

LARGEST DRY DOCK ON THE GREAT LAKES.

Almost a year has been required in the work of constructing the recently completed dock shown in our illustration, at the foot of Orleans Street, Detroit, Mich., where the saw mill, engine, boiler, and repair yards of the Detroit Dry Dock Company have been located for the past forty years. The soil where the dock is built is of fine blue clay, so that there was no interruption to the progress of the work from land slides or leakage. Two thousand piles were driven, making the structure very strong, it being designed to safely dock loaded ships carrying a cargo of 3,000 tons, while taking in vessels of the largest size.

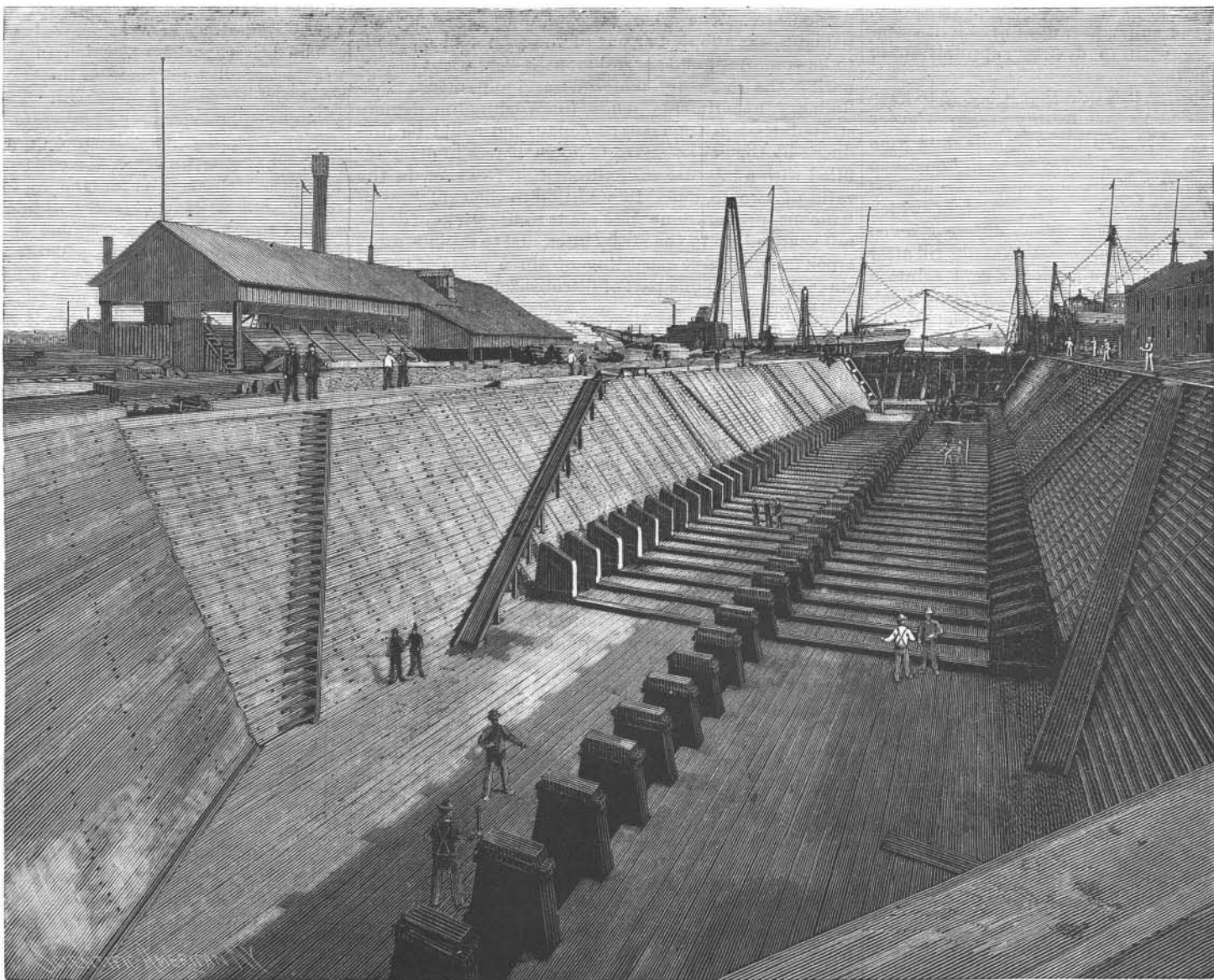
The inside dimensions of the dock are: 378 ft. long; 91 ft. wide on top; 78 ft. opening at entrance; 56 ft. opening on miter sill; 55 ft. wide on floor; 16 ft. 6 in. of water over keel blocks; 16 ft. 6 in. of water over sill; 4 ft. 6 in. from top of keel blocks to floor of dock; 20 ft. 6 in. from water line to floor of dock.

