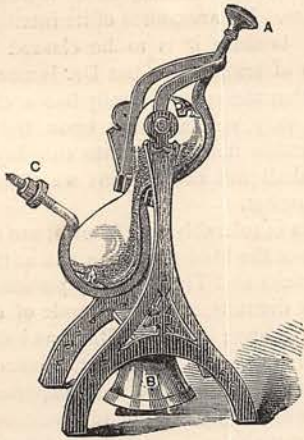


## THE GATHERER.

## An Alarm Sand-glass.

Those who are in the habit of boiling eggs by the aid of a time-measure may be interested to know that, by a very ingenious addition to the sand-glass, the efficiency of that instrument has been considerably in-



creased. The glass is fixed in a wire frame, and is provided with an axis which passes just behind the wasp-like waist and enters bearings in a swinging frame. The swinging frame is suspended between two standards with the object of making the appliance true, whether the pedestal stands on a level surface or not. The upper part of the frame is curved back to support the glass at a suitable inclination, while from the bulb of the glass the wire frame projects in a hammer-head, A, for striking the alarm, B, which is hung between the lower ends of the standards. On the screw-threaded arm, C, is placed a nut for regulating the action of the apparatus. The bulb containing the sand is turned upwards and rests against the frame. The weight of the hammer brings the centre of gravity of the glass above its centre of oscillation, and it is consequently top-heavy. When the sand has run into the other bulb, the glass is brought into a vertical position and it overbalances, when the hammer strikes the bell. This signal egg-boiler has been recently patented, and its advantages are obvious. By using it the housewife is spared all fidgety irritation, and can do other work while the eggs are being cooked, in the full assurance that the bell must ring, but that it won't ring until the sand has run out.

## A Chapter of Railway Accidents.

The following figures, culled from a Report to the Board of Trade, of the number of casualties on British railways during 1877, supply facts of painful and suggestive significance. They speak plainly for themselves, and require little comment at our hands. In

the year mentioned there were in all 1,227 persons killed and 5,713 injured; but from these figures we have to deduct 52 killed and 2,008 injured, in consequence of accidents not immediately caused by the movement of vehicles used exclusively upon railways. For instance, 6 passengers were killed while ascending or descending steps at stations, and 76 were injured from the same cause; 6 servants lost their lives and 462 were injured whilst loading, unloading, and sheeting waggons; 12 were killed and 131 injured by falling off scaffolds, platforms, &c.; 39 were hurt by being kicked or trampled on by horses, and so on. Making allowances, then, for catastrophes of this description, we have a total of 1,175 persons killed and 3,705 injured in the year 1877, in the course of actual public traffic on railways. Of this number, 35 deaths and 822 injuries resulted from accidents to trains and rolling stock. These disasters were chiefly due to collisions (182 for the year), by which 14 persons were killed and 551 (considerably more than one-half from this particular source) injured. By accidents other than those to trains, rolling stock, &c., but including those due to incaution, misconduct, and the like, on the part of the victims, 529 persons lost their lives and 878 were injured. Of this number 254 persons were killed and 141 injured by trespassing on the railways; 37 were killed and 19 injured by crossing the line at stations; 131 were killed and 66 injured at public level and other crossings; and 41 committed suicide. So that it would appear that at least 300 persons lost their lives by their own carelessness, and a wilful ignoring of company's rules, while at least 150 sustained injury from the same reason. The servants of contractors and the various companies, of course, poor fellows, contribute largely to these sad returns, for we learn that besides those killed and injured in the foregoing classes of accidents, 620 lost their lives, and 2,005 were injured. Most of the casualties occurred to the men in the discharge of their duty. Among other details we find these: 44 killed and 351 injured while coupling or uncoupling vehicles; 39 killed and 223 injured in getting on or off waggons, &c., during shunting; 129 killed and 147 injured whilst working on the permanent way, &c.; 154 killed and 162 injured while walking, crossing, or standing on the line on duty, &c. &c. At this stage we draw our summary to a close. The black record might point several morals, but we may say that one thing is clear—namely, that railway servants, in the risks they run, are deserving of the greatest consideration on the part of their employers, and that their claims for compensation in case of injury to life or limb have a very substantial basis. Another lesson we may draw from these figures is, that common sense and common caution, combined with self-control, would remove the item of accidents due to the absence of these possibly common-place but apparently rare virtues.



## Restoring Old Writing and Cleaning Oil-Paintings.

Should any of our readers possess a letter or other MS. of which the writing has become illegible from age, it may be restored by the following means—the recipe, however, being applicable to gall-ink only :—Paint the piece with sulphide of ammonium, which will bring out the lines distinctly, then wash off the surplus sulphide, and dry between filtering-paper. Or, a moderately concentrated solution of tannin, applied in a similar manner—the MS. being dried at from 50° to 60° C.—will effect the same result.

