

THE GATHERER.

Poisonous Toys.

The public mind has been very much exercised of late months on the question of the harmlessness or otherwise of various articles largely used in households. Arsenic has been, according to recent revelations, employed to an alarming extent, and it is highly right and proper that the whole subject of coloured goods should be thoroughly gone into. Meanwhile we note with satisfaction that the French Government have strictly forbidden the use of all poisonous or deleterious materials in the manufacture of toys. Arsenic, lead, and other mineral poisons are thus, at one swoop, prohibited the toy-maker, who will have to fall back

secured by a system of frames consisting of pieces taking the shape of St. Andrew's crosses. In order to withstand the strain of tempestuous weather, the arch starts from a base having a width of 48 feet. The roadway rests on a metallic pillar, and is so attached to the arch that the latter is free to move without disturbing it. As will be seen from the engraving, the bridge is a structure of considerable elegance.

Two New Musical Instruments.

Musical people are indebted to the French for an invention that bids fair to largely modify existing pianoforte systems, and to make that instrument of



THE NEW DOURO BRIDGE.

upon innocuous preparations in turning out his "playthings." The price of these ornaments will doubtless be raised, but mothers will scarcely object to pay more for articles which, they will feel somewhat justified in assuming, must be tolerably harmless. It is hoped that toy-makers in other countries besides France will fall under the restrictive hand of Government.

The New Douro Bridge.

We give an illustration of the viaduct which has been designed to cross the river Douro for the Royal Company of Portuguese Railways. The roadway is nearly 1,130 feet in length from shore to shore, and is about 200 feet above the level of the water. A central arch crosses the stream, the depth of the river and the thickness of the clay-banks rendering the adoption of a single arch, with a span of 512 feet, and supported by rocks on either side, compulsory. The form of the arch is semi-lunar, and the solidity of the structure is

more widely extended usefulness. We refer to the piano with double key-board patented by Messrs. Mangeot. The two key-boards are placed in close proximity, so that each of the player's hands can cover the complete compass without crossing. The right hand plays up to the middle of the lower board, and then proceeding to the upper board it plays backwards to the point whence it started, having the bass notes under perfect command. A like power belongs to the left hand, except of course that it starts from bass and goes on (on the upper board) to treble. The advantages of the double key-board are obvious at a glance, and the resources of all pianos which are supplied with them must be very materially increased. A little practice will soon enable any player to perform on the instrument with efficiency.

The other invention is of a less high-class character, but is notwithstanding very ingenious. It consists of a cabinet organ in which a piece of music is to be placed and to be played, *secundum artem*, by working

the bellows with the feet, so that even a child who was strong enough to blow could entertain a company with some of the choicest effusions of genius. This instrument is not supplied with key-board or valves, but comprises the pedal-worked bellows, a set of reeds, and a simple piece of mechanism for carrying the music over them. The music is the essential feature of this parlour organ. The notes are holes punched in the paper, the length of the holes agreeing with that of the notes; and when notes of the requisite length are punched at proper distances, the paper, while passing over the reeds, shuts the wind off from some of the reeds and allows others to sound. The pedals do double work, for they blow the bellows and carry the music over the pipes. The sheets of music are 18 inches wide and from 40 to 100 feet long. During the performance the paper is unrolled from one cylinder and rolled on another, and there is a contrivance for re-rolling one piece while another is being played, so that the former will be quite ready for use when wanted. As instancing the immense number of notes in a musical composition, it is interesting to learn that the music of the overture to *Guillaume Tell*, specially punched for this organ, contains no fewer than 6,000 notes or holes.

Ostrich-Farmers.

Ostrich-farming seems to be the coming industry of the Cape. Already it bids fair to rival wool, and last year nearly £400,000 worth of feathers was exported, while large tracts of land have been enclosed for the rearing of the birds. But the farmers have to contend with a serious grievance. There is considerable traffic of an illicit kind in the feathers, and a very large owner asserts that something like 25 per cent. are stolen, while it is on record that £60 worth of feathers has been theftuously abstracted from a small flock of ostriches in a single night. The Colonial Legislative Assembly have been requested to introduce a measure to prevent these nefarious practices, by requiring sellers and purchasers of feathers to be licensed, and to keep a registry of all their transactions. To poach the eggs would be bad enough, but the thieves, with their usual discrimination and audacity, prefer higher game—at least the feathers. The Cape Government, in the usual Parliamentary style, promises to give the matter its earliest possible attention.

