BLASTING OUT A REEF IN NEW YORK HARBOR.

Some few years ago, when the cruiser "Brooklyn" was passing through the fairway to the southwest of the Battery, the ship being fully equipped with stores, etc., and therefore at her maximum draft, she grounded quite heavily upon some obstruction, and received injuries which necessitated her docking at the Brooklyn navy yard, where extensive repairs had to be made on her damaged bottom.

As there was supposed to be an ample depth of water at this point, it was presumed that the ship had struck some sunken barge or vessel, of which no record had been kept. Subsequent examination of the locality, however, developed the surprising fact that at this point there was a reef of rocks where the channel shoaled from its normal depth of 40 to 45 feet to a least observed depth of 28.6 feet at mean low water. Complete soundings were made of the reef, and its contours established. The projecting mass of rock, which is of the same gneiss which underlies New York city, was found to vary from 32 feet in length by 25 feet in width at the 30-foot depth, to 200 feet in length by 77 feet in width at the depth of 40 feet, where the total area was found to be about 10,160 square feet and the total amount of rock to be removed was estimated at 1,450 cubic yards. Tenders for the removal of the rock were invited, and the contract was let to J. B. Miller, of this city, to whom we are indebted for assistance in the preparation of the present article.

The task of removing the rock is rendered unusually difficult by the depth of the water and the velocity of the currents, which vary from 5 to 6 miles per hour. Furthermore, the blasting and dredging operations have to be carried on at one of the busiest points in New York harbor. The reef is about 1,000 feet south by west from Pier A at the entrance of the North River, where it lies in the track of both the incoming and outgoing traffic from the North River docks and also directly in the way of the even heavier traffic which passes around the Battery between the North and East rivers. The most difficult task was that of drilling, and to expedite this work the contractor devised the movable platform which forms the subject of our front-page illustration. It consists of four massive spuds, each measuring 16 x 16 inches on the side, and 60 feet in length. These are pointed at the bottom, and weighted with iron in order to overcome the buoyancy of the timber at the greater depths. The working platform is carried upon four movable spud boxes, which are built of 4-inch yellow pine, strongly bolted together and adapted to slide vertically upon the spuds. A heavy framing of 4 x 6 waling pieces connects the spud boxes at their upper and lower edges, and upon the lower framing is laid the working platform from which the drills are operated. The platform is supported upon the spuds by means of 1½-inch steel pins, which are placed in holes bored through the spuds. From this description it will be seen that the contractor had at his disposal a platform whose legs could be readily adjusted to the uneven surface of the reef.

The drilling was done by a 5½-inch Ingersoll special submarine drill, steam being supplied from a scow moored alongside the working platform. When operations first started, it was found that the rush of the tides was so swift that the steel drill was bent as much as 7 inches out of line by the pressure. This condition was met by providing a heavy telescopic cast-iron pipe, which varied from a diameter of 4 inches at the bottom to 12 inches at the platform. The pipe was lowered down to the rock, and provided a shield within which the drill was operated without any further trouble from deflection.

The current was found to be strongest on the last of the ebb tide after heavy storms of rain, when special precautions had to be taken to keep the platform in its proper working position. Because of the heavy current, the diver was able to go down only at slack tide, which he did for the purpose of locating and charging the holes. When it became necessary to shift the platform, a scow was first floated between the spuds to receive the weight of the platform. The derrick then took hold of the four corners of the frame and lifted the weight off the pins, which were removed and the platform was lowered down on the scow.

The pins were then placed in the holes above the frame, and as the scow rose with the tide, it lifted the platform and spuds, and was moved with its load to the new position. Here the platform was lowered, and the spuds allowed to settle to their bearings, after which the pins were inserted, the scow floated out, and the platform was left in position for further drilling.

The work, which was started in the summer of 1905, has been delayed by various collisions which have wrecked the platform and necessitated repairs; but it is expected that the whole of the reef will have been blasted out and dredged away by the spring of next year, leaving everywhere a uniform depth of 40 feet at mean low water.

The Aeronautical Congress of 1906.

BY OUR BERLIN CORRESPONDENT.

