen, and coal passers, number twenty, and there are three Chinamen to serve as cook, steward, and cabin boy. The principal officers have all seen Arctic service; and the crew have been carefully selected for their physical and mental fitness for their arduous undertaking. The choice was made from 1,300 applicants.

Special pains have been taken to secure the most perfect outfit possible in the way of clothing and provisions. The ship is provided for three years, and, with the exception of flour and its preparations, all the food stores are in the form of condensed meats, vegetables, and fruits. Ample rations of beer, tea, and coffee will be served. The whole cost of the expedition—in many respects the best equipped that ever set sail for the Arctic regions—will be defrayed by Mr. Bennett.

The grand object of the expedition is to add to our knowledge of the unexplored regions in the neighborhood of the North Pole—if possible to attain to that long sought and apparently unapproachable geographical position. The magnetic and meteorological problems to be studied and possibly solved in those parts are of high importance; and there is no telling what geographical and climatic surprises may not await the plucky voyagers, who have started on the first deliberate assault upon the pole by way of the Pacific. Should the warm current which enters the Arctic Sea through Behring's Strait prove of sufficient volume to have a material influence on the climate within the seventieth parallel, we may reasonably expect that the Jeannette will at least do something to remove the great blank which covers our maps on that side of the pole.

PROPOSED EXPLORATION OF WESTERN ASIA.

A scheme for a systematic and competent exploration of the seats of ancient empire in Western Asia is talked of in England. The success which has attended the exploration of Palestine and the limited research that has been made in other parts of Asia Minor give assurance of grand discoveries to result from such an enterprise. Speaking of the relics already possessed, throwing light on the ancient Babylonian empire, the London *Globe* remarks that they cannot but fill with astonishment any one who will take the trouble to examine them, showing, as they do, that in an age of the world which we are accustomed to regard as an age of all but universal darkness and savagery, there flourished a degree of learning and civilization which seems in many respects to have been but little behind our own. It is really startling to find a library catalogue compiled some 4,000 years ago, appended to which is a direction to the student to write down and hand to the librarian the number of the book he wishes to consult, just as he would have to do today at the British Museum or the Guildhall Library. There are now in the collection at Bloomsbury, Assyrian bass-reliefs testifying to an extinct but advanced civilization to an extent of which comparatively few persons have any idea.

Fortunately the ancient libraries of Mesopotamia were largely made up of tablets composed of clay, and the fact that many of these have survived the wreck of the empires, and the extinction of the learning and civilization to which they testify, and are now in our possession, of course affords abundant reason to believe that Western Asia still possesses hidden treasures of a similar kind, such as would certainly have the most profound interest for every department of learning. So great an addition has recently been made to our knowledge of this old world that it is a matter for wonder that men and money and state influence have not by this time been secured for the prosecution of earnest and extensive exploration.

FLINT IMPLEMENTS OF THE ABORIGINES.

On another page will be found an interesting article on flint implements and their mode of manufacture by the earlier tribes of Indians. Mr. Frank H. Cushing, the author of these researches, is a man only about twenty-three years old, and holds the office of Curator of the Ethnological Department of the Smithsonian Institution, Washington. Up to the time when Mr. Cushing undertook, by putting himself in the identical position of the Aztecs and mound builders—using nothing but sticks and various shaped stones, such as he found on the river banks, to work with—the problem of how these implements of the prehistoric races were made had puzzled the antiquarian student. Mr. Cushing has kindly furnished us the sketches from which our engravings are made, and the description is from the author's paper read before the Anthropological Society at the Smithsonian Institution at its last meeting. We are sure the result of Mr. Cushing's researches will be read with interest by scientists and antiquarians in all parts of the world.

Sir William Fothergill Cooke.

