Influence of Mountains in Producing Dark Color Forms.

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It is well known that insects, more especially moths and butterflies, inhabiting Alpine slopes or mountain regions are darker than individuals of the same species, or of allied species, living on the drier and warmer lowlands. We have been struck with the numbers of black moths and butterflies to be seen in Alpine valleys of Switzerland, while dark or melanotic individuals occur in the White Mountains and on the Labrador coast. It is also the case with beetles. Leydig was, perhaps, the first to point out that variation toward greater darkness of coloring, the tendency to become black, is connected with the action of moisture. Eimer, in his "Organic Evolution," has shown that elevation has, besides moisture, been the cause of melanism, which he has noticed in the case of the slug (Arion). On all the mountains which he explored, e. g., the Black Forest, the Harz and Rigi, the greater number of the specimens, or even all, were dark, almost black. And he adds that only two causes, apart from moisture at high levels, seem to him possible, e. g., either light or decreased atmospheric pressure. Previous, however, to Eimer, Dr. Weinland, who lived some years in this country as a collaborator of Agassiz, observed melanism in various animals, and stating in 1876 that Arion, on the heights of the Alb, near his own home, was usually dark, makes the following statement:

"It might be said that darker pigment is always produced on mountains, as in Vipera prester, the black mountain variety of Vipera berus, as in the black rattlesnake of the White Mountains, in North America."

Another factor is evidently cold, as well as moisture and elevation, as proved by recent temperature experiments of Weismann, W. H. Edwards and, more recently, Merrifield. This subject was brought to our attention while walking along a road in Madison, N. H., in which lay dead a remarkably black striped, or garter, snake (Eutænia sirtalis). On each side of the narrow dorsal dull greenish-yellow line were two black bands about a quarter of an inch wide. We have never seen on the lowlands and coast of Maine and Massachusetts a snake of this species with such a preponderance of dark markings or wide bands. Near this was also seen a dead young milk snake, probably, like the other, run over by a carriage. It was about sixteen inches in length, and darker than the Osceola doliata var. triangula figured by Cope in his "Factors of Organic Evolution;" and the inside of the black wings along the back was filled with brown-black, thus forming large blackish-brown patches. On seeing these apparently melanotic snakes, which may or may not prove to be peculiar to the White Mountains region, for a melanotic garter snake has occurred in Tennessee, according to Cope, we recalled the statement of Weinland in reference to the dark mountain viper of Central Europe, and the black rattlesnake of the White Mountains. A day or two after returning to Intervale, N. H., we heard that a rattlesnake had the week previous been seen by a lady on Mount Surprise, near the farm of Mr. Durgin Eastman, who killed the creature. On visiting him we were told the snake, which was three feet nine inches long, and with seven rattles, had been buried. Exhuming it, the specimen was found to be very uniformly black on the upper side, becoming toward the tail spotted with still darker ocellated spots, while the under side of the body was whitish as usual. It was surprisingly dark, or melanotic, and evidently forms a remarkable local variety, or color form, which merits more notice than has been bestowed upon it by our herpetologists. It is quite apparent that this is a true melanotic variety, the variation having been caused by altitude, cold and moisture. These same factors apparently operate in producing unusually dark local varieties of the other snakes of the White Mountains region. Our Eastern rattlesnake (Crotalus horridus) has a wide geographical range, extending from the New England States and Canada to near Florida, and westward to central Kansas; and yet Cope, who has made a special study of the variations of our American snakes, remarks that it scarcely varies at all, apparently overlooking Weinland's back variety. In the low mountains just south of the Catskills we have been told by an observing woman that the rattlers there are of the usual grayish or dirt color.

Apropos of this snake in the White Mountains it is more abundant than we had supposed. We were told that on or near Bartlett Mountain, near Kearsarge village, a rattler was killed two years ago, and a man had been known to kill between one and two hundred, or at least four or five snakes a day, for the sake of the oil, each snake yielding about two ounces. They were, until a few years since, seen quite often on the mountains. In this region it is very sluggish and not dangerous.

Since writing the foregoing lines we have seen a finely stuffed rattlesnake, killed at Tiverton, R. I., in August, 1896, now in possession of J. M. Southwick, curator of the museum at Roger Williams Park, Providence. The snake is fully three and a half feet long, with eleven rattles, and though darker than those of the Middle and Southern States, it is ash-gray between the blackish circular bands, the latter irregular, but averaging about three-quarters of an inch to an inch in width; it is dark on the tail. The White Mountains individual, in the state we saw it, did not present any appearance of alternating light and dark, circular bands, the entire dorsal region being uniformly blackish-brown, almost black.

