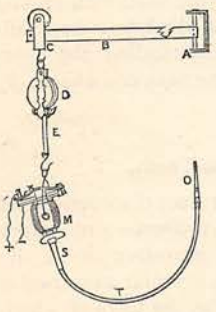
THE GATHERER.

An Electric Drill.

In a former GATHERER (Feb., 1882) we have described that useful little engine known as the Griscom electric motor, and now we have to chronicle its application in dentistry to a tooth-drill. The woodcut shows how this is carried out. A wall-bracket, A, carries a movable beam, B, along which a travelling roller, C, may be pushed to any position. The roller carries a circular case, D, similar to an ordinary spring tape measure. From a brass tape, E, is suspended the Griscom motor, M, which may be adjusted to any position. On the end of its axle is coppled a flexible shaft of steel wire, T, by means of a connecting-piece, S; and at the end of T is the drill, O. When the battery is connected to the terminals of the motor, this drill is made to revolve at the rate of 4,000 revolutions per minute. The flexible shaft is capable of transmitting power to the drill when held in any position, even when loosely knotted; and the whole apparatus may be readily moved so as to suit the needs of the operator. Although here employed to work a delicate tooth-drill, there is no doubt that the motor can be similarly used for other purposes.



New Mode of Storing Grain.

As a more economical and just as convenient plan of keeping grain as storing it in the ordinary way in granaries, it has been suggested that it might be preserved in air-tight sheet-iron cylinders, sealed after a partial exhaustion of the air. Wheat, flour, and bread have—so it is stated—been "canned" in this fashion for seven months, and have been found to be in excellent condition at the expiry of that period. Taking into consideration the security of the grain, when thus sealed in a partial vacuum, against the attacks of insects, large vermin, fire, dampness, fermentation, and other dangers, something might be said perhaps in favour of the plan here briefly alluded to. Doubtless, however, very strong evidence of its efficacy against damp and fermentation would be required before the tinning of grain could really become largely adopted. As regards the other risks mentioned, they do seem to be tolerably provided against.

The Heliograph and Cyclones.

The island of Reunion in the Indian Ocean is often visited by severe cyclones which travel from east to west, across Mauritius towards Reunion. As these two islands lie over 100 miles apart, there is ample time for a telegraphic warning to be sent from Mauritius to Reunion ere the storm-centre reaches the latter place. A recent proposal to lay a submarine cable between the two places for this purpose has, however, not been carried out by the French Government, and an enterprising colonist is about to establish a heliograph or sun-signal between Mauritius and Reunion, in order to flash the news of an approaching cyclone to the latter colony. The apparatus will be erected on two hills, one in Mauritius and one in Reunion; and from experience in Morocco there is no doubt that in clear weather communication will be feasible between the two places by means of flashed sunshine or electric light.

Bleaching Diamonds.

The yellow tinge of Cape diamonds reduces their price very considerably, and an attempt has been made recently to make them look white. This is done by immersing the stone in any solution of a blue tint, which is the complementary colour of its natural yellow tinge. The result is that a thin layer of blue adheres to the stone and quenches the yellow light, making the gem look as if it were of the first water. To bring back the native colour, however, it is only necessary to wash the stone. he apparent bleaching is only "skin-deep."

A Warning Lamp.

A lamp to warn the watchman on duty that a house has been forcibly entered has been invented by Mr. Diggins. It can be placed outside the premises, within view of the policeman on his beat, and when the house is safe it shows a white bull's-eye; but when a door or window has been opened by night, a red shade falls in front of the flame, and shows a red bull's-eye. The lamp is very simple in construction. An electro-magnet by the attraction of its armature when the current passes releases a detent, allowing a screen of red glass to fall down in front of the flame, thereby producing the red light. The current can be sent by the opening of a door, window, safe, or show-case, or by treading on a stair, and in other ways if necessary. This is done by an electric contact, which is arranged to close under any of these operations, and thus complete the circuit of a voltaic battery through the electro-magnet in the lamp. The lamp can also be used within a house to warn the inmates, and an electric bell can be rung by the current. Moreover, in case of fire, the red light and bell can be operated by the mercury column of a thermometer rising and closing the circuit.

