

THE GATHERER: AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.

Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article submitted.

A New Chimney-Top.

A chimney-top which prevents smoking in rooms, or rain coming down the chimney, is shown in the figure. The device is also useful for preventing down-draughts of cold air in bed-room chimneys. The tops are made of earthenware or metal, and they can be fixed to existing chimneys.



A Photographic Bag.

A new hand travelling-bag has recently been devised for the use of amateur photographers. It not only provides for toilet requisites, but contains a complete photographic outfit—camera, plates, and so on. Moreover, one of the sides of the bag can be turned into a dark chamber.

The Telemicrophone.

M. Mercadier, a French electrician, has combined the magnet and Bell telephone with the microphone in such a manner that it acts both as a transmitter and a receiver of telephonic messages. The microphone is so attached to the iron diaphragm of the telephone that the magneto currents induced in the coil of the latter when it is spoken to are superposed upon the microphonic currents, and thus a double effect is obtained, both currents conveying the speech. Acoustical tubes are fitted to the apparatus, which the inventor terms a "telemicrophone," so that it is unnecessary to hold it up to the ear or the mouth when using it.

The Best Lightning-Rod.

Professor D. E. Hughes, F.R.S., President of the Society of Telegraph Engineers, has made a series of experiments on the extra-currents set up by an electric current in its own conductor; and has from these experiments arrived at the conclusion that the best form of lightning-rod is a flat ribbon of copper, not a solid rod. The ribbon may be one millimètre thick and ten centimètres in width. A solid rod or wire of iron is, Professor Hughes thinks, the worst form of conductor. If iron is used, it should be not in the form of a single wire or rod, but as a ribbon, or as a strand of very many smaller wires of iron. These forms are good, in the professor's opinion, because the extra-currents self-induced in the wire by the electric flow oppose its passage, and in these particular forms this self-induction is greatly reduced. We may add that a new wire, with a niched or pinion-shaped cross-section, is recommended for long

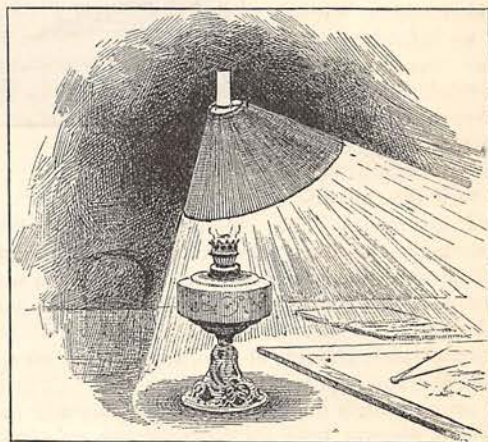
distance telephony or telegraphy. The pinion teeth, or niches, are formed by longitudinal grooves along the wire. This formation has been shown by Professor Hughes to diminish self-induction in the wire, and facilitate the speed of messages. Curiously enough a "spiral" was brought out some time ago, having four spiral grooves running along it; but, though ostensibly for telephonic purposes, it was not taken up at the time.

Eucalyptus Fluid.

In a recent GATHERER we stated that the leaves of the eucalyptus-tree were good for cleaning boilers; and we are now informed that a liquid is made from these leaves, which, when put into a boiler, cleans it of crust already formed, and prevents the formation of more.

Trimming Wood Pavement.

A machine for putting a new surface on worn wooden pavement has at length been devised by Arthur C. Bucknell. It resembles a steam traction engine, carrying a projecting set of revolving cutters driven by friction gearing. These cut into the wooden blocks at a depth which shaves off the worn surface, and leaves a new and level one. During a recent trial of the machine it was found to advance at the rate of one foot per minute. A machine of the kind was much needed in order to avoid the lifting and relaying of fresh blocks when the old ones were surface-worn.



A Hinged Lamp-Shade.

The accompanying figure illustrates a new French lamp-shade which some of our lamp-makers might do

well to copy. The shade can be inclined so as to reflect the light in other directions than straight downwards. This is effected by the hinge or gimbal by which the shade is fixed to the collar that slips over the top of the lamp-chimney as shown. The collar is furnished inside with clasps which take a tight hold of the glass. The device can be so made that the shade can be renewed by fixing it between the inner collar and the outer, which is hinged to it.

A Pedal Fan.

