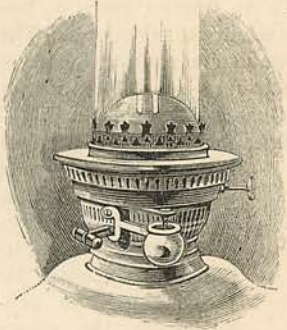


THE GATHERER :

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, LITERATURE, AND SCIENCE.

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 or work submitted.

A Safety Paraffin Lamp.

An ingenious lamp, which automatically extinguishes itself, has been invented by Mr. Snelgrove, C.E. Our illustration shows the burner and the simple device used to effect the extinction. A lever is held by a trigger or detent, which is set free by a slight oscillation of a ball,

which hangs within a ring on the end of the trigger. A jar to the ball, such as would be given by a shock, or the upsetting of the lamp, brings this suspended ball against the ring, actuates the trigger, and frees the lever. This has the effect of shutting up the metal passages of the wicks, and completely extinguishing the flame. The result is that a lamp is extinguished in the act of upsetting, and before it falls; so that there is no danger of its causing fire. The lamp has been very favourably reported on by scientific experts. It is a duplex lamp, with two flat wicks, giving a splendid flame; and it can be lighted without removing the globe or chimney, or cleaned without taking away the lever lift arrangement. Moreover, to add to its convenience, the ball and trigger device enables it to be put out at will by simply tapping the ball with the finger. The usual screw is fitted for regulating the power of the flame.

An Electric Chess Recorder.

Some leading electricians are constructing an electric recorder of the moves in games of chess, which has been devised by Dr. Würstzemburger, of Zurich. It consists of a chess-board which is similar to an ordinary one, except that the pieces fit into round holes by means of feet. The insertion of a piece into its hole completes an electric circuit, and the move is recorded on a tape of travelling paper by an electromagnetic arrangement, which we need not particularly describe, as it contains nothing novel or very interesting in itself.

A Race of Pigmies.

At a recent meeting of the Anthropological Institute, Professor Flower described two skeletons of a pigmy race of negroes, found in Central Africa. The remains have been sent to the British Museum by Emin Pasha. The people in question are probably the "pigmies"

of the old Greek writers. They were discovered in the Monbutto country, west of Albert Nyanza, by Schweinfurth, in 1870, but their affinities have not been known till now. The skeletons of these "Akkas," as they are called, are not longer than four feet; well-shaped; and the skull rounder than other negroes'. A similar small people have been noticed scattered amongst other Central African tribes, and are called "Negrillos." It is now believed the pigmy people are of the same stock as the "Negrillos," who appear to be a distinct branch of the negro race, corresponding to the "Negritos" of the Indian Archipelago, as compared with the larger Melanesians or Oceanic blacks of that region.

A Remarkable Fossil.

At a recent meeting of the Geological Section of the British Association, at Manchester, Professor H. G. Seeley exhibited a remarkable fossil which showed the development of the *plesiosaurus*. It was, in fact, a series of mummies of young *plesiosaurs*, less than five inches long, and showing the substance of their flesh, as well as the bones under it, very plainly. Moreover, the specimens were of different grades of development. The external form of the animals is to be seen even to the circle of the eye. We may add that at the same meeting Dr. H. Woodward, the president, described a fossil cockroach larva which had been found in the Kilmaurs coal measures of Ayrshire, and which he had named *Etblattina Peachii*.

The New Phonograph.

