

## THE GATHERER.

## An Improvement in Railway Lights.

The old systems of lighting railway carriages by oil or petroleum are so inefficient, that a good plan for lighting them with gas is a boon to travellers. Mr. Julius Pintsch's method is highly successful. It is in use on many of the German and Russian railways. The Metropolitan Railway Company is adopting it, and some other English railways show a similar disposition. By it each compartment is lit by a single gas-jet so as to enable passengers to read in the night. This is the degree of illumination required, but it is just the degree which most railway companies using oil lights fail to supply. A four-compartment carriage is fitted with four lamps fed by gas contained in two holders carried beneath the carriage, and these holders are filled with compressed oil-gas sufficient to keep up the light for thirty-six hours. Oil-gas is used because it is richer than coal-gas, its illuminating power being three and a half times greater; and, moreover, coal-gas, when compressed, loses so much of its hydrocarbon as to deprive it of almost all its lighting power. The reason why other systems of lighting trains by compressed gas have not hitherto given more favourable results, is largely due to the fact that no regulator which would automatically keep the stream of gas uniform and the lights steady, in spite of the oscillation of the carriages, had been invented. Mr. Pintsch's regulator effects this satisfactorily by means of a valve controlled by a lever, which is actuated by the pressure of the gas on a membrane. The burner used is a small fish-tail, and the lamp is so constructed that none of the products of combustion can enter the carriage. Provision is also made for turning the light suddenly low, to meet the wants of trains which run through tunnels and daylight spaces alternately. The gas is made by distilling petroleum or fatty refuse in an improved retort-furnace of Mr. Pintsch's design, and is supplied to the holders at a pressure of six atmospheres. Pintsch's process has won golden opinions in different quarters, notably the Society of Arts' special gold medal for railway lamps in 1877; and it effects a saving over oil or the ordinary gas-lighting systems of about fifty per cent. Of course tramway cars, steamers, coaches, as well as factories and private houses, may be lit by the same plan; and it is particularly well adapted for lighting river and sea buoys or light-ships, the gas being made on shore and regularly supplied at intervals.

## The Fattest Fish in the World.

Some fish have fantastic looks, others have strange ways, and others have curious qualities; and it is to this last section that the Ulikon belongs. Among the oddities of the ocean world he must take high rank. He is found off the coasts of British Columbia and Southern Alaska, is silvery in appearance, averages fourteen inches in length, and has a general resem-

blance to a smelt. In these respects the Ulikon possesses nothing peculiar, but when we come to consider his chief property we shall be somewhat enlightened. He enjoys the rare honour of being the fattest fish in the world, and accordingly he undergoes a proportionate degree of persecution. The natives of the shores which the unhappy Ulikon frequents engage in fishing for him two or three weeks at a stretch, and they generally succeed with great ease in obtaining large quantities of food and fuel. After the Ulikon has been dried in the usual rough-and-ready style of primitive people, he is quite fit for use as a torch. When the fisher-folk require a light, all that they have to do is to touch the tail with a piece of live fuel, when this candle-fish will burn brightly for a considerable time. Supplying, as he does, the natives of the Alaska and Columbia coasts with food and with light, it is needless to say that the Ulikon, though an odd, is a very useful member of piscatorial society.

## A Novelty—Steel Nails.

Iron is gradually being superseded by steel in many departments of engineering, and now we have to chronicle the introduction of steel nails by a well-known firm in Middlesborough. These nails are made by special machinery, they are well shaped and remarkably tough. A nail selected at random can be bent upon itself cold, while it is firm enough to pierce the hardest wood. Iron nails are more or less unsatisfactory articles, and these steel ones are well worthy of a trial.

## Cow-Tree-Milk.

Amongst the numerous curious objects exhibited in Paris last year, were some bottles of Cow-tree-milk from Venezuela.

