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THE CANADIAN MECHANICAL MAGAZINE

MAGAZINE


AND
PATENT OFFICE RECORD

Vol 4.

SEPTEMBER, 1876.

No. 9.

OUR PUBLIC SCHOOLS.



S the education of youth, in our public schools, is a question of very great importance to the mechanical interests of Canada, it is quite within the province of this journal to point out some of the errors into which our teachers are falling, with respect to the course of study laid down for them to follow and the rules of discipline adopted. Whilst we appreciate most highly the great advance made, of late years, in the education of the masses, and the superior class of

teachers employed, we still feel that we are giving to them a mere superficial education on many subjects of no importance to them in this country in after-life—in fact, forgotten altogether ere youth has reached the age of manhood, whilst other subjects of the utmost importance, not only to the people as a body, but to the future prosperity of the Dominion, are entirely ignored.

Some of the principal subjects of education, of the greatest importance for the future development of the resources of this vast country and for the benefit of its people, and which, hitherto, have received little or no notice by our Educational Boards, are Mechanics, Agriculture, and Geology, for boys; and Home Industries and Domestic Education, for girls. If a taste is not created for these important studies in early life, they are not likely to be attained after children leave school, when, to a certain extent, their education may be said to cease, and the little store of superficial knowledge acquired at school, on subjects not required in their sphere of life, except in isolated instances, becomes soon rubbed out, and all that remains on the mind, after five or six years instruction, is the knowledge of how to read and write, and to make such arithmetical calculations as are actually necessary in commercial life. How few boys and girls remember, say two years after leaving school, a problem of Euclid, or how to work out a question in Algebra; because in their daily routine of life their application is never called for; and even when taught, scarcely

one boy, out of twenty, leaves school with the slightest idea of the application of these branches to practical purposes in life. He is taught to learn them simply by rote—and the boy with the most retentive memory, will often receive the first prize, after an examination on those studies, although, with respect to the usefulness and application of these sciences, he actually knows nothing, because he has never been taught their value. How can it be expected that any boy can feel a pleasure in studying, or make any progress in a study which he learns to repeat as a parrot? One simple application of theory to practice would do more to create a taste for knowledge, and make a greater impression on the memory, than weeks of hard study, in endeavouring to retain on the mind words which have, apparently to him, no use and no meaning.

Our school teaching is undoubtedly too theoretical; we want more of practical instruction; we want teachers to be trained up to know the practical application of what they teach, and to teach it also; and we want our children to be taught those branches of education suitable to the sphere in life for which they are intended.

We have too many boys now in Canada whose educational training fits them only for clerks, of which we have already too many. We want more agriculturalists and more mechanics—not mechanics who simply know how to plane a board, or make a joint, but mechanics educated to their trades as to a profession, and who will be able to turn to advantage, in after-life, the education received in youth, not only to the benefit of themselves, but for their country as well.

To what do England, France and America owe their great prosperity during the past century? almost entirely to the inventions and skill of their mechanics. What would be the state of England in the present day, were it not for its high state of agricultural knowledge, by which every acre of land fit for cultivation is made to produce, to its utmost, food for the people; where one acre there, produces a larger crop than five in this country? Let us then, by all means, have a practical course of education for our children, and let those studies, of which a mere smattering knowledge is of no practical use, be laid aside and give place to other branches of education of greater benefit to the masses. This is really a question of vital importance to the country, and deserving of the serious consideration of all Boards of Education.