A Submarine Boat.

But a short time ago, the world was startled by the discovery of the deadly effects of the torpedo; and as this fearful engine of naval warfare is every day arriving at a greater stage of perfection, it bids fair before long to completely drive out of the field our costly ironclads. We cease, however, to marvel at the torpedo, when we hear of the latest discovery of scientific warfare—namely, a submarine boat. This boat, named after the designer the "Garrett" torpedo boat, can be made to sink, rise, move forward and backward, above or below the surface, at the will of the manipulator. It is cigar-shaped, running to a point at each end, in length about fourteen feet and in width about five feet. It is constructed of iron plates nearly a

quarter of an inch in thickness, and the weight of the boat including ballast is about five tons. It is propelled by means of a four-bladed screw, worked from within by an ingenious combination of treadle and fly-wheel, and is steered by means of an ordinary rudder. The boat is balanced evenly by means of a leaden keel nearly two feet broad and weighing about two tons. Access is gained to the interior of the boat by means of a little square tower, rising from the centre of the cigar to a height of about two feet. Once within, and having carefully closed this manhole, the operator can descend when he pleases. At each end of the boat is placed a water-tank, and it is by means of these tanks that he descends and ascends at will. If he wishes to descend he turns a small tap, and this filling the above-mentioned tanks with water, the boat naturally sinks; when he desires to rise to the surface he makes use of an air-pump, and expelling the water, restores the buoyancy of the boat. In the sides of the above-mentioned tower are four little windows, and in addition two small brass caps. These are flanked internally by a long kind of stocking, of stout water-proof material. The caps being removed, these stockings fill with water; and by turning them inside out, and using each as a glove, the operator gets the free use of his arms outside the boat to work his torpedo. In addition to working the boat, the submarine traveller has to keep himself supplied with pure air. The breath which he exhales passes by means of a tube through a kind of knapsack containing a mixture of chemicals, and by this means is purified sufficiently to be fit to enter his lungs again. The boat is, of course, lighted by electricity, as gas would increase the impurity of the atmosphere. A series of experiments took place a short time ago with the boat in question, and were, we are given to understand, highly successful. The present speed of the boat is only four or five knots an hour, but Dr. Garrett contemplates building a boat of much larger size, capable of accommodating three or four men, and has a scheme in view for increasing the powers of propulsion of the boat.

Testing the Atmosphere..

Ammonia being found to adhere to everything which is exposed to the atmosphere, its presence may be regarded as an index to the quantity of decayed matter in the air, a state of things for which Dr. Angus Smith has recommended a simple and effective test. By suspending glass flasks in his laboratory, and washing their external surface with pure water and testing with the Nessler solution, he observed ammonia after an exposure of the flasks for one hour and a half. As ammonia may be either pure or connected with organic matter, the test may be considered of negative rather than of positive value; and when ammonia is absent we may conclude that the air is not polluted by decaying matter, while, on the other hand, when it is present we may at once infer that there is need of precautionary measures. This test might be made readily available for air, sewer gases, overcrowding and cleanliness of dwellings, as well as for smoke and other of the usual sources of ammonia.

A New Gum-Tree.

