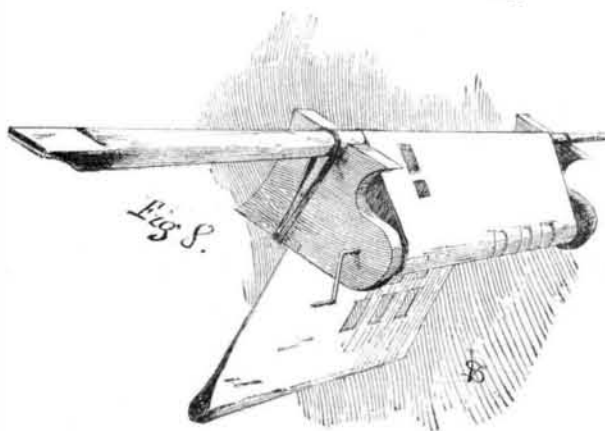
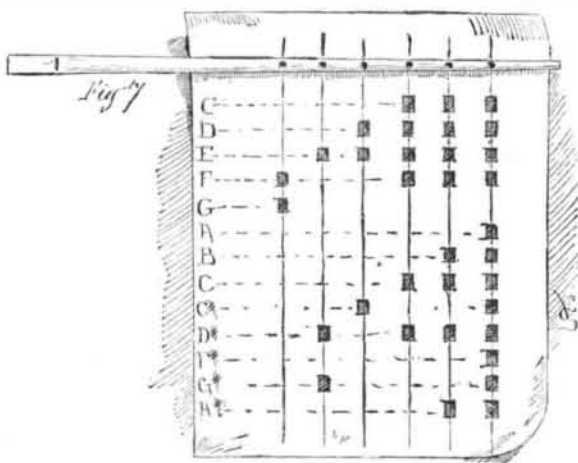


The Elevated Railways of New York.

Whatever may be said about monopoly, high fares, and watered stock, there is no local system of railways in the world that furnishes such admirable facilities for passenger transportation as the four lines of elevated roads in the city of New York. Since the trains commenced running on the two lines on the West Side, nearly six years ago, the traffic has steadily increased, until in the early and later hours of the day it is equal to the capacity of the trains, which run at intervals as short as safety will permit. The number of passengers carried on all the lines, comprising thirty-two miles of road, during the half year ending March 31, was over 46,000,000, and the whole number for the current year will probably fall but little short of 100,000,000. There can be no stronger evidence than this of the nature of the service rendered by these roads, not only to the vast population of the city proper, but to immense throngs of people from the suburban towns on every side, who come and go every day and at all hours of the day. The development of local passenger travel in the city within these few years has been tremendous.

The fares on the elevated roads are five cents during three hours in the morning and evening, which is the same as on the surface roads; and were it not that the cars on both are at such times equally crowded, it might be said that passengers have their choice between the two. The superiority of the former, however, is an ample compensation for the ten cent fares during the rest of the day. The speed of the trains, the capacious, easy riding cars, well warmed and lighted, the freedom from obstruction, comfortable stations and waiting rooms, with gate and platform men charged



THE INSTRUMENT COMPLETE.

with duties conducive to the safety and convenience of passengers, all contrast strongly with the absence of these most desirable things in the ordinary street car service. There is also a time schedule for all distances, which is adhered to with regularity and precision, and the average distance which a passenger is carried is five times what it is on the horse cars.—*Boston People's Fireside Journal.*

The Tunnel at Liverpool under the Mersey.

The great railway tunnel under the river Mersey is at the point of completion, and communication between the Lancashire and Cheshire shores will soon be opened. This engineering enterprise is just now of special interest to New York in view of the Hudson River tunnel enterprise.

The tunnel at Liverpool is a little short of a mile long, and, as usual in such undertakings, it has been bored simultaneously from both ends, with the intent to break from one perforation into the other near the middle of the river. The enterprise has required much patience, because the stream is deep. The entire tunnel had to be driven through rock. No check, however, has been experienced from encountering seams through which the water could break, and huge pumps have easily disposed of all ordinary leakings and drainage. The engines, working by compressed air or steam, for drawing away the refuse from the borers to the shafts and thence hoisting it to the surface, call for no special description.