A new method of cleaning oil-paintings has also been suggested. The picture is taken out of its frame, thoroughly dusted, washed with a wet sponge, and then covered for eight or ten minutes with a thick layer of soapsuds, which are cleared off with a strong brush. The painting is next washed with water and dried, after which it is rubbed with a linen cloth saturated with nitrobenzol, frequently changed until the picture becomes clean. Of the efficacy of this process we are unable to speak, but we should not advise, in the case of valuable oil-paintings at least, any departure from the usual custom of sending them to a professional cleaner, who will not only do his work *secundum artem*, but whom you can also hold responsible for any damage the pictures may suffer in his hands.

## Mesostitch.

A name that Fancy wreathes around  
With blooming weeds by cypress bound.

I had a wife, she had a fate ;  
And oft I stand for man's estate.

I may be worthless ; may be worth  
What mortals prize the most on earth.

A mountain vast—statue I might have been,  
Colossal, such as ne'er the world hath seen.

One of three thousand (Uranus' granddaughters)  
Whose home and joy are in the bounding waters.

To make terms with the Persian, I was bid ;  
Historians know if or if not I did.

I turn and turn and yet have never done,  
And when I've turned an age I have but just begun.

A town for onions famed in days of old,  
Ere yet the world heard of crusaders bold.

J. G.

## Answer to Double Acrostic on page 511.

BENEDICT—BEATRICE. (*Much Ado about Nothing*.)

B a r B  
E l s i E { Longfellow's  
                  "Golden Legend."  
N e m e A  
EngagemenT  
D e m e t e R (Ceres.)  
I c e n I  
C r i t i C  
T i d E

## Where do our Sponges Come from ?

It is not unlikely many of our readers could give a more satisfactory reply to this than to another question, namely, What is a sponge? For long, it was doubtful whether this familiar object belonged to the animal or the vegetable kingdom, but naturalists are now agreed that it is unquestionably to be referred to the former. Commonplace article as an ordinary sponge is, it possesses a history, from its cradle in the ocean depths to its cradle uses in the nursery and elsewhere, that in point of interest and instructiveness it would be difficult to surpass. No anecdotes of its intelligence could be narrated, because it is to be classed among the lowest forms of animal life, but Dr. James Murie has ably shown that the sponge family has a charm of its own, and a very special claim upon the thoughtful study of scientific men. But into this branch of the subject we shall not enter ; pass we therefore to its commercial aspect.

Sponges, as is tolerably well known, are obtained in various parts of the Mediterranean and at the Bahama Islands. Greeks and Turks mainly pursue the fishery in the former districts, and their mode of diving, &c., are familiar to many ; but of the Bahama industry information is not so general. Last year, 250,000 pounds of sponges, worth about £28,000, were exported from the islands, of which 150,000 pounds were sent to this country, the remainder being reserved for the United States and Canada. About 500 vessels and 2,000 persons (mostly coloured) are employed in the fishery. The ships cruise about among the islands, their trips lasting from two to six weeks, according to the weather, the divers being unable to work when the water is rough. The sponges, when caught, are found to be a black gelatinous substance, giving off an unpleasant odour that increases with putrefaction. After the divers have collected a sufficient quantity, the sponges are taken ashore and buried in the sand, or exposed to the sun for a few days ; they are then beaten with clubs to remove the decomposed animal matter, which flies away in the shape of black dust. They are next thoroughly washed in sea-water, after which they are stowed in the vessel's hold. On arriving at port, the sponges are sold to merchants who trade in them, and by whom they are passed into the hands of the clipper, who cuts off all coarse matter, and otherwise trims them. This operation having been performed they are ready for the press, where they are baled for shipment. A sponge-press is not unlike a cider-press on a large scale, but it is made of iron, and requires from two to eight men to turn the screw.

## Observing the Vocal Chords.

Within recent years the human voice has been the subject of many varied experiments. One of the latest observers, under the eccentric title of Laryngostroboscopy, describes a method of examining the vibrations of the vocal chords during the production of sounds, and it is satisfactory to learn that the results he has obtained are more interesting and valuable than the outlandish name by which he has chosen to style his



process would lead us to expect. The apparatus consists of a laryngoscope mirror—an instrument now well known in the physiology of the voice, and of great service in some affections of the throat—a strong light, and an arrangement by which the light can be rapidly interrupted. The effect of this interruption is to prevent the impressions made by the vibrations upon the eye from being modified before they can be perceived, and the interruption itself may be produced by a perforated diaphragm revolving quickly at a rate proportioned to the rapidity of the vibrations of the sounding chord, or by a tuning-fork of the proper note. The interrupting apparatus must be placed between the light and the mirror, or behind the mirror, between it and the observer. It is by this means possible to notice not only the vibrations of one of the vocal chords, but also to compare the vibrations of one with those of the other.