There is another matter in connection with public schools to which we desire to call attention, as being injurious to the health and habits of the scholars, and that is to certain methods of discipline whilst in school. For instance—in some schools in Montreal, the children, while not engaged in studies, are forced to sit in a constrained attitude with their arms crossed upon the chest. Is it necessary that this injurious posture should be persisted in, to the great detriment of the health of the offspring of consumptive parents, and the deformity of the figure? There are also many minor things to be complained of with respect to school discipline, which all, taken together, are exceedingly objectionable, and should be more strictly inquired into by those entrusted with the superintendence of education. We all know that the position of teachers is a very trying one, and wearisome in the extreme; and that there is no more responsible position in the country, for upon their adaptability to the trust and position they hold, to a great extent, does the future prospects of a child rest. We have known some teachers who have taken a pleasure in holding up the imperfect efforts of a dull child, in giving an illustration to its thoughts, to the ridicule and laughter of a whole school. That child, although slow in intellect, is perhaps gifted with a sensitive mind, and if encouraged and helped onward until the mind gained more strength, might eventually far outstrip all his school-fellows; but the shame and humiliation of being held up as a laughing stock to the school, and that, too, at the instigation of the teacher, has henceforth made the boy a dunce for life. The little light in the mind struggling to burst into a flame has been extinguished forever. Another source of complaint by parents is the unjustness of keeping a whole class in, after school hours, as a punishment for the undiscovered guilty one; because none of the children would be mean enough in spirit to point out the child, and have it punished, for what? perhaps, after all, for some trifling infringement of school discipline. As it is, the hours for children in many of our public schools are already too long, particularly for girls residing in towns. Of what use is education, without health and life to enjoy it? and certainly the hours of our town schools are too long. When a girl is kept in the close confinement of an overcrowded room from nine in the morning to half-past three, and even four o'clock in the afternoon, particularly in winter, what time has that child for exercise? the afternoon is closed for out-door recreation and household duties, and evening studies close the day. No wonder so many of our girls grow up unfit for the domestic duties of life.

If those to whom the superintendence of the education of a future generation are apathetic to their responsibilities and the necessities of a thorough reformation in the method of education suitable for the youth of Canada, then let parents, in a body, insist upon certain changes being made, which are absolutely essential to the welfare of the people, and the progress and prosperity of the nation.

AMERICAN PROTECTION.

Mr. Henry C. Carey, of Philadelphia, in a pamphlet entitled "Commerce, Christianity and Civilisation *versus* British Free Trade," has taken up the old-fashioned well-worn cudgels in defence of protective tariffs and carefully-nursed home industries. The alliterative title of his pamphlet appears to have been an afterthought, as, indeed, was the pamphlet itself. Works in this form labour under the great disadvantage of suggesting that as no publisher could be found rash enough to invest his money in them, the author, rather than remain mute and inglorious, has actually parted with ready cash for the satisfaction of seeing himself in print—an evidence of either his earnestness or his vanity. There is no disguise about Mr. Carey's counterblast to English free-traders. It is made up of eight letters addressed to *The Times*, but not published in that journal. Every effort was made to secure the appearance of the letters. A friend in London—probably one of those mysterious persons who are supposed by the outside world to have "influence with the press,"—was entrusted with the delicate task of obtaining their insertion. So far as can be ascertained, the mind of *The Times* was quickly made up, and the letters were refused admission to its columns. Mr. Carey tells us that his friend—the influential gentleman previously referred to—explains the brutal indifference of *The Times* in the following way: "he said, in effect, that that paper, in common with nearly all English journals, was so hopelessly given over to the advocacy of free-trade doctrines as to make it wholly useless to offer the letters for publication." Like Madeira of old, the letters have had a couple of voyages, and now present the old appearance of a correspondence with all the letters on one side and none on the other. The reasons which decided the rejection of Mr. Carey's letters are not far to seek. He begins with Adam Smith, cites the opinions of Mr. Huskisson, and goes on to prove that the great commercial superiority of France over England, and the greater measure of wealth and prosperity enjoyed by the people of the former country, are due to the rigid protective duties with which French people have sympathised ever since the days of Colbert. Now, if Mr. Carey were a young gentleman fresh from the University, who had passed some leisure mornings in reading up political economy, this stuff about Colbert and protection would be comprehensible enough, but that this kind of thing should be advanced by a mature man of business is inconceivable. When that singularly-gifted American—Dr. Oliver Wendell Holmes—said that "when good Americans die they go to Paris," he struck the right chord in ridiculing the fanatical love of his countrymen for France, *i. e.*, Paris. The Frenchman is, according to Mr. Carey, the most perfect of creatures, always—we suppose—after the free-born American citizen. Freed from the most oppressive of all taxes, the Frenchman grows in love of the beautiful, in love of freedom, in that love of his native land by which he is everywhere so much distinguished—each and every stage of progress marking the growth of real civilisation. We will not pause to discuss this wonderful estimate of our friends across the Channel further than to remark that the French people are the least educated in Europe, and that their love of freedom only exists among the minority for the time being—who, when they get the upper hand, will most assuredly maintain the censorship of the press and every other restrictive law in its integrity. To mere sellers of "cinder-pig and shoddy" (*et tu Brute!*) like the English, France hardly appears a paradise of sound political economy and aesthetic culture. There is hardly sufficient distance between France and ourselves to supply us with illusions. We know that Brittany cannot read, and that Paris let loose is not quite an exposition of the principles of the beautiful and the free; but all these matters of detail are lost in the wonderful argument by which Mr. H. C. Carey demonstrates the soundness of the protective system. Taking the year 1856—a remote date on which to base a discussion in which trade interests are involved—he finds that among her exports France shipped manufactured goods—textile fabrics—to the value of 140,000,000 dollars, or exactly the value of the three millions of bales of cotton and the hundred thousand hogsheads of tobacco exported in the same year by the Southern States of the Union. With considerable ingenuity, he raises the question of freight, as proving that the chances of prosperity must always be in favour of a manufacturing over an agricultural country, because it costs a less percentage to ship valuable goods than raw material. The beautiful fabrics of France would require but five-and-twenty ships to convey them, while the bulky products of the States would demand entire fleets. "How many ships were required?" he asks. "Thousands! How many seamen? Tens of thousands!" So far, Mr. Carey confines himself to facts and interrogations, and