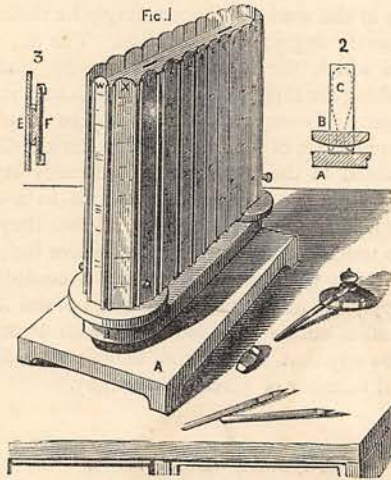
This milk or juice is extracted from the plant known as the *Brosimum galactodendron*, and an analysis of the milk has been made, with the following results. The component parts are:—

Alkalies	...	...	...	...	5 per cent
Caseine	...	...	...	...	17 "
Sugar, &c.	...	...	...	...	28 "
Wax, saponifiable mass	...	...	...	...	35.2 "
Water	...	...	...	...	58.0 "
Undetermined	...	...	...	...	1.8 "

It will thus be seen that this juice bears a resemblance, so far as its sugar alkalies (phosphate) and fatty constituents go, to the milk of the domestic cow. Farther, it has been ascertained that the waxy mass in the juice of the plant very much resembles the butter churned from ordinary milk, the solid constituents being almost identical; while those of the vegetable milk generally are three times as great as the solid constituents of cow's milk—resembling cream, in fact.

### A Revolving Index.

It is a matter of every-day experience that our stray notes occasionally disappear in the most mysterious manner, and we cannot therefore do better than call attention to an ingenious appliance, the patent of Mr. Albers, Carthage, Illinois, for systematically registering these memoranda and keeping them together in one



place. On referring to the engraving it will be noticed that it consists of a series of vertical slides attached to a stand. From the centre of the base A, there rises an upright post C, that passes through the lower bar, B, of the frame supporting the vertical slides, which are fastened to an endless belt E. These slides are made of sheet metal bent outward to form a receptacle for strips of paper or other material F, upon which the notes are to be written. On the upper end of each strip is placed a letter of the alphabet, while on the lower end at certain intervals knobs are fixed for convenience in turning the endless belt. The mode of using the apparatus is very simple. Suppose the entry you wished to make began with a W, you would turn the machine by means of one of the knobs until the strip of that letter came opposite, jot down the item with your pencil, and then be ready for the next entry. When a strip is filled it is withdrawn from the slide, placed in a drawer, and a fresh strip inserted in its stead. It will be seen that this appliance would be of great service to book-keepers, students, journalists, and others who like to work in a methodical way.

### Tempered Glass.

Attention has recently been called in several scientific quarters to the fact that vessels of tempered glass are very apt to break spontaneously—that is, without any assignable cause. On one occasion a filtering flask belonging to Herr Lamek, a German chemist, left in quite an undisturbed position, suddenly flew into a thousand pieces, several of which struck his face. The defect has, we are told, been found to be due to over-hardening, and can be scientifically detected; but it is right that this peculiarity of hardened glass should be known to all who employ it.

### A Golden Meteorite.

The *Yuma Sentinel* of California describes a meteorite recently found in the Mohave desert, which is ingrained with gold. The nature of the main mass of the body has not yet been determined; but it is of a steel-grey colour tinged with yellow and gives a crystalline fracture. It has some free gold on its surface, and it resists the action of various acid baths, as well as of cold chisels, and, unlike most meteorites, is not magnetic. We have long known that the rivers of California roll over sands of gold and that its "craggs glitter with treasure," but we did not dream that the precious metal even falls from the skies on this veritable El Dorado.

### Blasting by Quicklime.

As a substitute for blasting gunpowder in fiery coal mines, it is now proposed to use unslaked lime compressed into cartridges and well tamped down into the bore-holes. Its dislodging power is to be brought into play by pouring water on the lime, so as to cause it to expand in slaking itself. It is claimed for this harmless mode of blasting that it will neither vitiate the atmosphere, shatter the coal, nor endanger the lives of the colliers.

