MAY 16, 1885.]

Scientific American.

COURSE READING ATTACHMENTS FOR TRANSITS. This improvement is probably the most important one made in surveying instruments since the invention of the transit, some fifty years ago. The great source of error, in producing meander or preliminary lines with either a transit or a compass, has always been in mounted on a spindle extending through the lower the necessity of calculating the course of each line, by either adding or subtracting the deflection angle to or wheel, G, by which it may be readily turned. The



NIXON'S COURSE READING ATTACHMENT FOR TRANSITS.

lations liable to error when the addition or subtraction of the deflection angle will put the course of the new line into another quadrant from the one in which the preceding course was located. Every engineer of any experience knows the great loss of valuable time and the annovance often caused by errors of transit men in calculating courses.

The inventor of this improvement, Mr. T. L. Nixon, of Tacoma, Washington Territory, has had extensive experience in transit work, and after some study contrived this simple but valuable improvement. Any one can understand the working of the instrument by a glance at the illustrations. The course ring, A, can be revolved upon the lower plate, or can be clamped to it at any desired point. This ring is divided into the different quadrants, and graduated so as to read by the vernier exactly the same as the vernier reads upon the outer circle, which circle is graduated from 0 up to 180°, just the same as the old style of instrument. Therefore, instead of deflecting an angle upon the outer graduated circle each time and making the calculation of the course, with this instrument the zero of the vernier is set at the course of the back sight, and then when the upper plate is unclamped and the telescope directed to the forward tack and the upper plate again clamped, by a look at the vernier and course ring the

new course is read at once correctly, down to the finest graduation of the instrument, no matter whether it is known which way the deflection was made or not.

The revolving movements of the ring, A, are accomplished by means of the pinion, D, which is rigidly plate, and provided at its lower end with a thumb

ring, A, may be clamped in any position by turning the jam nut, F, so that it will bear against the plate. The vernier, B, is attached to the upper plate, and is fitted to travel immediately outside of the ring, A, and inside of a graduated circle, C, of the lower plate. The vernier is graduated to read minutes or half minutes, as desired, and the graduation extends to both edges, so that it will read precisely the same angle upon either the course ring or the circle, C.

The New Orleans Exposition.

The attendance at this great show, although still far below what its projectors, and probably most of the exhibitors, had anticipated, has been materially greater for a month or so past than it was previously. But now the warm weather is coming on, always so trying in New Orleans, and the date set for the closing of the exhibition is near at hand. The managers, however, have been making an effort to have the exhibition reopened next fall. With this view they have determined to solicit the government to allow the national exhibits to remain, and to station a

from the preceding course. Especially are these calcu- detachment of United States soldiers in charge of the buildings and grounds during the summer, trusting in this way to keep the most of the other exhibitors, and make the expense of continuance merely nominal.

TRIPLE EFFECT APPARATUS.

The accompanying engraving, prepared from a photograph, represents a triple effect apparatus, designed in the latest and most approved manner-the result of a long experience. The apparatus is shown connected to a patent air pump with condenser. It was manufactured by the Haslam Foundry Engineering. Co. (Limited), Derby, and is of a type of which several have been made by that firm for sugar estates in Java and elsewhere. The commercial results have, in all cases, been most satisfactory to the purchaser.

The advantages of the triple effect apparatus are now generally admitted to be of the highest importance on all large sugar estates where economy of fuel is of great consideration. The mode of working the apparatus is as follows: Exhaust steam, collected from various engines working in the factory, enters the heating space of the first pan. The steam boils the cane juice; the vapor from the juice passes to the heating space of the second of the third pan, producing a third ebullition. The vapor from the third pan is drawn off by the aid of a powerful air pump. We thus obtain a high vacuum, which reduces the boiling point and enables the concentration to be carried on at a very low temperature. The apparatus is so constructed that the pans may be worked as single vacuum pan or as a double effect apparatus in case of need. These advantages will at once be apparent to all estate owners who are interested in high-class machinery of this kind.



TRIPLE EFFECT APPARATUS.

RAILROAD SIGNALING APPARATUS.

