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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 501,

For the Week Ending August 8, 1885.

Price 10 cents. For sale by all newsdealers.

RIVERSIDE PARK.—THE BURIAL PLACE OF GEN. GRANT.

In preparing for General Grant's obsequies, the first question was naturally where he should be buried. A diversity of opinion prevailed, many preferring that national ground should be chosen for his last resting place, as he belonged in a peculiar manner to the nation at large; but his family thought fitting that New York, as the city which had been his home during the last few years, and had witnessed the heroic struggle of the past winter and spring, would be the most suitable place for his burial. The choice, indeed, was sanctioned by General Grant himself, who stated, but a short time before his death, that he selected New York as his burial place, "because the people of that city befriended me in my need."

The city authorities were prompt in offering the use of any of the city parks which the family might select, and for several days Central Park was uppermost in mind, and seemed likely to be the spot honored by their choice. Colonel Grant, upon whom devolves the principal arrangements for the funeral, was several times in consultation with Mayor Grace, and in company with several gentlemen of the city corporation visited the park, and examined various sites which had been proposed. A number of objections, however, conspired to make Central Park seem undesirable, and Mayor Grace suggested that Riverside Park should be selected, as it possessed many advantages, and would in all respects be a suitable site. The final decision rested with Mrs. Grant, and as her acquiescence was early telegraphed to Mayor Grace, Riverside Park was announced as the spot selected for the resting place of the hero.

The park thus chosen for so distinguished a trust is little known outside of New York, and indeed in the city itself there are many who are entirely unacquainted with its beauties. From 72d Street to 129th a high bluff extends along the Hudson River, its sides sometimes precipitous, and again falling in gentle slopes toward the river. It is but a narrow strip of ground, and as yet, with the exception of the broad macadamized drive and the heavy stone parapet toward the river, it is almost entirely unimproved, but it possesses the elements of great beauty, and is destined in time to become one of the loveliest spots on the whole island. Three miles of river frontage gives to the park a living feature, whose charm and naturalness can be disturbed by no future growth of the metropolis, and fully entitles it to the name of Riverside.

Just now it is in a state of transition; the old order of things is passing away, and the new has not yet taken its place. Three generations of homesteads are built side by side, facing the winding stream, and bringing the memories of the past into contact with modern progress. Here and there stands an old Dutch farmhouse, square and comfortable, and surrounded with its gardens and orchards, while a little further along and one comes upon the mansion of a less remote period, with its prim colonnade and heavy, dignified aspect. Several lovely spots have been selected as the site of modern villas, which tell of what is coming, and hint unmistakably that their neighbors are decidedly old-fashioned, and will soon be seen no more.

The park is fortunate in possessing together with its charming location many noble old trees, whose heavy foliage is very graceful and attractive. These, too, speak of the past. Occasionally one sees a few old apple or pear trees mixed with the other timber, and recalling pictures of former homesteads; or the remnants of an avenue of Lombardy poplars or aged elms tell of more pretentious country seats. It is a great advantage in choosing this quiet, unadorned spot, which must forever remain inviolate, that its development will shape itself to be a fitting environment for the sacred dust which it receives. It cannot fail to be dominated by the memory of the hero who is to rest there, and to become consecrated to him in a manner that could never have been the case with Central Park.

Following the road to the north, the ground gradually rises until at 124th Street it has an elevation of one hundred and thirty-five feet above the river. This is the most charming spot in the whole park, and has been chosen as the site of the monument. At the base of the hill, the river spreads out into the beautiful sheet of water known as the Tappan Zee. Its surface is always alive with all kinds of river craft, and its surrounding shores abound with associations of the Revolution. The past and the present are both here; it is a fitting place to lay a hero. On the opposite shore, the trap rock of the Palisades rises from the river and makes a graceful outline against the horizon.

But a short distance above the park are Fort Lee and Fort Washington. Just beyond the commanding knoll stands the Claremont House, which was the home of the eccentric Lord Courtney in the days before the Revolution. The wooden figure-head of George III. is still one of the curiosities of the neighborhood; but the house is near enough the site of the monument to be an obstruction, and is therefore to be removed. To the east the view is also commanding, and on clear days the boats on Long Island Sound can be distinctly seen. Twenty acres of land are to be devoted to the monument.