### A Railway to Timbuctoo.

A railway has actually been projected across the Desert of Sahara, and a French engineer has made his report upon the scheme. The great difficulty to be overcome is the scarcity of water, which is as necessary to the locomotive as to the "Ship of the Desert." The projected railroad is to run from Algiers to Timbuctoo, a distance of 1,300 miles. The rails will be laid on sand generally, though occasional strata of volcanic origin crop up in places. It was thought that the heat would materially affect the success of the undertaking, but 75° Fahrenheit has been ascertained



to be the average temperature, though the nights are cold. It is proposed to run three trains daily, for which number only sufficient water can be procured.

### The Argan-Tree.

An account of this remarkable tree, which is for the natives of certain parts of Morocco what the Mauritania palm is for the Indians of the Delta of the Orinoco, has recently been given us by Consul Drummond Hay in his report on Mogadore, the principal seaport of that country. The peasants extract the oil which they require for cooking and lighting purposes from the nut of the tree. In this work they are assisted by their goats, which swallow the fruit for the sake of the rind, but being unable to digest the nut they throw it up again, and it is then gathered into the general store. For private consumption the peasants rarely make a large quantity of oil at a time, but simply crack open a few nuts, and, after toasting the kernels in an earthenware dish, grind them to flour. The oil is extracted by adding water in small quantities to the flour, which is stirred in a bowl, and as the oil is separated from the water the flour hardens into a cake—which, like our linseed-oil cake, is an excellent food for cattle, especially when mixed with the dry rind of the nut. The argan-tree is invaluable to the natives in times of drought, for it suffers little from the latter. The goats also browse on the leaves of the growing tree; the empty husks of the tree make excellent fuel as well as the timber, from which large quantities of charcoal are made.

### Silent Gas-Engines.

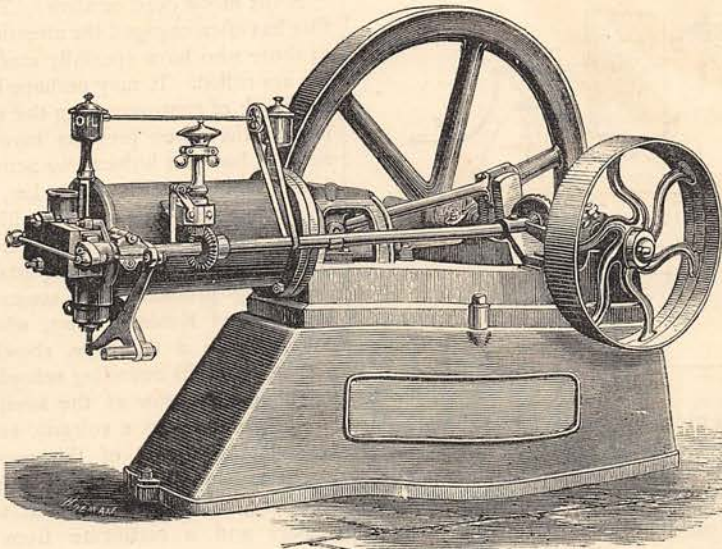
Gas-engines, as is well known, derive their motive power from small explosions of coal-gas mixed with air, so timed as to drive the piston from end to end of the cylinder. They are of special interest just now from the use that is being made of them in rotating dynamo-electric machines for generating the electric light; it being found that an intenser light can be produced in this roundabout way, than would be obtained by simply burning the gas itself in any of the burners now in vogue. Of these gas-engines, that termed the "Otto Silent" appears the best. Its special merit over the others consists in the fact that it works by a sustained pressure on the piston and not by abrupt shocks. This is effected by diluting the explosive gas with more air than is required for the complete combustion of the gas. Such a mixture

burns more slowly than one containing a greater proportion of gas, while the heat, generated by combustion of the mixture, expands the air which is unconsumed, and causes it to exert a sustained pressure on the piston without any jarring. At each outstroke of the piston the gaseous mixture is admitted into the cylinder, and, when compressed by the return instroke sufficiently to explode, it is ignited by side lights. The amount of gas consumed per hour for each indicated horse-power of work done by the engine is given as 21.5 cubic feet, thus making the cost of each horse-power about a penny.