The projector and constructor of the first telegraph line in England, Sir William Fothergill Cooke, died recently. He was born at Ealing, in 1806, and after graduation at the University of Edinburgh, spent five years in the service of the East Indian Army. On his return he took up the study of anatomy and physiology first at Paris, continuing at Heidelberg. At the latter place, in 1836, his attention was directed to the subject of electricity, to which he soon devoted himself exclusively. He constructed an experimental telegraphic instrument, which he took to England and endeavored to introduce on the Liverpool and Manchester Railway. This was two years after Professor Morse had privately demonstrated the success of his invention. Associating himself with Wheatstone, Cooke perfected his invention, so far at least as to make it practicable, and in June, 1837, Cooke and Wheatstone together took out the first patent for an electric telegraph, the mechanism of which, however, was quite unlike that of the Morse instrument. The first line constructed by Wheatstone and Cooke was finished early in 1839, and several other lines had been set up in England before Morse's Washington and Baltimore line was constructed in 1844. Cooke was knighted in 1869, and pensioned in 1871.

The Great Suspension Bridge between New York and Brooklyn.

At a meeting of the Trustees of the New York and Brooklyn Bridge, July 7, the contract for supplying the steel and iron for the suspended superstructure was awarded to the Edgemoor Iron Co. The contract calls for 10,728,000 pounds of steel and 34,000 pounds of iron. The bid of the Edgemoor Iron Co. was $4\frac{35}{100}$ cents a pound, amounting to $468,147. Chief Engineer Roebling said that when the change from iron to steel was first contemplated he supposed that the difference in price would be at least $100,000, but in fact the lowest bid for steel exceeded by only $4,000 the accepted bid for iron last year. The difference between the lowest bid and the lowest bid for crucible steel was $364,000.

Both towers of the bridge have been completed, the last work on the Brooklyn tower having been finished July 5. Mr. Kingsley expressed the belief that through this contract it would be possible to complete the bridge by January 1, 1881. The financial condition of the bridge on June 30 was as follows: Total receipts, $10,623,492.94; total expenditures, $10,523,574.86; outstanding liabilities, $112,807.62.

No Favoritism—No Presents.

Mr. Franklin B. Gowen, the indefatigable President of the Philadelphia and Reading Railroad, who has put himself so emphatically on record against the tyranny of trades unionism, has recently, according to the *Railway Review*, issued an order regarding the employment of new men on his road, which we regard eminently just and proper. Premising that he has discovered that bosses and superintendents have shown great favoritism in the employment of men, setting aside prior and worthy applicants, and giving positions to those who are related to them, or belong to the same society, lodge, church, or political party as themselves, or who have contributed toward making them presents, he calls the attention of those who have charge of the employment of men to the fact that the company "knows neither politics, sect, religion, nor nationality." He says: "Every able-bodied man of good moral character, no matter what may be his politics, nationality, or religion, is entitled to employment (if there is a vacancy) in the order in which his application is made." This is the correct doctrine; and the order which follows should be among the regulations of every railway company. It is, that any superintendent or boss who, in any manner, directly or indirectly, receives any presents or other valuable consideration from his employes, or who may be found unjustly discriminating in the employment of men in favor of his relatives, or in favor of

any particular party, nationality, religion, or association, shall be summarily dismissed from the service.

It would be well if the proprietors or chief officers in some other branches of business where large numbers of men are employed, would exact similar requirements of their superintendents or under officers.

A TROPICAL FRUIT.

A writer in the *Gardener's Chronicle*, in an article on the edible fruits of the forests and gardens of the Eastern tropics, gives a long and interesting account of that singular fruit the durion. He says that the regal durion (*Durio zibethinus*), like the finest of nectarines or melting pears, must be eaten fresh and just at one particular point of ripeness, and then it is a fruit fit for a king. So highly is this vegetable custard valued that as much as a dollar each is often paid for fine specimens of the first fruits of the durion crops brought into the Eastern markets. It is a universal favorite with both Malays and Chinese, but the opinions of Europeans vary as to its merits. It is a paradox, "the best of fruits with the worst of characters," and, as the Malays say, you may enjoy the durion, but you should never speak of it outside of your own dwelling. Its odor is so potent, so vague, so insinuating, that it can scarcely be tolerated inside of the house. Indeed nature here seems to have gone a little aside to disgust us with a fruit which is, perhaps, of all others, the most fascinating to the palate when once we have "broken the ice," as represented by the foul odor at first presented to that most critical of all organs of sense, the nose. As a matter of course, it is never brought to table in the usual way, and yet the chances are that whoever is lucky enough to taste a good fruit of it to begin with, soon develops into a surreptitious durion eater. There is scarcely any limit to durion eating if you once begin it; it grows on one like the opium habit or other acquired taste; but, on the other hand, the very suggestion of eating such an "unchaste fruit," is to many as intolerable as the thoughts alone of supping off cheese and spring onions, washed down with beer, and following it by a whiff from a short "dhudeen," by way of dessert.