Ten years ago Mr. Edison announced his invention of a machine for the storage and reproduction of speech, and the announcement was received at the time with a good deal of incredulity, notwithstanding the partial success of Faber and others in devising mechanical articulators. The simplicity of Edison's invention when it was seen and heard elicited much admiration; and though the novelty as then constructed did not answer all the expectations which a sanguine inventor had raised concerning it, it was nevertheless regarded as a remarkable instrument and the germ of something better. If the words spoken into the instrument were heard in the first place, the likeness of the reproduction was found to be unmistakable. Indeed, so close was the replica of sounds that a member of the French Academy of Sciences declined to believe there was no ventriloquism or other trickery in connection with it. It was evident, however, that

before the phonograph could become the practical instrument it was claimed to be, further improvements in the nicety of its articulation were required. The introduction of the electric light diverted Mr. Edison's energies from the task of improving it, although he does not seem to have lost faith in his pet invention. During the past ten years he has accumulated a colossal fortune, and been the means of introducing both electric light and power to the world at large. Quite recently, however, he returned to his earlier love, and has at length, it appears, succeeded in perfecting it so as to redeem his past promises and fulfil his hopes regarding it.

The old instrument consisted, as is well known, of a vibrating tympan or drum, from the centre of which projected a steel point or stylus, in such a manner that on speaking to the tympan its vibrations would urge the stylus to dig into a sheet of tinfoil moving past its point. The foil was supported on a grooved barrel, so that the hollow of the groove behind it permitted the foil to give under the point of the stylus and cause it, instead of penetrating the foil, to indent it more or less according to the force of the vibrations of the tympan. The result was that along the spiral groove of the barrel the tinfoil was deformed with undulations corresponding to the vibrations of the speech. Thus recorded on a yielding but somewhat stiff material, these undulations could be preserved and at a future time made to deflect the point of a similar stylus, and set a corresponding diaphragm or tympan into vibration, so as to give out the original sounds, or an imitation of them.

Tinfoil, however, is not a very satisfactory material on which to receive the vibrations in the first place. It does not precisely respond to the movements of the marking stylus in taking the impression, and does not guide the receiving stylus sufficiently well in reproducing sounds. Mr. Edison, like Professor Bell, has therefore adopted wax in the new phonograph; and instead of tinfoil spread on a grooved support, he now employs a cylinder of wax to take the print of the vibrations. Moreover, he no longer uses the same kind of diaphragm to print and receive the sounds, but employs a more delicate one for receiving. The marking cylinder is now kept in motion by an electric motor, instead of by hand-turning as in the earlier instrument.

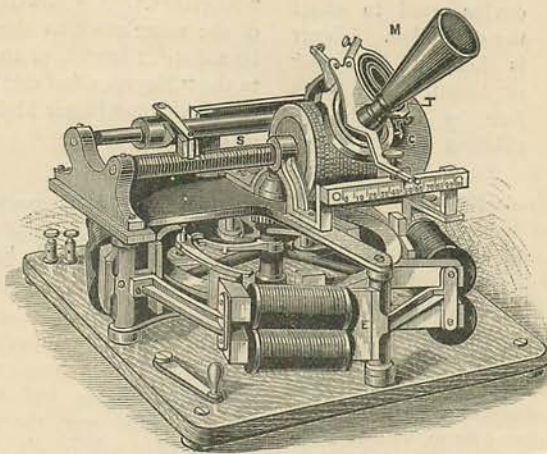
The new phonograph of Edison is about the size of an ordinary sewing machine and is of exquisite workmanship; the performance depending to a great ex-

tent on the perfection and fitness of the mechanism. It consists of a horizontal spindle, *S*, carrying at one end the wax cylinder *C*, on which the sonorous vibrations are to be imprinted. Over the cylinder is supported a diaphragm or tympan, *T*, provided with a conical mouthpiece, *M*, for speaking into. Under the tympan there is a delicate needle or stylus, with its point projecting from the centre of the tympan downwards to the surface of the wax cylinder, so that when a person speaks into the mouthpiece, the voice vibrates the tympan and drives the point of the stylus down into the wax, making an imprint more or less deep in accordance with the vibrations of the voice. The cylinder is kept revolving in a spiral path, at a uniform speed, by means of an electric motor, *E*, fitted with a sensitive regulator and situated at the base of the machine. The result is that a delicate and ridgy trace

is cut in the surface of wax along a spiral line. This is the sound record, and by substituting a finer tympan for the one used in producing it, the ridges and inequalities of the trace can be made to agitate a light stylus resting on them, and cause it to set the delicate tympan into vibrations corresponding very accurately to those of the original sounds. The tympan employed for receiving is made of gold-beater's skin—having a stud at its centre and a springy

pointer of steel wire. The sounds emitted by this device are almost a whisper as compared to the original ones, but they are faithful in articulation, which is the main object, and they are conveyed to the ear by means of flexible hearing-tubes.