The keel and bilge blocks are 5 feet from center to center, averaging 5 feet high, thus leaving plenty of room under a ship for the movements of workmen in making any necessary repairs to her bottom. There are two wells 12 feet deep situated at each end of the dock, with cranes above them for hoisting out and replacing wheels, etc. The caisson gate which, when closed, shuts off the ingress or egress of water, is of steel, constructed at the company's steel shipbuilding plant, at Wyandotte, Mich. It is 12 feet beam, 79 feet 5 inches long, with five 30 inch valves for flooding the dock, which it is estimated it will do in twenty minutes. Time required to pump the dock out is 1½ hours. The whole dock is surrounded with a puddling wall filled with blue clay 5 feet thick, and extending down below the old river bed, which completely shuts off all water from leaking through the sides.

The pumping plant consists of two centrifugal pumps, with 30 inch discharge each, driven by two 150 horse power independent compound Westinghouse engines. The pumps are in a well 22 by 11 feet inside and 35 feet deep, the water passing from the dock to the well through a brick tunnel, 5½ feet diameter and 55 feet long. The steam for the engines is supplied by a battery of three boilers, 5½ feet in diameter and 15 feet 6 inches long, built by the Dry Dock Engine Works. The fuel is oil, and the whole pumping plant is housed in a two-story brick building, 34 by 81 feet. A dynamo room is provided, where an electric light plant will be put in during the coming winter, which will supply the entire shipbuilding plant with light.

This dock is large enough to take in any boat now upon the great lakes, and has been designed especially for the wide railway car ferries and passenger boats with their overhanging guards and paddle-wheels. The cost of the dock was upward of \$200,000. There has also been added to the Detroit Dry Dock Company's plant a pair of steel shear legs for hoisting boilers, engines, spars, etc., from and into boats. They are 100 feet high and have a lifting capacity of 100 tons.

When timbers or shingles are found in this country that have withstood the blasts of one hundred or one hundred and fifty winters it is regarded as quite remarkable, but in Norway there are wooden churches standing, in excellent state of preservation, that have withstood the fierce frosts of seven hundred almost Arctic winters. These timbers are not oak nor beech, but Norway pine, and their



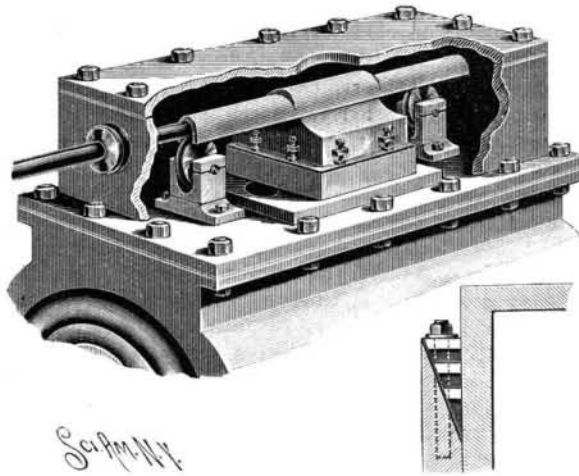
A GREAT DOCK RECENTLY BUILT BY THE DETROIT DRY DOCK COMPANY.

The bar supporting the yoke is prevented from being displaced on the rollers by suitable cross guards, not shown, and oil cups are arranged in the top of the steam chest to lubricate the rollers and bearings. The wear of the valve and of the bar traveling on the rollers is readily taken up, so that the relative positions of the several parts and their operations are not disturbed,

preservation is largely owing to the fact that they have been coated over and over again with tar.