We are not aware that there is any likelihood of the supplies of gum being exhausted at some period, more or less remote, but all fears on the subject—if such exist—may be set at rest for ever. For, according to authentic American information, the boundless West produces a tree that yields an abundance of gum, and which, along with existing sources of that material, will be ample for the world's requirements until a date too distant for mention. This tree is known by its Mexican name, Mesquite, grows to a height of thirty or forty feet, bears a pod or bean from six to nine inches long, and possesses the important feature of furnishing a gum which is almost identical with the gum-arabic of commerce. This article would appear to have been in common use in Mexican stores for a considerable time, and last year it formed an item of export, about 30,000 lbs. having been collected in the districts where the tree is found. The range of the mesquite extends from Canada River in the north to part of Mexico in the south, and from Texas in the east to the Colorado and Gulf of California in the west. As fuel, the wood knows no superior. The pods ripen in June, and contain a sugary pulp in which sweet and acid are pleasantly blended. They are highly valued for horse's food where grass is deficient, and the Indians greatly esteem their nutritious qualities. The natives bruise the fresh ripe pods in a mortar, then mix them with water and empty them into an earthen dish, when, after standing a few hours, they become a sort of cold porridge. For winter use the pods are gathered as they ripen, thoroughly dried, and stowed away in twig baskets covered with mud and grass to keep out the wet. As the gum exudes from the bark it collects into yellow lumps of various sizes. Being very brittle it can be readily pulverised. A single tree yields, in the ordinary course of nature, from one ounce to three pounds of gum; but were incisions made in the bark, the amount of the exudation would probably be much increased. The branches are said to give off a purer quality than the trunk. The mesquite abounds on plains over regions thousands of miles in extent, and grows luxuriantly in elevated and dry situations; when therefore the means of collecting it become more available, the gum will doubtless form a valuable export commodity, and ought to figure to some purpose in the revenues of the various districts in which it is cultivated.

Scottish Pearls.

The west coast of Scotland, which is almost proverbial for its rainy weather, was exceptionally favoured in the summer of 1878 with a very hot and dry season. So severe, indeed, was the drought that the upper waters of the Clyde and other streams were reduced to a remarkably low condition, and this state of the rivers brought into easy access the pearl-bearing mussel. The number of shells found was large, and for the better sort (which are of a pinkish colour) there was a ready market. A few years ago the beauty and

value of Scottish pearls created quite an excitement. Some of the gems obtained at that time fetched over £25, a few sold at from £3 to £10, but the generality of them were inferior, being worth about half-a-crown apiece. Queen Victoria and the then Empress of the French were among the purchasers of the pearls, Her Majesty having paid £40 for a very fine specimen. It is stated that one pearl is found, on an average, in every thirty shells, but that only one gem in twelve is worth anything. The "fishers" have learnt by experience that a young and smooth shell contains no pearls, and "molluscs" of that nature should be at once returned to the river, on the chance of their being more productive when they get older. Mussels gathered off the sandy bed hardly ever repay the trouble of their search, while those which are taken from stony places are the most likely to "have and to hold" pearls of some value. The fishery has been prosecuted with great diligence, but the results are of too uncertain a character to present any great inducement for enterprise on a large scale.

Answer to Double Acrostic on p. 703.

LONGFELLOW—"EVANGELINE."

L in E
O slashko V
N ikosi A
G ordia N
F ro G
E urydic E
L oya L
L azzaron I
O bero N
W if E

Grapes.

It may be useful to those who have the supreme felicity to "grow their own grapes," to have a word of caution and advice with regard to preserving them for autumn and winter use. The fruit should be picked as soon as ripe, and when perfectly dry packed in fine dry sawdust. Next, the bottom of a jar or box should be covered with sawdust, and then layers of grapes and sawdust placed alternately until full. They must be kept in the coolest place possible, free from frost. Above all things, don't pack them in bran, for if there be any heat, fermentation will ensue; or if any of the grapes should unfortunately burst, the bran will acquire a poulticy consistence round them, and the whole get musty. We once saw a large box full of splendid grapes which, with incredible thoughtlessness, had been most carefully packed in bran. The consignment was sent from the Cape; and *en route* heat had generated or some of the fruit had broken, and when the parcel reached its destination the grapes were found to be useless, and had to be thrown away. The contents of the box were perfectly warm throughout from top to bottom, and though the clusters had gone wrong, it was still possible to see how magnificent they had been.

