

necessarily fatal to the habit of scientific thinking. On the other hand, if the teacher is to be simply the guide of pupils in their pursuit of real knowledge, in their scientific exploration of the world that lies next to them in space, and in their scope of intelligence, the public must be content with a plentiful lack on the part of their children of the conventional information by which parents judge of the instruction and education of children. Until parents have a truer idea of what knowledge is most worth there can be little hope of radical improvement in this part of school work.

A CHANCE FOR INVENTORS.—THE \$5,000 CAR.

Our readers will remember that a prize of \$5,000 was offered last year by the American Humane Association for a cattle car so constructed as to allow cattle to lie down while in transit, and to be fed and watered while in the cars. This to prevent the suffering caused by long standing and the injury and delay incident to unloading and reloading. The president of the association, Mr. Edwin Lee Brown, announces in a circular that the money has been pledged and nearly all of it paid over to the secretary of the association and deposited with trustworthy bankers. All competitors for the prize are required to send their models and plans, with full descriptions, to Mr. Brown, corner Clinton and Jackson streets, Chicago, Ill., before the 1st day of October next. All communications with regard to the prize should also be addressed to Mr. Brown.

The judges appointed are Edwin Lee Brown, Chicago, Ill.; John B. Winslow, Boston, Mass.; A. Kimball, Davenport, Ia.; William Monroe, Brighton, Mass.; E. T. Jeffery, Chicago, Ill.

The judges do not prescribe the size or the internal arrangement of the needed car; but among plans which meet the conditions, that will have the preference which can most readily and cheaply be adapted to the cattle car now in use. Of course, also, that car which can be most easily adapted to the transportation of other live animals and merchandise, if in other respects satisfactory, will have the preference.

It is expected that competitors will take out patents for their inventions, before submitting them, or not, as each shall choose; but the judges must be fully satisfied of the legal title of a claimant to his invention, before awarding to him the prize, or any part of it. The prize winner must also convey to the American Humane Association, or to such persons as its Executive Committee shall designate, a patent for the United States and Canada of the invention, which shall be satisfactory to said committee, before any part of the prize money will be due to him.

As models and plans may be seen by others than the judges while in their possession, they suggest, as a precautionary measure, that each inventor file a caveat at the United States Patent Office before sending them.

The East River Bridge.

The first consignment of steel—27,460 pounds—for the superstructure of the East River Bridge has been received, and rapid deliveries are expected from this time on, the Edgemoor Iron Company having put its full force upon this contract. The girders of the superstructure, manufactured by the Roebblings at Trenton, of Bessemer steel, have also arrived. The Cambria Steel Company, which furnishes the steel, has about a thousand tons ahead of the Edgemoor Company. Colonel Paine reports that the steel has all been tested and is of superior quality, the strength of the steel trusses being six times greater than is likely to be required.

The last structure to be razed to make room for the New York approach will soon be cleared away. Thus far the bridge has cost \$14,000,000—of which sum \$3,000,000 went under water and \$4,000,000 went for real estate, to be covered by a mile of costly masonry. In the profile drawing of the completed structure the lofty towers sink to comparative insignificance. The projection carries in the observer's mind a sense of length rather than of height. The superb arches at Vandewater and Rose and William and North William streets, the massive anchorages at Franklin square in New York and Main street in Brooklyn, and the airy bridge over Pearl street become, says a critical observer, more conspicuous in this picture than are the towers, which are so imposing as seen at midstream on the East River.

It is calculated that with the greatest possible weight on the bridge and in the hottest of August days, with the tide at its highest, there will be 135 feet 6 inches in the clear between the lowest point in the bridge, midstream, and the surface of the East River.

THE production of Bessemer steel rails in the United States in 1869 was 2,550 tons; in 1878, 550,398 tons, and 9,307 tons of open-hearth steel rails in addition.

THE DE BAY PROPELLER.

The De Bay propeller, an English invention, which has attracted much attention since its efficiency was made public by a series of experiments in 1879, has recently been fitted to a steamship of a sufficient size to give a decided test of its value. The Cora Maria, a steamer of 831 tons net register and 2,800 tons displacement, was the vessel used for the experiments. Her dimensions are: Length, 235 feet; breadth, 31 feet; depth, 18 feet 3 inches. Her engines are of the compound inverted cylinder and surface condensing type, the high pressure cylinder being 28 inches, and the low pressure cylinder being 54 inches in diameter, with a stroke of 3 feet. The screw used in the first experiment was an ordinary four-bladed screw, having a diameter of 13 feet 2½ inches, and a pitch of 19 feet 6 inches. With this screw a

ordinary screw, it would have required 1,256.69 horse power to drive her at the speed of 11.28 knots obtained by the De Bay propeller. We might easily go on to calculate the immense saving in fuel thus obtained, but the foregoing figures are sufficient to call attention to the advantages of the new propeller.