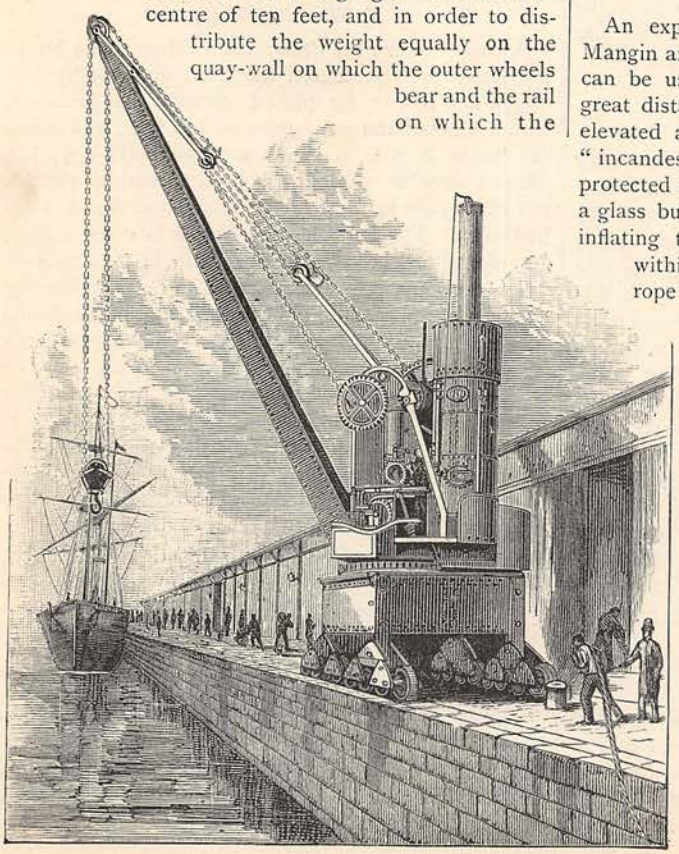
An Asbestos Fire-Shield.

Ample evidence of the fire-resisting power of asbestos was afforded in a recent trial made at Washington, under the conduct of members of the police and fire departments. A curtain or shield of asbestos millboard or sheathing covering fine wire was sus-

pended between two posts. On one side was piled up a heap of wood, and on the other, within six inches of the screen, a window-glass set in a frame. When the wood was fired, so intense was the heat that spectators were driven back a distance of fifty feet. The flames played upon the curtain, but in no way affected it, nor injured the glass frame behind. The shield was found at the end to be unchanged and undamaged, without even any trace of smoke adhering to it. The curtain can, of course, be constructed large enough to protect one side of a building from exposure to fire. This trial probably brought to light no new fact, but it was not held in vain if it showed somewhat conclusively the fireproof qualities of asbestos.

A Monster Movable Steam-Crane.

The annexed illustration represents the twenty-ton steam-crane constructed by Messrs. George Russell and Co. for loading and unloading the vessels of the Anchor Line. Four cranes were previously employed—of which two had a lifting power of five tons at a radius of thirty feet, and two of three tons—and were of course unequal to the raising of very heavy loads. In consequence of this the steamer had occasionally to be removed to the fixed public cranes of greater lifting capacity in another part of the harbour, thereby causing great inconvenience. The wheels of the carriage of the twenty-ton crane have a gauge from centre to centre of ten feet, and in order to distribute the weight equally on the quay-wall on which the outer wheels bear and the rail on which the inner ones run, the carriage is furnished on each side with eight supporting wheels. The jib is fifty feet long, the chain-barrel has a diameter of twenty-seven inches, and the malleable iron central post is two feet in diameter. The crane is moved along the quay by appliances fitted under the carriage. Its greatest working load is twenty tons at a radius of thirty feet, and sixteen tons at thirty-five feet. It is provided with tipping gear for lifting waggons, and will doubtless be available for coaling vessels. Notwithstanding the enormous capacity of this machine, one man can effectively superintend it.



Iridium-tipped Saw-Teeth.