Though Riverside Park is so comparatively unknown, it is by no means inaccessible. The Boulevard, a broad, shady avenue, which promises in time to become one of the most fashionable in the city, leads from the Circle on 59th Street, at the southwest corner of Central Park, almost directly to the monument site, where numerous other pleasant drives connect the locality with the surrounding parks. Our illustrations show some of the features of Riverside. The lower portion of the picture is a view from the bluff at 90th Street looking toward the north. The central and upper cuts represent different views in the park as one approaches Claremont. Various boat houses occupy the water's edge along the park domain, as represented in the cut at the left. The small engraving on the right gives a glimpse of Claremont taken a few steps in front of the spot chosen for the tomb.

It is admitted that Riverside is the most suitable place in the city, and though its selection has not given general satisfaction, we believe that time will justify the choice. It would be difficult to find a more beautiful spot, and almost impossible to select one which would become more thoroughly consecrated to the memory of General Grant.

CHARTS FOR GREAT CIRCLE SAILING.

We publish in this week's issue of the SUPPLEMENT an illustrated article by Prof. Richard A. Proctor, on charts for great circle sailing, which is a very interesting development of the law of least force. The chart brought forward by Prof. Proctor is a stereographic projection—one in which each point on the sphere is projected on a tangent plane by a line joining the point and the outer end of the tangential diameter; and since it gives the entire globe, except a small area within the Antarctic Circle, on one sheet, it is well adapted for plotting a great circle course. By the method given in connection with the chart, a seaman may lay down without any difficulty the shortest track between two ports, that is, the arc of a great circle joining those ports, or the shortest distance between any point reached during the journey and any desired haven, and can calculate the distance. Ordinarily, vessels follow what is called the rhumb course, or that in which the same compass bearing, apart from magnetic variation, is maintained throughout the journey, but a great saving of distance is effected by sailing on the arc of a great circle; thus the distance from Melbourne to Cape Town is 6,154 miles on the rhumb course, but is 587 miles shorter on a great circle. It is the purpose of Prof. Proctor's article to make this more advantageous course practically attainable.

The advantages of great circle sailing have been known for many years, but hitherto the difficulties of calculating and plotting the course have been so great that it never came into more than exceptional use. The gnomonic projection suggested by Mr. Hugh Godfray, for charts to be used in great circle and composite sailing, was some advance, but the area represented on one chart being of necessity limited, it was impossible to lay down a ship's course of any extent on one chart, and the process of calculation was too complicated. The chart and methods suggested by Prof. Proctor are very simple, and may be readily grasped by navigators of even small mathematical knowledge. They promise to bring great circle sailing into general use, and by the notable saving of time effected, to be a valuable contribution to the progress of an age which is prone to rank speed among its greatest attainments

BRONZE FRAMES.

Many productions of artistic articles are made under personal or trade secrets, and the methods are not made patent. Even where the methods are not guarded and controlled by legal act they may be confined in practice to a limited number of expert workmen. There is no exclusive right to the employment of bronze as a means of ornamentation, but in its uses as a decorative material few are experts.

Ever since the Exhibition at Philadelphia in 1876, there has been manifested great interest in the possibilities of bronze as a means of ornamentation. It was shown there that the appearance of hard steel and crude iron could be produced by treatments of bronze; in short, that bronze powders might be so managed by acids and heat as to assume all the metallic tints that could be possible in the solid metal. Of course, any mechanic can understand that such a disintegrous material as iron could not be spread into layering leaves like gold or like nearly pure silver; it was not capable of the extreme tenuity of fiber that could make it plastic in thin foils. So steel, although capable of greater tenuity, could not be beaten or rolled into films so requisitely thin as to make a tenuous sheet capable of being spread over even a plane surface. But much of this imitation of the hard metals must, by the present demands of fashion, be made on *alto rilievo* work, projections that would seem to require very flexible material to meet the requirement. This material is in the form of a very fine powder or dust, but being actual metal is capable of being bur-

nished. Very fine effects are produced by different colored bronzes, or bronze powders, but finer effects are produced by their treatment after being "laid."