A STEAM ENGINE SLIDE VALVE.

A valve of simple and durable construction, designed to reduce friction to a minimum, and be easily adjusted to its seat, is shown in the accompanying illustration, and has been patented by Mr. Roland E.



VANDEVENTER'S BALANCED SLIDE VALVE.

Vandeventer, Mount Sterling, Ill. The valve is connected with a yoke made in the shape of an inverted box and fitting with its sides on the inner surface of the upwardly extending sides of the valve. Attached to the top of the yoke is a bar connected with the valve stem, passing through one end of the steam chest, and this bar has near each end longitudinal grooves on its under side, each groove engaged by a roller journaled in a suitable support, whereby the weight of the yoke, as the valve is moved, is wholly carried by the rollers. In order to secure a steam-tight joint between the sides of the yoke and the sides of the valve, beveled packing strips are fitted in beveled inner sides of the valve, as shown in the small view. To prevent the valve from being unseated by back pressure in the cylinder, set screws are arranged in lugs on the sides of the yoke, the lower ends of the screws being a very slight distance above the packing strips.

and, with but slight changes in the steam chest, the device may be readily applied on engines now in use.

The Drawbaugh Telephone Claims Rejected.

The Drawbaugh telephone case, which has been dragging through the Patent Office for the last eleven years, was decided on October 28, by Commissioner Simonds' affirmation of the decision of the board of examiners in chief, denying the patentability of the subject matter of an application for patent for telephones, filed by Daniel Drawbaugh, on April 3, 1884, in continuance of his original application, filed July 26, 1880. The decision is on the ground that the invention was put to public use by Thomas A. Edison and others for more than two years prior to the date last mentioned, the evidence being presented that Edison had made the complete invention as early as July 30, 1877, as disclosed in the shape of his British patent of that date, etc.

How to Drink Milk.

Some complain, says a contemporary, that they cannot drink milk without being "distressed by it." The most common reason why milk is not well borne is due to the fact that people drink it too quickly. If a glass of it is swallowed hastily, it enters the stomach and then forms in one solid, curdled mass, difficult of digestion. If, on the other hand, the same quantity is sipped, and three minutes at least are occupied in drinking it, then on reaching the stomach it is so divided that when coagulated, as it must be by the gastric juice, while digestion is going on, instead of being in one hard, condensed mass upon the outside of which only the digestive fluids can act, it is more in the form of a sponge, and in and out of the entire bulk the gastric juice can play freely and perform its functions.

Half Century Jubilees.

The jubilee celebrations of two important inventions take place this year. One is the galvanic gilding and silvering method devised by the Swiss chemist, Mons. August de la Rive, in the year 1841, for which, in the course of the following twelve months, he received the Montyon prize of 3,000 francs from the Academie de Paris. Mons. Rive's process of imparting to common metal a firm gold or silver coating has entirely supplanted the old-fashioned pyritic method which, owing

to the noxious mercurial vapors engendered, materially injured the health of the artisan. The second invention is that of steel-facing copper plates, the outcome of the ingenuity of a Frankfort professor, Herr A. Bottger. By this process engraved copper plates are coated with a very thin but firm and durable steel deposit. The shape and fineness of outline of the engraving are not thereby altered, and the copperplate is imbued with the metallic hardness of steel, by which means a considerably larger number of clear, sharp impressions may be taken than with the ordinary copperplate. A further advantage is that when the steel face begins to show signs of

wear it may be dissolved by a chemical solution without in the least affecting the copperplate, which is then ready to receive another steel deposit.

The longest railroad bridge span in the United States is the cantilever span in the Poughkeepsie bridge over the Hudson River—548 feet.

Pyoctanin.

