Science and Art.

Notes on the Progress of the Paddle and Screw.—No. 7.

The blades were made movable on their radial axes in the boss by Millington, in 1816.

Woodcroft (1844) effected the adjustment by a rod lying along the shaft, jointed at one end to a short arm on the blade, and carrying at the other end a stud, which takes into a groove in a short box or hollow piece, traversing the shaft on feathers.

Woodcroft, in 1851, used another form of boss, by which the blades could be so turned on their axes, while the shaft revolved, as to operate on the water with their reversed sides, and thus to back the vessel without stopping the engines.

Hays (1844) altered the blade's angular position by screwing up a ring. Bodmer (1844) placed one pair of blades loosely on the shaft, so as to be properly set as they revolved, and to rest vertically behind the false stern-post. For the like purpose, Malo (1850) put the pairs of blades on different shafts, one being hollow.

Buchanan (1846) and Maudslay (1848) made the water turn the blade on its radial axis, and fixed it by clutches. Griffiths (1853) adjusted the blades from the deck by a key working a bolt in the boss.

Wingate (1857) turned the blade by a key, and fixed it by the friction of its conical shank in the boss.

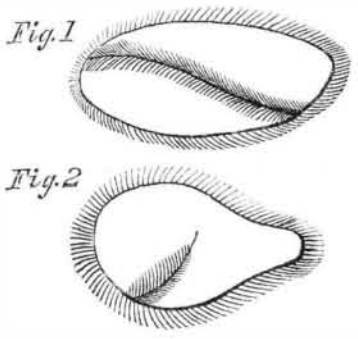
In 1849, Griffiths caused the pitch of the blades to be altered by levers, according to the speed of the shaft. Burch (1852) substituted a large plate for the boss, and the blades thus projected beyond the ordinary hull lines of the stern, which were continued aft beyond the propeller. Paterson (1857) produced a similar effect by using for the boss a large conical drum, coinciding at the foremost end with the shape of the vessel, which was terminated by a round vertical plane.

The screw-propeller was caused to steer the vessel by altering the direction of the shaft or the angular position of the blades. Shorter (1800) and Millington (1816) used the first plan, turning the shaft to one side or another by a Hooke's joint. Pumphrey (1829), Buchanan (1853), and Abadie (1854), attached the shafts to a frame moving laterally with the rudder; and Bucholz (1851) geared each of his three propellers in a ring, which allowed the axis to be directed for steering.

The second mode of steering was adopted by Woodcroft (1851), who attached each blade by an arm to a rod with a stud in the groove of a box on the shaft inside the vessel. The direction of the groove could be so altered by switches as to cause the blade to act with its broadside during one part of each revolution, and thus to impel the stern to one side or another. When the blades were stationary, in a vertical position, they might be turned on their axes, so as to act like an ordinary rudder.

Foulerton (1844) and Wimshurst (1850) placed a screw on an axis athwart the vessel, so as to steer by revolving in one or the other direction.

In the modes of propulsion adopted by aquatic animals may be found almost every plan which has been used by man with machinery. Thus water is ejected for propul- [illegible] the cuttle fish and paper nautilus; sail- [illegible] by the velella and water birds; pull- [illegible] towing by whelks and the lepidosiren; [illegible]ding paddle by the lobster, feathering paddles by ducks, and oblique surfaces by fish of all kinds. A screw-like appendage is found in the wings of an Australian fly, but it is supposed to be shaped thus only when dried after death. There is, however, one remarkable animal which propels itself by a rotary movement, acting on the water by means very similar to those of the paddle wheel and screw propeller combined; this is the infusorial insect Paramecium. My attention was called to this miniature Leviathan by Mr. Robert Mallet, and after some months of ineffectual search, I was fortunate enough to see its operations distinctly in one of Mr. Tomkins' splendid microscopes. The form is represented in the accompanying engraving,