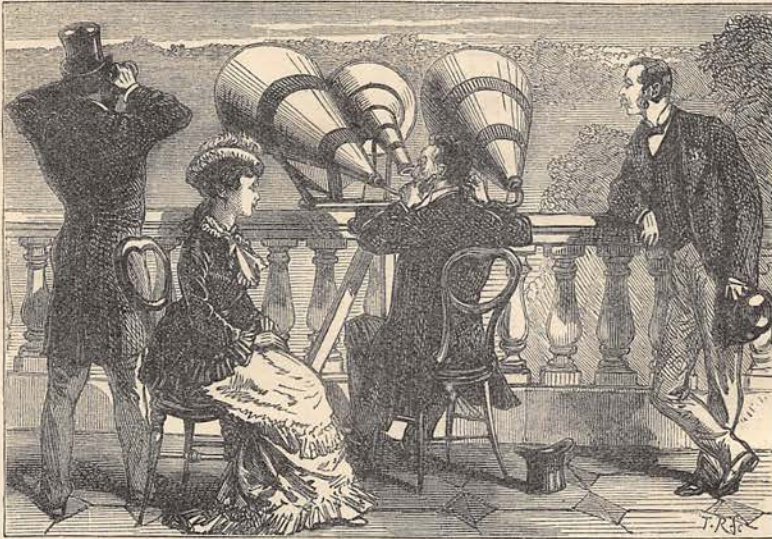
Silk from Mussels.

It is generally known that the mussel attaches itself to rocks and other substances by means of its *byssus*, a bundle of silky filaments that spring from the "foot" of the mollusc, and that are capable of being reproduced if destroyed. Is it possible to turn these strong silky threads to account? A German naturalist answers the question in the affirmative, and suggests that they might be found to form a raw material to rival the somewhat similar threads of the silk-worm. The toughness of the *byssus* is considered to be strongly in favour of its adaptation to some such use, and it is a fact that the threads of the Pinna, a relation of the mussel, have been spun into fine cloth and gloves, and have been used in Italy for that very purpose. As illustrative of the strength of the *byssus*-threads, it may be mentioned that the French "planted" the breakwater at Cherbourg with tons of mussels, in order to render it more secure by binding the loose stones together.

speaking trumpet, somewhat longer than the ordinary kind, and with a wider bell-mouth. The talking is done through the speaking trumpet, and the hearing through the funnels, each of which is provided with a flexible tube, the end of which is placed in the ear. Conversation and singing, whispering, and so on can be readily conducted throughout the distance already mentioned, another instrument being stationed at the end of the "journey;" and it will be seen that while the megaphone may afford some amount of amusement, it serves no important scientific purpose, and is little else than a huge toy.

Is there a Hole through Mercury?

In the course of his observations during the recent transit of Mercury, Mr. R. A. Proctor, the eminent astronomer, noted a very interesting circumstance. A bright spot was seen on the planet's disc, which appeared to him to be perfectly central and of sensible size. It looked, he says, just as if the disc were a



THE MEGAPHONE.

The Megaphone.

Mr. Edison's name must be familiar in a multitude of households where, only a few months ago, it was an unknown quantity. His inventive activity seems to continue as vigorous—though apparently less fine—as ever. He has now done for the ear what the telephone achieved for the voice, and the telescope for the eye; but it must be confessed that the megaphone, the instrument by which this is accomplished, is inferior as a piece of real scientific work to the other inventions which have rendered him famous; and it is not going too far to say that in itself it would not have secured for its author more than a local reputation.

In fact, the megaphone is simply an adaptation of the ear and speaking trumpets, by means of which conversation in the usual tone of voice may be carried on through a distance of from $1\frac{1}{2}$ to 2 miles. Two large funnels (Edison's are 6 feet 8 inches long, and have a diameter of $27\frac{1}{2}$ inches at the larger end) are erected on a stand, and between the two is fixed a

round piece of black card, and the bright spot a hole pierced though with the compass-point in striking the circumference. One feature seemed decisive of the subjective nature of the bright spot: when a small cloud passed over part of the sun's face, nearly the whole of which was in the field of view, the spot perceptibly diminished in brightness, though not crossed by the cloud. Another feature was that, as the spot thus waxed and waned, it was triangular in shape, but when the lustre of the spot was steady Mr. Proctor could not distinctly recognise this peculiarity. The appearance of the spot was not modified when the planet was allowed to approach the edge of the rather wide "field." Commenting upon this remarkable observation, an American paper suggests that Mercury may have a hole through it, and that the bright spot may have been nothing more or less than the sun shining through; while the question is also asked whether, if Mercury be tubular, the earth may not be so also.