Scientific Museum.

For the Scientific American.

Astronomy--Saturn's Ring.

The appearance of Saturn is unparalled in the solar system. He is a spheroid 1000 times larger than the earth, surrounded by a ring brighter than himself. This ring is 204,883 miles in diameter and 100 in thickness, and rotates from east to west about the planet in ten hours and a half. Hence a point on its surface moves at the rate of 100 miles per minute, 58 times swifter than the earth's equator. According to Bessel, its mass is equal to the 18th part of that of the planet. Each side has alternately 15 years of sunshine and 15 of darkness. The oblateness of the planet and the flatness of the ring act on each other like two magnets, so as to adjust each other's motions. Several astronomers have travelled beyond the precincts of their science to account for its formation. Maupertuis maintained that this luminous girdle was the tail of a comet. Mairan asserted that the exterior shell of Saturn (originally equal to the diameter of its outer ring,) broke in pieces, and, the equatorial parts of the exterior shell remaining entire, thus formed a ring. Buffon imagined it to be a part of the equator, detached by the excess of centrifugal force. La Place thought it a fluid zone, abandoned by its atmosphere. The ring was first observed by Galileo. Fearing piracy, he announced his new discovery enigmatically, (a practice then common,) and invited all astronomers to declare if they had noted anything new in the heavens. The transposed letters he published were—

"Smaismrmilme poeta leumi bune nugttaviras."

Kepler, in the spirit of his riddling philosophy, endeavored to decypher the meaning, and fancied he succeeded when he formed a barbarious Latin verse—

"Salve umbistineum geminatum Martia proles,"

thinking it related to Mars. At the request of the Emperor Rodolph, Galileo sent him the real reading—

"Altissium planetam tergeminum observavi;"

i. e., "I have observed that the most distant planet is triple," and constituted in this form, oOo. But it was reserved for Huyghens, in 1656, to declare to the world that these supposed attendant stars are in fact part of a ring. This he did by an anagram :—aaaaaaa ccccc d eeeee g h iiiiiii llll mm nnnnnnnnn oooo pp q r s ttttt uuuuu, which he afterwards recomposed into the sentence,—"Annulo cingitur, tennui, plano, nusquam, cohaerente, ad eclipticam inclinato;" *i. e.*, "He is surrounded by a ring, slender, flat, in no place touching him, inclined to the ecliptic." J.W.O.

Climate.

Acosta is the first philosopher who endeavored to account for the different degrees of heat in the old and new continents by the agency of the winds which blows in each. This theory Buffon adopted. The probable cause of the superior degree of cold towards the southern extremity of America seems to be the form of the continent. Geologists infer that during the deposition of the older fossiliferous rocks the climate was ultra-tropical, *i. e.*, warmer than at present exists on the globe.—Agassiz, Lyell, and Smith have proved that the climate of northern regions, immediately preceding the alluvial period, was lower than it is at present: and it is the opinion of the first that a similar fall of temperature took place near the close of each great geological period.

Moon.

Plutarch says that the Pythagoreans believed the moon to have inhabitants fifteen times as large as men, and that their day is fifteen times as long as ours.

The six regular geometric solids are, the cube, sphere, tetrahedron, octohedron, dodecahedron, and icosahedron; by means of which, Kepler endeavored to assign a reason why there are *six* planets.

Theory, said Leonardi da Vinci, is the general, and Practice the soldiers.

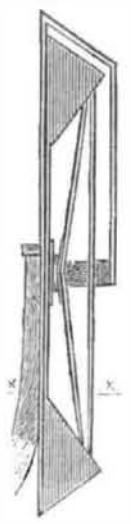
History of Propellers and Steam Navigation.

[Continued from page 369.]

RENNIE'S EXPERIMENTS.—(CONTINUED.)

FIG. 75.

(Improved Triangular System, when the vessel is upright.)



In connection with the forms of the paddles presented in our last, we here present two more, with Mr. Rennie's description of the same :—

A series of experimeats on two other vessels was again made in the years 1839, 1840, and 1841, by applying different shaped floats to paddle wheels of different diameters and widths —and on steam vessels of different powers of from 6 to 90 horses, an abstract of some of which was published in 1840.

The following were the particulars of the "African" when tried in 1837, previous to her being tried in 1841 :—

Length between perpendiculars,	109 ft.	11 in.
Extreme breadth, - -	24	10
Mean draught, - - -	9	4½
Depth, - - - -	10	0

Nominal power of engines (by Maudslays and Field) 45 horses, or 90 horses together.

Number of strokes made by the engine per minute, 20 to 30.

Barometer guage, 24 to 26¾ inches.

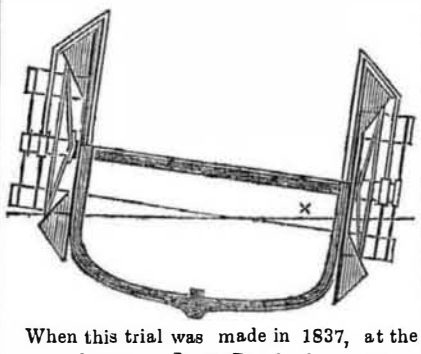
Area of immersal midship section, 150 square feet.