In a paper read lately before the American Laryngological Association, and reported by the New York *Medical Journal*, Dr. R. P. Lincoln, of this city, gives an account of several cases successfully treated with by this remedy. "Pyoctanin is a chemical preparation of the class of aniline colors, there being two kinds, the blue and the yellow, the former, according to Pohl,* having the greater germicidal power. It is offered in the market in the form of powders, tablets, and sticks. It is odorless, almost tasteless, non-poisonous, slightly anodyne, and non-irritating. It does not coagulate albumen, has great penetrating and disseminating power, and hence does not form a protecting shield about disease germs. It destroys bacteria quickly, even a weak solution prevents the development of all micro-organisms. It is freely soluble in water and petroleum products. Its disadvantage is its staining quality, which is an offense to the sight, but which can be avoided on exposed parts by exercising reasonable care.

It may be used without unpleasant consequences in any degree of strength, from the pure substance to a weak solution. It can be applied to the part to be treated in the form of a spray, by means of a pledget of lint saturated with a solution, in the form of an ointment, as a powder or by crayon.

Its Method of Action.—W. Pohl,† of Berlin, reports in his inaugural thesis the results of the study of the effect of pyoctanin on different bacteria. Putrefactive ones showed the greatest resistance. A solution of the strength of 1 in 2,000, however, stopped their evolution, while a solution of 1 in 1,000 killed them in half an hour. It is found by increasing the proportion of the chemical that this action is hastened. The rapidity of this action on all other micro-organisms is much greater. Janicke‡ showed that a total stoppage of development took place in streptococcus with a solution of 1 to 333,000, whereas a solution of 1 to 5,000 killed it in half a minute.

Professor Stilling,|| who appears to have been the first to have introduced and systematically experimented with pyoctanin, applied a strong solution to the eyes of his patients without much discomfort.

Bresgen,¶ who was the first to systematically use pyoctanin in the nose, noticed a distinctly anodyne faculty on its being applied to the mucous membrane.

Thus we learn that while its effect varies much in degree with the strength of the remedy, we need not be deterred, by fear of pain or too much irritation, from a free use of the substance, undiluted if it seems indicated, when we wish to destroy suppuration, or prevent it if impending.

When used in solution it is said that it is best to keep it in colored glass and have it freshly prepared every three or four days. My own observations date from July, 1890. One of my cases was a well nourished single woman, thirty-five years of age, with an abscess of the left frontal sinus, the early effect of which trouble had been most serious. Many different remedies had been applied for months. It was not till after I had made a few injections of a ten per cent solution of pyoctanin in water that a new impetus to the healing process began, which was speedily completed. In less than three weeks, the strength of the solution being gradually reduced, all discharge, either external or through the nostril, ceased, and the patient was relieved of a trouble that had caused physical and mental distress for nearly two years.

I had an opportunity to use the remedy in a case of suppuration of the antrum with equally gratifying results. Four cases of this disease where the suppuration has been pronounced have been relieved more promptly than ordinarily by other methods.** In cases of suppurative ethmoiditis, where I have been able to reach the parts in consequence of some fortuitous malformation especially, comparatively prompt relief has been secured, unless necrosis existed, in which case, after removal of detritus, the disease was readily corrected. Whenever ulceration of the mucous membrane and suppuration are present, I think the remedy most useful. I have seen several instances where there was erosion and unhealthy granulation on the septum nasi smoothed and healed in a short time. The granulations on the border of a perforated septum cicatrize more readily when coated with an ointment of 20 grains of pyoctanin with an ounce of vaseline. Like Bresgen,†† I have found it useful after cauterizations, but I am not prepared to say, with my present experience, that it has a great advantage over

* W. Pohl, Darmstadt, 1891.

† *Op. cit.*

‡ Stilling. *Anilin. Farbstoffe als Antiseptica*. Strassburg, 1890.

§ *Fortschritte der Medicin*, 1890, No. 12, p. 460.

|| *Loc. cit.*

¶ *Deutsche med. Woch.*, 1890, No. 24.

** In the *Journal of Laryngology and Rhinology* for September, 1891, I find, in the report of the May and June meetings of the Berlin Laryngological Society, that Cholewa recommends pyoctanin for diseases of the frontal sinus, and Meyer reports two cases of antrum disease improved. In the same report Scheinmann says it can only help when combined with other remedies, and Katzenstein and Herzfeld never saw any effect from it.

†† *Loc. cit.*

iodol, iodoform, and some other remedies we are familiar with, except for the fact that septic poisoning has been escaped by patients operated on when I have used it. It quickly heals all aphthous ulcerations in the mouth.

