How easily this could be remedied! In cities of health, warmth and ventilation ought to go hand-in-hand, and disinfection follow in the rear.

I sincerely wish that every reader of this paper would have great belief in the beneficial power of the sun's rays. Over in bonnie Erin, as the song tells us, "the grass grows green." Down in my dark cellar I sowed some in a box for the cat, and it grew white, and was such sickly-looking stuff withal, that I wouldn't permit pussy to touch it. O ye who are sickly and nervous, who are sore stricken and weak, do not, pray do not creep along on the shady side of the walk, but come forth into the glorious sunlight, the brave bold sunlight, and see what it will do for you!

Quaint and curious, I admit, looks an old-fashioned English farm-house, with its red brick gables, and its blinking windows of wee green glass diamond panes, but windows like these will certainly not do for our cities of health. They must be large, and the glass must be clear, and they must be made to open, so that daylight may fall easily in on the sick or on the hale.

Drains and Cesspools.—As there is a Director-General over the medical department of both Navy and Army, so in London should there be a Director-General over the Department of Health, and under him Inspectors and Deputy-Inspectors, and a large and efficient staff; and if a proper system of drainage and sewage were adopted, and strenuously carried out, our hospitals would no longer be crowded with cases of typhus and typhoid fever. We have already got rid of smoke in our, alas! imaginary cities of health; the air is no longer loaded with carbonaceous matter; let us get rid of sulphuretted hydrogen next, and ammonia, and with it will go dysentery and diarrhœa, and a hundred worse ills than these, not the least of which is cholera. Let us look well out for over-flowing drains, attend to the traps of water-closets and cesspools, keep our streets clean, and banish burial-grounds and slaughtering-houses to the outskirts at least; let us render our rivers pure as pure can be, and plant a tree wherever a tree will grow; then shall mortality decrease, and our people as a nation be more robust, and happier because healthier. Intemperance, too, would almost disappear from our cities of health, because our working classes, no longer toiling in pestiferous shops, nor sleeping at night in unhealthy homes, would not require the stimulus of alcohol to keep their shoulders to the wheel.

Reforms of this kind may not be grappled with yet awhile, it may not be truly commenced until a second plague depopulates London, and mayhap stretches its grisly fingers even as far as Glasgow; but begun it must be, if we would not have our proudest city become "a habitation of bitterns." We don't want any bitterns, and they can be kept away easily.

The streets of our cities of health should be kept extremely clean; at present those of some portions of our largest towns are reeking with fever and pestilence. They should be well paved too. Horses should no longer be worked until they dropped dead or dying on the stones; and there should be over-ground saddle-railways (as previously suggested in these pages) to relieve the traffic.

And the streets should be a little quieter than they are nowadays. This could easily be accomplished. I like street-cries as well as any one, when they are musical and moderately soft; but I have known cases in which the savage yell of a milkman, or the startling shout of a sweep, has actually hastened the death of an invalid.

Lastly, pure water ought to be one of the most important considerations. What the value of a good supply of pure water to a city is, cannot be too highly estimated. Pure water for drinking and for culinary purposes, pure water in abundance to wash with, pure water in a strong stream to wash the streets and flush the sewers—this is what we must have in our cities of health.

THE GATHERER.

Accommodating Wall-Papers.

What may possibly prove to be a most valuable idea is reported from Germany. New wall-papers have been suggested which will adjust themselves to the light within the room: growing lighter and brighter as the room darkens, and, on the other hand, getting darker in proportion as the room is illuminated. To this end it has been proposed that the papers be printed or coated with oxalate of copper, which acts in the manner above described. It is confidently expected that very curious and novel effects of colour and shade may in this way be produced; and if the proposal only turn out as well as its promoters anticipate, an entire revolution in the wall-papers of the future seems probable.

A New Cotton Plant.

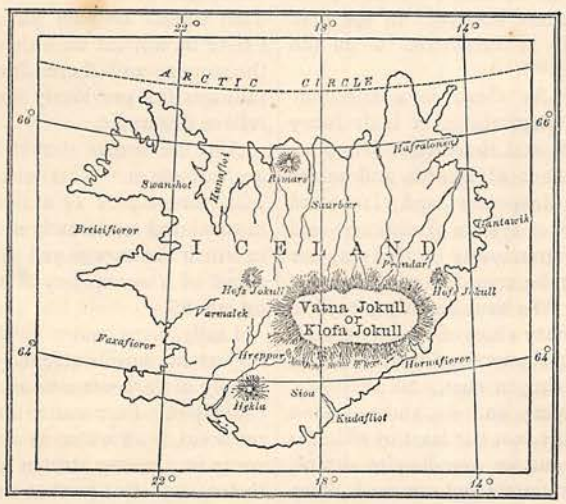
About two years ago, Signor Giacomo Russi, Austrian Consular Agent of an important cotton district in Egypt, discovered a stranger in the cotton fields in the shape of a curious plant, containing a much greater number of cotton pods than the ordinary cotton plant. The stranger attracted his attention on account of its peculiar shape and size, being taller and without any branches of its own. On a closer acquaintance Signor Russi found that the cotton it produced was of a very valuable kind; and since its discovery he has proved the plant, and finds that there is no difficulty in its cultivation in Egypt. Its seed has been sold at twelve times the amount of ordinary seed, and the cotton growers are showing