NEW ZEALAND PATENTS.—During last year, 22 patents for various inventions were taken out in New Zealand. Mr. W. F. Crawford, of that colony patented a floating dock to raise vessels by pumping air into the dock. Mr. G. W. Hollis, of the Thames, applied for a patent for a flux for smelting titaniferous iron ore, but the application was refused.

is on tolerably safe ground, but in the very next sentence falls into that extraordinary blunder which affects the otherwise supple mind of intelligent America. "Who paid them?" is the next question asked in his politico-economical "Cock Robin." The planters! "Who paid the charges on the cotton until it reached its final consumer? The planter; whose share of the two, three or five dollars a pound paid for his cotton by his customers in Brazil, Australia or California, amounted to but a single dime." This is, perhaps, the most tremendous statements ever made by any writer in any country on any subject. The planter did none of the things ascribed to his agency by Mr. Carey. Not the producer, but the distant Brazilian, Australian or Californian really paid the high prices to which the raw cotton of the planter was ultimately raised. This error of Mr. Carey's completely explains the confusion of his mind on the subject of free trade. It is the consumer who "pays the piper," whether that musician take the shape of a shipowner, a manufacturer or an almost prohibitive duty. This truth, which was made sun-clear a third of a century ago, has not yet dawned upon the American protectionist. The imposition of a high rate of duty is not "taxing the foreigner." Far from it. Nobody but the ultimate consumer suffers. Custom-houses take their share—merchants, commission agents and capitalists, who advance gold to pay duties with, taking a handsome profit on the duty—the whole of which falls with crushing weight upon the shoulders of the last buyer. So far as can be gathered from Mr. Carey's extraordinary pamphlet, that country is the best off which consumes its own productions, for that seems to be the meaning of "bringing consumers and producers into near connection with each other." On this principle, China and Japan were once eminently happy countries, for they sufficed to themselves and suffered no stranger within their gates. Steam, also, has done little to improve the condition of the world, and especially of the English people, who are not to be compared with the egg-farmers of France! But we fear to weary our readers with a recapitulation of Mr. Carey's worn-out fallacies. These ancient arguments were, we had fancied, "hung up for monuments," for they sound in modern ears like the clash of antique armour.