### Salt as a Preservative of Wood.

It may not be generally known that salt is an excellent preserver of timber from dry rot. The props and galleries of the great salt mines in Poland and

Hungary are found to endure for ages without any apparent decay. Wooden piles driven into salt marshes last far longer than those driven into fresh-water mud; and experiments have been made which show that dry rot may even be checked after it has begun, by immersion of the infected wood in salt water. In many countries the custom prevails of soaking logs in the sea before sawing



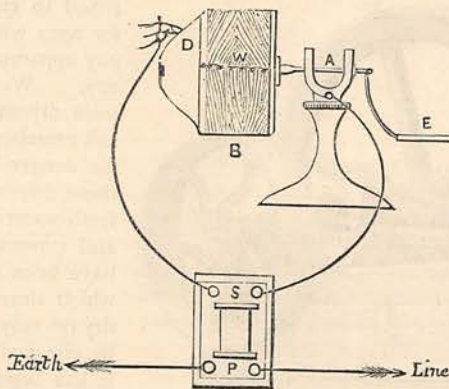
THE "OTTO SILENT" GAS-ENGINE.

them up, especially logs of hard timber, such as oak, elm, and ash, with a view to render the wood more durable.

### Gray's Finger Telephone.

Mr. Elisha Gray, of Chicago, has won fame as an inventor of what are called "harmonic telephones," or telephones for transmitting musical notes to a distance, in contradistinction to telephones conveying speech. The most interesting of these is the "finger" or physiological telephone, in which the instrument for receiving the sound consists of the living finger rubbing on a metal plate. This apparatus is illustrated in the figure. The portion of the telephone which sends the musical note or tone consists of a battery to supply the electricity and a tuning-fork giving out the note to be sent. This fork is so connected up between the battery and the telegraph line that, when vibrating, it breaks the circuit and interrupts the current as many times in a second as there are vibrations in the note. These pulses of

current, when they reach the receiving apparatus (see figure) by the "line," are passed through the primary coil, P, of a small induction coil; and corresponding intenser pulses can thus be drawn from the secondary coil S. It is these secondary pulses which are made to reproduce the original note. They are caused to pass from the operator's finger to a metal plate, while the finger is rubbing the surface of the plate. To secure this friction easily, the plate is made to revolve on an axle, and the finger is merely kept in contact with it, as shown in the figure, where B is a hollow resonance-box having a zinc face D, and mounted on an axle A, which can be turned by the handle E. One wire, carrying the currents from the secondary coil S, is held in the hand, and the other is in connection with the axle A, the circuit being completed through the finger, the zinc plate, and the wire W. As the skin rasps along the surface of the zinc while the latter is being



revolved, a sound is given out at the finger-tip on each passage of a pulse of electricity, and the rapid succession of these sounds produces the original note of the tuning-fork. The cause of this curious telephone, which was discovered by accident, is believed to lie in the fact that the passage of the electricity from the finger to the metal diminishes the friction between them, so that the finger *slips* as it were, the recurring slips causing the note; and this view is borne out by the fact discovered by Mr. Edison that certain alkaline salts, which are present in flesh and other animal tissues, become slippery under the action of electricity. In fact Edison has practically applied this property to the formation of a harmonic telephone receiver, and also to a telegraphic instrument, in both of which, paper saturated with one of the chemicals in question (nitrate of sodium) is employed.