About the middle or end of July, durion fruits are very common in Singapore, and their spiny skins lie about the streets in all directions. As you pass along you become aware of a peculiar odor all around you—an odor like that of a putrid sewer when half suppressed by holding a perfumed handkerchief to the nose—a blending of a good deal that is nasty with a *soupçon* of something rather sweet and nice. On opening a fruit for yourself, you find that the perfume, like that of musk plant, ceases to be evident after you have once had a fair whiff at it at close quarters. The flavor of the straw-colored, custard-like pulp surrounding the large chestnut like seeds is perfectly unique; and to taste it, as Wallace tells us, is a "new sensation worth a journey to the East to experience." The pulp is sweet, rich, and satisfying, but never cloys; the richness seems counteracted by a delicate acidity, and the want of grape-like juiciness is supplied by the most creamy softness of the pulp as it melts away, ice-like, on your tongue. The durion is one of Dame Nature's "made dishes," and if it be possible for you to imagine the flavor of a combination of corn flour and rotten cheese, nectarines, crushed filberts, a dash of pineapple, a spoonful of old dry sherry, thick cream, apricot pulp, and a *soupçon* of garlic, all reduced to the consistency of a rich custard, you have a glimmering idea of the durion, but, as before pointed out, the odor is almost unmentionable—perfectly indescribable. The fruit itself is as large as a Cadiz melon, and its leathery skin is protected by sharp broad-based spines similar to those of a horse-chestnut. There are many varieties in the Bornean woods some but little larger than horse-chestnut fruits, and having only two seeds; others larger but with stiff orange-red pulp, not at all nice to eat, however hungry you may be, and even the larger kinds, with creamy pulp and many seeds, vary greatly in flavor. The trees vary from 70 to 150 feet in height, with tall, straight boles and spreading tops, and the foliage is oblong acuminate, dark green above, paler and covered with reddish hairs or scales below. The fruits of the finer varieties fall when ripe, and are often the cause of serious accidents to the natives. The clusters of large white flowers are produced about April, and form a great attraction to an enormous species of bat, a kind said to be one of the greatest pests of Eastern fruit-groves. The finest fruits are obtained from cultivated trees.

The tree does well in Sumatra, Java, Celebes, and the Spice Islands, and even as far north as Mindanao. Forests of it exist on the Malay Peninsula, and very fine fruit is brought to Singapore from Siam about July or August. It does not succeed well in India, and cannot be grown in the West Indies.

FIRE-FLIES.

The insects termed fire-flies in America, and which lend such a charm to our summer nights, are soft-winged beetles of the family *Lampyridæ*, which have the property of emitting from the abdomen flashes of soft, phosphorescent light. There are several distinct species of these so-called "fire-flies" indigenous to North America, the most common and widely distributed of which is *Photinus pyralis* (Linn.). This insect most abounds in the Southwest, where, during summer evenings its constantly recurring flashes of light beautifully illumine the air. The perfect insect is of oblong form, somewhat flattened, and varies from ½ to ⅝ of an inch in length. The wing-covers are dull black, margined with pale yellow. The thorax is yellow, with a central black spot having on each side a patch of rose color. The under side of the abdomen is dark brown, with the exception of the two terminal segments from which the light is emitted, which are sulphur yellow. The manner in which the flashes of light are produced is not yet satisfactorily determined, but would seem to be the result of sudden, irregular inspirations of air accompanied by a peculiar voluntary action of certain abdominal muscles. The larva of this species, which may serve to illustrate the larval habits of the family, lives in the earth and subsists mainly on earth worms. It is of an elongate slender form, each joint having on top a horny brown plate, which is ornamented with a central straight line of white, inclosed between two curved lines of the same color. The sides are soft, and rose colored, with the white spiracles situated on elevated brown patches. The under surface is cream color, and each segment is marked in the center with two small brown spots. The thoracic legs are quite long, and the posterior extremity is provided with a singular fan-like proleg, which not only assists in locomotion, but serves to cleanse the head and fore part of the body from the impurities that may adhere after the larva has been feeding. The pupa is formed within an oval cavity in the earth, and is white, with a tinge of crimson along the back and sides. It remains in this state only about ten days. Both larva and pupa have the power of emitting light, though in a much less degree than the mature insect.

