SCIENTIFIC AMERICAN

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A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

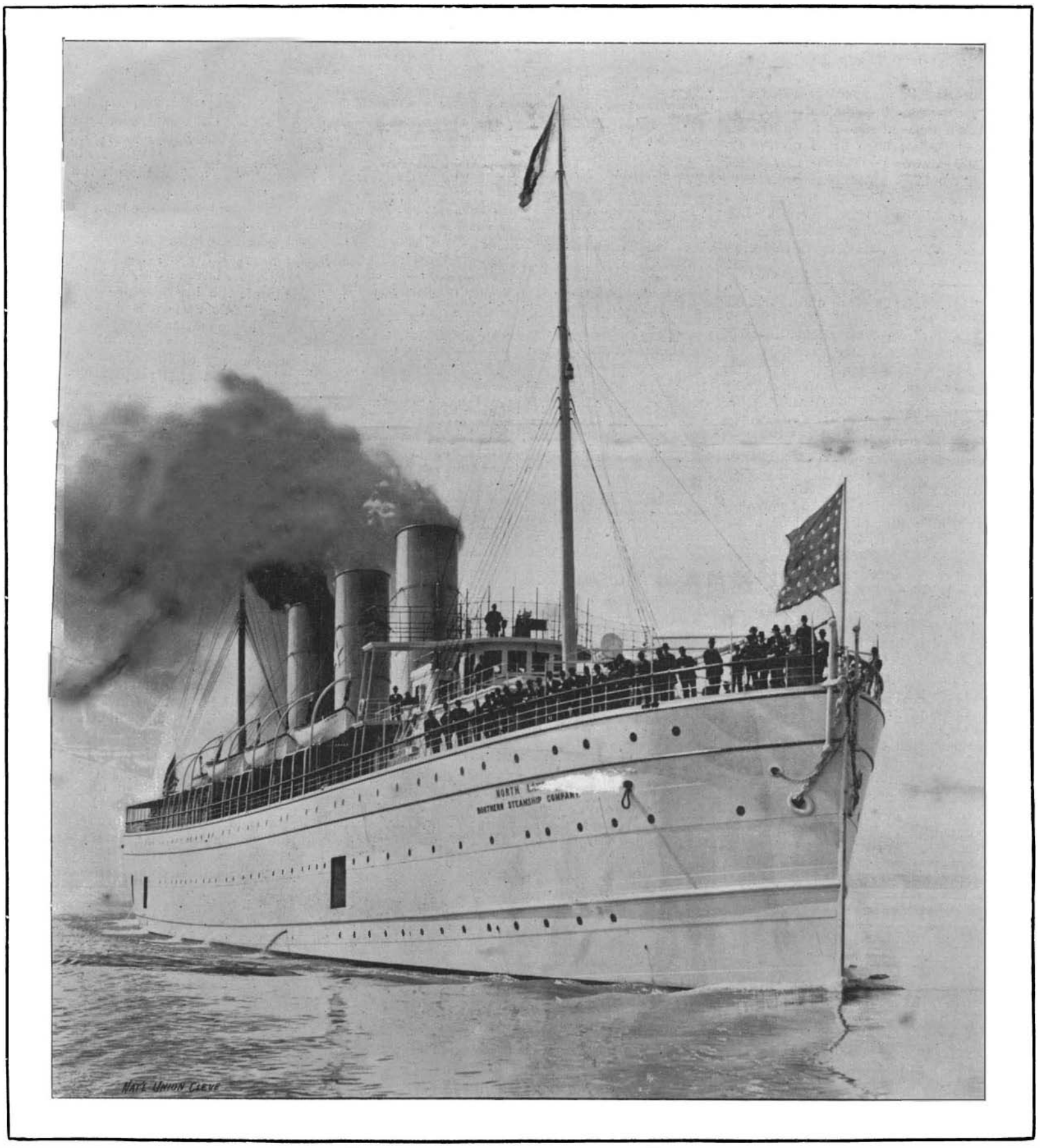
Vol. LXXIII.—No. 4. ESTABLISHED 1845. NEW YORK, JULY 27, 1895 [$3.00 A YEAR. WEEKLY.

THE LAKE STEAMER NORTH LAND.

The Northwest and the North Land are the names of two magnificent passenger steamships recently built to ply on the great lakes between Buffalo and Duluth, a distance of 1,100 miles. The construction of these vessels is but one of many indications of the rapidly increasing lake commerce, the result of the fostering care of the government in improving the navigation, by widening and deepening the channels, locks, and canals.

The two steamers mentioned are sister ships built at the Globe Iron Works, at Cleveland, Ohio. The length of each vessel is 386 feet, the breadth is 44 feet, and the depth from spar deck to the keel is 34 feet, not counting the higher cabins and upper works. We give an engraving of the North Land. The vessels ply from Buffalo to Duluth, touching at Cleveland, Detroit, Mackinac Island, Sault Ste. Marie, Duluth and West Superior. It was stipulated that the ships should make the trip from Buffalo to Duluth in sixty hours, and should furnish ample accommodations for five hundred passengers.