Advantage has been taken of recent discoveries and improvements in the working of iridium—a refractory and extremely hard metal—to introduce it in the manufacture of cutting-tools. A circular saw, twelve inches in diameter, has been made, the teeth of which were tipped with iridium. As the saw in question has been devised specially for the purpose of sawing the hardest woods, it will be seen that the employment of iridium in this capacity will probably be attended with the best results, and lead to a more extended application of the metal in this direction. There is but one serious drawback to the use of iridium, however, and that is that it happens to be one of the rare metals.

A Signal Balloon.

An experiment recently made at Paris by MM. Mangin and Cloris-Baudet shows that the electric light can be used for signalling messages at night to a great distance, if enclosed in a translucent balloon elevated above the ground. For this purpose, the "incandescent" electric light is used, because it is protected from the surrounding gas of the balloon by a glass bulb; it cannot, therefore, set fire to the gas inflating the balloon. Wires from the lamps fixed within the balloon run to the ground along the rope used to hold the balloon captive in the air, and the current is cut off or let on by a key, in accordance with a pre-determined code of signals. The resulting flashes of the light illuminate the balloon, which can be seen as a kind of artificial moon at a great distance. When the current is cut off, of course the balloon is invisible. In this way, by long and short eclipses of the light, a message can be signalled.

The Spectrum of the Large Comet.

Sodium and carbon have been discovered by means of the spectroscope to be present in the large comet. The carbon rays resemble those given out by a hydro-carbon gas when excited by the electric discharge, and the theory that the cometary tail is a vast electric arc light gains in favour.

Peat Dressing for Wounds.

The healing virtue of peat litter applied to wounds has been made the subject of investigation in Germany by an eminent physician, and he reports very favourably upon it. He was led to the inquiry by a labourer who had cut his arm while at work on a moor, and had put a dressing of peat upon the fresh wound. The healing went on rapidly, owing to the clean, antiseptic nature of the peat. The best way to apply the mould is to moisten it with carbolic acid solution, and squeeze it till a pap is formed. This is put into a gauze bag also rinsed in the solution, and the poultice applied to the wound. The peat is highly absorbent, and keeps the flesh clean.

A Constant Thermometer.

The chief fault of the ordinary thermometer is that the zero varies in course of time, and hence it is satisfactory to know that Mr. S. G. Denton has succeeded in making a thermometer with a special bulb, which keeps the zero constant. Mr. Denton's thermometers have been tested and approved of by Lieutenant Whipple, Superintendent of the Kew Observatory.

A Grasping Tree.

A tree having the peculiar power of lifting stones and other objects from the ground has been discovered in New Guinea by Lieutenant Houghton. It is a species of *ficus*, like the well-known banyan, and throws out air-roots from its branches. These eventually reach the ground, and taking root become in turn new stems, so that a single tree will in time make a forest of itself. Other long flexible tendrils do not root in the ground, but coil round any article within reach, and ultimately contracting, lift the article up and suspend it in mid-air.

A Telegraph Exchange.

The telephone exchange system, by which a number of subscribers can communicate with one another through a central station, is about to be introduced into America by the Mutual Union Telegraph Company. Suppose that A in New York finds in the course of the day that he wishes to settle a certain matter with B of Chicago. He sends word to the Mutual Union office to send to B, asking if he can be in the Chicago office of the Mutual Union at, say, 4 o'clock, in order to talk with A. If the answer is "Yes," the two persons meet by wire at 4 o'clock, one in Chicago and the other in New York, and exchange their views without delay or misunderstanding. The new system is in reality an application of the city telephone exchange to a whole country.

An Artificial Moon.

A very good imitation of the blistered lunar surface is made by taking a soup-plate, and greasing the surface with lard or oil, and sprinkling it over with citrate of magnesia in varying thicknesses. Then take a basin with a little water in the bottom, and pour in some freshly-burnt plaster of Paris, which will at once sink. Pour off the superfluous water, stir with a spoon into a paste, and pour it on the powder in the soup-plate. The water in the plaster will cause the citrate of magnesia to effervesce, and carbonic acid bubbles will rise, causing craters in the plaster of Paris like the volcanoes of the moon.

An Electrical Valve-Closer.