Carefully lined with brick and cement, and having a width of twenty-six feet, the tunnel, lighted by electricity, will doubtless supply to general satisfaction the railway accommodation which has been the chief motive for its construction. It will take directly into the heart of Liverpool trains that hitherto have been forced to end their journey at Birkenhead, there transferring their freight and passengers to ferry boats. In Liverpool the tunnel will be continued so as to connect with all the converging lines of railways.

Correspondence.

Improved Nails Wanted.

To the Editor of the Scientific American:

I am a carpenter by trade, and find difficulty in driving the ordinary cut nails, owing to their square face on the point. A pointed nail will drive easier and nearer where it is wanted, and does not tear the wood as much. The square face carries more or less wood with it, making it scoot to one side, and very uncertain as to its direction.

On particular work I have taken a flat file, and by twirling the nail with the left hand, with the point of nail resting on a bearing, filed off the corners so as to leave only about half of the former face on the end, filing at about an angle of forty-five degrees, and it makes a vast difference in the driving, making a far better job.

Can you do or say anything to the nail makers to induce them to put a point on their nails, something like wire nails, but perhaps not quite so peaked or sharp, nor to a full point. This is of course more applicable to a finishing nail, but it would be of very much benefit for the ordinary nail; they can be stuck in their place with one blow, where two or more would be required with the square end, drive easier, and keep their direction better.

HAMILTON SHERMAN.

Waverly, Pa.

A Word with our Correspondents.

We have hesitated for some time speaking to our readers concerning the questions which are sent in to our Notes and Queries department, and we would like to correct the impression which seems to exist in the minds of some that the editorial department of the SCIENTIFIC AMERICAN is possessed of a wizard who longs to be questioned and who has answers always ready for any query which the curious may choose to put to him. Such, we beg leave to state, is not the case; the answers to most of the questions are only obtained after much study, and in some cases after we have been put to considerable expense to procure the desired information. We have always willingly done this, and we are still glad to serve our readers in any way we are able; we simply wish to call attention to the fact that nearly every question sent in requires some research to answer, and not infrequently costs us more than the price of a year's subscription to the paper to obtain the information. About two-thirds of the questions asked are answered by mail, so it is easy to judge by a glance at our Notes and Queries column what a mass of matter is sent in to us each week for reply.

We always answer every question that is asked, unless it is manifestly absurd or entirely out of our line. There is sometimes delay, owing to difficulty in obtaining the information or on account of the amount of matter awaiting publication.

No question should be sent on postal cards, or without a stamp for answer, for if the question is worth asking it is at least worth a stamp for reply. In cases where an early answer is especially desired, or where the information is for the benefit of the inquirer alone, a small remittance of \$1 to \$5 should be sent. Such letters take precedence, and are answered by letter, unless otherwise requested.

We refer to this subject, not to deter any one from asking questions, but to give us an opportunity to state to the individual inquirer what he has probably never realized before, and that is, that labor and money are expended to obtain from reliable sources answers to his and the multitude of other queries coming to this office. We actually pay out several thousand dollars a year to persons skilled in various departments of science and engineering for replying to these questions, besides what are answered in the editorial room of this paper.

Yankee Sardines.

It is said that fully nine-tenths of the so-called sardines consumed in this country come from the State of Maine. Very few of the genuine French fish are imported now. These Yankee sardines are nothing but small herring prepared and put up in boxes, with attractive labels and French inscriptions. In Eastport there are nineteen establishments devoted to the production of sardines, besides three at Lubeck, two at Jonesport, and one each at Millbridge, Lamoine, and Robbinston. In 1876 a New York firm did a lucrative business packing "Russian sardines" in Eastport. These were little herring packed in small wooden kegs and preserved with spices of different kinds. It occurred to one member of the firm that these little fish might be utilized to better advantage by cooking them and packing them in olive oil, like the French sardines. The experiment had been attempted several years previous without success. The difficulty was to eradicate the taste of the herring. It was quite easy to cook the fish, pack them in olive oil in tin cans, and seal them air tight; but when they were opened they had not the rich, spicy flavor of the regular French sardines. After a great many experiments, one of the manufacturers succeeded in producing a compound of oil and condiments which removed the trouble.

The herring mostly used for making sardines are about four inches long, and are taken in immense quantities along the coast of Maine and New Brunswick. They can be purchased of the fishermen for about \$5 a hoghead, although when the fish are scarce, as they often are in the spring, they bring as much as \$15 a hoghead.