BREAKING DOWN.—Men often have their hands full, are overcrowded with business and drive hurriedly along at it, but they may not be overworked. We cannot always tell when we are overworked. A man does not always know himself, no more than he knows the strain on the mainspring of his watch that will break it. But there comes a time when it breaks—a click, a snap, and the watch stops. Men break down in this way. They go on, day after day, the pressure being harder each successive day, until the vital force gives out, and the machine stops. It is a great pity that the indications of this state of things cannot be seen beforehand, and if seen, regarded. It is one of the last things that men will admit to themselves, much less to others. They flatter themselves that it is only a little weariness of the flesh, which will pass off with a few hours' rest, when in fact, every nerve, power and resource is exhausted, and the system is driven to work by sheer force of the will. When the oil on the shaft or in the oil box is exhausted, every revolution of the wheel wears on the revolving part, and soon will ruin it. The same is true of the human body.—*American Manufacturer.*

EFFECT OF THE SEASONS ON THE BODY.—The curious fact has recently been pointed out by Dr. B. W. Richardson that the changes of the seasons have a patent physical influence upon the body. Some years ago, in a convict establishment in England, a number of men were confined amid surroundings (of clothing, room, food, etc.) practically the same for each individual. The medical superintendent of the jail undertook investigations, extended over some nine years, and during which over 4,000 individuals were weighed. It was found that during the months of winter the body wastes, the loss of weight varying in increasing ratio; that during summer the body gains, the gain varying in an increasing ratio; and that the changes from gain to loss and from loss to gain are abrupt, and take place, the first at the beginning of September, and the second at the beginning of April. This is shown in the following figures, indicating the ratio of loss or gain: Loss: January 0.14, February 0.24, March 0.95. Gain: April 0.03, May 6.01, June 0.52, July 6.08, August 0.70. Loss: September 0.21, October 0.10, November (exception) a slight gain, December 0.03.

COMBINED AGRICULTURAL LOCOMOTIVE AND REAPING MACHINE.

(See page 261.)

CONSTRUCTED BY MESSRS. AVELING AND PORTER, ENGINEERS, ROCHESTER.

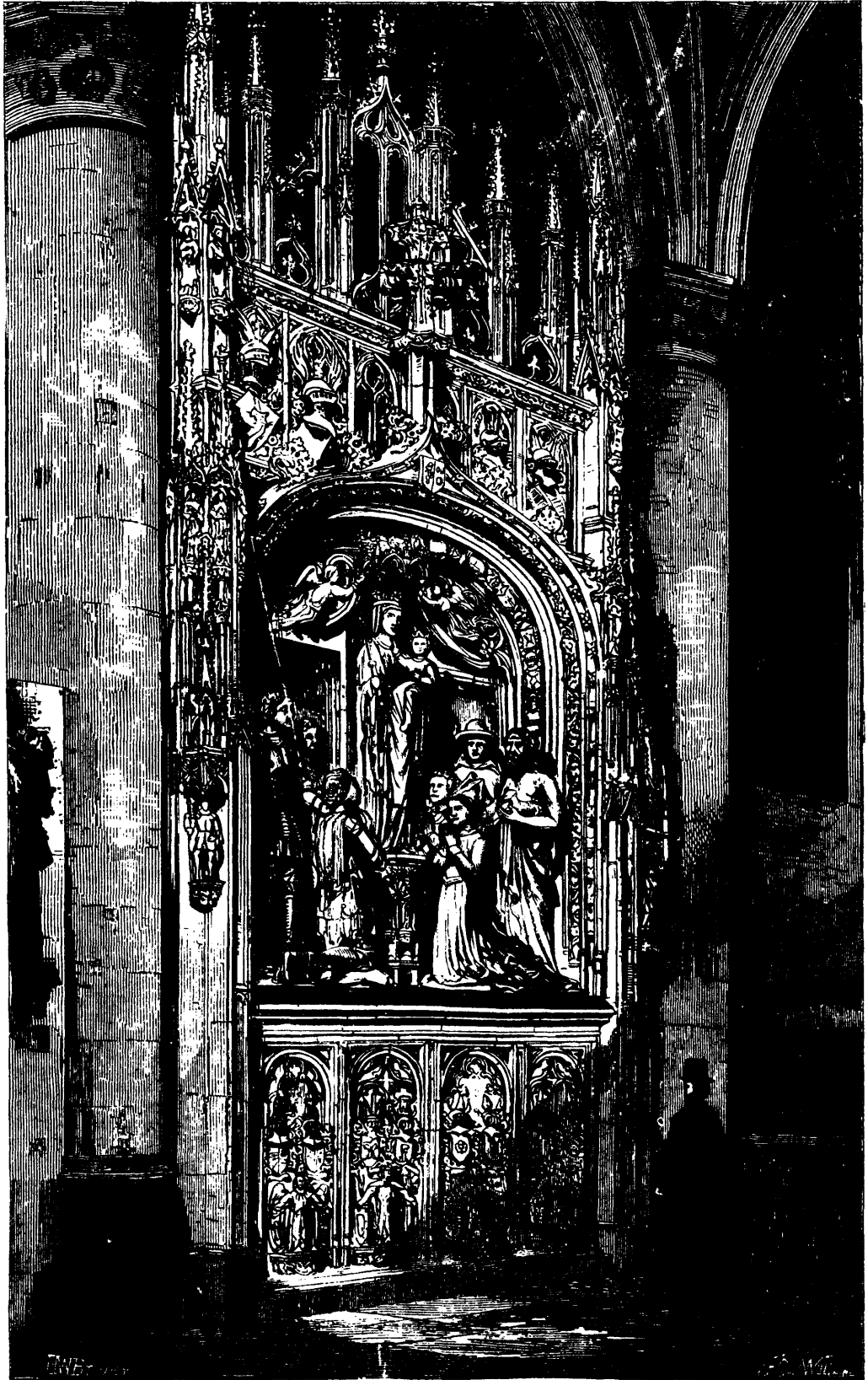
The agricultural locomotive steam engine having been successfully adapted to the work of ploughing, thrashing, and hauling, it some time ago appeared to Mr. Thomas Aveling, of the well-known firm of Aveling and Porter, of Rochester, that it would be advantageous if its services could be further utilised by its application to reaping and mowing, and the arrangement of which we annex an engraving, and which is to be exhibited next week at Birmingham meeting of the Royal Society of England, has been designed with a view to carry out this object. Mr. Aveling, having had many opportunities of practically working the various reaping machines invented and manufactured since the year 1851, when American reaping machines were first introduced in a practical form, has selected the well-known reaper invented by the Rev. Patrick Bell, a minister in Fifeshire, in the year 1826. This reaper was awarded a prize of 50*l.* in 1829 by the Highland Agricultural Society, but from some cause remained almost forgotten until 1852, when a competition took place at the Highland Society's show at Perth. Mr. Bell, having improved and put his old machine into thorough repair, then competed successfully with the American manual black-delivery-machine of Mr. Hussey. The superiority of Mr. Bell's machine, with self-acting delivery clear of the horse track, over one which required men to remove the corn to enable the horses to pass, was so evident that the judges unanimously awarded the prize to Mr. Bell's machine.