A fan actuated by the feet is shown in our illustration. The advantage is that it leaves the hands free for work or reading. Inside the hollow standard, there is a rod which is connected by a hook and eye arrangement to the end of a short lever, pivoted on its centre. This lever forms the pedal, which, on being pressed up and down by the foot, raises and lowers the rod, the upper end of which is connected to the lever which holds the fan, thus giving the latter a gentle oscillating motion.

A Standard Volt.

The electric light is now established in many homes, and a means of producing a standard volt or unit of electromotive force will be interesting to some consumers of electricity. M. Gaiffe, a French electrician, finds that a very close practical approximation to it can be obtained by means of a chloride of silver voltaic cell having an exciting solution of a given strength, and kept at a given temperature. A cell made with pure zinc well amalgamated for one pole, and pure fused chloride of silver for the other, with a limpid solution of pure chloride of zinc, showing 107 on the densimeter, and kept at a temperature of 18° C., gives very approximately the legal volt. We may add that a London electric light company propose to supply standard Daniell cells of pure materials, and constructed after a design of Dr. J. A. Fleming, for the use of electricians and those using the electric light. The electromotive force of these cells is also very nearly one volt.

The Telephone on Lightships.

A lightship anchored about ten miles off Walton-on-the-Naze, in the Swin passage, is now in regular communication by telephone with that town, the connecting link being a submarine cable. The messages sent relate to the state of the weather and the sea, the passage of shipping, and so on. The name of every ship is telephoned to the Walton post-office, and some ninety craft pass the lightship every day. It is hoped that when the existence of this facility is better known, such vessels will avail themselves of it more than they do. One rough night a vessel got on the sands, and the lifeboat was telephoned for, but was subsequently stopped by telephone when about to

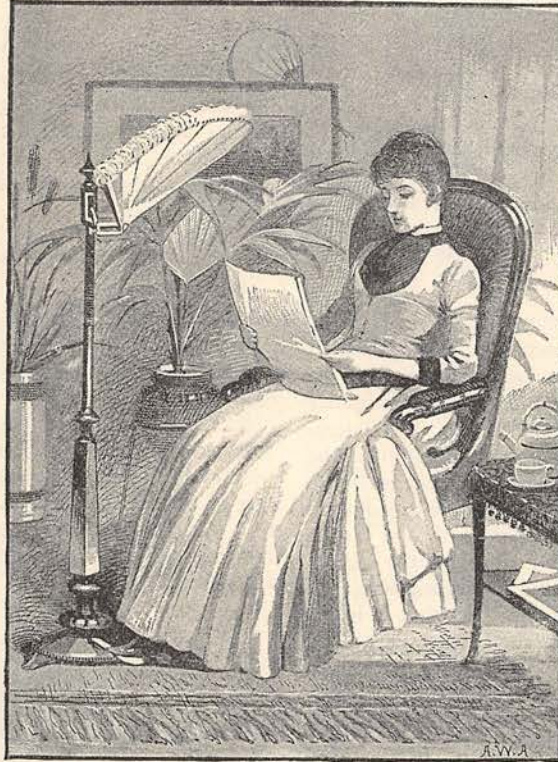
start, because the craft eased off the sands, and a night of exposure thus saved to the lifeboat crew. The cable has once been broken, but was reunited within twenty-four hours.

Wire Stone-Cutters.

Continuous saws or cutters for stone are now made of wire strand. Instead of a flat metal band, three steel wires are twisted together, and run at a very high speed, to form the cutting surface. Water and sand are applied in the usual manner as with the ordinary flat saws for stones. Such wire cutters advance from 10 to 214 inches per hour through marble, according to the hardness of the stone.

A Use for Liquefied Gas.

The manufacture of liquefied and solidified carbon dioxide is in Germany becoming quite extensive, and Herr Krupp now uses the liquid carbon dioxide as a means of exercising great pressure on steel castings during solidification. It is also used to remove the outer rings from condemned ordnance. Experiments were recently made at Essen by heating the entire gun, then rapidly cooling it by the intense cold produced by liquefied carbon dioxide. Complete success was obtained, and the outer rings could be removed from the inner shrunk rings. The gas is also used in the preparation of soda-water and other processes where pressure is required. The Kuhnheim Company of Berlin, who manufacture the liquid gas, supply it in wrought-iron bottles, each



PEDAL FAN.