It is useful as a local remedy in all acute follicular inflammations, and especially in those chronic follicular diseases of the tonsils and soft palate where we find inspissated mucus often crowded with micro-organisms, as *Leptothrix buccalis*. The effect of a fifty per cent solution applied in instances of this last named affection is immediately evident to the observer.

I have applied the remedy in but two cases of unquestionable diphtheria. Both recovered without sequelæ. One case was very severe, and one only moderately so.

Three cases of diphtheria were treated in the early summer and encourage me to give the remedy further trial.* Its effect on a single instance of membranous rhinitis was, as should be expected, prompt and salutary, the plastic deposit being quickly destroyed and not reproduced after three or four applications. My experience with the remedy in laryngeal phthisis does not cover a period sufficient to justify me in expressing a conclusive opinion, but I note† that Dr. Capart, of Brussels, presented at the Annual Assembly of Belgian Laryngologists, May, 1891, a case of ulceration and perforation of the soft palate, occurring after an ulceration of the tonsil, in which Koch's bacilli were found, healed rapidly under pyoctanin. He also exhibited two patients with laryngeal tuberculosis in whom the ulcerations had improved under pyoctanin. I have used pyoctanin with most satisfactory effect in both syphilitic and non-syphilitic ozena."

Rain Making in Texas.

In *Nature* of September 17 (p. 473), Mr. H. F. Blanford has discussed at considerable length the rain-making experiments in Texas, on the basis of such information as was attainable from newspaper reports. Inasmuch as these telegraphic reports have not only been inadequate, but also frequently inaccurate and misleading, the writer, who was the meteorologist of the expedition, is led to give the following brief summary of the experiments and their results.

The experiments, which have been quite independent of the direction or patronage of the Weather Bureau, have been carried on by the Hon. R. G. Dyrenforth, special agent appointed by the Department of Agriculture. The plan of exploding oxy-hydrogen balloons was adopted as one of the principal methods to be employed, and several months were spent in preparing the necessary materials and apparatus. Preliminary experiments made in Washington demonstrated that a tremendous concussion could be produced by the explosions of balloons 10 feet in diameter filled with a mixture of hydrogen and oxygen in the ratio of two to one. In addition to the explosion of balloons, preparations were made to fire sticks of dynamite carried up in the air by kites, and to explode rackarock (an explosive consisting of three parts of potassium chlorate to one part of nitrobenzol) and dynamite on the ground.

With materials for carrying out these three lines of experiment, the party went to an isolated ranch 23 miles northwest of Midland, Texas (lat. 32° 14', long. 102° 12'). The inauguration of the experiments attracted great attention throughout the whole southwestern section of the country, and, locally, people went from all the surrounding counties to witness the operations. Actual trial in the field soon developed the fact that the preparations for the balloon experiments were entirely inadequate. Accidents occurred to the furnaces for generating the gas, which took much time to repair, windy weather prevented the filling the balloons, and a combination of other sources of delay rendered this line of experiment a practical failure. One or two balloons were exploded on several days, but these were too few in number and too infrequent to serve the purpose of an adequate experiment. Similarly it was found impossible with the small available force to operate the kites to advantage, and in windy weather they were quite unmanageable; so that, although, in all, quite a number of dynamite sticks were fired in the air in this way, yet as a line of effective experiment this also proved a failure. The only explosions that were made on a scale even approximately commensurate with the requirements were those of rackarock, and it may be stated that all the effective operations essential at Midland can be duplicated in every essential particular with 1,500 pounds of rackarock, together with 500 feet of wire and a small portable dynamo.

The first rain that occurred after the party reached Midland began shortly after noon on August 10, and continued at intervals until evening. The amount of rainfall was not measured, but it was stated in the language of the country to be a good "grass rain." The writer, who was *en route* to Midland, met similar sharp showers in the latter part of the afternoon near

* Pohl reports nine cases of diphtheria, not selected, treated successfully.