After being caught the fish are carried immediately to

the factory and laid in heaps upon long tables. The first thing is to decapitate and clean the fish. The dexterity with which this operation is performed by the children who are employed is remarkable. On an average, seventy-five fish are cleaned and decapitated every minute by each child. Both operations are performed with one stroke of a sharp knife. A box holding about a bushel lies at the feet of each operator, and, as the cleaning is finished, the fish fall into the box. The pay for this work is ten cents a box, and some of the children make \$1.50 per day.

The herring are pickled for half an hour, and are then laid upon trays and placed in a large drying room heated by steam. After drying, the fish are thrown into large, shallow pans of boiling oil, and thoroughly cooked. They are then packed in tin boxes by girls and women, and in each box is placed a quantity of the patent compound of oils and spices. Covers are then fitted to the boxes, and sealed on by men. As air must be excluded, the cans, when sealed, are placed in a tank of boiling water, where they remain half an hour, and are then removed and placed on an inclined plane, so that the air inside rushes to one corner of the box. This corner is punctured with an awl, the hot air escapes, and the can is made air tight by a drop of solder. The boxes are then ornamented with gay French labels, stating that the inclosed are "Sardines a la Francaise." Some are labeled, "A l'huile d'olive." The oil used is cotton seed oil, such as is made in South Carolina principally, and is not always the best even of that. The best oil is used, however, for fish sold as "prime."

An Evening with Other Worlds.

A very interesting lecture entitled as above was lately delivered before the American Astronomical Society, Brooklyn, N. Y., by Mr. Garrett P. Serviss, of the editorial staff of the New York Sun. This gentleman has an attractive style of delivery, a wide command of language, and a rare power of interesting his audiences. The large hall of the Long Island Historical Society was crowded. Among other things the speaker said the motion of the earth upon its axis, and the motion of the earth in its revolution around the sun, were secondary to another and a mightier motion whose rate had not been accurately computed. This was the motion of our entire planetary system through space. Each of the great scenes of human history which had taken place upon the mighty stage of this moving air ship from age to age had been in regions of the universe separated by millions of miles. Beyond this solar system was a region of suns and worlds so vast that the imagination was powerless before it, but into which we were advancing.

The first pictures cast upon the canvas were illustrative of Jupiter, its famous red spot of 1878, and its equatorial belts. The changes in these belts and in the red spot had told astronomers that the surface of Jupiter was not solid, like that of the earth, but liquid, gaseous. In the revolution of the planet the red spot had gradually passed by noticeable spots in the great equatorial belts, whereas upon a body like the earth they would have maintained their relative positions.

Jupiter, he said, was apparently a world in process of formation. There was one occasion when the speaker had gazed upon it with Prof. Young, through the great Princeton telescope, which magnified it fourteen hundred diameters, or many millions of times, when it presented a picture whose beauty it was impossible to portray in words.

From pictures of Jupiter under different conditions, some of them handsomely colored, the lecturer passed to several showing Saturn and his mysterious rings, which he said would more nearly present their flat surfaces to the earth in 1885 than for many years before, and would then be very beautiful objects. Changes in these rings, their broadening, and their gradual approach toward the planet since the sixteenth century, were shown by views.

Mars, cast upon the canvas as a great globe, with lines of latitude and longitude, continents, seas, and islands, was apparently very much like the earth. It was so well understood by astronomers, and its surface so well explored and so completely named, that an astronomer who might be cast upon it would have no difficulty in finding his way about and in telling the inhabitants more than they probably ever knew about their own Arctic regions. In successive pictures the marked changes in the Arctic regions in winter and summer were shown, and the fact was noted that it had changing seasons like our own.

"Venus," the speaker said, "is the most shy and provoking planet of all, since she persists in constantly hiding her face beneath clouds. There was every reason to believe that, more than any other planet, she was like the world, with rain and snow and changing seasons, and perhaps inhabitants."

The transits of Venus and Mercury were illustrated in successive pictures, and the surface of the dead moon, with its great mountains and its vast craters, was shown by several views. The lecture closed with a startling view of the earth as it would appear from the moon.

THE American Angler, a weekly publication of which Mr. Wm. C. Harris is editor, has recently issued some beautiful "portraits of fishes." They are printed on bristol board, 7 x 11 inches each, and include 23 engravings of fish killed in fresh water and 37 of fish killed in salt water. These portraits have been carefully drawn from nature, and equal in accuracy and minuteness of delineation any efforts heretofore made in this line.