

SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class matter. Copyrighted, 1892, by Munn & Co.]

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

Vol. LXVII.—No. 6.
ESTABLISHED 1845.

NEW YORK, AUGUST 6, 1892.

\$3.00 A YEAR.
WEEKLY.

THE VESSELS OF COLUMBUS.

The Santa Maria, the largest of the three vessels in the little fleet of Columbus on his first voyage of discovery, is shown below on this page, as it is represented by the drawings made at the time by Juan de la Cosa, who was a pilot on the vessel. A reproduction of this vessel was launched at Carraca, Spain, June 26, and her appearance at the time is shown in the accompanying view. This vessel is being built at the expense of the Spanish government, and the two smaller

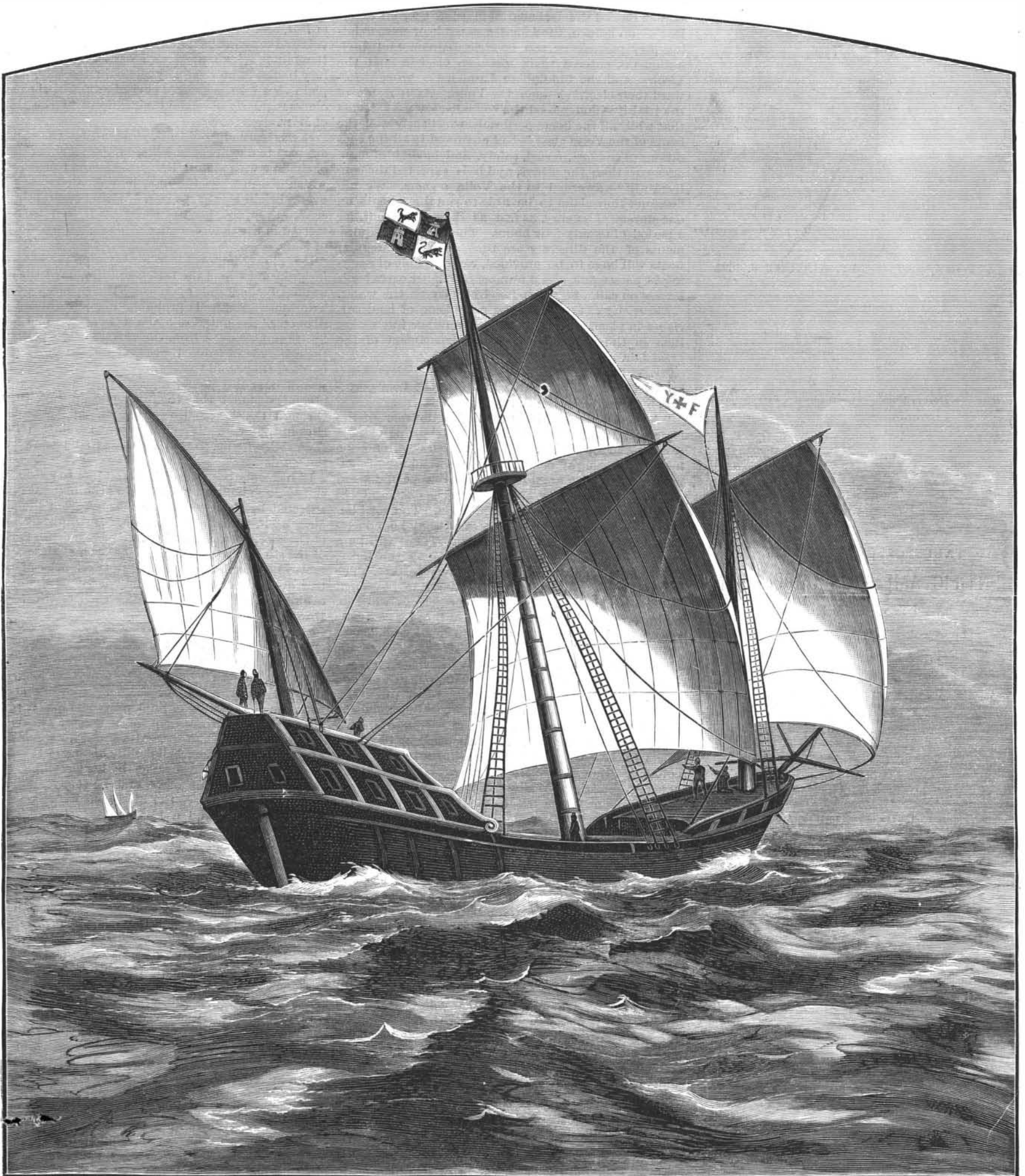
vessels of the fleet are at the same time under construction in that country, at the expense of our government, and under the supervision of United States officers, acting in conjunction with the Spanish committee.