An International Aeronautical Congress is being held at Berlin in connection with the twenty-fifth anniversary of the Berlin Aeronautical Association. While the first day of the congress was given up to the novel military sport of balloon hunting by means of automobiles, the second day was devoted to lectures.

Prof. Hergesell, of Strasburg, lectured on Studying the Atmosphere Above the Sea by means of balloons and kites. That old children's toy, the kite, has been developed into a most valuable instrument for scientific research. The first attempts made in this connection above land were extended to successful investigations of the atmosphere above the sea, by starting a captive kite from a vessel. The first more extensive trials were carried out from the imperial dispatch boat "Sleipner" and from the yacht of the Prince of Monaco. Great difficulties, however, were encountered in investigating the trade winds by means of kites, the raising of the latter up to a height of 13,120 feet requiring many hours. Another drawback in investigating the direction and speed of the winds in any region was found in the fact that the proper velocity of the wind at great heights is apt to be concealed by the winds set up by the motion of the vessel. These difficulties were done away with by using recording or sounding balloons, the ascension of which was found to be most rapid, and which readily reached heights of 5,248 and even 5,904 feet, while indicating the direction and speed of winds as faithfully as the moisture of the atmosphere. Special difficulties were, however, met with in the polar regions in which recording balloons have been sent up as far north as 81 deg. northern latitude.

Two recording balloons are generally connected together by a cable about 164 feet in length, from the center of which another cable branches about 80 feet, carrying the apparatus, to which another 160 feet of cable and finally a float are fitted. The whole system will rise until one of the balloons explodes, whereupon the other, unable to support the whole system, will drop until the float has reached the sea. The system being again in equilibrium, the balloon will then float at 3,280 feet above the sea, carrying the apparatus at a height of 80 feet.

Prof. Miethe next delivered a lecture on color photography from balloons and photography in the service of meteorology, and exhibited some beautiful specimens of colored cloud photographs. Aeronautics and meteorology are intimately allied, in so far as the former is a most efficient aid to the latter. The problem of taking photographs from a balloon may be said to be almost identical with that other problem of photographing clouds, in so far as the absence of any foreground in the picture in both cases requires the use of practically identical apparatus, rendering it possible to take the three views necessary for a color photograph. Colored views can be taken in a very small fraction of a second with the improved methods designed by Prof. Miethe. The views of Berlin taken from heights of 2,500 feet to 3,000 feet show the interest inherent even from a technical or military point of view to such colored balloon photographs. It may be said that color photography will possibly avail itself also of the rocket cameras which have been constructed quite recently.

Major Gross lectured on the development of motor-propelled airships in the twentieth century. The problem of the dirigible airship may be said now to have been solved, the main drawback formerly encountered being the disproportionate ratio between the capacity of the balloon and the weight of the motor. The experiments made by Santos Dumont, who traveled round the Eiffel Tower, have been continued by the Lebaudy brothers. The mammoth airship of Count Zeppelin and the Parseval airship had not so far met with the same success as those of the French aeronauts. According to the lecturer, any airship should be provided with a keel, to protect it against any rolling motion. Steam engines and electro-motors are unsuitable for the purpose, their output being insufficient as compared with their weight. Explosion motors, as used exclusively for the purpose, are still, it is true, far from being perfect. Zeppelin's airship recently made an entirely successful ascent.

It is reported from Paris that Prof. Behring has discovered a new method of sterilizing milk, without boiling it or destroying any of its essential principles. The method is based on the powerful qualities of German perphydrol, simply oxygenated. One gramme per liter of this substance is sufficient to destroy all noxious germs. Milk thus sterilized can be kept a long time, and is not injured by transportation, but cannot be drunk until it has been gently warmed and a drop of a catalytic substance added. Dr. Behring has proved that light has a very harmful effect on milk, whether sterilized hot or cold, and he recommends that it should be kept in a dark place or in red or green bottles.

Correspondence.

A "Rain Circle" at Niagara.