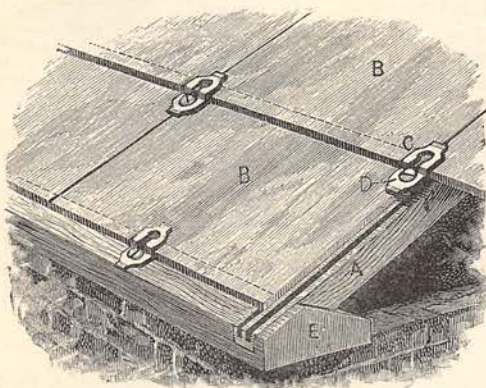
containing eight kilogrammes, and costing about sixteen shillings. Solid carbon dioxide is obtained by allowing the liquid to become gaseous, and to rush out through an outlet, over which is placed a porous bag. A portion of the solid gas appears on the bag like snow, and can be compressed into a substance like chalk.

Cobalt and Copper Alloys.

M. Guillemin, a French physicist, has produced alloys of copper and cobalt of a coppery tint, but possessing remarkable ductility, malleability, and tenacity. They are easily forged and beaten into plates, but do not take temper. They are formed in the crucible by fusing copper and metallic cobalt with a flux of boric acid and wood charcoal. An alloy of 5 per cent. of cobalt is especially useful. It is unoxidisable, malleable as copper, and tenacious as iron. M. Guillemin thinks that the new alloys will be useful for making rivets, parts of locomotives, tubes, and a variety of boiler appliances.

A Cable Tell-Tale.

In grappling for submarine cables, especially on soft sea-bottoms, it is sometimes difficult to tell when the cable is caught by the grapnel. In general the officer in charge judges by the feel of the rope under strain, but this is not always a certain guide, and requires much experience on the part of the officer. Sir James Anderson and Mr. Kennelly have devised an electric tell-tale, which rings an alarm-bell on the ship when the cable is caught by the grapnel. It consists of a chamber containing mercury, attached to the rope near the grapnel in such a manner, that when the cable is caught the mercury is tilted so as to complete an electrical contact, and send a current through the alarm-bell. An insulated wire runs down the grapnel-rope to the contact from the battery and bell on board the ship.



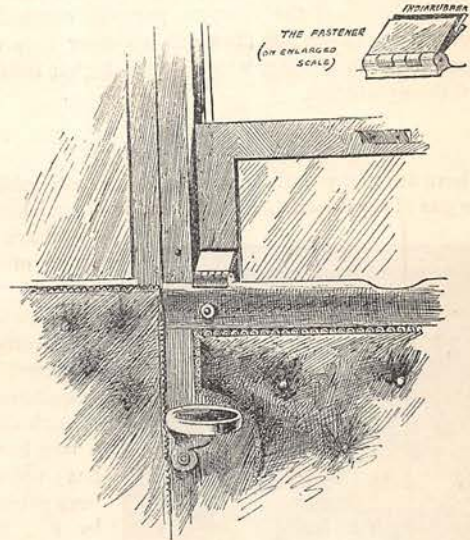
Glazing without Putty.

The figure shows a portion of roof glazed without putty by means of plates of glass, B, secured by metal plates or clips, C, fixed by brass screws, D. The rafters, A, are grooved to carry off condensed moisture, and terminate in a wooden sill, E. By this method of glazing the panes can be removed at will for repainting or

cleaning; all the rafters being covered by glass, they are protected from the wear of the weather; the screws are not entirely withdrawn, and only need to be screwed or unscrewed a few turns to loosen or hold the glass.

A Carriage-Window Fastener.

A device for fixing railway or other carriage windows is shown in the accompanying woodcut. Its



principle is that of applying lateral pressure to hold the window fast, and this is done by an india-rubber pad attached to a bent metal bar swivelling round an attachment to the frame of the door. The downward force of the window tends to increase the lateral pressure of itself; but all pressure is instantly removed, and the window freed, by pressing a knob at the end of the bar, which is flush with the woodwork. Some such device is much needed for railway carriages, and should work well, provided the lateral pressure is sufficient to hold the window in its place despite the violent shocks the door is sure to receive.

Mirror Spectacles.

A minor novelty is a pair of spectacles having a silvered area on the inner edges of the glasses, so that objects out of the direct field of vision may be seen by the vigilant wearer. Other spectacles are now made, having microscopic transparencies fixed to them, and are intended for public speakers, who can thus provide themselves with the heads of their discourses.