great interest in the plant, as its cultivation bids fair to be of great profit to themselves. In addition to the advantages of both quality and quantity, the plant requires less seed for sowing and less space for growing—as, having no intruding branches, it only takes up half the ground.

The one drawback to its production is, that in order to secure a good crop the ground must be well watered; and as so much drenching is injurious to the ground itself, it will be necessary to sow, in alternate years, crops of other kinds, such as grain and vegetables.

The End of Smoke.

The clouds of smoke which darken the air in our manufacturing towns, and even in whole districts of country, have a depressing effect upon the population that can hardly be exaggerated. Their pale faces are a sure sign of the absence of the vivifying influence of the sun's rays, so essential to the maintenance of vigorous health. In time, no doubt, by the efforts of science, the consumption of fuel will be reduced to a fractional part of its present amount, and smoke will then to a great extent disappear. But till that happy period arrives we might perhaps, in many localities, adopt a suggestion of Professor Andrews, which would not only carry smoke away from the busy human hive, but turn it to commercial account. Professor Andrews' plan is to convey the waste products of the furnace to a distance by a few horizontal flues of large dimensions, terminating in lofty chimneys on a hill-side or on some distant plain. A system of this kind has long been employed at the mercurial mines in Idria, and in other smelting works where noxious vapours are disengaged. With a little care in the arrangements, the smoke would be wholly deposited as flue-dust or soot in the horizontal galleries, and could easily be collected and sold for the use of the agriculturist. Here, then, we have health and wealth combined; but the latter might well be sacrificed if only we could have the pale-faced artisan regaining colour by breathing pure oxygen.



A Geographical Puzzle Solved.

Any one who looks at the map of Iceland will see that in the south-east of the island there is a blank space, representing a vast unexplored region—3,000 to 5,000 square miles—of ice and snow, called the Vatna Jökull. All that was known about it until lately was that, centuries ago, there existed a way across the northern portion to the extreme eastern districts. During the last fifteen years a few attempts have been made to penetrate this mountainous region, but the explorers all failed to reach even the edge of the Jökull. In 1875, however, Mr. William L. Watts succeeded in scaling its heights and exploring its recesses, and filled up the map of Iceland by traversing a district larger than Yorkshire would cover, if the space which it fills were left blank in the map of England. Mr. Watts had several Icelanders for companions: they were all courageous, persevering, obedient fellows. "Without them," says Mr. Watts, "I could never have crossed the Vatna Jökull;" just as we may say that, without him, it never would have entered into their heads to cross it. After dragging sledges, and sleeping night after night in holes dug in the snow, one of them began to ail. This only called from him the expression that he would sooner "die than turn back." For protection against the weather the party carried a low tent and a large sleeping-bag, capable of holding six persons, sleeping three with their heads peeping out at each end. These were close quarters, and gave little room for turning, or kicking, or cramps, when they were tucked up for the night; but its great merit was that it only weighed sixty pounds: a consideration for men who had to drag tent, bed, and provisions with them on hand-sledges, over snow that might be soft or sludgy for several days. When the explorers at length reached Grimstadir, a farm situate on the other side of the Vatna Jökull, they created quite a sensation; and well they might, for they had accomplished a considerable feat. They had reached the northern quarter of Iceland by a route never yet traversed by man, and had made their way from Napstadr, in the south, to Grimstadir, in the north—a distance of about 270 miles—in sixteen days, twelve of which had been spent among the regions of perpetual snow.

But apart from its interest as a mountaineering achievement, great scientific interest attaches to Mr. Watts' expedition. Before he crossed the Jökull, literally nothing, as we have said, was known of its formation. This Mr. Watts has carefully noted. In another point his observations have been most valuable. He has proved, beyond a shadow of doubt, what had long been suspected: that the great glaciers and Jökulls of Iceland are rapidly extending and invading the rest of the land. On descending the Vatna Jökull on the northern side, he found the face of the country, as laid down in the admirable Icelandic map of 1844, quite changed: great rivers had been diverted and blocked up by ice-fields; paths along which the

traveller rode forty years ago, now lay buried deep beneath glaciers; and long chains and ladders of ice-slopes stretched down towards the more level country. Evidently Iceland is now far more Iceland than it was some centuries ago.