This ingenious apparatus, by which a steam-engine of any kind may be quickly stopped from a distance, in case of accident to life or any other alarming circumstance, is the invention of Mr. Tate. The stop-valve of the engine is actuated by the piston-rod of a small steam-cylinder attached to the engine, and this piston is in turn actuated by steam admitted into the cylinder by the opening of a cock, which is effected by the passage of the electric current through an electro-magnet. Thus, when the electric current is closed by a press-button like that of an electric bell, the current traverses the electro-magnet, M (Fig. 1), and attracting a soft iron armature, A, releases a detent, which allows a pivoted weight, C, to fall, and this in falling strikes away the support, D, of a heavy suspension-rod, E, which in dropping opens a cock admitting steam into the cylinder (as shown in Fig. 2). The piston of the latter then ascends, and in so doing closes the stop-valve of the engine by means of a rack and pinion gearing. The steam admitted into the cylinder is of the same initial pressure as that of the engine cylinder, and can be drawn from any part between the stop-valve and the engine cylinder. The press-buttons are placed on the walls of the factory and protected from wanton tampering by glass shades, which have to be broken, as in the case of a railway carriage signal.

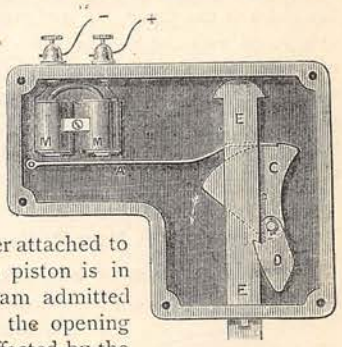


FIG. 1.

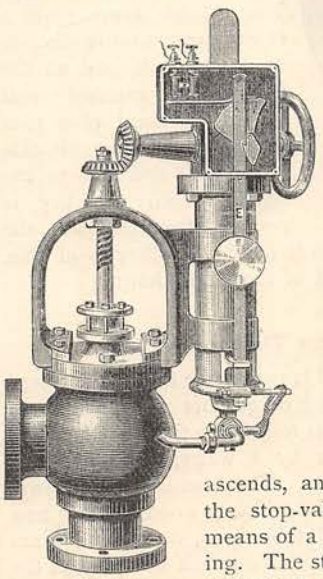


FIG. 2.

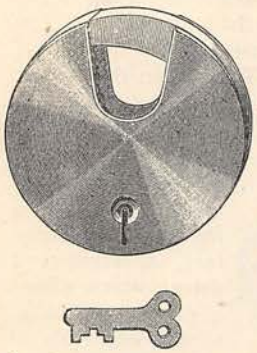
Pneumatic Power.

The Parisians have lately been enjoying a unique system of time through clocks regulated by pulses of

air sent along a system of pipes. A new plan of distributing motive-power in the same way is about to be tried. It consists in keeping a degree of vacuum in a system of pipes connected to the rarefied air-motor of M. Tatin. The sewers in the Boulevard Voltaire and the Avenue Parmentier are used for the pipes in a distance of 600 mètres. The power is to be sent a full kilomètre from the central station, where the pipes centre, and the exhaustion of the air is effected by special air-pumps worked by steam. The pipes are of iron in the sewers, and lead in the houses. There will be a trifling loss of power by friction of the air on the sides of the pipes, but not over 3 per cent. When compared with the loss in the electrical transmission of power this is very small, and for short distances air would seem to have the advantage over electricity. On the other hand, electricity will probably soon be "laid on" premises for electric lighting, and can readily be used for power too.

A New Padlock.

A well-known firm of lockmakers have introduced a new padlock, which, besides being neat and strong, has the merit of cheapness. It is shown in the illustration. There is no bolt, yet the lock is as securely fastened as with a bolt. The shackle turns upon a centre near to the bottom of the padlock, and on the key being inserted and turned one-third of a turn to the right, the shackle is released and falls to the right. Until the key is removed from the lock, the shackle-bolt will not lock itself. The key is of thin steel, nickel-plated, and of the shape shown.



Straw Timber.