#### The Willow as a Febrifuge.

The Australian blue-gum tree (*Eucalyptus globulus*) has at last been obliged to acknowledge a rival in the common willow. The very beneficial effects of the former tree in malarious regions are well known, but a letter from the Swedish consul at Smyrna confirms the statement as regards the humble willow. Before the Eucalyptus was even heard of in Asia Minor, it seems that the bark of the willow had been used as a febrifuge; and the ease with which that tree can be

reproduced, its rapid growth, and its excellent qualities both for fuel and agricultural purposes, caused M. van Lennep to plant it in company with plane-tree seeds in marshy spots. The result has been very marked; where a few years ago timber and even small trees were very scarce, M. van Lennep has now a most luxuriant growth of trees, and plenty of fuel, while fever is decreasing.

#### Answer to Double Acrostic on p. 192.

J ulianshaa B  
O rsin O ("Twelfth Night")  
H oratius S (Cocles)  
N o W  
S a l E  
O w L  
N ourmaha L ("Lalla Rookh").

#### An Active Volcano in the Moon.

Is the moon dead or alive? This interesting question has often engaged the attention of selenographers, as those who have specially studied the earth's satellite are called. It may perhaps be correct to say that the result of controversy on the subject, briefly stated, is that the moon presents many traces of volcanic activity, but that hitherto no active volcano has been found. There *may* be life in her, though unfortunately no observer has seen anything like an eruption. Evidence, however, reaches us from America which, if corroborated, has a most important bearing upon the perplexing problem. It seems that a Mr. John Hammes, of Keokuk, Iowa, who travels about the country with a telescope, showing the moon and planets to pupils attending schools and colleges in the neighbourhood, saw at the town of Oskaloosa what he supposed to be a volcanic eruption in the moon. He sent a sketch of the occurrence to Admiral Rodgers, superintendent of the U.S. Naval Observatory, who requested him to furnish full particulars and a certificate from the witnesses. A testimonial, apparently satisfactory, to his honour and trustworthiness was speedily forthcoming, but we do not learn that further details were offered, probably because the first communication contained all the information that Mr. Hammes had to give, unless he chose to "enlarge" upon the subject.

#### Floating Soap.

A patent has been granted for the formation of cakes of soap which will float on the surface of the water. It consists in making the core of the cake of a light substance like cork, or in forming cakes with hollow cavities in the interior.

#### Detachable Decks.

Mr. Fairlie, the well-known inventor of the bogie narrow-gauge locomotives, has suggested an ingenious plan by which the decks of river-steamers are rendered buoyant to a degree to insure passengers against drowning.

The terrible fate of the *Princess Alice* steamer has apparently given rise to the invention. The arrangement consists in a movable deck, complete in

itself, which can be disconnected from the hull. In case of accident occurring the latter would sink, but the deck will remain afloat sufficiently long to secure the safety of the majority of the passengers. We wish Mr. Fairlie all success in his useful and humane efforts.

#### Platinised Iron.

Huge rusty iron palings round a public building have generally an effect the reverse of pleasant. Nevertheless in most cases they are necessary as a protection to the buildings, however objectionable the appearance may be. It is, therefore, with satisfaction that we hear of M. J. B. Dodé's recently invented process of platinising iron—or, in other words, to coat iron over with platinum—which will make the metal ornamental and also prevent oxidation. Numerous attempts have been made to coat iron with platinum, but hitherto without success. M. Dodé's process is, to first prepare the iron by coating it with a compound of borate of lead and oxide of copper made into a pigment with turpentine. The iron thus prepared is made red-hot, whereby the pigment is burnt in, the iron cleansed, and its pores filled up. In this way the iron is made smooth, which is a preliminary necessity, unless the iron be polished. The platinum is then applied. The secret of the invention is said to depend upon the medium in which the platinum is held while suspended in essential oils. The articles are then again made hot, and the oils being driven off during the process, the platinum remains on the article, imparting the appearance of silver. The cost of platinising is one-fourth that of electro-plating, and for the carrying out of the invention M. Dodé does not require pure platinum, but uses the crude ore of that metal. Examples of ornamental iron coated by this process have been exhibited in London, and they are said by competent judges to present a beautiful appearance.

#### Triple Acrostic.

Though through earth's fairest scenes we roam,  
Our thoughts will ever wander home  
To friends whose faces vanish not,  
To "auld acquaintance" ne'er forgot.