These tympani are interchangeable at will, and the arm which carries them is also provided with a turning tool for smoothing the wax cylinder prior to its receiving the print. The cylinders are made of different sizes, from 1 to 8 inches long and 4 inches in diameter. The former has a storage capacity of 200 words. The next in size has twice that, or 400 words, and so on. Mr. Edison states that four of the large 8-inch cylinders can record all "Nicholas Nickleby," which could therefore be automatically read to a private invalid or to a number of patients in a hospital simultaneously, by means of a bunch of hearing-tubes. The cylinders can be readily posted like letters, and made to deliver their contents *visu voce* in a duplicate phonograph, every tone and expression of the writer being rendered with more or less fidelity. In addition to facilitating correspondence by dictation, Mr. Edison hopes that the new instrument will be useful in matters of law and the interests of justice; for example, in the



THE NEW PHONOGRAPH.

detective service, as the photographic camera is now. It lends itself to type-setting by the reproduction of a dictated article in the ear of the compositor; and it may also be employed to copy music and to render it again. In fact, numerous applications of the instru-

exhibition will be opened in May, and will form an interesting prelude to the greater display of Paris, in 1889. We may add that the Italian Exhibition, to be opened in May in London, will be enlivened by representations of the old Roman games. It



THE BRUSSELS EXHIBITION BUILDING.

ment can be suggested, from recording animal sounds, foreign languages, and decaying dialects, to the preservation of oratorical and vocal specimens of great singers, orators, and statesmen, or the accents of friendly voices which will one day be stilled. It should be added that the electric motor, *E*, which drives the machine is actuated by two or three Leclanché cells, and that a special factory has been set apart by Edison for the manufacture of the apparatus.

A New Auger.

A new twist auger for boring holes has been introduced by a Staffordshire firm. The point is unbreakable, owing to the screw forming a closed end with two holes, to allow of the passage of the severed wood. The auger is also said to prevent splitting of the timber, and the enlargement of the bore-hole. Owing to its durable qualities, also, this auger will prove serviceable, especially in the colonies.

The Brussels Exhibition.

The forthcoming international exhibition is expected to be a very fine one. The whole space allotted to it is about 316,000 square metres, and of this 20,000 square metres has been reserved for a "British Empire Section," which is to be a speciality of the show. The English Commissioner for this part of the exhibition is Mr. S. Lee Bapty, of Manchester, a gentleman who has had considerable experience in the work, having managed the late successful exhibition at Manchester. Our illustration shows the building intended for the British Empire Section. It is designed by a Manchester firm, and some idea of its size may be gained from the fact that the nave is 500 metres long. The

should be noted that the Society of Telegraph Engineers (which is about to become the "Institution of Electrical Engineers") has undertaken to cooperate with intending British exhibitors of electrical apparatus at the Paris Exhibition of 1889.

A Water-bearing Fire-Engine.

The figure illustrates a new fire-engine which carries thirty-six gallons of water and several hundred feet of



hose. This arrangement enables the engine to proceed to work at once on reaching the fire; no time being lost in joining on to the street hydrants while the fire is burning. The engine consists of an oak reservoir for the water, a gun-metal pump, and a carriage of wrought-iron on which the pump and reservoir swing in travelling. One or two persons can drag and operate it. The reservoir can be emptied in six minutes; but in that time fresh water to replenish it can be obtained on the spot. The stream can be projected far beyond the nozzle of the hose; and chemical liquid can be used in place of water. One person can work the pump by hand, while another directs the stream where most required.

