

Cyprus cloth is a woollen material which looks exactly like crape, and is made up into dresses for widows. The best-worn mourning materials are paramatta, baratheia, and cashmere; but there are some others—new, light, and non-transparent—most acceptable to those who have to go into mourning in hot weather. These are drap d'été, soft wool and silk, draping well; nun's veil cloth, the voile religieux of which we have heard so much; a new silk barège, a great improvement on the old Levantine, yet very much like it; and chagrin, which is thicker than drap d'été.

For black washing materials there are foulardine, black crape cotton, and satine, which might be worn a season without requiring any washing. Those who see much of English people just now must notice how those who are out of mourning affect black as much as possible, relieving it with but little colour, and loading it with jet, while people who are in mourning boldly wear heliotrope, French grey, and crimson satin before they have mourned their parents three months, and jet ornaments in the first widowhood, when they should be faithfully excluded. Widow's mourning cannot be too severe—all crape, with not so much as a tuck to relieve it. The cap to be worn for a year and a day is made of lisse or tarlatan, and can be created at home by cutting in strips of half an inch deep, sewing the edges together, and holding them over steam, after a pencil or ruler has been passed through them. Borders thus made are most durable. Jerseys, jetted cuirass bodices, jetted capes,

and jackets—all these are worn for second mourning. For the first, crape, stuff, and crimped silk fringe only must be used. Crape trimmings are lined and put on very simply; plaitings of crape, rolls, and French hems are out of date. The rules laid down are that a widow's first mourning should last twelve months, her second another twelve months; the mourning for parents and children, twelve months—three months deep crape; for grandparents, nine months; for an uncle and aunt, nephew or niece, three months; relatives by marriage being treated the same as relatives by blood.

The three figures we illustrate require but little explanation. The two in-door costumes are made of spotted fabrics, as, for instance, foulard satine with the real gold spots which the Princess of Wales brought into fashion by wearing during the latter part of the season in various dark shades of blue and green. The third figure in a Watteau tea-gown has selected a rich striped brocade with a gathered front of plain satin; coffee-coloured lace *en cascade* borders the plastron, and trims the pockets, sleeves, and fichu. Imitation or machine-made laces have made rapid strides towards perfection of manufacture during the past ten years. They never could possess the beauty and finish of the hand-made or real laces, but still some of the new Alençons and Argentans are now only detected by keen connoisseurs. And happily, too, they are inexpensive, for how lavishly lace is used not only on tea-gowns, but on breakfast and dinner-gowns as well!

## THE GATHERER.

### A Simple Audiphone.

In a former reference to the audiphone in the GATHERER we suggested the use of fine wood veneering; and the subsequent experiments of Mr. T. Fletcher, of Warrington, led him to the selection of birch-wood for the purpose. Further investigations in the rendering of sounds by different audiphones have, however, proved to him that a better audiphone can be constructed in a still more simple and inexpensive manner. In fact Mr. Fletcher's new audiphone costs practically nothing, and can be made by anybody.

Take (he writes) a sheet of stiff brown paper about 15 inches long by 11 wide, the paper being such as is ordinarily used for making up heavy parcels. Put the ends together, the middle forming a loop, and hold the ends between the teeth. The paper must be pretty stiff, as the loop must stand out round and full, and of course the paper must be without folds or creases.

### An Electrical Fire-damp Indicator.

An apparatus which seems to be particularly well adapted for indicating the presence of inflammable

gas either in the galleries of mines or in street mains has been invented by Mr. E. H. Liveing, Associate of the Royal School of Mines. It is primarily designed to measure the percentage of marsh gas or "fire-damp," as it is called, in the air of gassy pits; and its action is based upon the fact that in an atmosphere adulterated with inflammable gas a red-hot body glows more brightly in proportion to the amount of gas present. Though there is not enough gas to make the mixture explosive—that is, to burn of itself—there is enough to assist the burning of the red-hot body. Mr. Liveing takes for his red-hot body a fine platinum wire heated by the passage of an electric current along it, and he encloses it in a wire gauze screen which allows the gas-impregnated air to get to it. In order to gauge the increased glow of this incandescent wire in presence of the gas, and thus arrive at a measure of the percentage of gas in the air, he provides a second platinum wire exactly like the other and heated by the same current, but enclosed in a chamber of pure air, and excluded from the vitiated atmosphere which surrounds the other red-hot wire. This is the standard glow, and when the air to be tested is quite free from inflammable gas both