Along the side of the track and at suitable distances apart are set posts (Fig. 3), at the forward sides of which are the outer ends of levers, pivoted at a little distance from their inner ends to supports attached to the ends of the ties. The levers are at right angles with the track, and with their inner ends so near the rails as to be struck by the treads of the wheels of passing engines, and pressed downward, raising their outer ends. The outer ends of the levers are connected by rods with the outer ends of crank arms, attached to the ends of short shafts in bearings in the upper ends of the posts. To the shafts are attached signal arms, which, when displayed, project horizontally toward the track, and when withdrawn hang vertically. To the shafts, and projecting in opposite directions from the signal arms, are attached pairs of arms carrying colored glass plates which, when swung down, rest at each side of lamps. To the shafts are also attached single tooth ratchet wheels (Fig. 2), the teeth of which, when the signals are displayed, engage with teeth formed upon lever pawls pivoted to the posts, and which hold the signals securely in place when displayed. The pawls are held against the wheels by weights suspended from their rear ends, and which are of such weight as to only slightly overbalance the forward ends of the pawls. These ends of the pawls are secured to the ends of ropes passed around a pulley near the base of one post, and then around a pulley on the next forward post, and their other end fastened to the connecting rod of the forward post.

As the engine reaches each post it operates the lever and displays the danger signal on that post, and at the same time trips the lever pawl on the next preced-



BAUMBACH'S RAILROAD SIGNALING APPARATUS.

pan, producing a second ebullition; the vapor from the ing post, and allows the signal on that post to drop out cane juice in the second pan passes to the heating space of sight. Above the outer parts of the levers are placed springs, which prevent those parts from being raised too high, and also prevent too great a jar when the outer parts are struck by the wheels. This invention has been patented by Mr. Emil Baumbach, of 241 Broadway, New York city.

Perfumes of the Orange.

From the orange, Citrus aurantium and C. bigaradia, are obtained five distinct and valuable perfumes: 1. The true orange flower essence, obtained by digesting the flowers with lard. 2. Oil neroli petale, or oil neroli bigarade, by distilling the flowers of the sweet and bitter orange respectively. 3. Oll neroli petit grain, obtained by distilling the leaves and unripe fruit. 4. Oil orange of Portugal, obtained by rolling the fruit in a metal cup covered with spikes on its inner surface (known as ecuelle), which wounds the rind, and causes the essence to flow from the oil glands. 5. Commercial oil of orange, obtained by expressing or distilling orange peel.

Paper Slippers.

Paper slippers are the latest form in which paper is introduced in new inventions. An Englishman has patented a system of manufacturing slippers, sandals, and other coverings for the feet out of paper. Paper pulp, or papier mache, is employed for the upper, which is moulded to the desired form and size, and a sole is provided made of paper or pasteboard, leather board, or other suitable paper material, which is united to the upper by means of cement, glue, or other adhesive material. The upper is creased, embossed, or perforated at the instep and sides, which renders them somewhat pliable, and prevents their cracking while in use.

A Sunken Continent in the Pacific.

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The fact is quite generally conceded among scientists that the probabilities are strongly in favor of the supposition that there formerly existed a large island, of continental dimensions, between the West Indies and the western coast of Africa. This continent is supposed to be the "Atlantis" of the ancients, whose recent discoveries point to the further probability that there also once existed a similar continental area of land in the Pacific Ocean, between the west coast of South Americaand the present Australian continent, as it is sometimes called.

At a recent meeting of the Academy of Sciences of San Francisco, Captain Churchill read a very interesting paper in relation to this matter. His paper referred especially to the gigantic sculptured figures still to be seen upon Easter Island, and evidently the work of a different race than that which now inhabits the island, and one much more numerous, since the works referred to are on too large a scale to have been constructed except by many hands. He argued that a vast continent once existed where there is now nothing but a waste of ocean, dotted with countless isles and islets of varying size and character, the majority showing in their formation the traces of that former volcanic action which either upheaved them from the depths of the sea or shattered and sunk the continent of which they are now the only vestige. Easter Island, it is believed, was once the home of a population numbering many thousands, of whom scarcely any now remain. Besides dwelling upon the sculptured figures to be found there, Captain Churchill laid much stress upon the hieroglyphic tablets of wood discovered upon Easter Island, and which are the only instance of a written language in Oceanica. He thought sufficient attention had not been given them.