To the Editor of the SCIENTIFIC AMERICAN:

While at Niagara Falls the past summer, I witnessed an unusual phenomenon. I was standing on the wall at the brink of the Canadian falls in the thick of a drenching mist from the tumbling waters. It was a spotlessly clear day, and the point where I stood was on a line with the sun and the center of the cloud of mist. Here the gorgeous rainbow that spanned the falls from other points of view resolved itself into a circle, a tangent of which passed along the wall on which I was standing. The iridescent circumference extended to the upper rim of the cloud, having an apparent diameter of fifty yards or thereabout. Here was a digression from the traditional rainbow, and a "rain circle" lit up the fog-sea with a halo of the most vivid and strikingly beautiful colors. Some of the readers of your valuable publication must have been witnesses to the same phenomenon. READER.

Montreal, November 11, 1906.

Night Work on Panama Canal.

To the Editor of the SCIENTIFIC AMERICAN:

The chief difficulty with the Panama canal problem is the labor problem. Suggestions are sometimes harmless and sometimes helpful, and I therefore send forth this one: That the canal be built by night rather than by day, so as to escape the midday sun, and if the night air is not too miasmatic the plan would allow workers to be employed that could not stand the tropical sun at midday. Work two relays, commencing at 4 P. M. and working until 12 midnight, then the other relay, commencing at 12 midnight and working until 8 A. M., and all resting during the heat of day until 4 P. M. This plan would enable the negro as well as hardy laborers from our cities to stand the climate and save to ourselves the millions that our government will pay out. Let the plan be tried.

Chicago, Ill., October 30, 1906. CHARLES ROGERS.

United States Army Erosion Experiment in 1864.

To the Editor of the SCIENTIFIC AMERICAN:

In your editorial of September 15, in the article on erosion as a detrimental factor in the rifled gun problem, I wish to state that the proposition of Maxim, Vickers & Co. is untenable in practice. I will state that in 1864 there was issued to the infantry a lot of ammunition in which every tenth round consisted of a ball having at its base a saucer-shaped zinc plate, which by the impact of the charge was flattened and thereby wholly filled the bore of the gun. It presumed to act as a cleaner, and it surely fulfilled its office, as after about ten to fifteen shots of this kind the best Enfield rifle was no better than an old smoothbore musket, having so stripped the rifling that it was scarcely discernible.

In other words, the gun was draw-bored until it was a smoothbore. J. R. WILKINSON, 3d U. S. A.

Ex Reg. Artillerist, Army of the Cumberland.

Sanger, Cal., November 17, 1906.

The Current Supplement.

It is generally supposed that it is necessary to go to the Rhine, to England, or to Italy to see the stepping stones which connect the past with the present; yet in various parts of this country we have ruins of antiquities that reach far back, and with which romance and history are intimately associated. The California missions are striking examples. Mr. Charles F. Holder has taken the California missions for the subject of a vivid illustrated article, which opens the current SUPPLEMENT, No. 1612. Interesting from a medical point of view is an article on predigested and malted breakfast foods. Dr. J. D. Pennock gives some data on Mond producer-gas engines. For the purpose of contributing to the knowledge of an imperfectly investigated subject, Mr. J. Alex. Smith writes on air in relation to the surface condensation of low-pressure steam. Mr. A. J. Jarman gives some valuable hints on gelatino-chloride emulsions for gaslight developing paper. It is difficult to find a square yard of soil in which, under proper conditions of heat and moisture, seeds of some kind will not grow. This curious tenacity of life is well discussed by Mr. Craig S. Thoms in four papers bearing the general title "How Seeds are Carried." The first of these, published in the current SUPPLEMENT, deals with seeds that fly. Mr. C. F. Jenkins's paper on single-phase electric traction is concluded. Sir William H. Preece presents a very good discussion of incandescent lamps and the grading of voltages. The scientific investigation of automobile pneumatic tires is taken as a subject by the English correspondent of the SCIENTIFIC AMERICAN. Our Paris correspondent writes on light-weight gasoline motors for aeronautical work, a subject which is becoming of considerable importance in view of the recent developments in aeroplane flight. Dr. H. W. Wiley's paper on the source of industrial alcohol is concluded.