wires glow with equal brilliance. But even a quarter per cent. of marsh gas in the air getting to the exposed wire causes it to show a distinct increase of brightness over the standard wire. The electric current is supplied by the mere turning of a small handle, which rotates a little magneto-electric generator attached to the indicator. Instead of employing the instrument to measure the percentage of inflammable gas present, it can readily be modified so as to act as a detector showing whether or not there is a *dangerous* amount of gas present. For this purpose the photometer is to be set so as to show the critical percentage in such a way that the engineer will be able by a glance to tell whether that percentage happens to be present in the air or not. When such is the case no blasting in the mine must be permitted.

A much more simple gas detector was, however, recently exhibited by Dr. Angus Smith to the Manchester Philosophical Society. This is simply a metal syringe or single closed cylinder having a piston inside. The end of the cylinder is of glass, so as to enable the eye to see what goes on within. A piece of "spongy" platinum is placed in it, and the sudden forcing of the piston down generates sufficient heat by compression of the air to ignite the gas or fire-damp by means of the glowing platinum. This contrivance will indicate  $2\frac{1}{2}$  per cent. of marsh gas in the air of a mine.

#### Neptunite.

Neptunite is the name bestowed upon a new and very simple invention for waterproofing garments or fabrics. The ingenious inventor is a Mr. Lamb, a Canadian. He, after many experiments, has succeeded in producing a water-expelling substance that does not injure the fabric to which it is applied. The liquid termed Neptunite is a "solution of certain hydro-carbon gums, the chief ingredient being a solution of rubber." The effect of this solution, when applied to silks, is to strengthen the fibres, and, far from injuring the most delicate colours, it even freshens and sets them, while cloth is left as free in its ventilating power as before. Experiments have been made with various fabrics, and it has been proved that stains from coffee, ink, claret, or grease are successfully *repelled* from the articles dipped in Neptunite. Carpets, woollen cloths, and a piece of white brocade were experimented upon. Silks, satins, hats, ostrich feathers, ladies' shoes, gloves, and many varieties of ribbon were dipped in water, played upon by a hose-pipe, submitted to tests from ink, lemon-juice, and claret, and in the latter cases a dash of water removed all stains, leaving the articles as brilliant and good as before. Velvets were also tried, and with equally good results. It must be remembered that Neptunite does not "waterproof" a garment, it renders the fabric *water-repellent*, and no application of boiling water, soap, or alcohol will suffice to eradicate the solution when once it has been properly applied. Every article submitted to the dipping process should be thoroughly dried for twenty-four hours in a temperature of about 170°.

#### A Self-levelling Ship's Berth.

Any one who has suffered from sea-sickness, or even the inconvenience of being tossed about during a night of rough weather at sea, will appreciate the advantages of a perfectly level steady berth. A pendulum bed of this kind was recently tried on board the Havana steamer *City of Alexandria*. It is an American invention, and consists of the usual bedding so hung and balanced as to maintain itself horizontal whether the ship rolls or pitches. By this means both the discomfort and sickness attendant on the use of the ordinary fixed berth are overcome. Many who have used these new berths testify to a complete exemption from sickness while occupying them, and if really serviceable we hope they will soon find their way into general use. Making the berth self-balancing by means of gimbals, like those sustaining the compass-card, is evidently a more practical plan than buoying the entire saloon in this way.

#### Electrical Insects.

The electrical properties of the electric eel and the torpedo are very well known, but few people are aware that there are certain insects which possess the property of giving comparatively powerful electric shocks. The *Reduvius serratus*, or wheel-bug, of the West Indies is alleged to send a very smart discharge into the flesh of any person touching it. It is also well authenticated that the same mysterious power is wielded by a beetle, one of the common *Elaterida*, and by a large hairy Lepidopterous caterpillar found in South America. Captain Blakeney, R.N., who attempted to pick up one of these electrical worms, received a severe shock which paralysed his arm for some time, and even put his life in danger.