The steel, and iron, and rusty iron, and copper, and brass, and the bronzes are all produced on picture frames and other ornamental objects by careful preparation of bronze powders, by acids, and heat, aided somewhat by some other materials and by tasty workmanship. These metallic powders are not attached to the object to be ornamented by ordinary "tacky" size as is gold leaf, but are laid on by means of an alcoholized solution that softens temporarily the whiting coating that is put on the wood mouldings of picture frames, mirror frames, and other articles to give a smooth, hard surface for the reception of gold leaf.

The bronze powders, whatever be the color they have been made to assume by calorific and acidulous treatment, may be applied so thinly as to be partially transparent, and so very attractive effects are produced by the use of a colored varnish or wash to the surface of the article before applying the powder. Thus different shades of one color may be produced by mixing with the softening alcoholic solution that prepares the surface for the reception of the powder, certain proportions of ivory black, burnt umber, or other volatile pigments which dry readily but leave their stain. In an attempt to imitate in bronze powder the appearance of rusty iron, the actual oxide of iron was found to be the very best pigment. This was made in the usual way by steeping soft iron—horse shoe nails—in acetic acid—vinegar—and mixing it with a little alcohol. This was washed over the surface of the frame or moulding, the bronze powder applied in different thicknesses to produce different tints, and was ready for burnishing within two hours.

Except plain and distinctive color, the most pleasing effects of bronzing are produced by the manipulations of the artist workman. He must be an artist to properly do his work. Chippers of stone may be employed to reproduce in marble the sculptor's clay model; but the decorator is himself the artist and the worker. He lays the powder in solution on the surface, thick or thin, as the work or his taste demands, employing the softest of camel's hair brushes. Where the original tint is to remain, the surface is wiped with silk floss or a rabbit's foot. But where prominences should show boldly, the protuberances are carefully burnished with queerly shaped implements of agate, flint, or of hardened steel or bloodstone. All these hand tools are ground to curves, angles, and edges to fit the sinuosities of the work; and they require practice in their use as well as taste in working, because much of the raised ornamental work on which they are employed is only a paste of glue and plaster of Paris.

National Fish and Oyster Hatching.

An officer in the service of the U. S. Fish Commission at stations on Chesapeake Bay reports obtaining 500,000 eggs from five Spanish mackerel on July 14, and that great success has been reached in hatching the eggs at the several stations, the temperature of the water being such at present that the eggs are hatched in from twenty to twenty-six hours. Included in the work of the Fish Commission there is also an oyster breeding farm at the mouth of the Potomac River, where ponds have been created to rear oysters hatched artificially. The oysters are taken indiscriminately, male and female, opened, the eggs expressed from the ovaries of the one and brought in contact with the spermatozoa of the other. Development begins immediately, and the oysters are swimming about freely in the rearing tanks in twenty-four to thirty hours. This is the height of the oyster spawning season in that locality. Ample material is found in the oysters of the bay and those reared in small ponds. These ponds are provided with collectors of various forms, on which the spat or young oyster attaches itself. When about five months old they are removed from the collectors, which have been coated with mortar to enable the delicate young oysters to be more easily detached. It is essential they should be separated, as they gather in such numbers as to smother each other. The experiments have been directed to making a certainty of obtaining the annual catch of spat, with which to plant oyster beds, independently of the ordinary and natural elements and influences. The French have developed oyster raising largely by depending on the natural oyster to fix the spat. Our Fish Commissioners are carrying the experiments to the earlier stage, and produce the oyster artificially as fish are produced. The oyster itself, when first hatched, is only one five-hundredth of an inch in diameter, which makes it an exceedingly difficult animal to handle. The difficulty here has been to confine them to limited waters and to give a sufficient change of water to keep them in healthy condition. The Commissioners expect by their experiments to be able to repopulate at small cost beds which have been exhausted. The spawn can be transported in great number at small cost. The present transplanting when grown to an inch in diameter is quite costly.

The oyster experiments will be continued at Wood's Holl to a later period of the year than on the Chesapeake. The oysters in Buzzard's Bay and vicinity spawn considerably later. This is the rendezvous, also, of our vessels engaged in deep sea researches. The Albatross, having refitted after a winter cruise in the Gulf of Mexico, has visited the Banks of Newfoundland and the Georges, engaged in bottom dredging.