A New Turkish Bath Heater.

A novelty has recently been introduced by a well-known ventilating engineer in a Turkish bath heater, operating by steam-heat. The air is passed through a series of heaters without acquiring the offensive dryness produced by hot-air apparatus. The heat of steam is only a few degrees above that of the ordinary Turkish bath, so that there is no "scorching" of the air, as it is termed.

A New Incandescent Lamp.

A German inventor, Herr Max Muthel, has devised an electric incandescent lamp which requires no vacuum to protect the glowing filament from oxidation. His filament is prepared from magnesia, silicate of magnesia, and porcelain clay, formed into a fine thread, which is heated to incandescence and saturated with a solution of platino-iridium salts. The heat of the filament reduces the absorbed salts to the metallic state, and renders the filament partially conductive. In order to render the filaments stronger they may be covered with chrome, which has a higher melting-point than platinum.

A Self-Lighting Gas-Burner.

There are many positions in which it is advisable to have gas always available, but where it is undesirable



to have a flame of any considerable size continually burning. To meet the requirements of such cases, a new burner has recently been patented by Mr. Kinnear, which is illustrated in the accompanying woodcut. The burner instead of being set, as usual, in the centre of the holder, is near the edge, and beside it is a small flash-light; both burners being surrounded by a shield of brass or porcelain. The flash-light is so small that when a porcelain shield is used the light can only just be distinguished. The supply of gas to the burners is so arranged that when by turning the button the gas is cut off from the large burner, the flash-light is still fed with the very limited quantity of gas it requires to keep it continually alight. But when the button is turned the other way the gas is admitted to the large burner, and the flame from the flash-light immediately ascends and ignites it. So small is the quantity of gas consumed by the flash-light that a pressure of half an inch suffices to feed it, so that less than one-third of a foot is burned in twenty-four hours. Any additional cost that would otherwise be incurred by the constant burning of gas by the flash-light, is more than counterbalanced by the saving effected by a governor attached to the large burner, to say nothing of the saving of time and matches. The shield round the two burners serves to protect the diminutive flame of the flash-light from draughts. For use in doctors' consulting rooms and other places where a light is apt to be suddenly required for a few minutes, this novel device seems well adapted.

A Red-hot Telephone.

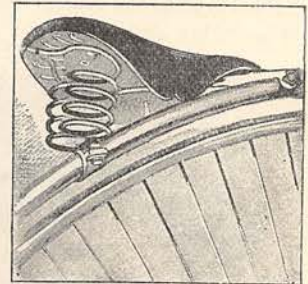
Experiments have been made by Mr. Preece and others with a telephone receiver consisting of a very fine platinum wire, stretched, and having one end attached to the centre of a tympanum or drum-head. When the current from a microphone transmitting telephone was sent through the wire, the variations in length of the wire, due to the passage of the varying current, caused the tympanum to give out sounds which reproduced the original sounds spoken into the transmitter. Recent experiments by Mr. Ross, of the Massachusetts Institute of Technology, have shown that if the wire is .004 inch in diameter, and has a length of about five to seven inches, the sounds are very good, especially when the current is sufficiently strong to heat the wire to a dull red heat. The effect is then remarkably good. German silver wire does not seem so susceptible to the heating as platinum wire. Copper and iron wires do not give very good effects. The battery used by Mr. Ross was ten Grenet cells. Why the heating of the wire should improve the effect is not, perhaps, very clear. Mr. Ross supposes it due to an increase of expansibility produced in the wire. Further experiments may elucidate the point.

Paper Rails.

A company is about to establish large works for making rails from paper near St. Petersburg. The paper is subjected to great pressure, and is extremely durable. The cost is said to be only one-third of that of steel rails. They are also lighter than steel rails, and can therefore be transported at less cost. Moreover, the wheels adhere better to them, and hence the working expenses of the traffic are reduced.

A New Bicycle Saddle.

The figure illustrates a new ventilating spring-saddle for bicycles. The saddle-frame is made of steel wire, having a double spiral spring supporting it as shown. The frame is covered with soft tanned hide, laced underneath to tighten it to the required degree. The saddle is therefore very light, while at the same time it is cool and springy.



Magnetism and Embryons.