The Santa Maria was built at the arsenal of Carraca, sixty-three days being taken for the construction of the vessel, under the direction of engineer Leopoldi Puente y Wilke. Her length between perpendiculars is 22.60 meters; length over all, 29.10 meters; extreme

beam, 9.86 meters. The hull weighs 127 tons; it has five decks and a main mast, fore mast, mizzen mast, bowsprit. The armament consists of six falconets and two lombards, the latter being on the main deck.

It is intended that all three of these vessels shall be completed in time to take part in a celebration in Spain, commemorative of the date of the sailing of Columbus, August 3, 1492. The vessels are then to be sent to this country, arriving in New York in time to

(Continued on page 85.)



THE SANTA MARIA—A COPY OF COLUMBUS' SHIP, RECENTLY BUILT IN SPAIN.

THE VESSELS OF COLUMBUS.

(Continued from first page.)

take part in the celebration which is to take place in October next. After that the vessels will sail *via* the St. Lawrence River and the lakes to Chicago, where they will constitute a feature of the Columbian Exposition.

A special proclamation has been issued by President Harrison, setting apart October 21 next as a general holiday, this date corresponding with that of October 12, O. S., 1492, when the first land of the New World was sighted by the discoverer. The President in his proclamation says: "On that day let the people, so far as possible, cease from toil and devote themselves to such exercises as may best express honor to the discoverer and their appreciation of the great achievements of the four completed centuries of American life. Columbus stood in his age as the pioneer of progress and enlightenment. The system of universal education is in our age the most prominent and salutary feature of the spirit of enlightenment, and it is peculiarly appropriate that the schools be made by the people the center of the day's demonstration. Let the national flag float over every schoolhouse in the country, and the exercises be such as shall impress upon our youth the patriotic duties of American citizenship. In the churches and in other places of assembly of the people let there be expressions of gratitude to Divine Providence for the devout faith of the discoverer and for the divine care and guidance which has directed our history and so abundantly helped our people."

The Spanish committee having the matter in charge have made careful examinations of all obtainable data to insure that the vessels shall be, in every detail which can be definitely determined, exact copies of the original Columbus vessels. In connection with this subject *La Ilustracion Nacional* of Madrid, to whom we are indebted for our first page illustration, says:

"A great deal of data of very varied character has been obtained, but nothing that would give the exact details sought, because, doubtless, the vessels of that time varied greatly, not only in the form of their hulls, but also in their rigging, as will be seen by an examination of the engravings and paintings of the fifteenth century, and as there was no ship that could bear the generic name of 'caravel,' great confusion was caused when the attempt was made to state, with a scientific certainty, what the caravels were. The word 'caravel' comes from the Italian *car a bella*; and with this etymology it is safe to suppose that the name was applied to those vessels on account of the grace and beauty of their form, and finally was applied to the light vessels which went ahead of the fleets as dispatch boats. Nevertheless, we think we have very authentic data, perhaps all that is reliable—and this data has served for the basis of operations in making the drawing which is produced in our issue of to-day—in the letter of Juan de la Cosa, Christopher Columbus' pilot. Juan de la Cosa used many illustrations, and with his important hydrographic letter, which is in the Naval Museum, we can appreciate his ability in drawing both landscapes and figures. As he was both draughtsman and mariner, we feel safe in affirming that the caravels drawn in said letter of the illustrious mariner form the most authentic document in regard to the vessels of his time that is in existence. From these drawings and the descriptions of the days' runs in the part marked 'incidents' of Columbus' log, it is ascertained that these vessels had two sets of sails, lateens for sailing with bowlines hauled, and with lines for sailing before the wind.

"The same lateens serve for this double object, unbending the sails half way and hoisting them like yards by means of top ropes. Instead of having the points now used for reefing, these sails had bands of canvas called bowlines, which were unfastened when it was unnecessary to diminish the sails."