A FLOATING DRY DOCK FOR HAVANA.

On September 15 the New York newspapers announced that the Spanish authorities of Havana had a perplexing problem to solve. The floating graving dock which had been completed for the Spanish government by Swan & Hunter, of Wallsend, England, was found to draw too much water for the bay of Havana; so a dredger was ordered by cable from the United States, with instructions to send it immediately "at any cost." There are several difficulties in the way of providing a dredge in short order, as it would be necessary to know more of the nature of the bottom of the bay. Since Havana was founded, in the sixteenth century, no one has ever dredged the bay. The result of this unforeseen hindrance is serious, as the dock will soon be towed into Havana.

Wherever fleets of vessels congregate there, of necessity, docks are required. They are of two kinds, wet and dry. The latter may be divided into two classes—stationary and movable or floating docks. One of the earliest records of the floating dock we have dates from the year 1776, in which year a shipwright constructed in the Thames a floating dock of timber which was used for the repair of vessels. In 1785 another dock was constructed with an end gate which was lowered to admit a vessel and afterward raised, and the water pumped out of the dock. It is stated that prior to these dates—in fact about the time of Peter the Great—a north country captain in the bay of Cronstadt, wishing to repair his vessel, found an old hulk floating in the bay, and arranged means for letting in and pumping out the water, so as to form a floating dock. The name of the hulk was the "Camel," and to the present day a contrivance for raising and lowering weights in the water by attaching them to watertight iron or wooden boxes which can be emptied or filled with water at pleasure is in frequent use by engineers, the box being called the "camel."

The essential characteristics of the floating dock are that it shall be possessed of sufficient buoyancy when required to float both itself and the vessel placed upon it, and that its construction shall insure its stability when floating both with and without its load, while it must also be sufficiently rigid in construction to afford efficient support to the inclosed vessel at all points, resembling in the latter respect a fixed graving dock.

The floating graving dock for Havana, which was launched on August 28, is a new type only recently introduced by the engineers, having been first described in a paper read by Mr. Lyonel Clark, of the firm of Clark & Standfield (the inventors of this type of floating graving dock), before the Institution of Naval Architects at the Hamburg meeting last year. It is a compromise between a graving and a floating dock.

A graving dock, simply described, is a recess excavated in a foreshore, lined with masonry, and closed at its entrance by a movable gate. The excavation is allowed to fill with water and the vessel is hauled in. The end gate is then closed and the water pumped out, leaving the bottom of the vessel dry. It is usually constructed of masonry, but it might be built of steel, and if the invert were of sufficient strength as a girder to carry a vessel on its middle, such a dock would be independent of the support of the ground, but might be made a floating dock. That belonging to the British government at Bermuda is a floating dock of this description, one of the disadvantages of which is that, since the bottom of the ship can only be got at by removing the water from around it, the height of the gates which close in the pound in which the ship is placed must as a minimum be equal to the draught of the ship, and when the pound is empty they have to withstand the external water pressure, so that they must be heavy and powerful structures; and besides, from economical and engineering reasons which need not be detailed here, this type of dock is sometimes very unsatisfactory.

A floating dock is merely a watertight box or pontoon into which water can be admitted or pumped out as required, the ship being lifted or supported simply by the displacement of the pontoon, which consequently must be sufficient to carry the weight of the ship, that of the pontoon itself, and the weight of the walls of the floating dock. This requires a depth of water which is sometimes unattainable. The floating graving dock built for service at Havana effects a compromise between the graving and the floating dock, and combines in a single dock the advantages of both types. It is an ordinary two-sided floating dock of an over-all length of 450 feet, with a lifting power of 22 tons per foot run, and in respect of large merchant vessels there are no gates at the ends to prevent a ship of a greater length than 450 feet overhanging to any extent. The Havana dock is of the minimum length, and consequently of reasonable first cost, while the ships repaired by it are, as regards position, dealt with in the most convenient and favorable manner. There is the economical advantage, too, that the cost of lifting a ship is proportional to its weight.