What Becomes of the Pins?

It is estimated that no less than 50,000,000 pins are manufactured daily in England and Dublin; and that out of this number 37,000,000 are produced in Birmingham alone, thus leaving 13,000,000 for the production of Dublin, Stroud, and London. The weight of wire (both iron and brass) consumed for the purpose is 1,275½ tons every year.

Question: What becomes of these pins produced with such rapidity and in such numbers? That the tremendous quantity above referred to is sold every day is evident from facts; but where these necessary items to our domestic comfort disappear, is a matter for very curious speculation.

A Hidden Quotation.

In the following lines will be found a well-known quotation—one word in each line:—

IN THE CATHEDRAL.

Where all the teeming world is still at even,
When through the air the grey owl wheels his flight,
I love to sit within the old cathedral,
While lingers long the coming of the night.

And when at length night's mantle's drawn, and shadows
Wander no more through aisle and lofty nave,
And all the dusk seems lit with strange weird fancies,
From fretted organ-chamber streams a wave

Of song as sweet as from the vault of heaven
Is echoed when the lark essays his flight,
And through the dark the pealing cadence lingers,
And the sweet anthem welcomes in the night.

With noble grandeur swells the echoing chorus,
Raising the thoughts from earth and earthly ways,
With sweet glad note a joyous song proclaiming,
Rich with the promise of bright golden days,
Then dying soft in one last peal of praise.

W.

Fire-proof Store-houses in Japan.

A Japanese style of store-house may be recommended to the notice of happy possessors of property to be insured against fire. During the winter months vast conflagrations, as is well known, are prevalent in Japan. The most perishable and valuable articles are, therefore, kept in fire-proof store-houses, known as "mud godowns." These structures are formed of mud or, to speak more correctly, of clay. To build them is a slow affair: it sometimes takes as long as three years. First, a double framework of bamboo or slight boarding is run up; then the intervening space, about eighteen inches or two feet wide, is filled with mud, which is gradually packed, and allowed to dry by the action of the air. Once up, the "godowns" are the safest structures imaginable. At a great fire which recently took place at Tokio, and raged for eight hours, destroying nearly 10,000 houses and an immense amount of property, not a single "mud godown"—and there were several hundreds of them—was injured throughout the entire area, of from five to six miles in extent, laid waste by the conflagration.

Decrease in Emigration.

The emigration officials of Liverpool show by their last year's returns an enormous decrease in the number of emigrants. Last year the number estimated to have left this port for foreign shores was 66,446, showing on comparison with the year 1875 the extraordinary decrease of 28,533 passengers.

Notes on Domestic Filters.

When a water-supply is not above suspicion, the only thing to be done with it is to submit it to filtration. This is effected on a large scale by passing the water through sand, a method which is efficacious in removing mechanical impurities to an extent that can scarcely be believed without seeing the process. But, for all that, much is left that had better be away. To render the water safe for use, we must filter it again in domestic filters, through animal charcoal or spongy (metallic) iron.

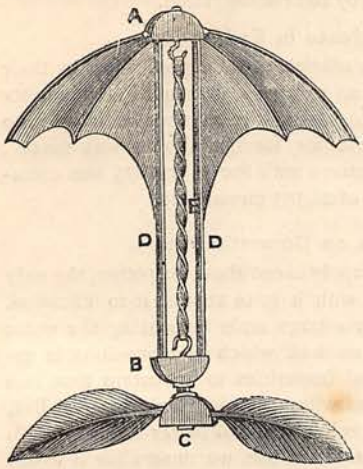
In connection with these two filtering mediums, some interesting information is given in one of the reports of the Royal Commission on Rivers Pollution. Fresh animal charcoal removes organic matter from water very satisfactorily: the material, however, must be renewed every three to six months, according to the purity and quantity of the water filtered. When this is not done, myriads of minute worms are sometimes developed in the animal charcoal, and passed out with the filtered water. This circumstance caused the Commissioners to arrive at the conclusion that "the property which animal charcoal possesses, in a high degree, of favouring the growth of the lower forms of organic life, is a serious drawback to its use as a filtering medium for potable waters."

It is otherwise with spongy (metallic) iron. This filtering medium, being of inorganic origin, is free from the disadvantages of animal charcoal. The Commissioners carried on a course of filtration through this material for eight months, and the filter was then as efficient as when first started. Thames water was found by them to assume, under the influence of spongy iron, the chemical character of a deep well water—that is to say, of a water "which contains the smallest proportion of organic matter, and is almost always bright, sparkling, palatable, and wholesome."

A Mechanical Bat.