#### Balloon Photographs.

A plan for photographing a great expanse of underlying country by means of cameras elevated on balloons and actuated by electricity has recently been tried with great success at Rouen in France. It is an invention of M. Paul Desmarests, and consists in fitting a camera, loaded with its sensitive plate, to a captive balloon so as to point downwards on the earth below. Instantaneous exposure of the sensitive plate is effected by an electric current sent from a battery on the ground to the camera by means of wires attached to the rope restraining the balloon. The Rouen photographs were obtained in this manner at an altitude of more than 1,000 yards, and one of them comprises a piece of land 300 yards square, with houses, gardens, and roads upon it, while another shows a considerable stretch of the Seine together with the Rouen railway bridge. By magnifying the picture the details can be brought out with great distinctness, and a natural map of a whole district obtained. Indeed so excellent are these photographs, and so much more interesting to the public than ordinary maps, that steps are being taken to photograph all Paris in the same way.



### Pneumatic Clocks in Paris.

A system of public clocks actuated by means of compressed air has been introduced into the city of Paris. It consists mainly of the central standard

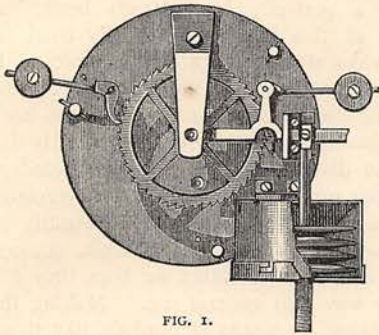


FIG. 1.

clock, the receiving or district clocks, and the tubes for conveying the compressed air from the central to the several receiving clocks. At the central station air is compressed by a pump to a pressure of about five atmospheres, or 75 lbs. on the square inch, and stored in a reservoir. Every minute the air is distributed from this reservoir, at a fixed pressure of seven-tenths atmosphere, to the receiving clocks, through the action of the standard timepiece, which works a sliding valve so as to allow the air to pass from the reservoir into the distributing pipes. These are made of wrought iron, and run to the various districts of the city which possess a street clock. Smaller pipes of the same kind are also laid on to private houses, and connected by india-rubber tubes to the clocks of rooms and corridors. By sending a current of the compressed air through these tubes for twenty seconds at the beginning of every minute, any number of clocks can be operated at a distance of one to two miles from the central station.

The receiving clocks may be of any description whatever, but they are all fitted with the device illustrated in Fig. 1. This consists of a small bellows, resembling that used in pneumatic call-bells, and communicating with the tube conducting the compressed air from the central station. At the beginning of every minute the transmitted pulse of air raises the bellows, and a rod attached to the top of the bellows actuates a lever engaging a toothed wheel, which is rigidly connected to the arbor of the minute-hand of the clock. The wheel has sixty teeth, and rotates one tooth every minute, and a weighted pawl at the other side of the dial checks this movement. The hour-hand is rotated by means of the usual dial-wheels. To make the clock strike the hours a second bellows is required. Clocks operated in this way require no winding up, since the controlling agency is also the motive-power; and the ordinary spring or weight clocks can be easily transformed into pneumatic receiving clocks. Many of the chief hotels, railway stations, and public offices of Paris are provided with these clocks; and street pillar-clocks of the pattern shown in Fig. 2 are erected in various parts of the city.

### Cow-tree Rubber.

Most of the Brazilian india-rubber hitherto in use has come from the city of Para on the Amazon river; but large quantities are now being exported from the province of Pernambuco, further south. Para rubber is the inspissated juice of the well-known caoutchouc-tree, whereas the Pernambuco gum is the product of the mangabeira or cow-tree. It is only recently that the rubber-yielding qualities of this tree have been appreciated, and the discovery has tapped an almost

inexhaustible store of rubber, for these trees are common in the Brazilian woods. The process of preparing mangabeira rubber is simpler than the method followed with Para rubber. The milk or juice of the cow-tree is coagulated by admixture with alum and water, and the clotted mass allowed to dry in the air before it is packed up for exportation. For rough work, demanding strength, the rubber thus prepared is preferable to the ordinary caoutchouc; and it is eminently suited for the springs of railway waggons, tram-cars, or other vehicles, and the tires of bicycles.