#### Pots and Pans.

Utensils for boiling purposes have undergone little modification in shape from the remotest times to the present day. The reason for this is not far to seek. Water heated in a round vessel with upright sides would soon boil over, whereas when treated in a pot whose sides incline inwards towards the top, the bubbling waves of the liquid have a tendency to a common centre, and usually waste themselves in conflict with each other. Thus the cauldron, kettle, and saucepan have in all ages and in all nations much similarity in form. With regard to material, no doubt the earliest pots and pans consisted of such natural objects as adapted themselves to the requirements of cooking—as the gourd, pipkin, cocoa-nut shell, and the like—and among savage tribes these are still employed for the purpose. In course of time vessels of clay came into service, and afterwards metal was brought into requisition. The old Egyptians had pots precisely like the modern saucepan, and their larger utensils were furnished with the well-known ears and feet which may even yet be seen in some of the homesteads of our country. Shakespeare makes the "secret, black, and midnight hags" in *Macbeth* use a cauldron of this description, and it will be remembered that the savoury mess with which the more respectable Meg Merrilees appeased the hunger of worthy Dominic Sampson was dished from a like vessel. That these articles were common in China in dim antiquity, and that the Chinese had a superior method of mending them, can surprise no one, and is what we might have expected to find in a people who seem to have forestalled nearly every invention, great and small, that was ordinarily supposed to have first seen the light in other lands than theirs.

#### Planting Fish.

Some of the American rivers are from time to time stocked with fish which are either of rare occurrence in them, or are not found at all. The Potomac was recently planted with some 600,000 shad, and the experiment has been so far a marked success. The

eggs were gathered in Albemarle Sound, off the coast, and when the vessel started it contained 800,000 eggs, but a large number of them were injured from some cause or other not clearly ascertained. The hatching process went on apace, and by the time the ship reached the river the young shad were nearly three inches long. At this point the planting began, and was continued until the vessel was moored at the wharf at Washington. The process of planting is both easy and simple, and consists merely in lowering cans containing the infant fish down into the water, and allowing the contents to escape into their native element. The Americans would appear to be more successful than ourselves in the matter of stocking our colonial rivers with salmon, for we understand that from 1,000,000 eggs of California salmon supplied to the New Zealand Government at its expense, 95 per cent. of live fish was obtained. Probably, however, there is some difference between the Californian and European salmon that may explain this state of affairs, which, however, is extremely gratifying, and upon which our Antipodean friends are to be heartily congratulated.

#### Answer to Hidden Quotation on page 510.

"But O! for the touch of a vanished hand,  
And the sound of a voice that is still!"

*Tennyson's "Break, break, break!"*

#### A One-Man Power.

The term horse-power is, as our readers are aware, used to express the force of a motive-power, and is commonly applied to the steam-engine. Estimates of the work done by a horse working eight hours a day vary, but as it signifies little what number is adopted provided that the same be always and everywhere used, the original estimate of Watt—namely, 33,000 foot-pounds per minute—is still reckoned a horse-power.

Our American cousins, with customary fauciful ingenuity, have calculated what constitutes a one-man power, and they state it to be the raising of seventy pounds one foot high in a second (or 4,200 foot-pounds per minute) for ten hours a day.

#### Japanese Bronzes.

Bronze statuettes, vases, candlesticks, and a great variety of knick-knacks are made in Japan in a thoroughly business-like fashion. A subject having been decided on, the designer makes a sketch of it on paper, and then a specimen figure in wax. When this has been approved, the artist proceeds to make a finished model with much patience, dexterity, and skill. The model is then pressed into fine clay, and into the mould thus obtained the metal is poured. After cooling, the mould is broken off, the rough bronze filed away and a lustre imparted, when the casting is ready for delivery. It is significant and pleasurable to be informed that many of the designs show the influence of foreign ideas, and are the better for it. The articles range in value from \$30 to \$100, say from £6 10s. to £20 or £25, but we presume their artistic excellence is great.