A substitute for wood is now made from compressed straw, flax, hemp, or any other fibre which will work into a pulp. The pulp is rolled into thin sheets, which are cemented together by a waterproof glue, then pressed into a solid mass. The boards can be sawn, planed, and polished like ordinary wood, and are now made into counter and table tops, doors, and ornamental frames. They sell at one-half the price of the finer pines and walnuts. The artificial timber is practically fireproof and waterproof, having been manufactured under 500° of heat, and boiled without any apparent change of structure. Its tensile strength is greater than that of oak or walnut, and it weighs more than walnut when dry. A ton of straw produces about 1,000 square feet of boarding.

An Electrical "Iris."

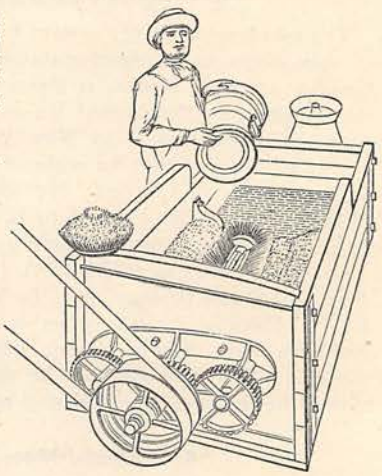
The recent Munich electrical exhibition was chiefly remarkable for the artistic development of the electric light. Munich is an artistic capital, and as the new incandescent lamps readily lend themselves to the production of artistic effects, the display there was very fine. One spectacle was a fine fountain of water on which the electric light was directed by lenses so as to produce an iris or rainbow in the spray. The varied hues of the light refracted through prisms and thrown upon the rising water were also very fascinating. While upon the subject we may mention that the bright berries of mistletoe and holly at one place of entertainment in London are in reality small incandescent globes of opal and ruby glass, illuminated inside by incandescent carbon filaments.

The Crumbling of Tin.

Leaves of tin-foil, when exposed for a long time to cold, are found to crumble into pieces. Indeed, there is a case on record in which good commercial tin was changed into a grey powder during its transit from Rotterdam to Moscow one cold winter. The process of change is not well known, but M. Wiedman, a well-known chemist, finds that the same result may be produced by a succession of small shocks, and suggests that variations of temperature may have the same effect. M. W. Markownikoff, of Moscow, gives an account of some tin pots left in a cold room in one of the Government buildings there, which broke into holes and gradually crumbled away. Heating the tin in warm water restores the crumbled powder to its original metallic lustre and condition; but it was found that the decay of the pots could only be stopped by removing the parts attacked.

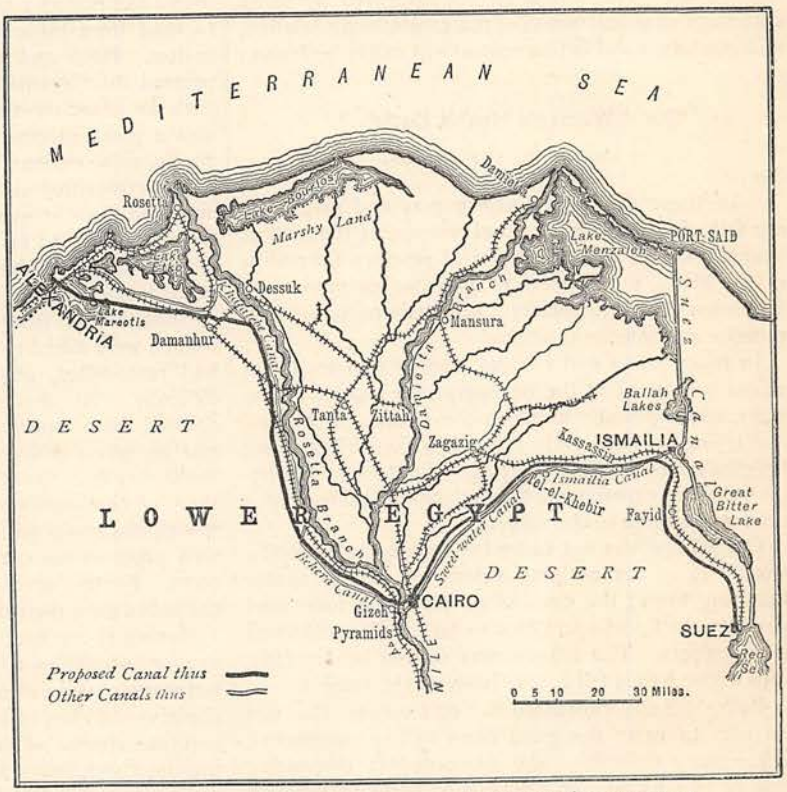
A Steam Milk-Can Cleaner.

