## 352

# Scientific American.

Scientific Museum. Lightning and Lightning Conductors.

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The chain itself has no advantage over the rod conductor for buildings. For ships it has one advantage in its form over the rod, as it is better calculated for and more applicable to the standing rigging of vessels, for by its means the desirable end of carrying outside and overboard the charge of electricity is obtained; but to ensure perfect security by a sufficiency of surface and approximately perfect continuity, the chain must be made of as large a size of copper rod as that before given; this is an objection, for in consequence of the form of the link, &c., the necessary quantity of material to form it perfectly is considerably more than is required for the purpose of conduction; the weight, of course, is considerable, and unless the cost is unnecessarily great, it is liable to break from its own weight and form, and when arranged as a permanent conductor is subjected to the lowering of the upper masts. The wear from its own weight and the friction produced by the continuous motion of a vessel, comparatively soon damages the chain, and wear the links, if applied as a temporary means to guard against electric discharges ; and when it has to be triced un on the indication of a coming storm, its application in time of course depends entirely upon the foresight and judgment of those in charge of the vessel; these are amongst the principal objections to the chain. The next form is that of the tube. When intended for buildings, this form if of sufficientsize posseses equal advantages with the rod. For marine purposes, the same reasons for its inapplicability exists as in the copper rod. The next form is that of flat copper strips or ribands. which for building purposes possess no advantages over the rod, and they are as difficult of application and considerably more expensive. But it is for marine purposes they were principally intended; they are formed by 2 plates of copper, each 2 to 4-inch wide, and one 1-8th inch and the other 1-16th inch thick. These have holes drilled and countersunk in them. and are rivetted together, forming a plate 3-16th inch thick; these plates are let into the masts, the masts having been previously grooved and dovetailed to receive them from the cap at the head to the foot of the mast on its after side; these being let into and securely spiked and fastened to the lower, top, topgallant, and superior masts-the highest of which is terminated with a copper vane and spindle. fitted into a socket-cap, under which and in mechanical contact is placed the copper strips, which are continued down the sev eral masts; and where the foot of the upper mast comes into the cap of the lower mast, contact is intended to be made, it is a loose tongue or flap, hung on centres to allow of the mast traversing up and down in the cap; the lower mast is fitted with the plates in the manner before described, they are continued down until they reach the step of mast over that by a branch running fore and aft; the charge is here divided and passes through cop-

metal (commercially considered), it posseses the most perfect continuity of its parts, it has ample electrical capacity, and its form gives the greatest amount of surface for the quanti- minute :-ty of material employed.



Continuing this subject, the accompanying engravings represent the Ericson propeller applied to the Princeton and to the Robert Stock. ton, the latter vessel being tried successfully on the river Thames as a tug boat, in 1839. It was named after Commodore Stockton, who introduced the screw into the American navy. The propeller, figures 68 and 69, page 344, some have contended was the best form of all as the broad shovel ends were fixed at a mean angle of 45°. It was the one preferred by Woodcroft, as adopted, and termed the "Liverpool Screw."

The advantage of the Ericson screw, figs. 70 and 71, is in having a ring within the arms, whereby any number of blades can be fixed, and a large area of surface obtained in a very judicious manner. The Great Britain, which was lost in Dundrum Bay, in 1848, had a four-bladed Woodcroft Screw, and she made most excellent time-some having supposed that she was wrecked on this very account, her commander not being aware of her great speed. With respect to a screw of equal, and one of an increasing pitch, Mr. Woodcroft tried a fair experiment with two such, of equal area, pla\_ ced at the stern of a vessel, and he found that the screw of an increasing pitch gave the greatest impulse to the vessel, turning it from its direct course-thus showing that the two forces were unequal-the greatest effect being produced by the screw of an increasing pitch.