Too much of the world in our minds we carry;  
He, bearing the earth, was obliged to tarry.

What is he called who strikes a smaller lad?  
A bully? Well, an adverb quite as bad.

'Tis reaped and gathered, bleached and spun,  
Before its use has yet begun.

The old stage-coach and / are left behind;  
In railway trains now travel all mankind.

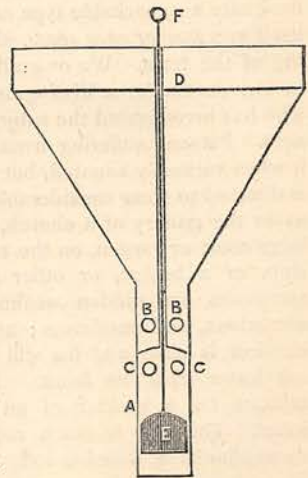
#### Electricity and Gardening.

Agricultural chemists have long been of opinion that the lightning flash exercised an important influence on agriculture, by reason of the electric fluid helping to form nitrous and nitric acids, with their ammoniacal salts. But it has recently been discovered by a French physicist, M. Grandeau, that the feeble electric currents known to be ever present in the atmosphere, exercise a far more important influence on the welfare of vegetation than the violent lightning discharge.

M. Grandeau reared plants of tobacco, wheat, and maize, both under the influence of atmospheric electricity, and excluded from it by a metallic frame which acted as a screen to ward it off the enclosed space; all other circumstances, such as the size of the seedlings, amount of air, earth, water supplied, and temperature, being the same for the two specimens compared. After being pitted against each other for several months, the plants were weighed, measured, and analysed, and the results of all the experiments show that the plants defended from the influence of electricity had built up about 60 per cent. less of living tissue than those exposed to the atmospheric electricity; in other words, they were stunted to less than half the size. M. Grandeau also measured the state of electrification beneath those large trees and bushes which appear to impoverish the soil below, and found it to be *nil*, a fact which may partially account for the absence of herbs under such trees. Similar experiments by M. Celi have confirmed M. Grandeau's curious results, which point to a time when the atmosphere of a forcing-house may be advantageously charged with electricity, as it is now charged with heat. The nature of iron conservatories and vineries makes them act as a kind of screen to atmospheric electricity, and there is therefore all the more reason that electricity should be artificially supplied. In connection with this subject, we may add that Professor J. Macagno finds that in grape-growing a decrease in the intensity of the available light hinders the formation of sugar, and that the formation of other assimilated products is directly proportionate to the intensity of the light. Perhaps the time is not far distant when the electric light will be used for forcing rare fruits and flowers during our dark winters, as much as artificial heat is now.

#### The Indicating Funnel.

In filling a cask, can, or jar by means of a funnel it is usual, in order to find out when the vessel is properly filled, to insert the forefinger into the bung-hole. This is, however, an awkward and time-wasting plan, and Mr. Eugene Carless has patented a funnel which does not require to be removed until the cask is full, and moreover the funnel indicates when this is the case. One person, by the use of these funnels, can fill as many casks as there are taps to the store-vat, while with the ordinary funnel only one cask could be attended to at a time. The figure represents one of these funnels. The spout, at about one-third down,



has two round openings in it to allow the liquor to flow out of the funnel into the cask; and just underneath these holes the spout is itself closed by a partition C C. A narrow tube, supported at the top by a bar D across the funnel-mouth, runs down the funnel and opens, through the partition C C, into the lower part of the spout A. This tube encloses a rod which carries a float E at its lower end, and a ball F at its upper. Now, as the end of the spout A is open to the cask, when the liquid rises in the latter it raises the float E, which in turn raises the ball F, until the float is stopped by the partition C C, when the ball ceases to rise and indicates that the cask is filled within an inch of the bung-hole. Similar funnels made to indicate the quantity in a cask, or to fill casks with a given quantity, are also made under this patent. To the manufacturers of petroleum and other dangerous chemicals this invention will be especially useful, while the amount of "waste" in filling prevented by this means must be enormous.