Camp-Houses.

Portable houses for temporary villages, camps, or annexes to permanent establishments have been introduced into the United Kingdom from America. Ducker's "camp-houses" are made of wooden panels hinged together in pairs to form the walls, and singly for the roofs and floors. All the parts are interchangeable and lock into each other. The rafters are keyed into slots in the ridge-pole. In the floor there is a central shaft provided with grated openings to allow a supply of fresh air access to the building, and there are ventilators in the roof. This air may be warmed if necessary by a stove in the porch of the house. The floor is raised eight inches above the ground on feet which are adjustable to inequalities of the ground. There are six glazed windows on each side, and two in

same number of tables and chairs. Two horses and an ordinary waggon are sufficient for its transport. It can be erected in a place by twelve men in an hour, and taken down in about half that time, without the use of nails, screws, or tools of any sort. In addition to the main building, there is an annexe at each end; one being used for the heating of the air. The building has recently been tried in London by a party of volunteers. Our figure shows the interior as arranged with beds and furniture for camping out.

An Anti-Vibration Fork for Cycles.

A simple and ingenious device has been introduced for destroying the vibration of the steering wheels of cycles, and diminishing the "rolling" resistance. Fig. 1 shows a vertical section through the device, where A is the vertical steering spindle attached to a spring, K, which can be stiffened to suit different riders by turning the cap, H, connected to the screw, F. The connection of the "fork" with the socket and the direction of the steering is maintained by circular grooves cut in the collar, B B, into which steel balls are made to slide. These balls are held in position and

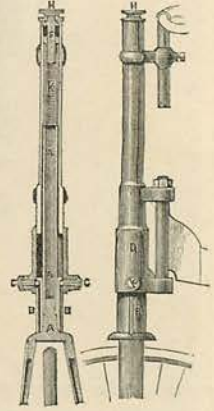
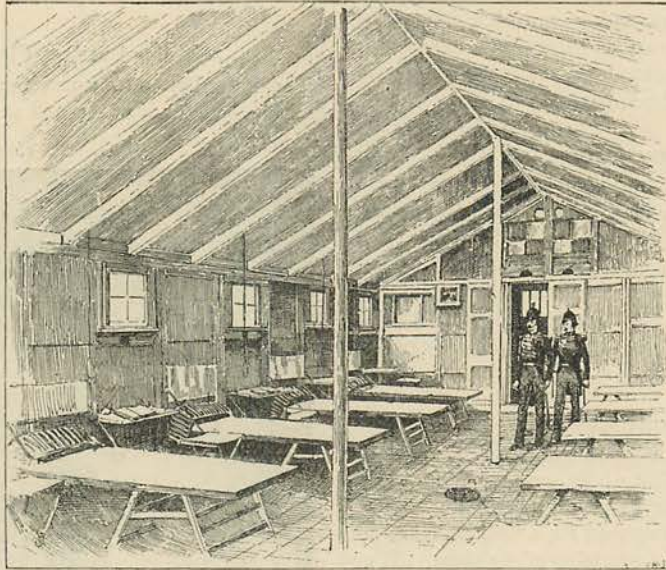


FIG. 1. FIG. 2.

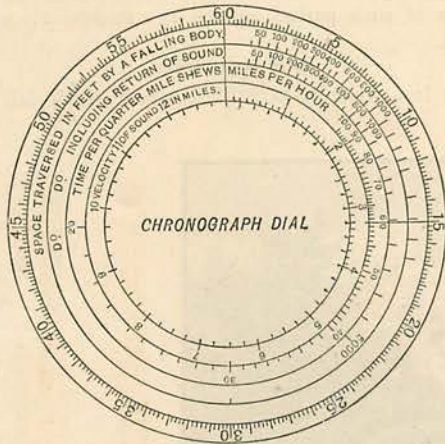


A CAMP-HOUSE.