The amount of slip in a screw is not yet so per bolts, fastening this horizontal plate to the MANOFACT ORDERS and INVENTIORS. Bech num-ber is illustrated with from five to TEN original EN-GRAVINGS OF NEW MECHANICAL INVEN-TIONS, nearly all of the best inventions which are patented at Washington being illustrated in the Sci-entific American. It also contains a Weekly List of ing account, as given by an eye-witness, Mr. keelson, &c., and in the under side of deckwell known, owing to the difference of opinion about the best form and the proper diameter of J. Spaulding, of a singular phenomenon which beams another set of plates are placed, they occurred in Two Heart River, on the Southern branch off abruptly to each side of the vessel the screws. The four bladed Liverpool Screw, Patent Claims; notices of the progress of all Me-chanical and Scientific Improvements; practical dipage 344, was enlarged three times, and every shore of Lake Superior. It is worthy the atat about right angles with the mast. The obrections on the construction, management and use of all kinds of MACHINERY, TOOLS, &c. &c. This time improved the speed of the vessel. The tention of geologists. About 11 o'clock in the jections to this kind of conductor are great exspeed of the engines remaining the same. This day of the 18th ult., Mr. Spaulding's atten pense, the destruction to the masts of all ships sed at the end of the year of a large volume of 416 pages was no doubtowing to its being too small at tion was attracted to a slight agitation of the to which they are applied, should it be necesillustrated with upwards of 500 mechanical engravings. TERMS: Single subscription, \$2 a year inadvance; \$1 for six months. Those who wish to subscribe have sary to remove them; the injury to the spars first. The area of a propeller must be in pro- water near the shore, and very soon he saw only to enclose the amount in a letter. by applying these conductors, from the inser-portion to the body to be moved, but what that the land suddenly rising out of the water a tion of the spikes and the consequent splitting area should be precisely, is not yet generally few rods from the shore, and within a stone's A PRESENT! To any person who will send us Three Subscribers, we will present a copy of the PATENT LAWS OF THE UNITED STATES, together with all the information rela-tive to PATENT OFFICE BUSINESS, including full direcunderstood. In paddles it is well known that throw of himself. The beach opposite was of the masts and admission of wet. The principle objection to the system is leading lightalso raised up at the same time to a height of the vessel does not move through the same tive to PATENT OFFICE BUSINESS, including full direc-tions for taking out Patents, method of making the Specifications, Claims, Drawings, Models, buying, selling, and transferring Patent Rights, &c. N. B.—Subscribers will bear in mind that we em-ploy no Agents to travel on our account. MUNN & CO., Publishers of the Scientific American, 128 Fulton trate New York All actuar must be Next Daid space as the wheels, the difference being 1000 some twelve feet. ning into the ships, in heavy discharges ex. plosions would take place, and damage or set for paddles, and 739 for the speed of the ves-The new island is round, and about 150 feet fire to the ship. The liability to the interrupin circumference, and is raised above the wa sel The following formula from Tredgold is laid ter six feet, and the rise on the beach, which tion of their continuity is great, and would MUNN & CO., Publishers of the Scientific American, 128 Ful street, New York. All Letters must be Post Paid. is wide at this place, is of about the same easily escape detection; a break of 12 degrees down by Galloway to determine what pitch a would certainly cause an explosion. The next form of conductor is the Copper Wire-rope. This completely fulfils several condi-tons. It is composed of the best conducting next form of conductor is the Copper Wire-Π rope. This completely fulfils several condi-5 

minute; number of revolutions, 120 feet per 860+172\_8.6 feet. 120

#### Lord Rosse's Telescope and the Binary Stars.

To Sir William Herschell the honor of discovering this extraordinary combination of the heavenly bodies is due. That great man remarked that there were many instances of two stars being placed so close together as to appear to the eye as one, it being only by means of the telescope that their separate orbs could be descried. This might, no doubt, if it happened in one or two instances, have been the accidental effect of their rays combining as they reached the earth-the stars themselves being sufficiently far apart in distance, if not in direction. But extended observation soon showed that this combination occurred far too frequently to be the mere effect of accidental similarity of direction; there is no position in astronomy better established than the fact, that two, three, or more stars, may be found in combination revolving round each other, and exercising a combined influence on the planetary systems relating to each. The matter has been especially followed up by Sir John Herschell, the illustrious son of an illustrious sire, and his speculations are not among the least interesting which are brought before the reader. It has long been known, and may in fact be detected without the aid of an instru ment, that the stars are not all of a uniform color. The same diversity prevails among the combined stars, and in all probability that diversity will be felt in the planets under their control. "It may be easier suggested in words," says Sir John, "than conceived in imagination, what a variety of illumination two stars-a red and a green, or a yellow and a blue one-must afford a planet circulating around either, and what cheering contrasts and grateful vicissitudes a red and green day, alternating with a white one and with darkness, must arise from the presence or absence of one or both from the horizon."