However, in addition to this, it may be made to lift ironclads of a unit weight of more than 22 tons by being converted into a dock of the Bermuda type, by closing in its ends by means of gates, or rather caissons, and removing the water from the pound formed by the sides of the dock and these caissons, for which latter various positions have been arranged, so that they may always be placed close up to the bow and stern of the vessel, no matter what its size, within the limits of 450 feet, thus fulfilling the condition that the lifting power of the dock should only be applied directly under the ship, and that the lifting power of the dock per foot run should always be equal to the weight of the ship per foot run. The advantages thus possessed by the new type of Messrs. Clark & Standfield are reasonable length and reasonable cost, minimum expenditure of pumping power in lifting vessels, and equal facilities for lifting merchantmen or ironclads, while all vessels lifted are placed on a platform either above or only a foot or two below the water level, thus enabling repairs to be done under the best conditions as regards light and air. The advantages of a floating dock over a fixed graving dock are obvious, but this new type happily combines the chief advantages of both.

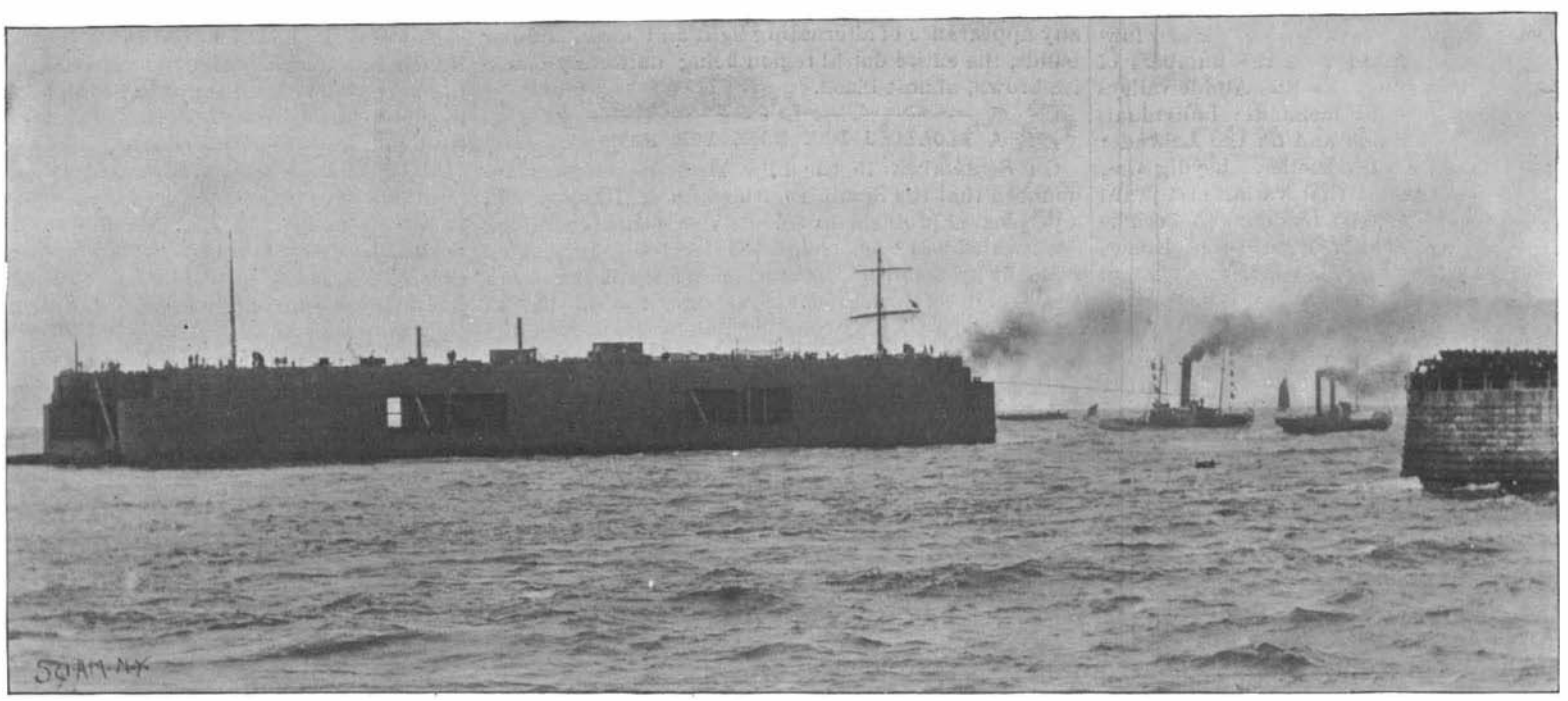
The following is the official description of the dock. The floating graving dock was built to the order of the Spanish Colonial Office, for use in the island of Cuba, at the port of Havana, having been rendered absolutely necessary since the recent insurrection in Cuba, since the Spanish government has to maintain a somewhat large fleet in the waters of the Gulf of Mexico, and it is absolutely necessary to dock, clean and paint these vessels at regular intervals. The type of floating dock accepted by the Spanish authorities is the latest improvement in this class of structure, and consists of three portions: (1) The pontoons, or body of the dock, affording the required buoyancy; (2) the high sides or walls, regulating the descent of the pontoons below the water, and also affording the necessary stability; and (3) the movable caissons or gates, they are only used when it is required to increase the lifting power of the dock. The length over all of the dock is 450 feet; the clear width between the broad altars, 82 feet; the depth over the sill, 27 feet 6 inches; the draught of water under these conditions being 42 feet 6 inches and the freeboard 4 feet 2 inches. The pontoons are five in number, the three middle ones being rectangular in shape, and the two end ones being finished off in the form of a point. The width of all the pontoons is 87 feet 11½ inches, the length of the rectangular ones is 75 feet and that of the pointed ones 108 feet 4 inches. There is a space of 2 feet between each pontoon. They are separate from and lie wholly between the two walls, to which they are strongly bolted. The extreme breadth of the dock is 109 feet.