From other sources we learn that a German government vessel recently visited that island, and made a large collection of prehistoric remains, and made copious notes of other matters of scientific interest. The German government, it is understood, are making preparations to send another expedition to Easter Island with a corps of scientists and engineers to sketch the island, surveying the ground, and to make plans and sections of the prehistoric buildings and ruins.

Our own government has also taken steps to secure some of these valuable remains representing the prehistoric and known races of this hemisphere. Instructions have already been sent to Admiral Upshur, in command of the South Pacific squadron, to send one of his vessels on a cruise in the direction of Easter Island, and to make such explorations, collections, and reports as he may think important in the interests of his government. The Government of France is also turning its attention to this island, with a view to the establishment of a protectorate.

It is reported in the accounts given by the German vessel that the island, which is small, is strewn with large stone images and sculptured tablets. The inhabitants of the island know nothing about the remains, and even tradition gives no account of a people living there when their ancestors arrived.-The Jewelers' Journal.

Launch of the Mersey.

The first of a new class of British "protected corvettes" intended to act as swift cruisers, was recently having sharp cutting edges on its circumference. This successfully launched from the Royal Dockyard at is pivoted to a steel bar attached to a wooden handle. Chatham.

Designed as an armed cruiser for service in which her usefulness and her own safety upon occasion will depend upon her speed and ability to maneuver rapidly, the Mersey is fitted rather for attack than defense. Although she might not be able to do much mischief to a fort or a first-class ironclad, her armament, including two 8 in. and ten 6 in. breechloading guns, torpedoes, and ram, would make her a formidable opponent for any unarmored ship. The guns will be disposed so as to give the power of firing with the greatest possible effect while maneuvering. The two large guns are to be pivoted, one on the forecastle and one on the poop. On either side, fore and aft of amidships, are two projections or sponsons, and in each of these one of the 6 in. guns is to be placed, the others, three on a side, between the sponsons, increasing the effectiveness of her broadside fire. Long ports in the forward sponsons permit the guns to be trained 4° across the bow and to an angle of 60° abaft, giving a lateral range of 154°, while they may also be fired with a depression of 7° or at an elevation of 20°. The after sponsons admit of an equal range of fire. These guns carry their own shields for the protection of the gunners. She is also to carry one 9 pounder and one7 pounder boat and field gun, a 1 in. Nordenfelt, and two 0.45 in. Gardner guns. Whitehead torpedoes will be carried, and provision is made for discharging them either above or below water on each broadside. Except for the steel faced armor, 9 in. thick, protecting the conning tower, and the steel protective deck plating, 2 in. thick where it is horizontal and 3 in. thick where it slopes downward across the coal compartments at the sides, the Mersey is unarmored. The authorized complement of coal is 500 tons. Her engines, of the horizontal compound pattern, are

with twinscrew propellers, and it is anticipated that Fig. 3. A quickly drying printer's ink is used. On her speed will be 18 to 19 knots an hour. The principal dimensions of the ship are: Length between perpendiculars, 300 ft.; extreme breadth, 46 ft.; mean draught of water, 17 ft. 9 in.; load draught amidships, 19 ft.; load displacement, 3,600 tons. Her crew will number 300 officers and men.

THE CYCLOSTYLE.

The cyclostyle is one of the latest of the several pro cesses which have been invented for reproducing manuscripts and drawings. In it, the stencil has met with

These few words are a facsimile of work pro-duced by this process.

a new application, and one which produces excellent results. The apparatus consists in a plain walnut board provided with a zinc writing tablet. A double frame, also of walnut, fits snugly around the zinc, having its under frame hinged to the board at one



side. The upper frame being removed, a sheet of thin waxed paper is placed on the tablet, as indicated in Fig. 1. The frame is then replaced and locked to the underneath one, as shown in Fig. 2. In this manner the paper is securely fastened in the frame, the same



as in an ordinary drawing board, and the instrument is ready for use. The cyclostyle pen consists of a tiny wheel made of an alloy of iridium and palladium, and



Fig. 3.