A machine for rapidly cleaning milk-cans by steam has been devised by Mr. S. J. Pocock. The apparatus consists of a tank, six feet long by three feet wide, and filled with hot water when in use. At one end are three brushes revolving at the rate of 120 revolutions a minute. The brushes are shaped so as to fit the can both inside and out, and all that has to be done is to plunge the can into the water and slip it over the middle brush, holding it there for a few moments until it is thoroughly scrubbed inside and out. This operation takes about half a minute. The covers are cleaned by throwing the outer brushes out of gear, and fixing a head to the centre brush, which cleans the covers.



Mr. Fowler's Egyptian Ship Canal.

Messrs. Fowler and Baker have made a study of the portions of Lower Egypt through which they propose to construct a new ship canal from Alexandria to Suez, *viâ* Cairo. It will be a fresh-water canal bordering the desert, and taking advantage of Lake Mareotis, and the directions already followed by the Khâtatebe Canal to Cairo, thence joining the present Ismailia Canal, it will pass by Tel-el-Khebir and Kassassin to Suez by following the existing line of railways to that place. We annex a sketch showing roughly the route proposed by Mr. Fowler, and a short description will perhaps be interesting. The total distance followed by the new fresh-water canal is estimated at 240 miles, which is about ten miles shorter than the present route to Suez by water. No disturbance of existing water-ways or railways will ensue. The Nile is only crossed at one place. The canals—for they may be considered as two—originate in the Nile about three miles below Cairo, and then descend with a gentle slope averaging ten inches to the mile to the right and left towards Suez and Alexandria. The present Behera Canal towards the latter town will be followed after the first fifteen miles for about three miles, when an independent and more direct route will be entered upon until the Behera Channel is again struck. The old course of the Khâtatebe Canal will then be followed till at a distance of fifty miles or so from Cairo a turn to the left is taken, and the new course laid direct for Lake Mareotis and Alexandria. On the other hand, from Cairo to Suez the now well-known places Tel-el-Khebir and Kassassin are passed, Ramses is left upon the north of the new canal, and at eighty-four miles from Cairo the Sweet-water Canal and the railway to Suez are followed to Fayid, and thence along the railroad to the end. Ten millions sterling, it is estimated, will amply suffice for the cost. No great novelty nor unheard-of difficulty will be found in the work. The ships will be warped across the Nile near Cairo and pass into the second section of the new canal. The success of the canal as an undertaking is already considered certain. The traveller will henceforth have time and opportunities to visit many interesting places in Egypt while the vessel is making her way at no great distance towards Cairo. The ship can then be quickly rejoined at Suez, after the visit to the Pyramids has been paid. The time occupied may be a little longer by the new route than by the old, but the advantages in the saving of coal, and in the fresh-water cleansing of the vessels' bottoms, are justly considered to outweigh the few hours extra occupied in the transit. Such, briefly, are the advantages and objects of the new canal which skirts the desert and by its carefully directed course does not interfere in any way with cultivated lands. Cairo would also be opened up by it in a manner which could not fail to be beneficial to Egyptian and European trade.



MAP OF LOWER EGYPT, SHOWING THE ROUTE OF THE PROPOSED NEW CANAL.

A Simple Accumulator.

Some short time ago, we described the cheap and useful voltaic cell of Mr. Alfred Bennett, which consists of a zinc plate and an iron plate, surrounded with iron filings; both being immersed in a solution of caustic soda. For convenience the iron plate is sometimes made into the containing vessel itself; and an empty iron meat-tin is found to answer very well. Quite recently Mr. Thomas Farrington has employed this cell with good results as a secondary battery or accumulator. He has altered the cell slightly by using rusty iron in preference to clean iron, in order that the oxide might be reduced to spongy iron by the hydrogen evolved. The result was that the cell gave

a very constant current for some time, zinc oxide and spongy iron being formed in its direct or primary action. When employing the cell as a secondary battery the reverse action takes place, and the zinc oxide is reduced to metallic zinc, whilst the spongy iron is oxidised. The cell is further improved by using carbonate of soda instead of the caustic soda solution, and possibly a still better neutral salt might be found.