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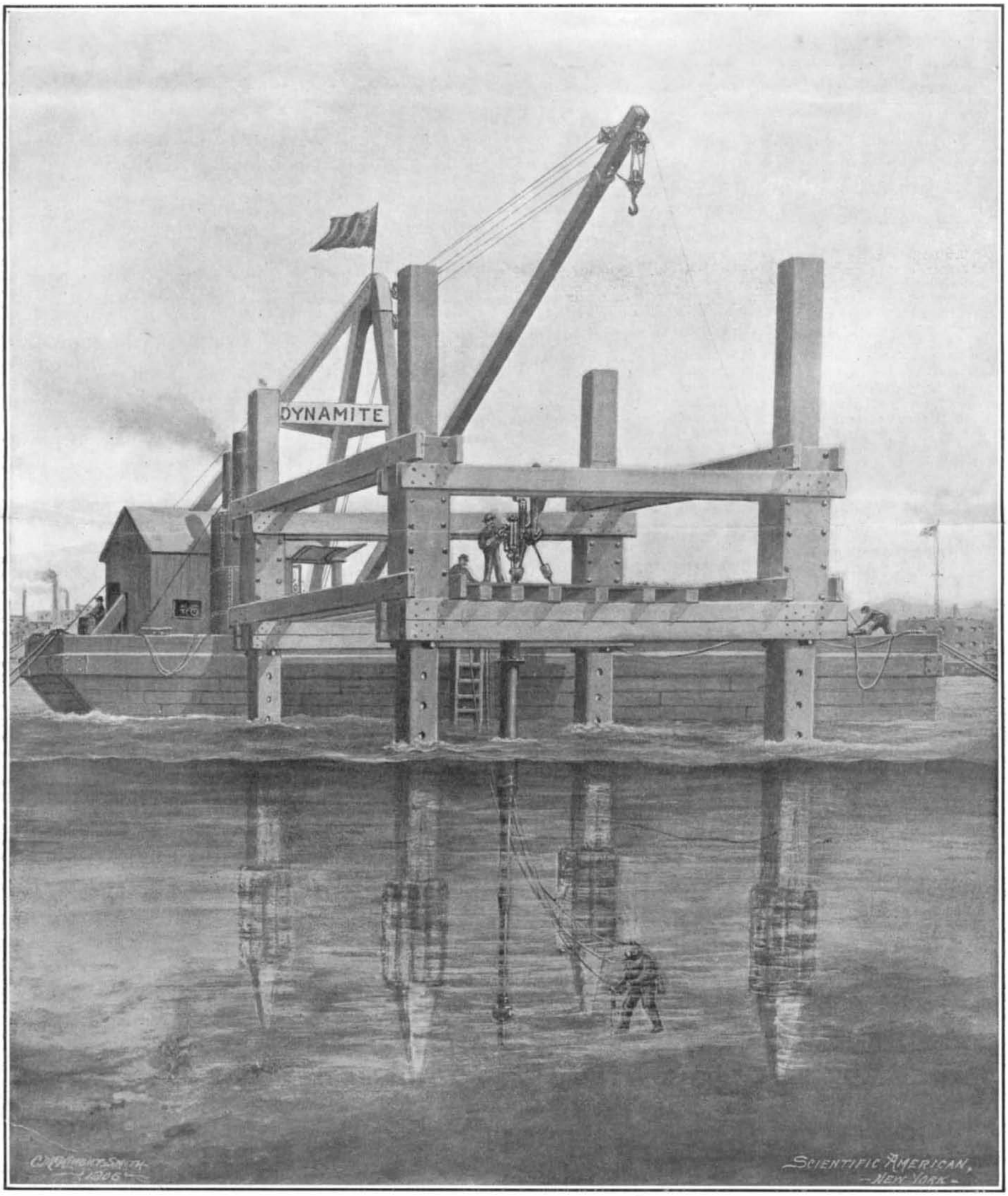

The Drilling Platform is Carried on Four Massive Timbers Sixty Feet in Length. The Drill is Inclosed in a Heavy Telescopic Pipe to Protect It from the Rush of the Tide, Which Flows at This Point at from Five to Six Miles per Hour.

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