Here we have one of the most amusing philosophical toys ever invented, and one which serves, too, to illustrate some very important mechanical truths. It is the invention of M. Pinaud, a member of the French Aëronautical Society. The scientific name given to it is the "Helicoptere," but it is popularly known as the "Mechanical Bat," from its imitation of the erratic flight of that creature. The construction is shown in the annexed engraving. A, B, and C are semi-circular pieces of cork. Between A and B are

secured two thin wooden rods, D, made of orange or some other light strong wood. From A extend arms, between which and the adjacent rods, D, tissue-paper wings are pasted. In A a hook is rigidly secured. There is a similar hook in B, turning freely therein, but fastened in another piece of cork, C. From hook to hook, and between the rods, a rubber band, E, is stretched; and in the cork, C, two feathers are inserted, like the fans of a propeller.



To set the mechanical bat in motion, hold the body in the left hand, and wind up the apparatus by turning the cork, C. Continue winding until a strong twist is thrown in the rubber, E; the stronger the twist is the better. When the machine is released, it will fly for a considerable distance, either up in the air or horizontally, and return and circle about until the revolution of the screw ceases, when it will sink to the ground.

Poisonous Dyes.

It is necessary nowadays to be very careful in the use of coloured clothing.

Not long since a poor shoe-maker bought a new hat, and on wearing it became painfully conscious of headaches and severe swellings of the forehead, which were accompanied by pustular eruptions. At last, when inflammation reached to the lower part of his face and the swelling closed up his eyes, he suffered himself to be led to the chemist for relief.

On examining the hat the chemist discovered the use of poisonous dye in the colouring of the brown leather lining. This dangerous hat had, we are sorry to say, been made by a well-known firm, and as several people have lately complained of the use of the same dangerous dyes in the colouring of other articles of clothing (particularly stockings), we think it incumbent upon us to issue a word of warning.

Cleopatra's Needle.*

Professor Erasmus Wilson, with the permission of the Government, has generously volunteered to bring this long-neglected present from Egypt to England at his own expense.

The manner to be adopted for its removal is curious and clever. In the first place it will be ballasted in the water at Alexandria, where it is at present lying, and a deck will be built upon it, bearing two masts. The hinder part of the vessel will be so constructed as to contain a few men, who will steer by means of a rudder attached to the stern. A steamer will be waiting to receive it and will tow it out to sea: and the barometer will be regularly consulted in order to avoid dangerous weather.

As this enormous obelisk weighs 200 tons, great care must be expended on erecting it in an upright position when it reaches our shores. This is the method Professor Wilson suggests:—Hydraulic power to be applied at each end of the structure, raising it gradually until it is poised in the air to the height of 29 feet. Afterwards a "jacket" to be placed round the centre of gravity, with a couple of trunnions fixed firmly to it, when all that would be required to complete the operation would be to sever the lashings, allowing the obelisk to drop into its intended position on the pedestal.

Pleasant Light for Weak Eyes.

The most noted oculists recommend blue, bluish-grey, or smoke-coloured glasses as a protection for weak eyes against the unpleasant effects of red, orange, and yellow light. On the same principle, remarks a scientific contemporary, the trying reddish-yellow light of candles, lamps, and gas may be pleasantly modified by the use of blue chimneys or globes. Shades coloured a light ultramarine blue may also be used for the same purpose. A remarkably near approach to a light as agreeable as daylight is said to be produced by a petroleum lamp, with a round wick, and a light blue chimney of twice the usual length, the latter causing so great a draught that the petroleum burns with a nearly pure white flame. Of all the gateways of knowledge sight is the most important, and for its preservation we should adopt all possible precautions.

A Distance Calculator for Battle-Fields.

A distance calculator, or "Range Finder," made by General Berdan, is reported to be making a great stir in German military circles, and, if generally adopted, is likely to revolutionise the science of war to a very great extent. Our War Office is about to make a trial of one of them, with a view to ascertaining the practical worth of the instrument. It is described as a two-wheeled chariot, with a single horse, and a seat at the top to accommodate a driver and an operator. When the "Range" is required for use, the horse is taken out of the shafts, and the carriage is turned over on its axle, revealing a box containing the "Range," and what before was a comfortable seat for the two men now serves as a support to the instrument, arranged in position for use. This wonderful instrument, which consists of a couple of very powerful telescopes, is so cleverly constructed that a moment's glance through it will show the exact position of the enemy; the pointer (the main feature of the invention) proving to the operator the true distance between the conflicting parties. When this is satisfactorily ascertained the instrument may be readjusted, the carriage swung to its original position, the driver and operator remount, and away they go again.

* See CASSELL'S FAMILY MAGAZINE, Vol. II., p. 508.