Mean diameter of the paddle wheels, 14·7.

Area of the immersal rectangular floats, on the cycloidal or Galloway system, twelve in number, 7 feet in length, and 1 foot 9 inches in breath; thus presenting an area of from 57 to 60 square feet, being a ratio of 1 foot of float to 1·6 midship section.

FIG. 76.

(Improved Triangular System, when the vessel is inclined.)



When this trial was made in 1837, at the measured mile in Long Reach, her average speed of six trials each was 9·174 statute miles per hour with her rectangular floats.—Subsequently, she was employed for towing and other purposes, and had never undergone any other repairs than in her engines, and had never been in dry dock; her bottom was consequently foul and covered with green weeds, when tried with the trapezium floats in 1841.

Experiments on H. M. Steamer "African," with Trapezium Floats :—All the rectangular floats, twelve in number on each wheel, were removed, and twelve trapezium floats were fixed to the interior and middle rings of each wheel. X X is the water-line.

Thus making the area of the immersed floats 34 square feet.

Number of revolutions made by engines, 23½ per minute.

Mean speed of vessel in statute miles, 9·1.

Mean diameter of wheels, 17 feet.

Comparing the whole of the experiments, when tried in still water under the most favorable circumstances, and when tried in the "African," under the unfavorable circumstances of foul bottom and difference of the powers of the engines, the concluslon is in favor of the trapezium floats. The truth of the principle is confirmed by Mr. Ewbank, and by the laws which govern the forms of the tails of fishes, the feet of aquatic birds, and the wings of birds and insects, whereby the means are so admirably suited to the ends; and the triangular form proposed by Mr. Ewbank for paddle floats entirely confirms the view I took of the the subject in the years 1839 and 1840.

To Color Nankeen.

Nankeen is a cotton cloth of a beautiful color, which derives its name from Nankin, in China, from which place it was first brought to Europe. Many suppose that true Nankeen is artificially colored, but this is not so; its color is that of the natural cotton—a peculiar kind, some of which has been successfully cultivated in Georgia. The color of nankeen may be imitated in the most perfect manner, and in every case linen drill of this color, may be set down as an artificial production.

In the first place, let us say, every planter should have a washing house with a chemical drug-room close at hand, and every farmer should have the same thing. A small dye-house should also be attached, containing one or more boilers, a plentiful supply of water, tubs, &c., and a good drain to carry off the waste water. Every agriculturist should endeavor to acquire an extensive knowledge of practical chemistry. We know of no science superior to this for expanding the mind.

To produce light nankeen shades, the cotton cloth should be first bleached white. This can be done by having some of the chloride of lime dissolved in cold water in a tub, using the clear hot, and handling the cloth in it till it is white, then handling it in a clean water, made sour to the taste, in a tub, by vitriol, and afterwards washing it well. It is then fit to be dyed; to do this, dissolve one pound of copperas in half a gallon of water, and dissolve two pounds of quick lime in 10 gallons of water; then let both solutions settle. Pour off five gallons of the clear lime water into a tub of clean cold water, sufficient to cover the cloth, and allow it to be handled by the selvage freely. Then into another tub of cold water, about the same size as the lime water tub, put in one quarter of the clear dissolved copperas. (Although it is a little more expensive, one ounce of the nitrate of lead should be dissolved with the copperas.) Now handle the cloth well for five or ten minutes in the lime, giving it three selvages from end to end, and afterwards wring and shake it. It is now to be handled the same way in the copperas solution, then wrung and aired for ten minutes. It is then to be put through the lime and copperas in the same manner, adding enough of the strong lime and copperas to make three successive dips, airing well out of the copperas every time. It is then put through, last, a clean tub of lime water, which can be made by putting more clean water among the two lbs. of lime, letting it settle and using the clear. It is then well washed in water, then in a strong solution of soap, and afterwards well washed, then dried. This will also dye unbleached cotton cloth, which will be somewhat darker in the color. The quantities of lime and copperas given, will dye 30 yards of common cloth. Light and dark shades are produced by the quantity of lime and copperas used, and the number of dips given. The eye will judge the depth of color desired. Unbleached cotton cloth, should be boiled for about one hour in lime water, then washed well before it is dyed.

Bleached goods sold in stores are difficult to color level—they always *spot*, owing to some chloride of lime not being thoroughly washed out of them. The only remedy for this is to steep the cloth all night in warm water, then boil it in lime water, and wash it well before it is dyed, (and it would be all the better to be quickly handled in hot water, made sour with vitriol, and then well washed.) By pursuing the process laid down, any person may color his own *nankeen*. This color washes well in strong soap suds, but it spots brown and black, if tea, coffee, or any solution containing galic acid, gets on it. If the nitrate of iron (clean iron dissolved in nitric acid) is used in place of the copperas, a much richer color is the result, but a somewhat more expensive one.

There are two other processes for dyeing this color, which we will explain next week.

According to Hembel, a horse-hair, if pushed down a narrow tube of glass, so as to make its end rub the side, will cause it to break on the application of a high temperature, even the heat of the hand will be sufficient in cold weather.

The longest day in Patagonia is the 21st of December.