The Shipping of New York.

The collection district of New York includes the waters of New York Bay and Harbor, East River and Long Island Sound bordering on Westchester county, to the Connecticut line, the north and south shores of Long Island, Staten Island, and that part of Hudson and Bergen counties lying on New York Bay and Hudson River, and the navigable waters of the Hudson River. The district possesses a water front of about 700 miles, and the wharf fronts of New York port cover 25 miles. Marine sailing papers are issued at New York city, Albany and Troy, on the Hudson, and Cold Spring, Port Jefferson and Patchogue, on Long Island.

The registered shipping of the port of New York on the first day of January, 1879, was as follows:

Sail vessels under register foreign trade, number 814; tonnage 481,545·28.

Sail vessels under enrollment or license for the coasting trade or fisheries, 1,384; tonnage, 100,922·81.

Steamers under register foreign trade (wood hulls), 43; tonnage, 56,146·43.

Steamers under register foreign trade (iron hulls), 19; tonnage, 43,266·25.

Enrollment or license coasting trade (wood hulls), 546; tonnage, 138,241·49.

Enrollment or license coasting trade (iron hulls), 34; tonnage, 35,812·93.

Total of steam vessels, 642, with 273,467·10 tons.

Barges and rigged vessels enrolled or licensed, 379; tonnage, 94,234·24 tons, to which may be added the total sailing vessels as above, namely, 2,198, of 582,468·09 tonnage, and 642 steam vessels, of 273,467·10, making the grand total number of vessels of the port of New York 3,219, with a capacity of 950,169·93 tons.

The shipping of the other ports of the district (mostly sail vessels and barges) was, on the same day:

Albany, 304 vessels, 46,306·39 tons; Troy, 465 vessels, 45,656·06 tons; Patchogue, 193 vessels, 2,811·77 tons; Port Jefferson, 119 vessels, 10,723·23 tons. Making a total, for the entire district, of 4,398 vessels, with a capacity of 1,052,731·42 tons.

The steam fleet of the district numbers 811 vessels, embracing a tonnage of 302,820·42. It is estimated that if all the above vessels were placed in a line they would reach from Albany to New York, a distance of 144 miles.

Anatomy of Walking.

Dr. J. W. Ranney gave a lecture the other evening at Chickering Hall on anatomy and physiology, with special reference to athletic exercises. After giving a description of the human skeleton, of the skin and its various glands and vessels, the doctor addressed himself to the muscular system, which was illustrated, first with histological micrographs, and finally with a general plan of the muscular arrangement projected upon a screen. The most novel part of the lecture was the exhibition upon the screen of tabular statements of the amount of force required to carry on the various physical operations. Premising that a foot ton is merely a symbol for the power required to raise one ton a foot high, the relative amounts of power expended in vital action, concerned in vital movements, and required for the production of animal heat for one day are, respectively, 260, 300, and 2,840 foot tons. To row one mile at racing speed requires an expense of 18·56 foot tons of muscular energy; to walk one mile, 17·75 foot tons; to walk one mile, carrying a knapsack weighing 60 pounds, 24·48 foot tons. The force expended in a day's work is calculated at from 250 to 350 foot tons.

Dr. Ranney took occasion in the course of his lecture to inveigh very severely against the mania for walking which is now prevalent, in which young women, without training and without proper preparation, attempt such impossible tasks as walking 3,000 quarter miles in 3,000 consecutive quarters of an hour. Such practices, he said, were not athletic exercises in any proper sense of the term, but downright cruelty, and he hoped the time was not far off when spectacles of this class would cease. Dr. Ranney regards rowing, when properly pursued, as a finer and more healthful exercise than walking.

The St. Gothard Railway Tunnels.

In addition to the great tunnel, thirteen miles long, there are on the St. Gothard Railway twelve other tunnels, the shortest of which, Waren, is 1,106 yards long, while the longest, the Olberg, reaches 2,027 yards. The total length of these twelve tunnels is very nearly ten miles—15,578 meters. Then there are five tunnels between 220 and 550, and twenty-five between 110 and 220 yards, making in all fifty-two subsidiary tunnels, of an aggregate length of 16 miles. Between Immensee and Goschenen there will be thirty-three tunnels; between Airolo and Giubiasco, seventeen. The highest part of the line above sea level is the big tunnel, 3,307 feet; the lowest a point between Cadenazzo and Magadino, 675 feet. The line will be carried over sixty-four bridges and viaducts, the longest of which, that of Cadenazzo, in Tessin, will consist of five arches, each having a span of 55 yards. The total length of the Gothard line will be 151 miles, 17 per cent of it being tunnels and 1 per cent bridges and viaducts. In the first instance the line for the greater part of its length will be single, but the tunnels and permanent way are to be so arranged that additional rails can be laid down so soon as the financial success of the enterprise seems to be assured. If all goes well, the entire length of road will be in running order in from four to five years.