each gable. These are protected by shutters. The panels are made of wood framing covered with a kind of "leather-board" of jute and leather-pulp. The standard size is 35 feet long by 18 feet wide, and weighs about 4,000 pounds. It contains a dozen beds, and the

revolve in cups formed on the end of set pins, C C, the slightest movement of which is sufficient to give adjustment from time to time. All the wearing surfaces are of tempered steel. Fig. 2 shows the device as mounted on the cycle. While upon this subject we

may also mention a new underguard which is designed to reduce the discomfort of cycling to a minimum. It is longer than the guard at present in use, and is jointed at its lower end, a spring attachment allowing it to return to its place after passing over any obstacle, thus making it safer than the ordinary guards, which are liable to be bent or broken by stones on the road.



A Chronograph Dial for Watches.

The annexed illustration shows an ingenious dial devised for use on stop-watches. It can tell the distance traversed by a falling body, if the time between its start and stoppage be observed. The distances are read off on the second and third circles of the dial. The outermost circle gives seconds, as in the usual chronograph dial. The second and third circles are marked to the depth a falling body travels in eight or nine seconds. For greater distances the resistance of the air disturbs the result, and as this depends on the shape and character of the body, it could not be told by the dial, which has only been marked for 1,000 feet at farthest. The fourth circle shows miles per hour when the second hand is started on entering upon, and stopped on completing, a quarter of a mile. The fifth, or innermost circle, shows the distance in miles corresponding to the interval which elapses between the flash of a gun and the arrival of the sound.

Blotting-Paper for Copying.

A German journal gives the following process for making blotting-paper able to give copies of letters:— Soak 4 parts of the best clear glue in a mixture of 5 parts of pure water and 3 parts of ammonia liquor, until the glue is thoroughly softened. Warm it till the glue is dissolved, and add 3 parts of granulated sugar and 8 parts of glycerine, stirring the whole well, and letting it come to the boiling-point. While the mixture is hot, paint it with a broad brush on clean white blotting-paper until the latter is thoroughly soaked and a thin coating remains on the surface. Let it dry for two or three days, and it will be ready for use. The writing or sketch to be copied is done with the usual aniline ink on writing-paper. Before transferring it to the blotting-paper, wet the latter with a sponge

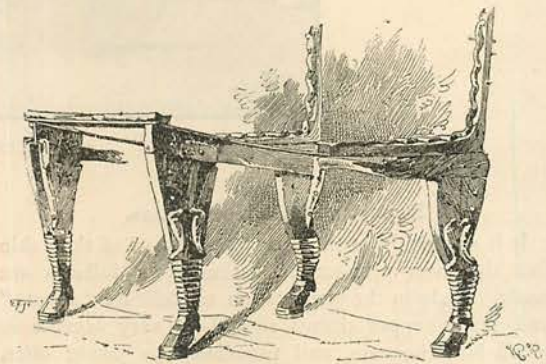
or brush and clean water, and allow it to stand for one or two minutes. Place the written side on the blotting-paper, and press out air bubbles. After a few moments of gentle pressure remove the written paper. A number of copies can then be made after the manner of the "graph" processes from the blotting-paper. When the impressions grow faint, damp the surface of the blotting-paper again.

A Remedy for Sea-Sickness.

Mr. Watson Smith, F.C.S., has pointed out that the new artificial alkaloid, antipyrine, discovered in 1883 by Herr Knoer, of Erlangen, and made from coal-tar, is an excellent remedy for sea-sickness. In most cases a dose of $1\frac{1}{2}$ grammes is sufficient, and the effect is felt in about ten minutes. In other cases this dose has to be repeated. In rare instances it is sometimes necessary to administer it in the form of a subcutaneous injection of 1 gramme of the antipyrine. It is manufactured by a German firm of chemical makers. Some correspondents, however, have complained of the after-effects of this remedy.

The Chair of Queen Hatsu.