With the ordinary screw there is, as every one knows, a great deal of vibration, and the stern of a screw steamer shakes and quivers very unpleasantly; while the De Bay invention produces no local commotion at all.

Since the first trial in 1879 the shape of the larger half of the propeller blades has been somewhat altered. Formerly they were designed so that they nearly filled up a segment of a circle having the same diameter as the propeller. They now have a curved form in place of an angle, and each blade, instead of a uniformly increasing pitch, has a pitch of 17 feet to half radius, increasing therefrom to a pitch of 19 feet to 21 feet.

The Cora Maria is now on a voyage to Alexandria, Egypt, with a full cargo, and the reports of her captain and engineer will be awaited with great interest.

TRAVELING FLIES.

On the afternoon of Saturday, September 4, the steamboat Martin encountered, on the Hudson River, between New Hamburg and Newburg, a vast cloud of flies. It reached southward from shore to shore as far as the eye could reach, and resembled a great drift of black snow. The insects were flying northward "as thick as snow flakes driven by a strong wind." The steamer Mary Powell ran into the fly storm off Haverstraw, some forty miles below where the Martin encountered it. The flies were "long and black and had light wings."

A dispatch from Halifax, Nova Scotia, states that on Sunday, Sept. 5, immense swarms of flies passed over Guysboro, 120 miles north-eastward of Halifax. They came from the east and resembled a dark cloud.

A correspondent of the Toronto Mail, writing from East Pictou, Nova Scotia, describes a similar phenomenon as occurring there August 21. The flies, forming a veritable cloud, passed Lismore at 6 o'clock in the evening, close to the shore. They went with the wind, which was blowing lightly from the west, occupying about twenty minutes passing a given point. They made a loud, buzzing noise, which was heard by many who missed seeing them. They flew so low that some of them appeared to fall into the water. About two miles below Lismore they slightly changed their flight, heading more to the north. After their passage numbers of strange flies were observed in some of the houses near the shore. They were about half an inch in length, with wings proportionately longer than those of the common house fly, but whether they belonged to the swarm is uncertain.

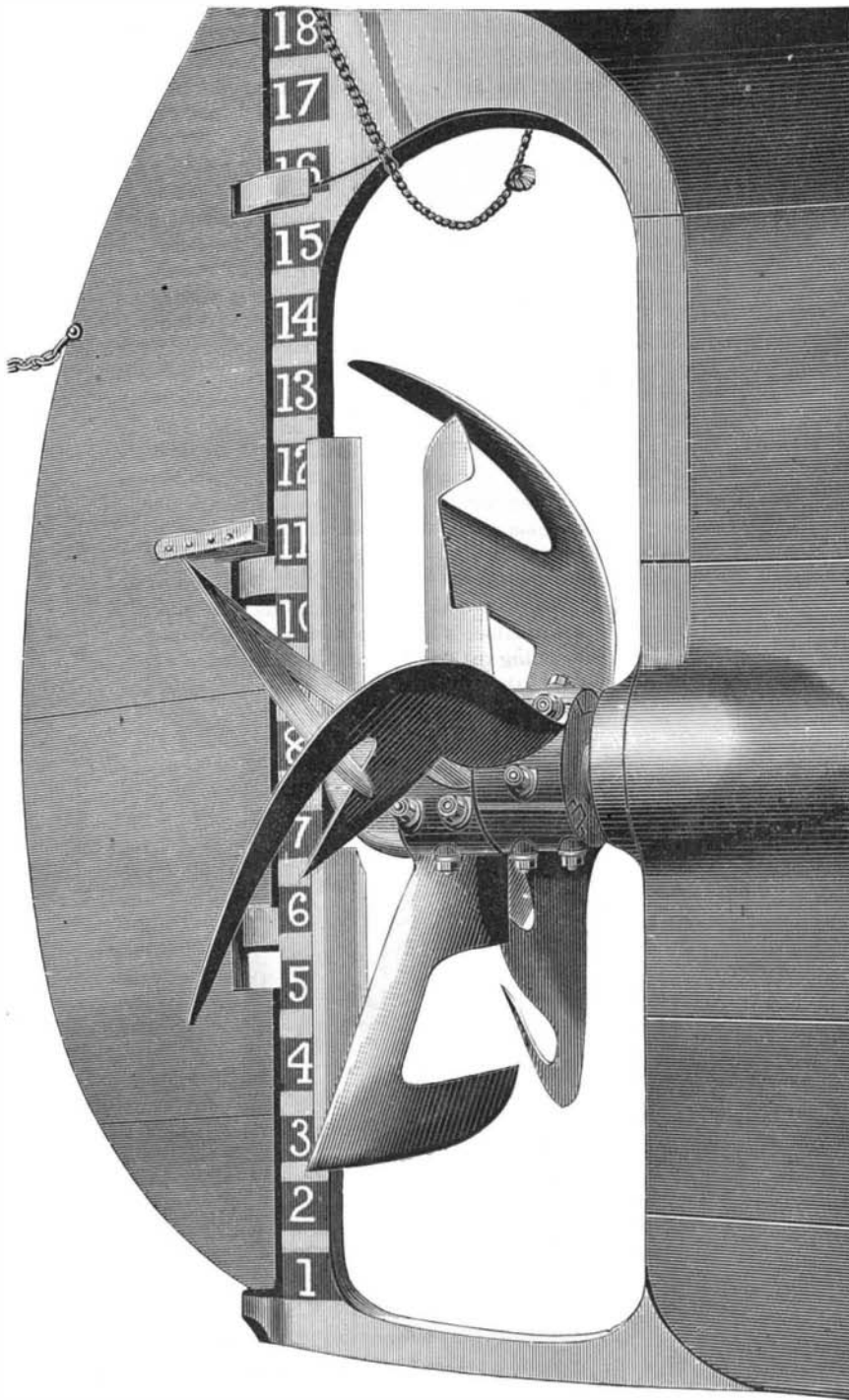
In none of these American reports are the flies mentioned as biting, like the swarm of flies which invaded the port of Havre, France, a few weeks ago. From the indefinite descriptions given of them it seems possible that the American flies may have been ichneumon flies, which have had an exceptionally favorable season for multiplication, owing to the multitudes of army worms in which they deposit their eggs.