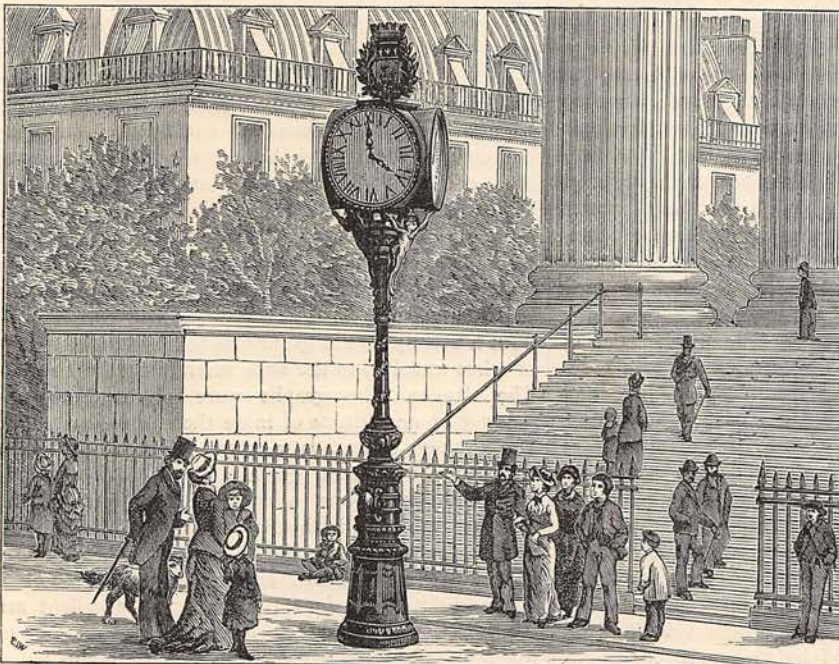
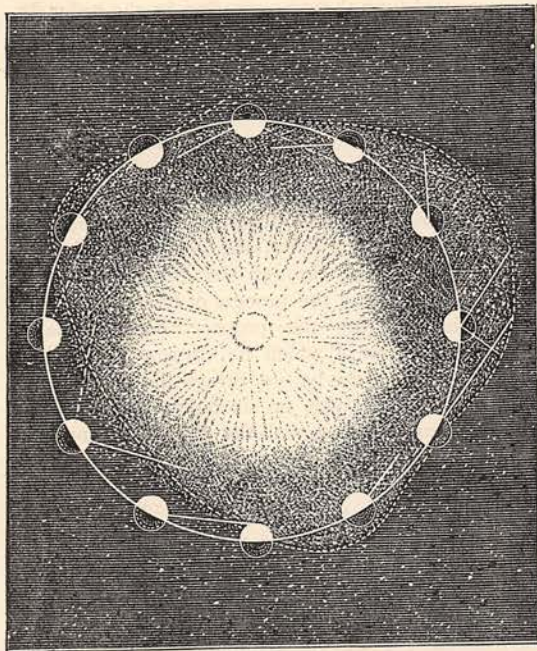


FIG. 2.





The Zodiacal Light.

This mysterious phenomenon, often seen as a luminous glow in the track of the sun, has been referred by some astronomers to the atmosphere of the earth, and by others to an extension of the atmosphere of the sun. The observations of M. Dechevrens, carried on for the last five years at the observatory of Ze-Ka-Wei, in China, would however seem to leave no doubt that it is due to a haze of nebulous matter surrounding the sun and almost filling up the earth's orbit. The theoretical form given to this nebulous cloud is shown in the engraving, where the right side represents the summer and the left side the winter solstice, while the lowest position of the half-illuminated earth is that of the vernal equinox in spring. According to M. Dechevrens, the cloud is formed of the rarer matter left by the condensation of the sun and planets from the one vast nebula out of which, according to the hypothesis of Laplace, they were originally formed.

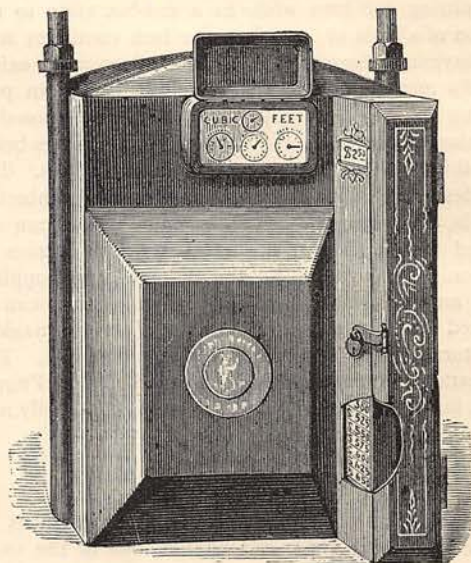
#### A New Photographic Positive.