The "fire-fly" most common in the more Northern States is the *Photuris pennsylvanicus* (De Geer). In some species of both the genera here mentioned, the females are incapable of flight, the true wings being entirely undeveloped, and the wing-covers very short; while in the well-known glow-worm of Europe (*Lampyris noctiluca*), belonging to the same family, the female retains the larval form, and has the merest rudiments of wings.—*Prof C. V. Riley.*

Discovery of Another Mastodon.

In 1845 the largest and most perfect skeleton of a mastodon ever found was taken from a swamp in the town of New Windsor, near Newburg, N. Y. It was set up by Dr. Warren, and is now in the Boston Museum.

On July 5, the bones of another mastodon were discovered in the same neighborhood—namely, on the farm of Hugh Kelly, at Little Britain, N. Y. The skeleton appears to be nearly if not quite complete, and the separate bones are in fine condition.

The dimensions of the chief parts of the skeleton found are as follows: The skull is 45 inches long, 28 wide, 29 high, and 23¼ between the eyes. The diameter of the nostrils is 6 inches, the nostrils extending into the head 2 feet. Four teeth were found in each jaw in an excellent state of preservation. The enamel is of a bluish tint and unbroken. The four back teeth are eight-pointed, measure 7 by 3¾ inches, and stand 3 inches out of the jaw. The four front teeth are six-pointed, and measure 4¼ by 3½ inches. The depth of forehead is 18 inches; the eye-sockets are 7 inches in diameter, and the ear-sockets 18 inches in diameter. On each side and above the mouth are holes measuring 6½ inches in diameter, from which probably protruded the tusks, which have not yet been found. These openings extend into the skull a depth of two feet. There are eight fangs on each back tooth and six on each front one. The space between the rows of teeth across the jaws measures 7½ inches on the upper and 6¼ inches on the lower jaw. In the center of the forehead is a cavity measuring 11 by 4 inches. It cannot be surmised what this cavity indicates, unless it be for a trunk between the tusks corresponding to that of an elephant. The lower jaw was joined to the upper after they had been unearthed, making a perfect skull. It is estimated that the skull complete will not weigh less than 600 pounds.

The fore-leg, including the thigh bone, measures 7 feet in length, and it weighs, it is judged, 150 pounds. The first joint of the hind leg measures 2 feet 5 inches in length, and the second joint of the same leg 3 feet 4 inches. The only part of the other fore-leg yet found is the second joint, measuring 3 feet 10 inches in length. A dozen or more sections of the spine are among the bones unearthed. The largest measures 10 by 16 inches. A score or more other bones are among the lot, among them that of a toe, measuring 6½ by 4½ inches.

These measurements indicate an animal rivaling in size the one described by Dr. Warren.

Swift's Comet.

In a letter to the *Tribune*, with regard to the comet discovered by him, June 17, Mr. Swift reports, under date of July 5, that from observations made by Professor Hough, Director of the Dearborn Observatory, Chicago, on June 23, and by Professor S. C. Chandler, at Boston, on the 26–30, Professor Chandler has computed the following parabolic elements referred to the mean equinox of 1879:

Perihelion passage—May 20·2115, Washington mean time.

Longitude perihelion	11°	35′	24″
Longitude node	56°	4′	0″
Inclination	70°	38′	3″
Logarithm of perihelion distance			0·09482

Motion retrograde.

These elements resemble those of no comet which has been observed during authentic history. In fact, they differ widely from all recorded comets since 370 years B. C. down to our own time. If correctly calculated the orbit of this comet is parabolic, and the comet is visiting us for the first and last time. It is now receding from the sun rather rapidly, but is approaching the earth somewhat slowly, and will be visible for several weeks, but only through the telescope. Professor Chandler thinks it was at its maximum brilliancy on the 1st of July, when it was just visible with a 2½ inch telescope.