Several sea salmon, weighing eight to twelve pounds, were taken recently in the Chesapeake waters. One of nine and a half pounds was secured by the Commission twenty miles south of Washington in the Potomac, and was fresh run, beautiful, true salmon. It has been preserved in alcohol at the Smithsonian Institution. The spring run leads to the hope that that valuable fish has been permanently established in the Chesapeake Bay and its tributaries, hundreds of miles south of its old haunts.

Cocoanut Cellulose as a Lining for Ships.

The long standing rivalry between heavy ordnance and armor plates is likely to be disposed of in a manner little expected, as a means appears to have been discovered whereby the effects of shot and shell, and even torpedoes, will be effectually neutralized. For some time past naval architects have ceased to rely solely upon armor for the protection of ships, for, notwithstanding the enormous thickness to which armor plates had attained, they were found to be no match for the artillery that was brought to bear upon them. Steel plates and compound plates were next tried, but to no avail. As a further increase in the thickness of plates, whether of iron or steel or both combined, was impracticable, owing to the overweighting of vessels with armor, shipbuilders tried the expedient of supplying a second line of defense in the coal bunkers, which were constructed along the sides of ships, especially those parts where the machinery and magazines are located. They certainly, to some extent, furnished that second line without overburdening the vessel, for coals have to be carried under any circumstances.

But a far more effective protection appears now to have been supplied by the invention of a composition which, besides being efficacious as a protector, possesses the merit of being light—a desideratum much wanted by naval constructors. This composition is a preparation obtained from cocoanut cellulose, which has the remarkable property, when penetrated by shot and shell, or even after the explosion of a torpedo, of closing up as rapidly as it has been in preventing the influx of water into the ship's hold. The very appropriate name of "coffer dam" has been given to the preparation, which, besides being very light, is highly elastic and tenacious. Some important experiments have lately been made with the composition before a French commission at Toulon, which, if everything that is reported concerning them is true, prove the preparation to be destined to solve the armor plate controversy. The commission submitted the composition to a threefold test against shot, shell, and torpedo. The target was a coffer dam made of a mixture of 14 parts of pulverized cellulose and 1 part of cellulose in fiber. This composition was compressed to a felt-like mass, of which 1 cubic foot weighed about eight pounds. A layer of beams 4¾ inches thick represented the side of the ship, behind which there was a layer of coffer dam 2 feet thick. Against this target a 7½ inch solid shot was fired, which penetrated it, taking with it not quite one-fifth cubic foot of composition, a very small quantity, considering the size of the shot. But as soon as the shot had passed through the target the cellulose composition closed up again, and so firmly that a strong man was unable to force his arm through the opening made. A box filled with water was then fixed against the aperture, the contents of which ought to have acted in the same way as if the coffer dam had been washed away by the sea. It was observed that a few drops of water began to percolate after the lapse of from 10 to 15 minutes; and even after the composition had become well saturated with water, only between 3 and 5 pints of water escaped per minute, which could be easily intercepted by pails. As soon as the cellulose had become thoroughly soaked and grown denser, it offered greater resistance to the percolation of water, which finally almost ceased to flow. The experiments with shell gave similar results, the breach made closing automatically. It was also found that the coffer dam was proof against fire. A special experiment was made in which red hot coals were placed upon a mass of coffer dam, and covered with the same composition, the result being that the fire went out. The experiments with torpedoes were not so decisive as those with shot or shell. A chest was anchored out at sea, one side of which was lined with coffer dam, a torpedo attached to it, and exploded. The chest floated for a few seconds, and then sank. When fetched up by a diver, it was found that the lid had been blown off, but that the coffer dam composition was little injured. The above experiments appear to prove that the material in question possesses the property of automatically closing a leak caused by shot or shell, and of protecting a ship to a certain extent against fire. Whether its use will render ships unsinkable remains to be shown, but we understand that in order to investigate this point thoroughly further experiments on a larger scale are to be undertaken by the Toulon commission.

Animals as Barometers.