THE PRAXINOSCOPE.

We are all familiar with the zoetrope, which consists of a short cylinder, on the walls of which are represented different positions taken successively by a body in motion. These representations are viewed through longitudinal slits in the cylinder while it revolves at great speed. The pictures viewed in this way appear as if possessed of life. This is certainly one of the most curious of optical phenomena. The accompanying engravings represent an apparatus based on an entirely different principle.

In the praxinoscope, as the apparatus is called by the inventor, Mr. Reynaud, the different pictures representing the consecutive positions of a moving body substitute each other incessantly, the light remains constant in brightness, and it is stated that it constantly presents to the eye an image of a moving body, without exhibiting the slightest irregularity or interruption.

A mirror, A B (Fig. 1), being placed at a certain distance from a picture, C D, the image of the latter will be reflected and visible at C′ D′. When we now turn the mirror as well as the picture, C D, around a common center, O, in the same direction, so that they will occupy positions at B E and D F respectively, the image of the picture will be seen at C″ D″. As will be seen, its axis has remained unchanged.

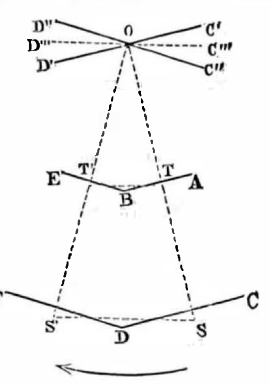

Fig. 1.—THE PRAXINOSCOPE.

If another mirror is placed at A B and another picture at C D, the eye being placed at O, one half of the first picture will be reflected from O D″, and one half of the second picture from O C′. When both pictures and mirrors are turned, the second mirror at T T′ and the second image will be fully visible at C‴ D‴. Afterward the second mirror and the picture will be found in B E and D F respectively. By replacing them by another mirror and design at A B and C D, the same succession of changes of position will be produced.

In the apparatus of Mr. Reynaud the pictures are placed within a polygonal box. Turning around a common center there is a concentric polygonal prism formed of mirror plates, and having a diameter equal to the radius of the exterior

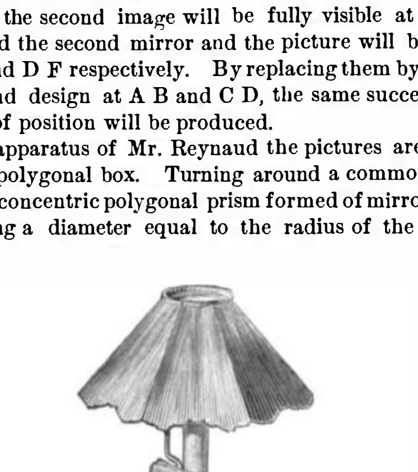

Fig. 2.—THE PRAXINOSCOPE.

polygon, as shown in Fig. 2. The box carrying the pictures and the reflecting prism is revolved at a moderate speed by means of a crank, pulley, and cord.

In the evening the apparatus may be lighted by a lamp or gas flame, the light being reflected downward by a shade.—*G. Fussandier, in La Nature.*

The Piezometer.

This is an apparatus invented by Dr. W. E. Woodbridge, M.D., in 1853. It signifies a pressure measurer, or, more accurately, a measurer of a great or hard pressure. Among all the philosophical instruments that have been invented this deserves to take a place as one of the most ingenious. It consisted essentially of a small steel cylinder, in which was placed a piston fitting it accurately. The cylinder was filled with oil, on which the piston rested, and was screwed into the bore of the gun, inside the powder chamber. All liquids are compressible in a very small degree. When the powder in the gun was fired, the piston was forced down on the oil in the piezometer and compressed it. The distance to which the piston was driven in was recorded on what may be termed the piston rod by a small steel point in the side of the cylinder, which scored a line in the side of the rod. The length of this line was subsequently measured by a micrometric scale, divided into ten-thousandths of an inch, with the aid of a microscope. In order to establish a standard of comparison, the compression of the oil under various pressures was first ascertained by means of a hydraulic press and gauges of special construction. Precautions were taken to prevent changes in temperature from affecting the accuracy of the indications of the instrument.