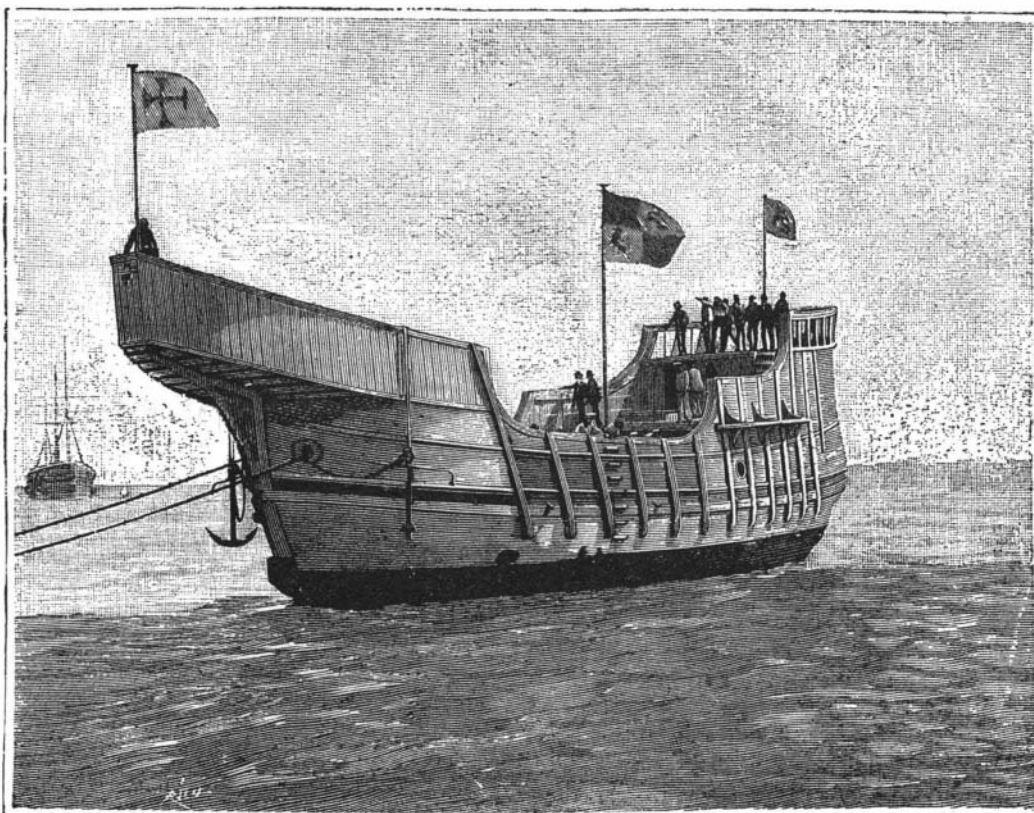
PROFESSOR BROOKS, director of the Smith Observatory, at Geneva, N. Y., successfully observed the recent occultation of Mars by the moon. Excellent photographs were also secured of the moon and planet before and after the occultation, with the equatorial telescope.

Patents—Death of Inventor.

The United States Circuit Court for the Northern District of Illinois held, in the recent case of *The De la Vergne Company vs. Featherstone*, reported in the *Chicago Legal News*, that all the rights and remedies of inventors to the exclusive property in their inventions comes from the statutes; that the statutes of the United States recognize only three classes of persons to whom a patent can issue for an invention, viz., to the inventor himself, to the assignee of the inventor, when the assignment is made before the issue of the patent, and to the executor or administrator of the inventor, if the inventor dies before the patent is granted; and that upon the death of an inventor before the grant of a patent the right to a patent descends to his personal representatives, and if they fail to suggest his death and take the necessary steps under the statute to perfect the patent, there is no person to take the thing granted, hence the grant never can take effect.

An Acoustic Method whereby the Depth of Water in a River may be Measured at a Distance.

About two years ago I wished to know from time to time the rate at which a river was rising after a fall of rain. The river was at a considerable distance from the spot where its height was to be known. By means of the combination of two organ pipes, and a telephone circuit, described in the following lines, I have been able to make the required measurement within rather close limits. At the river station, an organ pipe was fixed vertically in an inverted position, so that the water in the river acted as a stopper to the pipe, and



COLUMBUS' SHIP, SANTA MARIA, RECENTLY LAUNCHED AT THE ARSENAL OF CARRACA, SPAIN.

the rise or fall of the water determined the note it gave, when blown by a small bellows driven by a very small water wheel. A microphone was attached to the upper end of the organ pipe. This was in circuit with a wire leading to a town station at some distance. At the town station there was an exactly similar organ pipe, which could be lowered into a vessel full of water while it was sounding. By means of the telephone the note given by the pipe at the river was clearly heard at the town station; then the organ pipe at this station was lowered or raised by hand until it gave the same note. The lengths of the organ pipes under water at the two stations were then equal, so that the height of the water in the distant river was known.