During the course of an artificial incubation Professor Maggiorani submitted a certain number of hens' eggs to the influence of powerful magnets, while keeping an equal number of similar eggs away from the magnetic effect. He found four more eggs were arrested in their development in the first group than in the second. After being hatched, thrice the number of chicks died out of the first group than out of the second. Among the survivors those of the second

group all developed normally, while out of 114 of the first group 60 showed imperfections or abnormal movements. Six chicks of the same group reached maturity, namely, two cocks, which were of remarkable size and appetite, and four hens, one of which never laid eggs, while the other three laid very small ones, weighing about one ounce, and incapable of producing living beings. Such is the account given in a scientific contemporary.

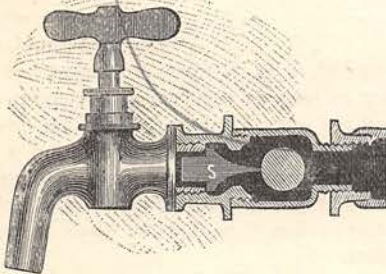
Safety Horse-shoes.

The severe winter has brought forward the question of non-slipping shoes for horses; and attention has been called to the pattens belted to ordinary shoes of horses in New York, when frost sets in. These pattens consist of a metal rim with flat spikes in front and behind, and leather belts to bind them to the horse's hoof. Another shoe used in America is that of Streather, which has an india-rubber pad at the frog of the horse's foot. Our illustration shows an English shoe, invented by Captain Floyd, which is so grooved underneath as to prevent slipping.



Log-Mines.

In parts of the State of New Jersey, U.S., there are numerous deposits of evergreen white cypress near the surface of the ground. The wood is in good preservation, and the logs are found by probing with a pointed iron rod, then dug up. Shingles for roofing are made from the logs in large quantities at Dennisville. Sometimes the underground timber catches fire and smoulders for a long time, thus causing a sinking of the ground.



A Stop-Valve for Pipes.

Householders are sometimes put to inconvenience by repairs to water-taps and valves as usually fitted, owing to the necessity of cutting off the supply at the cistern. A little device which we illustrate has been introduced to prevent this by allowing the tap to be unscrewed without spilling the water. It consists of a loose spigot-piece, s, inserted into the pipe behind the tap, and a ball-valve which closes the pipe unless pressed back by the spigot, as it is in the figure.

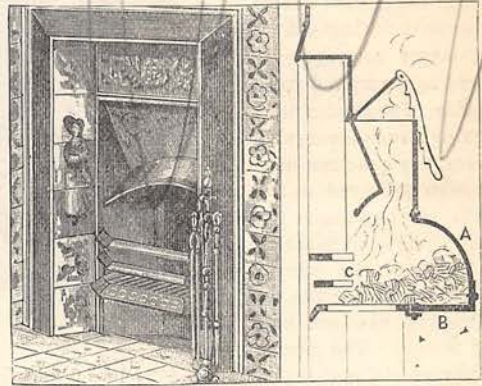
The tap forces the spigot back and opens the valve; but when the tap is withdrawn, the flow of water is stopped by the ball.

Predicting Tornadoes.

The Signal Service of the United States Army have been making a special study of the meteorological phenomena attendant upon tornadoes, and have been enabled to predict their occurrence with remarkable accuracy. So much is this the case that intending settlers now seek information of the department in order to choose land where their buildings and crops will be least liable to devastating storms. It appears that such hurricanes are quite prevalent in certain localities, and not in others. In 1884, some 3,228 predictions were followed by 3,201 tornadoes. In June and July, 19 tornadoes were foretold, and 15 occurred. In every instance during the year when tornadoes were expected, either tornadoes or violent gales ensued. The tornado is distinguished from the gale by its rotary character, as the name implies. These facts show how much can be done by scientific meteorology.

A Grate Coking Chamber.

The annexed figure represents a front and sectional view of a new grate for economising coals and abating smoke, brought out by Mr. Frazer, an engineer, who



has given attention to these matters for a long time. In the section, A is a fire-clay back forming, with the fire-clay bottom B, a chamber which is filled with very small coals, while the grate C in front is filled with round coals. Coke and cinders from the previous day's fire may be mixed with the round coal in front. The small coal behind is coked by the fire, and in order to replenish the fire it is simply drawn forward.

An Iron Prison.