American Glass Making.

The first glass factory in America was erected in 1609 near Jamestown, Va., and the second followed in the same colony twelve years later. In 1639 some acres of ground were granted to glassmen in Salem, Mass., probably the first year of the industry which was prosecuted there for many years. The first glass factory in Pennsylvania was built near Philadelphia in 1683, under the direction of Wm. Penn, but it did not prove successful. The first glass factory west of the Alleghenies was set up by Albert Gallatin and his associates in 1785, at New Geneva, on the Monongahela River. A small factory was established on the Ohio River, near Pittsburg, in 1790, and another in 1795. The earlier attempt failed, the later was quite successful. In 1810 there were twenty-two glass factories in the country, with an annual product valued at \$1,047,000. There are now about five times as many factories, producing eight times as much glass. According to the returns received under the recent census, our flint glass factories turn out 210,554 tons of table and other glassware; and the window-glass works produce 2,644,440 boxes. The total value of the product is nearly \$45,750,000.

The Anglo-American Telegraph Company.

This company has lately laid a new cable between Ireland and Newfoundland, and now has four separate cables in operation. By the use of the new duplex system the directors report that they are able to do as much business on these four cables as could formerly have been done on eight cables.



THE DE BAY PROPELLER.—THE TWO HUBS WITH THEIR BLADES MOVE IN CONTRARY DIRECTIONS.

trial was made over a course of two and one-fifth knots on the 10th of July last, and then the De Bay gearing and propeller (diameter 11 feet) were fitted to the vessel and a trial was made under exactly similar conditions on the 10th of August. The results obtained from each trial are herewith tabulated for comparison, it being understood that in each case four runs over the course were made, the first and third being with the tide and the second and fourth against it.

| | Ordinary screw. | De Bay propeller. |
|-------------------------------------|-----------------|-------------------|
| Average revolutions per minute..... | 60.32 | 65 |
| Average steam pressure, pounds..... | 74.7 | 74.5 |
| Average vacuum, inches..... | 25.58 | 24.25 |
| Indicated horse power..... | 584.51 | 585 |

| TIME. | | | | |
|-----------------------|---------------|-----------|----------|-----------|
| | First course. | Second. | Third. | Fourth. |
| Ordinary screw..... | 12m. 5s. | 20m. 27s. | 12m. 3s. | 19m. 56s. |
| De Bay propeller..... | 9m. 4s. | 16m. 42s. | 9m. 6s. | 16m. 10s. |

| SPEED IN KNOTS PER HOUR. | | | | |
|--------------------------|---------------|---------|--------|---------|
| | First course. | Second. | Third. | Fourth. |
| Ordinary screw..... | 10.924 | 6.45 | 10.954 | 6.62 |
| De Bay propeller..... | 14.557 | 7.898 | 14.505 | 8.162 |

| TURNING THE CIRCLE. | | |
|---------------------|-----------------|-------------------|
| | Ordinary screw. | De Bay propeller. |
| To port..... | 4m. 44s. | 4m. 33s. |
| To starboard..... | 6m. 51s. | 5m. 4s. |

The mean speed obtained on each trial was 8.73 knots for the ordinary screw and 11.28 knots for the De Bay propeller, or an actual gain for the latter of over 29 per cent for the same expenditure of power. Assuming that the resistance varies as the cube of the speed (and practically this ratio is greatly exceeded), since it required 584.51 horse power to drive the Cora Maria at a mean speed of 8.73 knots with the