The experiments were made at Washington Arsenal in 1855, under the direction of Major Alfred Mordecai. Two six pounder guns, one of iron, the other of bronze, were used. The diameter of the bore of each at the shot was 3·69 inches, very nearly. The iron gun was used in the first three experiments, the piezometer being attached to the bottom of the bore. It was afterward pierced through the side to receive the instrument, inclosed in a hollow steel plug, the place in the hole being 1·5 inch in advance of the bottom of the bore. It was thus employed in many experiments. The bronze gun was, however, more used. It was drilled with nine holes at different distances from the bottom, beginning with 1 inch and ending at 47·8 inches. They were arranged alternately to the right and left of a central vertical plane in the upper half of the gun, and inclined 45° to that plane. Not the least interesting feature in the trials consisted of tests made with a musket barrel. The results obtained are very instructive, and support most of the theories held in the present day concerning the action of fired gunpowder. For example, the larger the charge the greater the pressure, irrespective of the space in which the powder was fired. Thus, while pressures of as much as 22,000 pounds, or over 9·8 tons to the inch, were registered in the six pounders, the highest that would be got in the musket barrel was 18,500 pounds to the square inch.

Bennet Woodcroft, F.R.S.

The death is announced of Mr. Bennet Woodcroft, for many years the executive officer of the British Patent Office. Mr. Woodcroft was widely known as a successful inventor, manufacturer, and author of several works relating to invention and the industrial sciences, as well as an efficient public officer. Born in December, 1803, Mr Woodcroft early learned the art of weaving. He studied chemistry under Dalton. On reaching his majority he joined his father in business as dyer and velvet finisher, at Manchester. In 1826, in one of his patents, he described himself as a silk manufacturer. About this time he became acquainted with Whitworth, Nasmyth, Fairbairn, and other eminent Manchester mechanicians. In 1843 he started in Manchester as consulting engineer, removing to London in 1846. From 1847 to 1851 he occupied the Professorship of machinery at University College, and in 1852 was appointed Superintendent of Specifications in the British Patent Office, becoming, in 1864, the sole controller of the department, with the title of Clerk of the Commissioners. From this office, which he had filled with signal ability for twelve years, he retired in March, 1876. His death occurred at his residence in South Kensington, February 7.

Mr. Woodcroft took out his first patent when only twenty-four years of age. It was for processes and apparatus for printing yarns before being woven. It was a valuable invention, and notably useful in the manufacture of ginghams. His next inventions were in naval engineering, the principal being the well known increasing-pitch screw propeller. About the same time he patented certain improvements in calico printing. The patent with which his name is most widely associated was granted in 1838, for an improved tappet for looms. In his official capacity Mr. Woodcroft is accredited with the foundation of the South Kensington Patent Office Museum, the Patent Office Library, and many improvements in the management of the Patent Office.

A New Insect Pest.

At the annual meeting of the New York State Agricultural Society, held in January last, at Albany, Mr. J. A. Lintner, the entomologist of the State Museum, read a paper in which, among other injurious insects recently observed, he gave an account of the larvæ of an insect which had been discovered two years ago in several localities in eastern and northern New York, hidden within the seed pods of the red clover, and destroying the seeds. The perfect insect had not yet been seen, but the examination of the larva showed it to belong to the cecidomyidæ, and in all probability very nearly allied to the wheat midge. A description of the larva was given under the name of *Cecidomyia trifolii*, Lintn. (n. sp.).

The range of the insect's depredations, or the extent of its ravages, was as yet unknown. In some localities in the western counties of New York the clover was so infested with it last year that it was worthless for seed. It is believed that the not infrequent failure heretofore reported of the clover seed crop throughout the country, which has been ascribed to imperfect fertilization of the blossoms and various other causes, has been the result of the secret operations of this destructive little insect.

IT is said that a gentleman of wealth and liberality, in the city of Rochester, whose name is not given for the present, proposes to furnish a site and build an observatory for Professor Lewis Swift, at an expense for both of $20,000, provided a glass of sixteen inches in aperture is purchased. Such a telescope complete, with globe and charts, will cost several thousand dollars. The heirs of the late Lewis Brooks have already given $3,000 toward a telescope, and an effort is to be made to raise the necessary sum remaining by subscription.