The determination can be made in less than a minute by any one who can recognize the agreement of two similar notes. The arrangement when first tested was so placed that the height of water at two places near together might be easily compared. I found that a lad with an average ear for musical sounds was able to get the two heights to agree within one-eighth of an inch of each other, while a person with an educated ear adjusted the instrument immediately to almost exact agreement. The total height to be measured was 17 inches. A difference of temperature at the two stations would make a small difference in the observed heights. For example, taking a note caused by 250 vibrations per second, a difference of 10° C. between the temperatures of the two stations (one not likely to occur) would make a difference of about 0.02 feet in the height—a quantity of no moment in such a class of measurements. The organ pipes were of square section, and made of metal, to resist the action of the water.—*Frederick J. Smith, in Nature.*

Acute Rheumatism.

There is at least one thing about which doctors agree, and that is the drug which acts most surely in acute rheumatism. Dr. M. Baudouin has made a tour of the Paris hospitals and finds that all the physicians use salicylate of soda. Some give also bicarbonate of soda and antipyrin, but salicylate is the sheet anchor. The mode of administration differs, however. Dujardin-Beaumetz gives 15 grains every three hours; Talamon, the same amount every two hours; Straus gives 45 to 60 grains in single doses twice daily; Bouchard, 75 grains of the salicylate and 150 grains of the bicarbonate of soda daily. Barth in some cases gives quinine and antipyrin, while Chauffard uses antipyrin alone, giving 60 to 120 grains daily. Barie gives 30 grains three times a day, and Comby 15 grains every two hours.

In the New York hospitals larger doses than the above are often given. In Bellevue, 20 grains every two hours, for the first day, is usually prescribed. In St. Luke's, oil of wintergreen has been much used. Salol has been given also instead of the salicylate. Nothing has yet approached the salicylates in efficacy in the treatment of acute rheumatism. It is generally the septic and gonorrhoeal cases only in which it fails. But there is still a wide divergence of opinion as to how to administer the drug so as to get its effects *cito, tuto, et jucunde*.—*Medical Record.*

Experience with Metallic Ties in Belgium.

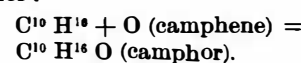
A summary of five years' experience with metallic ties on the Belgian State railroads is given by Mr. Janssen in the June number of the *Revue Generale des Chemins de Fer*. Two patterns, says the *Railroad Gazette*, of metallic ties were used, both of the same weight, 165 pounds, but of somewhat different cross-section. The flange rails, weighing 76.6 pounds per yard, are fastened to the ties by movable clips and bolts and nuts. There are twelve ties to a 9 meter rail. Careful observations were made on four sections of track with metallic ties and one section of track with half log, creosoted, oak ties.

It was found very difficult to keep the metallic tie track in good shape, particularly as the stone ballast was ultimately pulverized by the ties, necessitating the addition of new ballast in 1891. The metallic ties are themselves in damaged condition, owing to cracks which start at the bolt holes. Out of 240 ties of each pattern which were carefully examined, 77.5 per cent of the Braet form were more or less cracked, and 17.9 per cent of the Post type were similarly damaged.

Up to the time of making the report the track with metallic ties has cost for maintenance about nineteen times as much as the track with creosoted oak ties. Beyond this, many of the metallic ties are damaged to such an extent that they must soon be removed.

Artificial Camphor.

Mr. L. Nordheim, of Hamburg, presents the following method of preparing camphor through the action of ozone or of ozonized air upon camphene: Turpentine obtained through the distillation of the crude oil is treated with dry hydrochloric acid gas. The solid hydrochlorate is separated from its liquid isomers by pressure, and is purified and then treated with crystallized carbonate of soda in a distillatory apparatus. The temperature is raised to about 120°. The camphene obtained is so pure as to need no rectification. Ozonized air is made to act upon its vapor, and this converts it into camphor:



The product obtained is purified by sublimation, like natural camphor.—*Moniteur Scientifique.*

RODINAL, according to the *Chemische Zeitung*, is prepared as follows:

| | |
|----------------------------------|-----------|
| Potassium metabisulphite..... | 30 parts. |
| Para-amidophenol hydrochlor..... | 10 " |
| Boiling water..... | 100 " |
| Soda hydrate..... | q. s. |

Dissolve the first two as far as possible in water and then add slowly a concentrated solution of caustic soda, until the precipitate at first formed is again dissolved, and the solution clear.