A recent addition to the British Museum is the royal chair of an Egyptian queen, believed to be Hatsu or Hatasu, who reigned some 1,600 years before our era,



and twenty-nine years before the time of Moses. The throne, if throne it be, is a graceful chair of a dark wood, resembling lignum vitæ, or the cocus wood of the Bahamas. It is overlaid at parts with thin plates of beaten gold, and at other parts countersunk with little rings of silver on the bodies of the asps or snakes shown round the legs of the chair. The snake was, as is well known, a symbol of royalty in ancient Egypt, and figured in the head-dress of its queens. This interesting relic is one of the oldest pieces of furniture in the world, and although dilapidated, exhibits in its elegant form a high degree of taste.

An Electric Dog-Cart.

Mr. Magnus Volk, the electrician of the Brighton electric railway, has applied electricity to propel a dog-cart. Our illustration shows the vehicle in question. The current is provided by sixteen "E. P. S." (Electrical Power Storage Company's) accumulators

capable of keeping up a supply for six hours. The accumulators are stowed under the seats in the body of the cart. The current works an Immisch electric motor of $\frac{1}{2}$ -horse-power, which is supported by hangers under the body of the cart, and drives a countershaft in front by a steel link chain. The right-hand wheel of the cart has a number of blocks on the inner side of its rim, and a second steel chain, passing round these blocks from the countershaft, turns the wheel and propels the cart. The cart travels nine miles an hour on asphalt; and with a load of two persons a grade of 1 in 30 can be surmounted.

tions form a prominent feature of this edition, and the figure subjects, by Mr. Blair Leighton and the brothers Paget, are singularly striking and instructive. Mr. Railton's architectural drawings, too, deserve more than a passing word of praise. Any one who wants a really good, well-illustrated history of our country, could not do better than procure this one, which presents to the ordinary reader a very complete picture of each period, as well as a faithful record of events.

In a New Vein.

The last work by Mrs. Molesworth which fell into



AN ELECTRIC DOG-CART.

Sweets and Supper Dishes.

It is frequently in the little "etceteras" of the table that the most pronounced successes or failures are made. Help in the preparation of delicate "sweets" and tasty supper dishes should be very acceptable to all housekeepers, and especially to young ones. Mrs. de Salis gives another little volume of her series of "*À la mode*" cookery books, dealing specially with "Sweets and Supper Dishes" (Longmans). It is enough to whet one's appetite, only to read of some of these dainty dishes, but we fear that housekeepers who are to try many of them will need long purses.

A Memorial of the Jubilee.

It is well for nations, as for individuals, to look back now and again, and "take stock" of their position, and such an event as Her Majesty's Jubilee affords a most suitable vantage-point for such a purpose. In nothing can we see more clearly than in re-reading our history, how our liberties have grown and broadened, and how almost immeasurable our advance has been. Messrs. Cassell have taken advantage of the Jubilee to issue a Jubilee edition of their popular "History of England." The first volume is now before us, and carries the history from the Roman Invasion to the Wars of the Roses. The illustra-

our hands was that charming child-story, "Little Miss Peggy," to which we referred in January last; and now this same writer comes before us again with a volume of ghost stories! "Four Ghost Stories" (Macmillan) is its title, and though we are free to confess that, for our part, we prefer Mrs. Molesworth as the delineator of winsome maidens, like "Miss Peggy," there is considerable interest about these tales. Perhaps the most interesting of the four is the second, entitled "Witnessed by Two." But we should be glad to hear that ghost stories, of a kind to encourage superstition, were altogether things of the past.

Poet and Novelist.

The story of Sir Walter Scott's chequered career has often been told, even since Lockhart's great work appeared. But the tale will bear repeating, and Mr. Charles Duke Yonge makes it very interesting in his contribution to the "Great Writers" series, published by Sir Walter's namesake, Mr. Walter Scott. Some of Mr. Yonge's analyses of the leading characters in the stories are very clever, though we should not always feel disposed to agree with him. We note that Professor Blackie has written a life of Robert Burns for this same series.