But the most important consideration arising out of a view of these complex arrangements, is the duration of the season thus caused by their combined influence, as ascertained by the orbits in which the stars and their system move. In our own system, the centre of gravity, undisturbed by any other large mass, lies near the centre of the sun, and the planets accordingly roll round that luminary in an orbit so nearly circular as to produce seasons of almost equal duration. But it is not so with the complex system under consideration. In the presence of several luminaries each of them exerting the force of attraction, in proportion to their bulk, the centre of gravity must reside with neither, but at some point apart from both; and hence the motion of the dependant planets must be more or less elliptical, considered in relation to the suns on which they depend, acording to the complexity of the arrangement. This shows how recent discoveries in astronomy may be made to throw light upon the not less extraordinary disclosures of the sister science of geology.

#### Strange Phenomenon.

10 miles per hour or (860) feet per minute ; ed it down to a black clay. The water was the amount of slip 2 miles or (172) feet per about 5 feet deep where the island was formed, and a boat had passed over the very spot not five minutes before its formation.

> A few rods from the beach, back on the rise of ground, a great depression of the earth took place as remarkable as the upheaving in the water. A circular spot of ground, some fifty rods in circumference, covered with trees, was suddenly sunk down to the depth of 20 feet below the surface.

> No agitation of the earth, or noise took place, and the cause must have been much less powerful than the internal convulsions of the earth that usually accompany such phenome-

> Theophilus Fiske has been prosecuted in Raymond, Mississippi, for obtaining money under false pretences-that is, by the Practice of Psychology and Biology. The magistrate gave a decision that the matter was a scientific one for scientific investigation.

> A meteor, resembling a ball of fire the size of a four pound shot, was seen at Portland, Me., a few days since, to issue from a cloud in the northwest; it passed rapidly over the city, entered another cloud, and exploded, and the report was heard almost instantly.

#### LITERARY NOTICES.

AMERICAN RAILWAY GUIDE for the United States, for July, contains 32 extra pages, making 130 in all forming the most complete and accurate guide ever published. It gives the starting time, fares, distances, etc., on all the railway lines in the United States, together with a map. This work is published every month, corrected by Curran Dinsmore, Pathfinder Office, 138 Fulton street, and sold for 121-2 cents a copy or \$1 per annum. No person should be without it who has any idea of ever leaving home. It is as indispensable as an umbrella on a rainy day.

We notice that our old friend Isaac Crooker has assumed the sole proprietorship of the "Yankee Nation." and has just commenced a new volume. It is now issued in quarto form, and is one of the most elegant and entertaining literary journals now issued. We wish it abundant success. Published in Boston at \$2 per annum.

THE AMERICAN FARMER.-This excellent monthly nagazine, published by Samuel Sands, Baltimore, Md., commences its sixth volume with its Julynumber. For variety, number, and quality of articleson agriculture, this magazine has no superior in our land.

SOUTHERN LITERARY GAZETTE :-- Published in Charleston, S. C., by Walker & Richards, at \$2 per annum .- This is one of the most interesting weeklies in America, and deserves an extensive patronage. The same firm also publish monthly the Southern Eclectic Magazine at \$1 per annum.



of NEW INVENTIONS. () The Scientific American is a Weekly Journal of Art, Science and Mechanics, having for its object the advancement of the INTERESTS OF MECHANICS, MANUFACTURERS and INVENTORS. Each num-instituent advith from five to TEN original EN-The Lake Superior Journal has the follow