An important discovery, likely to revolutionise the existing mode of taking photographs, has just been made by M. Janssen, the eminent French astronomer. He finds that a prolonged exposure of a sensitive plate to the sunlight produces a "positive" plate, which may be developed into a photograph at once. In other words, the usual "negative" plate produced by a brief exposure is gradually changed by the continued action of the solar rays into a "positive" one, the shades becoming bright and the lights dark, in imitation of the natural object. The consequence is that the intermediate photographic process of obtaining a positive plate from the negative one is rendered needless. The new process will of course require improve-

ment; but M. Janssen has already taken some very fair photographs of the sun's corona by its means. The period of exposure required to change a negative into a positive plate varies, of course, with the sensitising of the plate. When a bromide plate is used, a negative produced by an exposure of 1-20,000th of a second is turned into a positive by keeping it in the light for half a second; and, as might have been expected, there is a certain neutral phase between these two states at which the image vanishes, and only blackness is developed on the plate.

#### A Price Indicator for Gas Consumers.

Although a gas meter is a simple instrument, there are not many householders who understand it, and the result is that disputes sometimes arise between consumers and the gas collector about the cost of gas consumed. To prevent such difficulties a meter has been devised by Mr. Frederick Egner, of Norfolk, Virginia, U.S., which, besides showing the number of cubic feet of gas burned as in ordinary meters, likewise indicates the corresponding cost to the consumer. This instrument is shown in the engraving, where the price register is seen on the right. It con-



sists of an endless band with a scale of prices printed on it. The band is mounted on two rollers, driven by a simple train of wheels gearing with the pinion of the registering mechanism; and the gas-consumer may at any moment learn how much he owes the company, by inspecting the aperture at the top of the case enclosing the scale.

#### Poisonous Pans.

At a recent meeting of the Royal Dublin Society, Dr. Reynolds drew attention to the fact that poisonous frying-pans were being made and sold in that city, and exhibited one of the pans in question. It was of ordinary sheet-iron, but for the internal coating, instead of the usual tin, a poisonous alloy of tin and lead



was used. On inquiry, Dr. Reynolds had found that numbers of these pans had been presented by Dublin tea-dealers with purchases of tea; and one of his friends had nearly lost her life through eating food which had been cooked in one of them. In some cases a small dose of lead may do no harm, but there are acid foods which may in combination with the lead produce the symptoms of English cholera, attended by death. To detect these dangerous utensils Dr. Reynolds gave the following recipe:—Boil a little nitric acid diluted with pure water in the suspected pan, then dilute the liquid still further with pure water and pour it into a clean vessel. On adding to it a little iodide of potassium, the presence of lead will be indicated by the formation of a yellow precipitate of iodide of lead.

#### Oxydised Iron.

When iron is coated with an artificial surface of magnetic oxide, or grey rust, it is, as is now well known, protected from decay. The coating can be produced in two ways, either by Professor Barff's process of exposing the iron to the play of superheated steam until the surface becomes covered with a glaze of the magnetic oxide, or by Mr. Bower's process of submitting the iron while in a red-hot state to the action of a blast of air, when the iron combines with the oxygen to form a thin coating of magnetic oxide. Barff's method is now extensively employed in protecting large and useful pieces of ironwork exposed to the atmosphere; but Mr. Bower's plan besides being useful is also applicable to ornamental objects. The articles to be plated, such as gas-brackets, umbrella-stands, saucepans, fancy iron castings, &c., are enclosed in a chamber, heated by the combustion of carbonic oxide gas within the chamber, and supplied with an excess of air. Even red-rusted iron can be treated in this way, and the red (or sesquioxide) rust turned into the protective magnetic oxide. The appearance of the coating itself is a beautiful French grey, but if another colour is desired it can easily and safely be painted over.