Our "Women's Health Society."

A LETTER TO THE EDITOR.

SIR,

In these days when newspapers and magazines are full of woman's rights and wrongs, of the evils of women's habits and dress, and of schemes for reform of all kinds, an account of how we managed our "Women's Health Society" will perhaps be of help to some and interest to others.

In many towns and villages, women who are themselves convinced of the necessity of a change in the ways, and especially in the mode of dress of women, are trying to help their more ignorant friends and neighbours by holding meetings, circulating information, making experiments themselves, and giving much time and trouble to the subject.

Our village was not to be behindhand in so good a work. It is the outlying suburb of a large manufacturing town; the class of people to be influenced consists chiefly of operatives in large mills and small shop-keepers. The scheme was started by one lady, into whose hands fell a little book on the subject.

Being herself convinced by this means, she was anxious to carry the good news to her neighbours. After many difficulties she succeeded in convincing one or two friends, and persuaded them to summon up their courage and help her to get up a meeting for women, in which they should talk in a friendly way to the people, state some of the facts of the case, tell what they themselves had done, and invite help in forming a society, to be called the "Women's Health Society," for the discussion and treatment of matters relating to woman's dress and health.

The use of a school-room was obtained; small bills stating the objects of the proposed meeting were circulated; those interested asked their friends from the town to come and show their sympathy with the movement, and the result was a gathering of nearly 200 women—over sixteen—of all grades, though principally of the working classes. It was no easy matter for the few ladies who had the management of the affair to "speak in public," but their belief in the good to be done helped them to say in simple words what they felt and thought, and most of them had some experience to give. One read a short paper on the aims of the society; another had collected various bits of information as to other societies of a similar nature from books and papers; another had some correspondence to read from those who had had experience in the matter. Here and there women stood up and expressed their sympathy, or their feeling of need for such an association as was proposed. The meeting was a great success. The women were some enthusiastic, some curious, nearly all ready to help.

So a committee was formed, and other meetings were arranged for. It was decided that dress reform was the first thing to be considered. The ladies agreed to take different subjects to talk about. This took up several meetings, as free comment and remark were encouraged, and many difficulties were discussed. The women were asked to bring any garments which they had remodelled, and any with which they found a difficulty. At one meeting two long tables were covered with specimen articles, some most clever and ingenious conversions of old into new and more healthy styles. Another evening was devoted to a show of new patterns. Every one begged and borrowed, and paper patterns—the people bringing their own paper—were taken by any one who wished for them. For this several tables were required, at which the ladies gave their help in cutting out, &c.

During the winter arrangements were made with one or two ladies to come from a distance to give lectures on very elementary physics, physiology, or chemistry. This, of course, entailed expense, and an entrance charge of 6d. and 3d. was made; and the meetings were very well attended, as many as 300 coming in spite of bad weather. The other meetings had been quite free, the ladies of the committee undertaking the small necessary expenses.

In the summer the meetings were discontinued for two or three months, but were begun again in the autumn with renewed interest. At some of the lectures the attendance of gentlemen was invited, and it was not found difficult to get an M.D. to take the chair, and give his hearty support to the movement.

The society is still in full work, and has made many converts, and the people take a real interest in the work.

I may add that a large blackboard should be freely used; very rough sketches are enough, and are more effective than diagrams, though they are of use too when very simple. I hope this account of our success will encourage many others to try a similar plan.

R. A. E.

THE NEW YEAR'S MESSENGER.

HOW would you picture her, she who should bring
Wishes for good when the New Year is born?
Gay as the birds who look upward and sing,
Fair as the sky on a bright summer morn,
Face full of laughter and sunny content,
Eyes of a child whom no troubles enthral:
She is the maid who should fitly be sent,
Wishing "a Happy New Year to you all!"