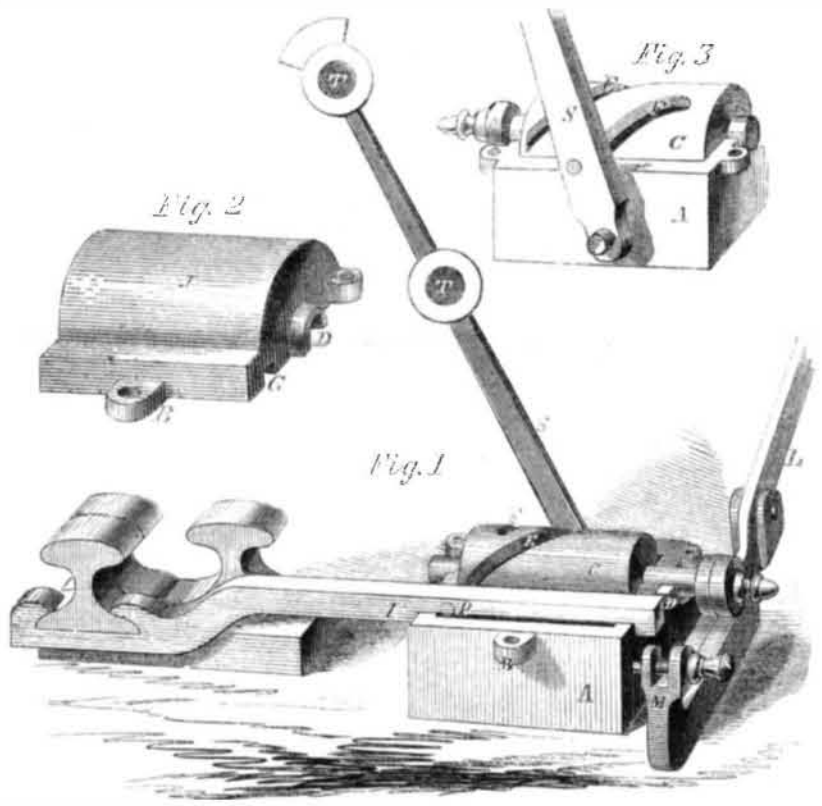


1 being the *Paramecium Caudatum*, and 2 the *Paramecium Compressum*. A sulcus or furrowed groove runs obliquely round the oval-shaped body of the animal (in one variety it is only near the stern). A wave-like protuberance passing along this sulcus (with or without cilia) causes the body to rotate on its longer axis, and thus propels it as by the fore-and-aft stroke of a paddle, as well as by the screw-like progress induced by the spiral groove. Galloway (1856) proposed to combine the paddle wheel, screw propeller, and the discharge of water.

A Technological College.

While we have many colleges in which the student is taught the theory and practice of medicine, and likewise the arguments of the schoolmen in theology, we have few in which the useful arts are taught as a profession, or a practical knowledge of our manufactures given. We want more places where men of science shall be made and prepared for the field of industry, and sent out fitted to fill the positions of managers of chemical, metallurgical or mechanical works. Such an institution, which may be taken as a model by our other States, is the Polytechnic College of the State of Pennsylvania, in Philadelphia, over whose able faculty Dr. Kennedy efficiently presides. In that institution the sciences are taught practically and with reference to their application, and as a consequence, the graduates are able to take scientific positions in any large manufactory. More of our young men should set to work and study technology, now that they can do so without going to Europe, and should take advantage of the educational resources that this college affords.

DODGE'S RAILROAD SWITCH.



This improved device for operating switch rails, either single, double, or treble, is designed for hand use; and is more particularly intended to remedy the inconvenience occasioned by the use of the ordinary timber head-blocks in crowded or confined locations. It stands on the tie or sleeper, and can be placed between the rails, the size being only 10 by 8 inches for a single switch, and no extra timbers are required. Fig. 1 is a perspective view of the whole arrangement, with the cover, Fig. 2, removed.

A is a metal box, provided with lugs, B, to which, by corresponding lugs, B, in the cover, the whole can be firmly secured together, so that no ice can accumulate about the device. In bearings, D, in the box and cover, rests the barrel or cylinder, C, also of metal. In this are two grooves, E and F; in E a pin, P, works, which projects from the side of a bar, I, to which the rails are attached, and as the cylinder is rotated or moved by the lever, L, this bar, I, is moved, bringing the single rails into connection or line with any of the other rails on which it is desired to "shunt" the train.

The groove, F, works, by a pin similar to P, the target staff, S, seen in the back view of the arrangement, Fig. 3, and inclines the targets, T, in the same direction as the rails are put. When a treble switch is required, the groove, E, only, is necessary in the cylinder, as the lug in front can be replaced by two as at the back, and the target connected to the bar, I, can be secured to the front, so that with the switch it will either stand perfectly perpendicular, or incline to the right or left. When the switch is placed very close to, or between the rails, the target can be removed to form a "muley switch," and the switch can be locked in any position by the slot and pin, M. The cylinder being reversed in its bearings, it can be made to work with the lever, L, on the side next the track.

The inventor is C. C. Dodge, of Marshall, Mich., from whom, or S. W. Dodge, of the same place, further information or switches (they being manufacturers) may be obtained. They are durable, cheap, and easy transmitters of power, and were patented October 5, 1858.

A solution of nitro-muriate of cobalt turns green when heated, which color disappears on cooling; it is on this account used as an invisible ink.

Guano Discoveries.

We learn from the New York *Tribune* that large and valuable deposits of guano have been discovered in the Pacific Ocean, and formally taken possession of by citizens of the United States. Among these islands are Malden's, Arthur's, Howland's, and Christmas; and at one of them there is said to be a land-locked harbor in a lagoon, six miles broad by twelve miles long, which is entered from a bay outside, where ships can safely anchor in seven to ten fathoms of water. Almost the entire surface of this island (more than forty miles long and fifteen broad) is reported to be covered with guano from one to ten feet deep. Especially is this so for many miles in extent around the lagoon, where hundreds of ships can lie, and thousands of boats work at once in loading them.

SALE OF EXPRESS GOODS.—The Dayton *Journal* tells the following good story of a "sell," such as does not occur every day, in which curiosity "ran a muck" with the desire of gain:—"The sale of express goods, not called for and forfeited, to pay charges, took place on Saturday morning. There were some amusing scenes at the sale, as it was a lottery in every sense of the word, except that the Express Company promised no prizes and offered no inducement to purchasers; the package was sold just as it was—you saw the *outside*, but the contents were a sealed book till you bought, and so gained the right to break it open. One man paid a pretty good price for a bundle of advertising almanacs; another a like sum for a fluid of a sort which could only be used on some very particular occasion; another bought a letter which he *said* contained $4, but he did not break it open in the presence of witnesses; and another gave thirty-five cents for a neat little package which, on being opened, proved to be the daguerreotype of a 'colored gal.' And so the thing ran. Many of the packages contained patent medicines; one, a baby's belt of patent leather. The sale was continued for three or four hours, and afforded 'lots of fun' to the spectators."