#### An Electrical Type-Setter.

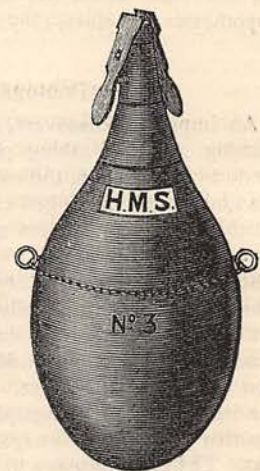
At the recent exhibition of printing appliances in the Agricultural Hall at Islington, one of the most interesting objects was the electrical type-composing machine of Mr. Clowes. Parliamentary reporting is now done by telephone, and it is very probable that before many years the type-setting of most of our large publishers will also be effected by means of electricity. Using the Clowes machine, it is stated that as many as 22,000 letters have been set up in an hour by an expert compositor. With a month's practice an ordinary compositor can easily set up 12,000 types per hour, and including the time taken up in "justifying" the types—that is, breaking up the text into lines and columns—experience shows that an average of 10,000 words may be accomplished hourly.

As in other type-setting machines, the types are contained in a series of troughs, each trough holding one kind of letter or mark of punctuation; and the types

are abstracted from these receptacles, in the order desired, by the opening of a small trap which allows the types to fall upon endless moving tapes carrying them forward to the "collector," which builds them into a line. This line is continuous and requires to be broken up into paragraphs or "justified" by hand. The discharge of the types from the troughs is effected by means of an instantaneous electric current passing through a series of electro-magnets, corresponding to the series of troughs. What the compositor does is to send this current through the electro-magnet of the proper type; and the process of liberating simply consists in touching the proper "contact plate" with a metallic point which he carries in his right hand. A wire from the battery brings the electric current to the metal stylus in his hand, and when he touches the contact plate with the stylus he completes the electric circuit and sends the current through the electro-magnet corresponding to that contact piece. The result is that a particular type is liberated. To help the learner as much as possible, these contact plates are arranged to resemble the ordinary "lower case" in use in every printing office for holding the types before the compositor; instead of picking out a type from each of its compartments with his fingers, the compositor has merely to touch the compartments in succession with his metal point. The rapidity with which a skilled setter hovers over the plates, pecking each in turn as if by instinct, is truly wonderful; and it is also very curious to see the liberated types gliding on the moving tapes in tributary streams to the main current, where they are caught and marshalled into ranks. Electricity acts so quickly that the process of touching the plates is only limited by the rapidity with which the printer can read his copy and move his hand; and to facilitate his reading, a "sliding copy-holder" is employed to keep the line of the copy at the same level so as to guide the eye of the compositor.

#### Ship's Message Bottle.

The figure illustrates a special floating bottle for sea-messages which has been cleverly contrived by Mr. Pulford. It is made of strong waterproof canvas and india-rubber, and will remain in the water unimpaired for years. The neck is opened by grasping the clips exhibited, and on releasing the latter the bottle corks itself. A label with an attached pencil is always contained inside the bottle, ready to receive the message to be committed to the deep. The name of the ship is painted in white letters on the red surface of the bottle itself, and a cord





runs round the middle to facilitate picking up. The front of the label inside the bottle is to be inscribed with the name of the ship, date, latitude, longitude, and any other remarks; while on the back are printed instructions in three or four different languages to forward the information to Lloyd's, England. The bottle is large enough to be visible at a considerable distance on the blue ocean; its height is 2 feet, and circumference round the thickest part 3 feet. Moreover it can be used as a life-buoy, since it is stated to be capable of supporting three persons in the water by means of the cord.

#### Galene Plating.

A novel process for coating surfaces with a brilliant layer of galene has been discovered by Dr. Reynolds, of Dublin. Iron, steel, brass, and other metals, glass, porcelain, ebonite, and other materials are readily coated with a pure and strong deposit by simple immersion in the active solution, and without the aid of electricity, as in the ordinary electrotyping process. The details of the method are not yet made public; but the results have been exhibited. The plating is darker in colour than pure silver, but brighter than oxidised silver, and while it takes a fine polish on being rubbed with washleather, it does not readily tarnish by exposure to the atmosphere.