The construction of the hull does not differ materially from that adopted in the highest types of ocean steamers. Twenty-eight boilers of the Belleville patent water tube system generate the steam for the various engines. The boilers were subjected to a pressure of 800 pounds per square inch and are operated at a pressure of 275 pounds. The consumption of water is 70 tons per hour. The boilers are placed back to back in long rows each side of the keel, so that the fire rooms are on the outward sides of the ship and next the coal bunkers, which have a capacity of 1,000 tons. In these fire rooms, [illegible] blowers are constantly delivering supplies [illegible] ash, [illegible] air to the stokers. Each vessel is propelled [illegible] dependent screws, and to operate them, two independent quadruple expansion engines are used on each vessel. Each of these engines is of 3,500 horse power, so that the energy applied to the propulsion of each ship amounts to 7,000 horse power. The propellers make 120 revolutions per minute, and at each revolution thrust the ship forward 17 feet, or at the rate of about 22 miles per hour. The twin propellers are four-bladed screws 13 feet in diameter. There are various supplementary engines, including three triple expansion electric light engines, engines for moving the rudder, engines for hoisting, turning capstans, operating elevators, air fans, water pumps, feed pumps and pumps for mixing the ashes with water and throwing them overboard. The electric lighting plant is very complete. One thousand two hundred 16 candle power incandescent lights being installed. The search lights on the deck have 100,000 candle power and were used on the Liberal Arts build-



THE LAKE STEAMER NORTH LAND.

ing at the World's Fair at Chicago. The wiring scheme is that used by the United States navy. The main saloon is lighted by means of beautiful clusters.

The ships are equipped by electric signal lights of 100 candle power each, connected to an automatic alarm attachment located in the pilot house. In case a lamp is extinguished by accident or otherwise, it rings an alarm bell in the pilot house and also lights a lamp, immediately notifying the officers in charge that a lamp has been extinguished. The refrigerating plant is an especially interesting feature of the vessels. By means of a freezing machine, all the compartments used for the storage of perishable provisions are kept at any required degree of coolness, and for various uses on ship board 1,000 pounds of ice per day are manufactured. This plant was built by the De la Vergne Refrigerating Machine Company, of New York City.

The accommodations for passengers are of the very best, and the decorations compare favorably with the finest transatlantic liners. On the main deck provision has been made for officers' accommodation, and next to this has been fitted up a spacious and elegantly furnished dining room, capable of seating 150 passengers at one time. Staterooms are arranged in a double line along the sides of the vessels, and are handsomely finished and fitted up, well lighted and ventilated. Each room has its separate light and electric call bell, and is finished in mahogany and in white and gold. Many of the rooms are provided with sliding doors, so that two staterooms, if desired, may be used as one. At the forward end of the hurricane deck, a large deck house has been fitted up for exceptionally large and handsome staterooms. A large, airy and beautifully finished smoking room has also been arranged here, commanding an unobstructed view in front and on both sides of the vessel. Life boats, life rafts and other life-saving apparatus of sufficient capacity to carry both passengers and crew have been provided.

Prevention of Electrolytic Action upon Water and Gas Mains.

In the annual report of Superintendent George J. Bailey, of the Albany, N. Y., water works, for the year 1893, the effect of the electric current on the water mains situated near the power house of the Albany Railway Company was referred to, and it was further said that, though conferences had been held with the officials of the railway company, no remedial action had been adopted. In May of last year the railway company agreed to replace the damaged mains with new ones; to pay all expenses that had been occasioned to the department from this cause, and to so arrange that no further trouble would occur; all of which agreements have been fully kept. The methods adopted and used for the protection of the mains are explained in a communication addressed to Superintendent Bailey by Henry P. Merriam, electrical engineer of the railway company. In this communication Mr. Merriam says:

"The remedy which has been applied for the prevention of electrolytic action of the railway current on water and gas pipes in South Pearl Street consists in providing a regular metallic path for the return current, leading from the underground pipes to the power station.

"It has been demonstrated that destructive action of the electric current is confined to those surfaces of the underground piping where the current leaves the metal, passing thence to the moist surrounding earth; the resulting decomposition of water sets free the oxygen to attack the metal.

"To prevent this passage of current from pipes to earth, heavy copper wires, connected to the negative 'bus' bar of the station switchboard, have been run along South Pearl Street 600 feet to the south and 3,000 feet to the north, with a branch running east through South Ferry Street to Broadway, a distance of 1,300 feet. At intervals along this route branch wires are connected, leading across the street and intercepting all gas and water mains. Each main is tapped and provided with a three-quarter bronze plug, which connects with the branch wires. The current, which it is impossible to prevent from returning to the neighborhood of the station by way of the street mains, is thus conducted into the station without the corrosion of lead or iron pipes."