I do not know of any surer way of predicting the changes in the weather, says a correspondent of the Cincinnati *Enquirer*, than by observing the habits of the snail. They do not drink, but imbibe moisture during a rain and exude it afterward. This animal is never seen abroad except before a rain, when you will see it climbing the bark of trees and getting on the leaves. The tree snail, as it is called, two days before rain will climb up the stems of plants, and if the rain is going to be a hard and long one, then they get on the sheltered side of a leaf, but if a short rain, on the outside. Then there are other species that before a rain are yellow; after it, blue. Others indicate rain by holes and protuberances, which before a rain rise as large tubercles. These will begin to show themselves ten days before a rain. At the end of each tubercle is a pore which opens when the rain comes, to absorb and draw in the moisture. In other snails deep indentations, beginning at the head between the horns and ending with the jointure of the tail, appear a few days before a storm.

Every farmer knows when swallows fly low that rain is coming; sailors, when the sea gulls fly toward the land, when the stormy petrel appears, or Mother Carey's chickens, as they are called, predict foul weather.

Take the ants: have you never noticed the activity they display before a storm—hurry, scurry, rushing hither and yon, as if they were letter carriers making six trips a day, or expressmen behind time? Dogs grow sleepy and dull, and like to lie before a fire as rain approaches; chickens pick up pebbles, fowls roll in the dust, flies sting and bite more viciously, frogs croak more clamorously, gnats assemble under trees, and horses display restlessness.

When you see a swan flying against the wind, spiders crowding on a wall, toads coming out of their holes in unusual numbers of an evening, worms, slugs, and snails appearing, robin redbreasts pecking at our windows, pigeons coming to the dovecote earlier than usual, peacocks squalling at night, mice squeaking, or geese washing, you can put them down as rain signs. Nearly all the animals have some way of telling the weather in advance. It may be that the altered condition of the atmosphere with regard to electricity, which generally accompanies changes of the weather, makes them feel disagreeable or pleasant. The fact that a cat licks herself before a storm is urged by some naturalists as proof of the special influences of electricity. Man is not so sensitive. Yet many feel listless before a storm, to say nothing of aggravated headaches, toothaches, rheumatic pains, and last, but not least, corns.

The British Ship Rodney.

The steel armor plated barbette ship Rodney, ten guns, 9,600 tons, 7,000 horse power, lately returned to Chatham Dockyard after a successful series of trials of her engines. The official trial, which took place recently, was of the most satisfactory character. With a natural draught the following results were obtained: Mean indicated horse power, starboard, 4,222; port, 4,040; collective, 8,262; steam in the boilers, 89 lb.; vacuum in condensers, starboard, 28·5 in.; port, 28 in.; revolutions per minute, starboard, 94; port, 93; mean pressure in cylinders, starboard, high, 45·61; low, 11·74; port, high, 43·44; low, 11·50. With forced draught and inclosed stokeholes, the following results were obtained: Mean indicated horse power, starboard, 5,598·55; port, 5,558·21; collectively, 11,156·76; steam in the boilers, 90 lb.; vacuum in condensers, starboard, 27·5; port, 28; revolutions, starboard, 104; port, 103; mean pressure in cylinders, starboard, high, 59·75; low, 12·83; port, high, 60·10; low, 12·78. The rate of speed attained was beyond that anticipated, over 17 knots per hour being made, notwithstanding the fact that the vessel's bottom was foul through having been in the basin at Chatham so long. The machinery worked with smoothness and regularity, the boilers generating an ample supply of steam, and no hitch occurred.

A New Oyster Pest.

In the vicinity of Stratford, and elsewhere along the Connecticut shore of Long Island Sound, it is said that a new and very destructive pest has made its appearance, to the alarm of the oystermen. It resembles an insect, and mainly attacks the "seed oysters," *i. e.*, those from one to two years old. It builds on top of the oyster shell a cluster of brown coll-like cells, which accumulate so rapidly that the young bivalve is soon smothered. According to Mr. Henry C. Rowe, an experienced oyster grower, nine-tenths of the many thousands of bushels of seed oysters planted this year have been thus destroyed. Others dispute this and seem to think there is no ground of alarm. The matter has been taken in hand by the Connecticut Shell Fish Commission, by whom the evil will be investigated.