#### Floatable Mail-Boxes.

As a means of saving the mails from going to the bottom with a sinking ship it has been suggested that they should be enclosed, not in the usual canvas bags, but in watertight metal cases rendered floatable on the sea by an air-chamber in the lid. If the boxes proved too expensive for general use they might, at least, be employed for registered letters. Moreover, besides their function as mail-cases, they could also be made available in the construction of life-rafts for the rescue of passengers from the doomed ship.

#### New Uses of Compressed Air.

Compressed air has long been used to propel carriages, but never before with the success which has attended the new air-locomotive of Col. Beaumont, R.E. This engine is now running at the Royal Arsenal, Woolwich, and will, we believe, be tried on the Edinburgh and Portobello Tramway. If successful there, perhaps it will afterwards find its way into our underground railways, where, from its immunity from noxious steam and smoke, it would materially enhance the health and comfort of passengers. The compressed air is supplied to the locomotive from a reservoir in which it is stored up by means of a stationary engine; and it is capable of exerting the high pressure of 1,000 lbs. on every square inch of the piston. The result is that the locomotive can travel twenty miles without requiring a fresh charge of air.

#### A New Cereal.

A new grain, said to be more nutritious than maize, rye, or oats, has been discovered in the States of Kansas and New Mexico, in North America. It goes by the name of "pampas rice," or "rice corn," and is supposed to have sprung from seed brought to the United States by Mennonite settlers from Southern Russia. The grain grows in a tuft at the top of the stalk, like the grains of the drooping sorghum, of which it appears to be a variety, each kernel being a little smaller and rounder than a grain of wheat. It can be eaten either whole like rice, or ground and broken into flour and meal like wheat. The meal resembles that of Indian corn, but is somewhat richer in flesh-producing constituents. The stalks serve very well for fodder, and also for winter fuel, a matter of some importance on the treeless prairies. But the most valuable property of the cereal is its power of resisting prolonged drought. Seeds of it have germinated and flourished although there was no rain for five weeks after they were planted. It is thus especially adapted to the arid plains of Mexico.

#### A New Waterproofing Process.

At the meeting of the New York Academy of Sciences, some samples of delicately-coloured silks, velvets, and other fabrics, endowed with a peculiar power of repelling water so that it ran off in globules, were shown by Professor Kroch. Untreated portions of the same goods were also shown to absorb water in the usual way. The inventor of the new waterproofing process is Mr. W. M. Lamb, of New York, and he gives the name of Neptunite to the material he employs. What this is exactly has not been divulged, but it is believed to be a preparation of india-rubber dissolved in naphtha. It differs from ordinary waterproofing in not filming over the pores of the cloth and thus preventing the free passage of air, so that the new process is likely to supersede the old in point of healthiness. Wearing material of all kinds can be treated with Neptunite, and made quite waterproof without injuring their finest tints, and with some improvement in their wearing qualities. It is stated, moreover, that ink, wine, and other stains can be readily washed off the prepared fabrics. Time alone will show whether these claims are or are not well-founded.

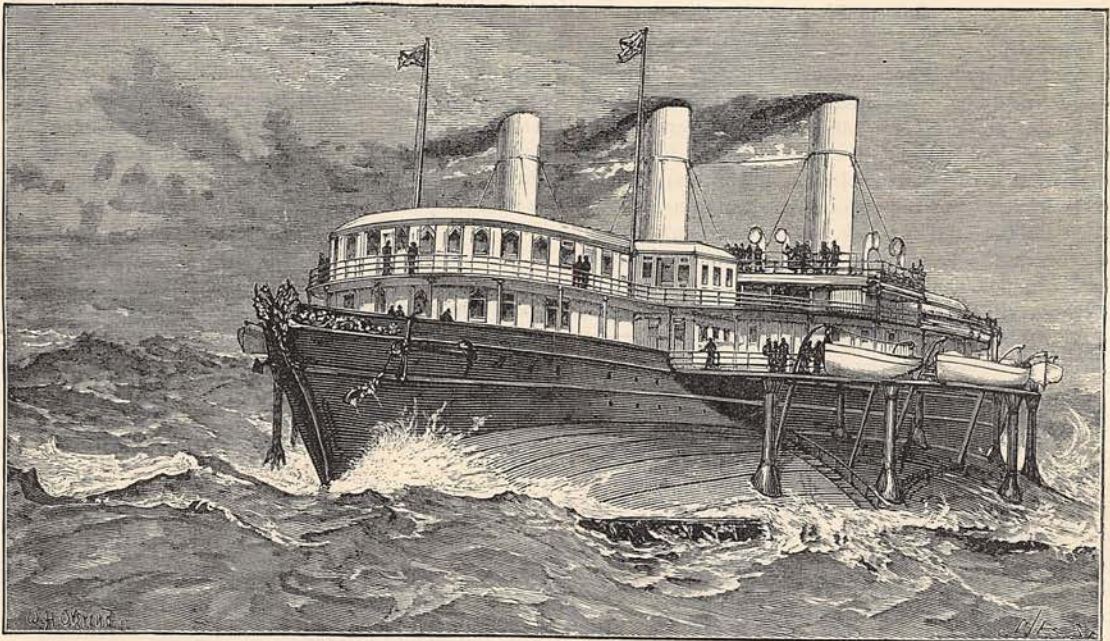
#### New Way to Warm Railway Carriages.