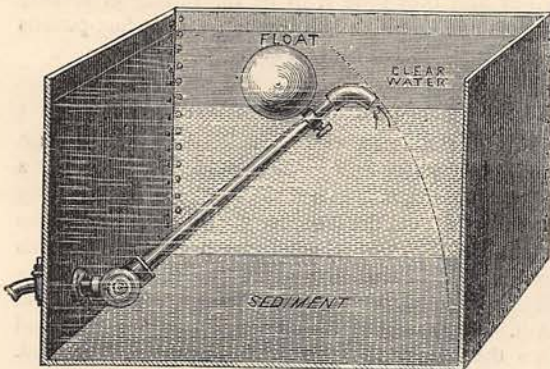


### The Phoneidoscope.

The marvellous rapidity with which the inventions of the telephone, phonograph, and microphone followed one another will receive permanent record among the *memorabilia* of science. Reference has already been made to these instruments in the pages of CASSELL'S FAMILY MAGAZINE, and readers will remember that in the two first-named a thin disc of metal is thrown into vibration by the human voice. It has been proposed to render these vibrations visible by the use of a film of soap-solution, and the experiments can be effectively made by means of a recently constructed instrument known as the Phoneidoscope. This instrument consists of a cylindrical L-shaped brass tube, the horizontal limb of which has a caoutchouc tube ending in a wooden mouthpiece, while the open end of the vertical limb is surmounted by a brass ring, that carries a blackened brass disc pierced with an aperture of variable shape and size. This aperture is covered with the film of soap-solution, which soon becomes thin enough to show the wondrously beautiful colours familiar to every one in a soap-bubble. On singing near the mouthpiece, the air in the tube is thrown into vibration, and the soap-film at once takes up the motion, which results in the production of many lovely colour-designs, often arranged in definite form, which, as the film becomes thinner, are sometimes simply superb. Change of pitch and difference of quality effect remarkable changes in the reflected figures, and the shape and size of the film are not without influence, as may readily be observed by using discs with apertures of different forms and magnitude. It is the varied colour-display that makes this experiment both novel in character and exquisite in demonstration.

### An Improved Cistern.

Our engraving represents a simple but effective means for draining off clear water from the cistern, not polluted by any of that dust or dirt that will find its



way into even the best-regulated reservoirs. The tap is attached outside near the foot of the cistern, and the flow-pipe within is fastened at its top to the float, and rises and falls with it. All sediment having a natural tendency to sink, it is evident that while the bottom of the cistern will be covered with a layer of the sediment, the water above will remain clear. The water

entering the outlet-pipe from the surface, this layer is undisturbed, and consequently when the water is drawn off it will be always clear, and as wholesome as unfiltered water can be reasonably expected to be. The pipe and float arrangement is the useful appliance, and it is scarcely necessary to point out that by placing the tap at the top of the receptacle, the same purpose would not be served, for as soon as the liquid sank below the level no water could be drawn off.

### A Suggestion on Behalf of Divers.

Under no circumstances can the occupation of a diver be considered pleasant: that it is an unhealthy one may readily be believed, and it ought to be, and we trust is, profitable. It is stated that the operations of this subaqueous worker are seriously hampered at any depth in excess of forty feet, by the pressure of water, which is such as to prevent him from remaining underneath for more than twenty minutes at a time. If no return-pipe be used, the air he breathes is subject to a pressure due to the column of water above him; and if a return-pipe be used, he will have to contend against a pressure of about a ton on his chest, unbalanced by any compensating effect of compressed air within. It has been proposed to obviate this by enclosing the diver's body in a loose-fitting coat of metal, which should relieve the principal parts of the body from all external pressure of the water. The limbs would be covered with the usual india-rubber cloth, the joinings with the trunk being carefully made water-tight. The pressure on the limbs would be of little consequence, while the case need not be larger than the body by more than one inch all round, and would not interfere with the freedom of the diver's arms.

### Railway Passengers and the Guard.

Any means by which immediate communication between travellers by rail and the guard can be effected is worthy of serious consideration. A Mr. Morris has patented what appears to be an ingenious and practicable plan for attaining the object in question, and one that will compare favourably with the system now in vogue. Attached to the end of each carriage are two waterproof detonators or fog-signals. In the centre of each compartment a short chain is suspended a few inches from the roof, and by its means a passenger with one pull can explode the fog-signals in rapid succession, and at the same time cause a red or white semaphore to appear at right angles to each side of the carriage. The compartment in which the signal has been given being thus infallibly indicated, this very fact would probably alone prevent any misuse of the communicator. By a simple addition to the apparatus, the lamp nearest the signal end of the carriage can be raised above the roof so that it could be seen at night by a signalman, and the train be stopped at the next signal-box. But this additional precaution is considered hardly necessary, because if the guard did not hear the first fog-signals they could be repeated from carriage to carriage until his attention was attracted. The appliance for each carriage is complete in itself.