#### Making Paper Transparent.

All who have occasion to make use of tracing paper may manufacture it for themselves by damping the paper to be employed with pure fresh-distilled benzine. So long as the benzine remains in its substance the paper is transparent, and permits of tracings being made or of writing and water-colour drawing on its surface without any "running." But as the benzine evaporates the paper recovers its opacity; and if the drawing be not completed before this happens it is necessary to damp it again. Of course this very fact that the paper again becomes opaque is an advantage over the permanently transparent tracing paper, which is flimsy and unmanageable. Even stout drawing-paper can be rendered transparent by this process.

#### Agoraphobia.

This word, which is imported direct from the Greek and is much less formidable than it looks, is used to designate a remarkable type of disease that manifests itself in a *fear of open space*, which is the literal meaning of the term. We owe all that we know about it to Dr. du Saule, a distinguished French physician, who has investigated the subject with great thoroughness. Persons suffering from this illness experience it when variously situated, but always when their gaze is directed to some considerable expanse of open space, as in the gallery of a church, at a window facing a large court or garden, on the top of an omnibus, on a ship, or a bridge, or other slight elevation. The symptoms are sudden weakness of limbs, tingling sensations, and numbness; and though the patient's intellect is clear and his will perfectly free, he does not know what he fears. He will, for instance, hesitate for a quarter of an hour to cross a quiet street. The fear is much more readily induced in those who have fasted a long time than after a meal. The causes of the disease are not easily ascertainable. Dr. du Saule finds that the primary form most frequently attacks men of intellect who are in the prime

of life, while women are most commonly subject to the secondary form, accompanied with other nervous affections. He thinks that it may in some cases be caused by the intemperate use of black coffee. With respect to cure, hydropathic treatment and bromide of potassium have some value, but moral suasion is the best remedy. The doctor is to reason with the patient, and prove to demonstration that the fear is purely imaginary, and the latter will ultimately be relieved of his anxiety. It only remains to say that Dr. du Saule shows that the disease is quite distinct from vertigo or giddiness.

#### Mesostich.

My power and charm most men will own,  
In arctic seas, in tropic zone;  
My interest grows ever faster and faster;  
I'm a very good servant, a very bad master.

Though often coy and hard to please,  
Without her, where is joy or ease?

I cannot exist in the smoky town,  
But resort to the country fair;  
Yet best am found, health-giving breath!  
In the bracing seaside air.

An errant knight this sorry beast bestrode,  
When in search of romantic adventures he rode.

Ah, queen! thou wilt for ever rue  
Thy faithlessness to one so true,  
Whose joy it was to live for you.

More valiant in word than with sword!  
Oh, corporal frail! who fairly turned tail  
When the breach was in sight, in the thick of the fight.

#### How Hearing is affected by Air-Currents.

Mr. Jacques, of Baltimore, has lately made a series of experiments with a view to ascertain whether sound transmitted through certain air-strata loses in intensity and distinctness. The experiments were made at the Baltimore Academy of Music, the great hall of which is remarkable for its excellent acoustic properties, and in which the ventilation is particularly attended to. The observations were made by people stationed in various parts of the building (without knowing of the experiment), and at intervals during the performance the ventilating valves were reversed so as to interfere with the free current of air.

The testimony of the persons, who were subsequently questioned as to their impressions at fixed times, was that "the sound was then dead, confused, and indistinct." It was further noticed that at such times people all over the hall appeared to be making efforts to hear the music. The explanation given is that "the original ray is partly reflected and partly transmitted at each variation of the density." The reflected portions are not entirely lost, but are re-reflected and divided in passing backward, like the primary wave, so that a series of secondary waves comes to the ear after the primary one, and mars the original distinctness of the notes.

These observations prove the distinct effect of air-currents on the acoustic qualities of an auditorium and the effect is most marked on a man's voice.