† *Journal of Laryngology and Rhinology*, August, 1891, p. 343.

the Sweetwater, 100 miles to the eastward. On the preceding evening some preliminary explosions had been made, but only on a small scale, and no result was anticipated. In the telegraphic dispatch that was sent reporting the rainfall no causative action was claimed; in fact, such action was explicitly disclaimed in the telegraphic report, which stated, "We do not think the explosions actually produced the storm, as they were not on a large enough scale. The preliminary trial was made simply to test the efficiency of the special blasting powder." The firing, which was not over half a dozen blasts, was, then, simply a preliminary trial of material, and not in any sense an experiment to produce rain.

On August 16, 17, 18, and 20 cloudy weather very largely prevailed, and numerous thunderstorms were seen on the horizon that did not visit the ranch. On each of these days blasts of rackarock and of dynamite were fired while heavy cumulus or dense storm clouds were in the field. In several instances, when a dense, threatening cloud was overhead, a sharp detonating explosion of rackarock or of dynamite was followed at an interval of 30 to 40 seconds by a spatter of rain, or, if it was already sprinkling, the blast was followed by a very noticeable increase of the drops. This interesting result occurred a sufficient number of times to indicate that the phenomenon was a real effect of the explosions. On none of these days, however, was the amount of rainfall appreciable, except on the 18th, when it was two hundredths (0.02) of an inch. The 18th opened cloudy, and old settlers predicted rain for the afternoon, whether the experiments should be made or not. To what extent, therefore, the explosions that were made were influential in producing the 0.02 inch that fell is obviously very difficult to determine, and as an evidence of the efficacy of the explosion it is practically valueless.

The next explosions were on the evening of August 21, when 156 pounds of rackarock were fired in fourteen blasts. During the night a genuine norther came on, the wind blew from the north, the barograph curve rose rapidly, the temperature fell rapidly, and during the next forenoon a fine mist prevailed. This change of weather was quite extraordinary and unexpected, and with its accompanying mist was attributed to the heavy firing of the evening previous; but the norther had been on its way for several days, and the fine mist was evidently due to the uplifting by the cold north wind of the warm moist air of the plains. At numerous points in the State, where the air was more humid, a heavy rainfall occurred.

The last experiment, which in magnitude was the greatest of all, took place on the evening of August 25, after the writer had departed. The conditions were thought to be extremely unfavorable for rain, and the party was advised to wait for a more propitious occasion. The firing, however, was carried on until 11 P. M., when the party retired for the night. It is reported that "at 3 A. M. the heavy rolling of thunder disturbed the sleepers, heavy banks of clouds were seen advancing, almost constantly lighted by most brilliant lightning. An hour later the rain began to fall in torrents on the ranch, and did not cease till 8 A. M." Unfortunately, records of the amount of rainfall have not yet been received, but I am informed by a gentleman who was present that "it was nothing but a sprinkle." Further light is thrown on this rainfall by the weather map for 8 P. M., eastern time, of August 25. Rainfall is shown in New Mexico to the northwest of Midland, Texas, and the forecast officer made the following prediction: "For Eastern Texas, generally fair, except local showers on the extreme southeast coast and the northwest." Here we have an official prediction made in Washington City of probable showers over the district in which the experimenters were operating, and for the very night in which the thunderstorm followed the last of the explosions to produce rain.

In view of these facts, it is scarcely necessary for me to state that these experiments have not afforded any scientific standing to the theory that rain storms can be produced by concussions. But, if the adherents of the theory maintain that "no experiment has been tried that is worthy of the name, and that no results ought to be looked for," it will be difficult to take opposite ground.

GEORGE E. CURTIS.

Smithsonian Institution, October 9.

The Lake Marine Exhibit.

Mrs. Annie C. Meyers, lady alternate of the World's Columbian Exposition, to whom has been intrusted the work of preparing an exhibit of the lake marine, is the widow of the late Capt. Victor E. Meyers. He was the first captain backed by a Chicago syndicate to successfully sail by the way of the Welland Canal and the St. Lawrence River to the West Indies and return. Prior to his death he commanded the freight steamer City of New York, of the Union Steamboat Company, plying between Buffalo and Chicago. Mrs. Meyers is thought to be in every way qualified for the work. She at one time held a position in the Patent Office and has for many years been prominently connected with foreign and home missionary movements.—*Marine Review*.