The deck is constructed throughout of mild steel of the quality usually employed for shipbuilding purposes. Each pontoon is divided into four watertight compartments, and each wall is divided below the engine deck into five watertight compartments, so that the entire structure is divided into not less than thirty absolutely watertight spaces. Each of these compartments can be emptied of water by means of an electrical pumping installation. This consists of two generating plants, one in each wall, but with connecting cables, so that either can serve the whole dock. Each plant is complete with boiler, engine and direct coupled dynamo. The power is transmitted by cables to ten electric motors, five in each wall, having their switches and resistances located in the valve houses. These motors are vertical and drive direct on to the shafts of the horizontal centrifugal pumps placed in the bottom of the walls. The pumping machinery is capable of lifting an ironclad of 15,000 tons weight in two and one-half hours, which means that 15,000 tons of water must pass through the pumps before the process of lifting is complete. The whole of the electrical machinery has been supplied by Messrs. Scott & Mountain, of Newcastle, and it includes a complete system of electric lighting throughout the dock. In order to render the dock efficient and suitable for lifting short heavy vessels such as ironclads, a caisson is fitted at either end of the dock. These caissons are so adapted as to be adjustable to various lengths of vessels, the greatest distance apart being 383 feet and the smallest 350 feet, these lengths representing the longest and shortest armored vessels of the Spanish navy.

Another important feature in this dock is the arrangement by which any portion of it can be examined, repaired, cleaned and painted. Each pontoon can in turn be detached, lifted and hung up on the side walls, and there any necessary work can be executed. The underneath portion of the walls may be exposed for cleaning and painting by careening the structure. The dock is thus what is now termed self-docking. The dock itself will during the passage across the Atlantic be manned by a captain, officers, engineers

and crew, accommodation for whom is provided in one of the walls of the dock above the engine deck. The dock itself is provided with a fore mast and square sails, together with a jigger mast aft, and has steam steering gear, steam windlass, anchors, cables and every minor appliance necessary for the voyage. An interesting point about this dock is that electricity has been used as the motive power for pumping the water from its interior. This is generated by means of two sets of Messrs. Scott & Mountain's compound vertical engines, each driving direct on to a Tyne dynamo.

Both motors and pumps run on steel balls like bicycle bearings. The power generated by the motors is sufficient to lift a vessel weighing 10,000 tons. The Havana dock will leave the Tyne in the tow of the New Zealand Shipping Company's powerful steamer Ruapehu for Havana, and she is expected to arrive there within six weeks of her departure. A manila hawser for towing has been specially made for the purpose and is twenty-two inches in circumference and weighs nearly five tons. The dock will commence her regular work of docking vessels immediately after arrival; so that, within eleven months of the Spanish government's decision to acquire docking facilities, Cuba will be in possession of one of the largest, most modern and economical docks in the world. The dock is said to have cost $900,000.