The cost to the Albany Railway Company for replacing mains, etc., was $1,419.26.—Water and Gas Review.

Wire Rope One Thousand Nine Hundred Years Old.

While conducting a series of tests with a 100 ton testing machine at the Yorkshire College in England, which included the testing of a steel wire rope, Prof. Goodman stated that such ropes were not a modern invention, and that he had recently seen a bronze wire rope one-half inch in diameter and from 20 to 30 feet long which had been found buried in the ruins of Pompeii and which must have been at least 1,900 years old.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

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

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S., Canada or Mexico.....$3 00
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One copy, one year, to any foreign country belonging to Postal Union. 4 00
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MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

The Scientific American Supplement

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NEW YORK, SATURDAY, JULY 27, 1895.

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No. 1021.

For the Week Ending July 27, 1895.

Price 10 cents. For sale by all newsdealers.

BICYCLE AN AID TO SCIENCE AND ART.

There are several branches of science as well as art from which many have been practically excluded, simply because of the lack of suitable means of gaining access to subjects for consideration. Take for example the subject of microscopy. The student of the smaller things in nature who is restricted to his own locality soon exhausts the immediate field of investigation, unless it is unusually rich in objects; but when the whole country for miles around is presented to him whenever he enjoys a little spin on the wheel, interest in the bicycle and the microscope are jointly augmented. The discovery of new pools, each teeming with a different world of microscopic life, plants which are new to the investigator, a greater variety of insect life, these all add value to the wheel in the estimation of the microscopist, and whenever he goes out he is pretty sure to carry along his specimen-gathering paraphernalia, so that on his return he will not only have had the benefit of the outing, but will also have secured the means of passing many profitable hours indoors.

What has been said in regard to the microscopist applies with equal force to the geologist, mineralogist, botanist, or any other student of nature, although it must be admitted the mineralogist will be likely to feel that he must be limited as regards the size of specimens.

The artist finds in the wheel the missing link between himself and nature. It carries him outside of brick walls and burning pavements into the open fields, among trees and rocks and picturesque buildings, where he may study subjects in their natural environment, or make sketches, or do serious work, as his inclinations may dictate.

The photographer finds in the wheel his natural ally; it carries both himself and his instrument to the objective point, and widens his range beyond what could ever have been contemplated before the bringing forward of the bicycle.

Appliances have already been made for carrying on the bicycle the instruments and apparatus of some of these out-of-door students of nature, and it would seem to be a simple matter to provide conveniences for the others which would enable the wheelman to proceed on his journey of investigation without much hindrance in the way of preparation.

TERRESTRIAL HELIUM.

Resting peacefully on the broad bosom of the Norwegian hills, there lies the mineral cleveite. It looks so uninteresting, so utterly ordinary, that the Paleolithic Norwegian would probably have considered it too unspeakably common to use for cracking open either his oysters or the skull of his enemy, while the fighting Viking would very properly have hesitated to accept it as ballast for his war ship.

Well, the Paleolithic gentlemen and the Vikings have been gathered in with others of the "real old school." Peace be to them; they were men! But we, who now walk about the earth, have adopted a different standard of interest; and cleveite, common-looking stone as it is, has carried down to us through the years, not only the "thoughts ... too deep for tears," of Wordsworth's flower, but the radiant hope of a widening knowledge which will not only increase the material comforts of our civilization, but will solve some of the most exasperatingly elusive puzzles that the poor chemist and physicist have to deal withal.

Cleveite was investigated first by Cleve of Upsala, and is a variety of uraninite. It is made up chiefly of the compounds of uranium (uranyl uranate and uranate of lead), a somewhat rare metal about eighteen times as heavy as water, having the appearance of nickel. Together with these compounds of uranium there were discovered small quantities of rare earths which, although not of economic importance, are some hundreds of times more valuable than gold.

Now, unfortunately, our cleveite, though noteworthy as a source of these elements, did not add to our knowledge, for we knew uranium and the rare metals; and it therefore remained for some years classed with other rare minerals whose names are a "terror by day" to the unfortunate mineralogist who finds it necessary to memorize them. During the month of March, however, Professor Ramsay, whose name is inseparably connected with the epoch-making discovery of atmospheric argon, was led to seek some clew by which he could hope to make his argon combine with some other element. His attention was drawn to a paper by Hillebrand in the United States Geological Survey (No. 78, page 43) "On the Occurrence of Nitrogen in Uraninite." According to Hillebrand, the gas nitrogen was obtained by simply boiling the mineral in dilute sulphuric acid. Now this is a very astonishing thing, for throughout the whole realm of nature we know no mineral which gives off nitrogen on being boiled with sulphuric acid, and Professor Ramsay was entirely skeptical as to its possibility.

In the hope that the gas was in reality argon, and with the idea of so striving to make argon combine