The pen is used just the same as the ordinary form, except that slightly great pressure is exerted. As it passes over the surface of the waxed paper, the little wheel revolves, turning in the direction of the writing, and leaves a series of minute perforations, so close to-



Fig. 4.

gether that the line traced appears continuous. When the writing is completed, a piece of ordinary writing paper, preferably unglazed, is placed under the waxed paper and on the zinc tablet. An inling roller is bearing ends of girders, from their walls, and who use to be of 6,000 indicated horse power. She is provided then passed over the waxed paper, as represented in framed floors.-Professor Hosking.

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lifting the frame, a clear and exact reproduction of the writing is found on the sheet underneath, as shown in Fig. 4. This copy has the decided advantage of being in black ink, and possessed therefore of all the appearance of a written letter. As many as two thousand copies can be obtained from the one writing, and at a rate of from four to five hundred an hour. The new process has met with a very favorable reception. It is already in use by several government departments and by many firms and corporations. At the office of the Cyclostyle Company, 152 Broadway, quite an interesting scrap book is on exhibition, illustrating a great variety of manuscripts and sketches reproduced by this process.

Native Mercury in Louisiana.

Native mercury has been recently discovered in a locality where its presence has hitherto been unsuspected. At "Cedar Grove" plantation, in Jefferson Parish, Louisiana, on the west bank of the Mississippi, ten miles above New Orleans, native mercury occurs in small globules disseminated through the alluvial soil. These globules vary in size from a microscopic pellet to a BB shot used for sporting purposes. They seem to be thoroughly admixed in the soil, and although more abundant within a limited area, are found for a distance of 1,200 feet. Beyond this destance, the limited time at my disposal did not allow me to investigate, but the appearance of the soil seems to indicate that the metal is gathered around a certain center, and gradually disappears as the distance from this center increases.

The apparent center lies about 300 feet from the Mississippi River in an orange orchard, where, also, a number of live oaks are in luxuriant growth. The presence of this mercury has been noticed for a number of years, during the operations of plowing and ditching, but has never, to the writer's knowledge, been officially reported to the scientific world.

The writer took two negro men, with spades, to the locality, and obtained several specimens of the soil, one to five feet below the surface. He also washed out on the spot, from a small wash tub full of earth, about two or three ounces of the native element. An analysis of two triturated specimens of the half dried earth was made with the following results:

1. Weight of soil, 500 grms. Wt. Hg, 1'4652 grms. p. c. 0'0029+ Total. Giving a mean percentage of mercury of 0.002934 per cent. The soil is all alluvial, and for a depth of 25 feet is as follows:

1. Surface, mercury bearing stratum, six feet thick. A sandy soil containing blue clay and avegetable mould.

2. Stratum of blue clay 6½ feet thick.

3. Similar stratum to surface, but containing no mercury, six feet thick.

4. Stratum of blue clay 61/2+ feet thick.

It is not known how much deeper the fourth stratum extends. In none but the upper stratum of alluvial soil does mercury occur in sufficient quantity to be perceptible to the naked eye.

The large quantity of mercury, the great area over which it is scattered, the situation above the most frequented resort of commerce, the protection from overflowing by levees, and the absence of any appearance or history of any large cargo of mercury being wrecked in that vicinity, make it extremely improbable that such results could have been effected by the agency of man.-E. Wilkinson, American Journal of Science.

French and English Timber Flooring.

We can and do frame floors most effectively by carpentry alone, whereas the French do the work in framing their floors so badly that no important bearing is, or indeed may be, trusted by them to the framed joint, dog-nailed stirrup straps of iron being always brought in aid. But the common practice with us, who can and do frame floors well, is to use single or unframed floors, which carry the weight and the vibration to which floors are exposed into the walls over voids as well as over solids; while, on the other hand, the French almost invariably frame their floors to or upon girders, by means of which the floors are brought to bear upon the solids of the walls. The walls are thus not only less exposed to vibratory action, but are both tied together and strutted apart with better effect by the stout girders stiffened by joists than by joists which themselves require some foreign aid to stiffen them. Moreover, single floors of joists, unless trimmed at frequent intervals-when, indeed, they may be termed halfframed-require, or are thought to require, plates of timber laid along the inside faces of outer walls and upon internal walls, and thus tend to the injury of the walls by introducing timber, that bane of brick and stone walls, into their structure, so as to render the timber a part of the structure. This defect is avoided by our neighbors, who exclude all timber, except the