On a railway in the south of France there has recently been tried the experiment of heating an express train in the simplest, cheapest, and readiest way, combining "efficiency with economy." This fresh plan consists in using acetate of soda in the foot-warmers. The substance in question possesses a considerable degree of latent heat, and when it dissolves at a particular temperature, it absorbs a great amount of heat, which makes itself felt during the process of crystallisation in cooling. An ordinary case being filled with the requisite quantity of acetate, it is closed and then put in a stove at 100°. The cooling of



a case thus prepared will occupy from twelve to fifteen hours. When thoroughly cooled, the case will then be removed from the carriage and placed in a stove where the acetate of soda crystals are re-dissolved, when it will again be ready for further use. Acetate of soda not being very expensive, and the present foot-warmers being available for the new plan, this method of warming railway compartments could be easily adopted, while it is deemed to be superior to those now employed, inasmuch as the carriages can be heated for a journey of many hours without needing to change the warmers several times during the journey, as in the existing systems.

10,500, and the speed will be some 14 knots per hour. For a displacement of only 4,000 tons, this must be considered a low speed for the power stated. The *Inflexible* of the British navy weighs 11,500 tons, and yet attains a speed of 14 knots with engines of only 8,000 indicated horse-power. The *Livadia* is to be manned by 250 men, and will be provided with three steam-launches, two life-boats, and six other craft. She has been decorated in a magnificent style, and altogether she is a very costly experiment. The engraving represents the *Livadia* at sea. The state saloon is seen in front of the bridge, and the imperial apartments are beneath it on the second deck.



THE LIVADIA.

#### The Czar's Yacht.

The new steam-yacht *Livadia*, recently launched from the shipyard of Messrs. John Elder and Co., Glasgow, besides being a masterpiece of shipbuilding art, is also a scientific novelty. She has been described as a floating palace carried on the back of an enormous hollow steel turbot. The lines of the turbot-shaped raft on which the palace stands sweep round into a point at bow and stern. The breadth at the widest part is 153 feet, or over three-fifths the length, which is 230 feet. The depth of the raft in the centre is 18 feet, and the draught of water is only 6 feet. At the stern, however, there is a downward projection, which draws 16 feet of water, and is designed to hold the three screws which propel the vessel. Stability is attained by dint of weight and breadth of bottom, and she is expected to be very steady in the water. From the keel upwards to the ordinary water-line the bottom slopes outwards, but above the line the sides slope inwards so as to form the turbot. There are nine boilers, three to each screw; the horse-power is

Below these again are the lodgings of the crew. Aft the bridge is the accommodation for the Grand Duke, captain, imperial suite, and officers. She was designed by the Russian Admiral Popoff, the inventor of circular ironclads; and her keel was laid at Messrs. Elder's yard last November.

#### DOUBLE ACROSTIC COMPETITION.

*So large a number of Double Acrostics has been sent in for this Competition that it will take some time to make the award. We do not expect to be able to make the announcement of the result earlier than in the December Part.*

#### SONG COMPETITION.

*Our readers are reminded that the last day for sending in musical settings of Wordsworth's "Lucy" is the 1st of November, 1880.*