An iron prison of cylindrical shape has been built at Omaha, U.S. The cells are arranged round it, and the cylinder revolves about its axis in such a manner that only one cell is at the opening at a time. It is three storeys high, and there are ten cells on each floor. The cylinder weighs forty-five tons, and is hung from above instead of turning on a track

below. It can be turned by a simple crank with the power of a man. The cylinder containing the cells is also completely surrounded by a cage of iron bars.

Gasolene for Forges.

Gasolene vapour generated by passing an air current through naphtha is extensively used in the United States for isolated gas plants for dwellings at a distance from towns, or for city gas works. The light is very agreeable, although insurance offices object to it. The reservoir of vapour is placed at some distance from the building to be lighted, for safety, and below the surface of the ground. Thence it passes into a series of small chambers filled with fibrous material, and blown through; these chambers become saturated with the vapour, which passes into pipes, and is burned the same as any illuminating gas. The gas is also used for heating small metal works, such as the manufacture of spectacles and jewels, and it has recently been used in the United States Arsenal at Springfield for the larger forgings required in the manufacture of rifles. The results have been of a very favourable nature, the gasolene having been delivered to the works at one-third the cost of the coal hitherto used, and the saving otherwise reduces the total expense to about half that of coal. The dies in the forges do not scale, and the room is free from smoke and dust.

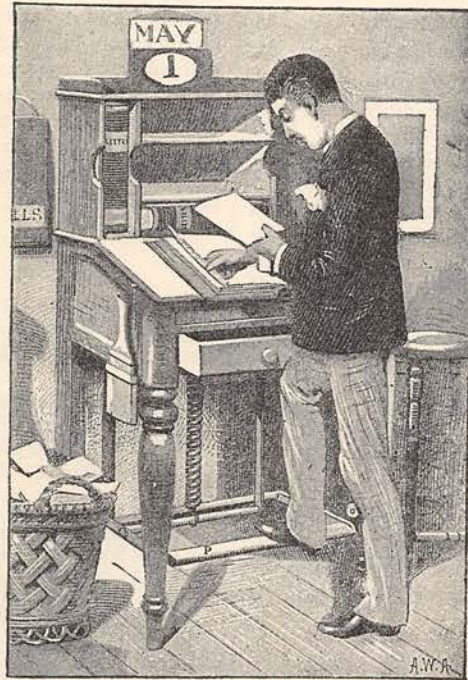
Uses for Toads.

According to an American scientific paper, toads have been tried for ridding a household of cockroaches, and with success. These unsightly but harmless animals are also kept in vineyards, where they keep

down insect pests; and it is stated, too, that in the garden they are the enemies of slugs and snails, which prey upon green produce.

A Foot Copying-Press.

A copying-press, operated by the pressure of the foot, has recently been introduced. It is illustrated herewith; the pedal P being shown below, together with the spiral spring, which causes it to right itself when the pressure is withdrawn. The press will take several copies at once; and it leaves the hands free to manipulate the letter and copy-book. As shown in the figure, the press is in the form of an office desk.



FOOT COPYING-PRESS.

A Gust Anemometer.

At a recent meeting of the Royal Scottish Meteorological Society, a paper by Dr. Crema Brown, F.R.S., was read, describing a new anemometer for recording maximum wind pressure, that had been devised by him and used at the Granton Marine station. The instrument consists of eight cups, instead of four, as used in Robinson's instrument. The shaft passes through the room to the floor, where it works in a ball-gearing. A drum is attached to the shaft, and cords attached to spiral springs pass round the drum in such a manner that when a gust of wind turns the cups round, the drum is also turned from its normal position, but recovers the latter as soon as the pressure is removed. The twists of the instrument are traced by pencil on a sheet of paper which is wrapped round a cylinder driven by clockwork, thus giving accurately the times of the various gusts. According to Mr. Dickson, the observations taken show that the winds are very gusty at Granton.

NEW STORY BY MR. BARRETT.

A New Story by MR. FRANK BARRETT, Author of "John Ford," "Hidden Gold," "Honest Davie," &c. &c., will be commenced in our next issue.

NEW PRIZE COMPETITIONS.

The Editor hopes to announce the details of a New and Important Series of Prize Competitions, open to all readers of the Magazine, in the June Number. The result of the recent Handwriting Competitions will be made known in an early Number.