The reader must not lose sight of the curious fact that the comet on the 13th passes quite near the Pole Star and almost exactly over the true pole of the heavens, which accounts for the abrupt change in right ascension.

One very clear night Mr. Swift has seen a broad but very short and faint tail inclined at a considerable angle from a point opposite the sun. On another clear night he was able to see an exceedingly minute star-like nucleus which appeared to be double. Neither of the last two phenomena could be seen except by eyes long trained to viewing faint objects, and then only on nights exceptionally clear and with instruments of fine definition.

Decease of Two American Ship Builders.

With the death of John Dimon, recently, the last of the old-time ship builders of New York passed away. Mr. Dimon was born at Jamesport, L. I., in 1794. He apprenticed himself to Henry Eckford, ship builder, at an early age, and when but eighteen years old was sent by the latter to Sackett's Harbor to help in building the frigates which served in the war of 1812. Afterward, associated with Stephen Smith, Dimon became a prosperous ship builder, building many noted clipper ships, and at a later day many steamships, notably for the Pacific Mail Steamship Company. Mr. Dimon retired from business in 1854. He had for his contemporaries in the palmy days of the ship building trade, among others, the father of Wm. H. Webb, the father of Henry Bergh, the two brothers James R. and George Steers, Jacob Westervelt, and Mr. Mills, who died a short time ago.

An American ship builder of more recent fame, William Cramp, head of the Cramp Ship Building and Engine Works, Kensington, Philadelphia, died at Atlantic City, July 6.

Mr. Cramp was born in Kensington, in September, 1807. He served as a ship building apprentice when that industry was carried on in its primitive stages in the yard of Samuel Grice, which was then the principal establishment in its line in Philadelphia. After attaining his majority he engaged in business for himself, beginning in a small way. During the fifty years he spent in business ship building made great strides, and William Cramp was acute in his perceptions of the wants of a progressive people.

The firm of William Cramp & Sons was composed of William Cramp and five sons. Since the works have been established there have been constructed 225 vessels of every description, including merchantmen, men-of-war for this and other governments, the steamers of the American Line, and Reading Railroad colliers. Five iron cruisers for the Russian navy have been built at the works within the past year.

The Bridgewater, built 27 years ago, and at that time the largest vessel of her class in the country, is still afloat.

The largest iron freight ship ever built in this country is now under construction at this yard. She is to be 2,000 tons measurement, and to have a carrying capacity of 8,000 bales of cotton.

A Good Sign of the Times.

One year ago this month, July, the New York Belting and Packing Company became financially embarrassed, owing to serious losses occasioned by the defalcation of an officer in the Boston Packing Company. A compromise was effected with their creditors, and notes were given for full amount, interest payable at intervals extending to October, 1881. It will gratify the friends of the company to know that they are now enabled to meet all their obligations, and to this end the energetic manager and treasurer, J. H. Cheever, Esq., requests the holders of their notes, whether due or otherwise, to present the same for immediate payment.

Fourth of July Snow.

A sudden and unusual fall of temperature was widely experienced on the afternoon of the fourth of July. At Portland, Maine, it was attended by a fall of snow. Sergt. Boyd, of the Signal Service, explained the phenomenon in this way: Shortly before five o'clock a cloud was observed rising from the south. At the same time another rose from the northwest. The current of wind which bore this along was cold, while the opposing current was warm and saturated with vapor. These two intermingled, and the effect was to form crystals of snow. The preceding heat and dryness of the day also helped to produce this result. The barometer was very low at the time, and the thermometer dropped 15 degrees in 10 minutes. The minimum temperature Friday night was 57°. This sudden change was no less remarkable than the snow-flakes.

The Mississippi Jetties Finished.

Capt. J. B. Eads reports, under date of July 10, that the greatest depth and width of channel required by the Jetty Act at the mouth, and also at the head of South Pass, has been secured. The completion of the great work was certified to the Secretary of War the same day by Captain M. R. Brown, of the United States Engineers, inspector of the work. The jetty channel is over thirty feet deep, and a good navigable channel of twenty-six feet, measured at the lowest stage of the river, exists at the head of the passes. The benefits to commerce likely to flow from this brilliant achievement are inestimable.