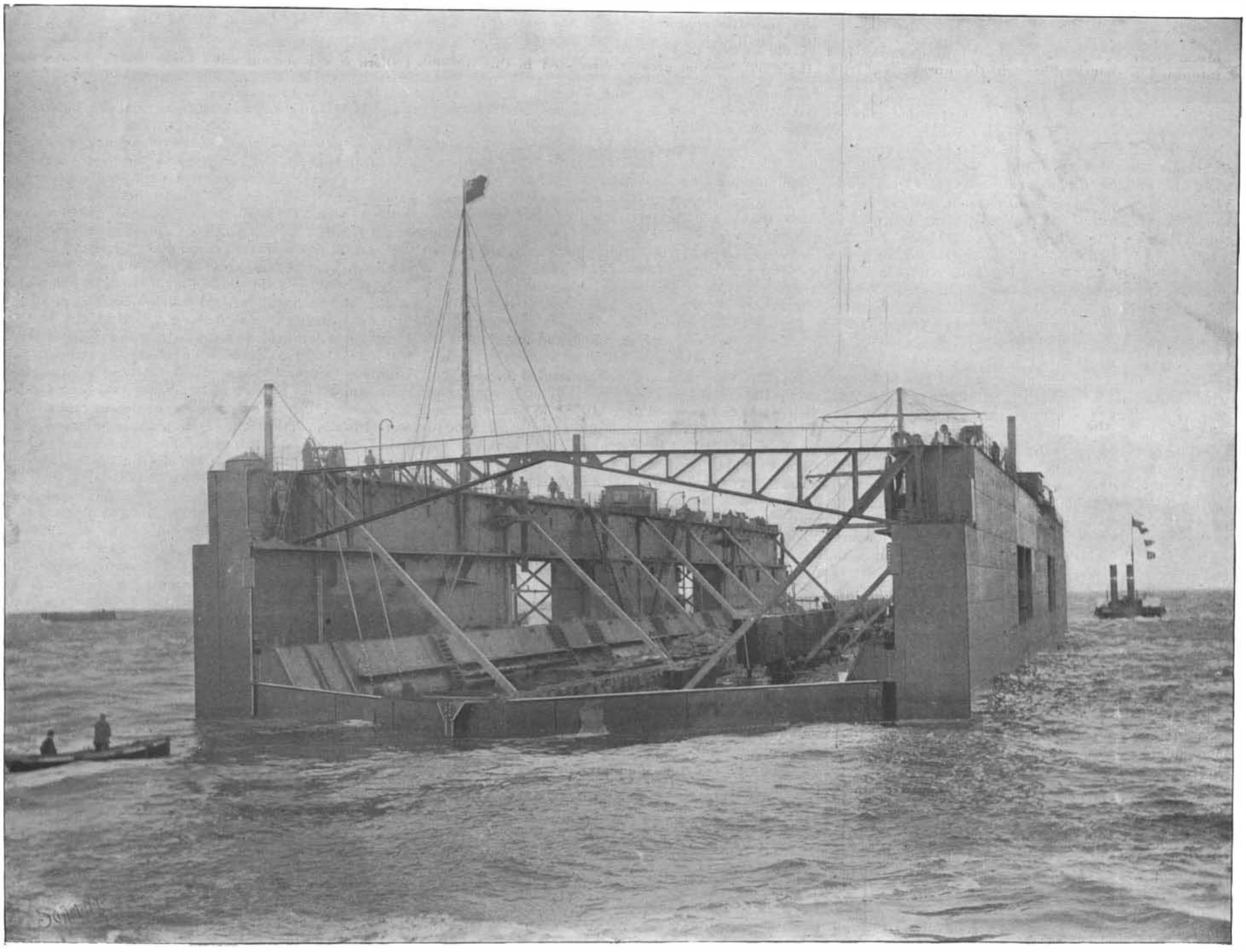


FLOATING DRY DOCK CONSTRUCTED ON THE TYNE FOR THE HARBOR OF HAVANA.

Steel Trackways for Wagons.

The office of Road Inquiries of the Department of Agriculture has made arrangements with the Cambria Iron Works, of Johnstown, Pa., for rolling special rails for steel trackways for wagon roads. The directors of the road inquiries and the engineer of the ironworks have agreed upon a plan of track in which no wood is used in the construction and no cross ties used for support. It consists of a simple trough or channel of steel for each wheel, with a slightly raised bead on the inside to guide the wheels, each channel resting in a bed of gravel and the two tied together occasionally to prevent spreading. The bearing or tread for wheels is eight inches wide, the thickness about seven-sixteenths of an inch; the weight is about 100 tons per mile of single track road. It can be furnished in small sections at the rate of $3,500 per mile. The first order for track has been given by the New York State Agricultural Station.

ALL single track railways of Russia are being converted into double track lines, and it is expected that in all main lines the change will be completed before the close of the current year.—Uhland's Wochenschrift.



THE TWELVE THOUSAND TON FLOATING DRY DOCK EN ROUTE FOR HAVANA.