The manufacture of this machine was subsequently undertaken by the well-known firm of Messrs. W. Crosskill and Sons; but it has not come largely into use, its weight, heavy draught, price, and the peculiarities of propulsion and steering having, it appears, counterbalanced its numerous advantages. With the employment of steam power instead of horses, however, these objections become of minor importance, and altogether the machine is admirably adapted for the purpose to which M. Aveling has applied it.

The machine now under our notice, and shown in our engraving, is capable of clearing a space of 12 ft. in width, and delivering the cut corn to either side in swathes sufficiently large that sheaves can be gathered without a rake. Motion is communicated from the engine by means of a pitch chain driven from the crank shaft end, the liability to slip on the part of the carrying wheels of the horse machine being thus avoided, and the reciprocating motion of the knife at a proper speed being secured. The machine is connected to the engine by means of two angle iron bars secured to the frame of the reaper. A bolt passing through the ends and through the smokebox, enables the reaper to be lifted by means of the crane clear of the uncut crop when the machine is turned at the end of the field. When thus lifted the engine can also readily carry the reaper from one position to another.

The engine is an eight horse-power agricultural locomotive of Messrs. Aveling and Porter's ordinary type, fitted with a crane, and it can be steered and managed by one man. Such an engine is adapted for all descriptions of farm work. The engine, like all those lately made by Messrs. Aveling and Porter, has the bearings of the crankshaft, countershaft, and driving axle carried by the side plates of the firebox casing, these plates being extended upwards and backwards for this purpose. The whole combination of engine and reaping machine is well worked out, and it is one which we consider possesses great promise.—*Engineer.*

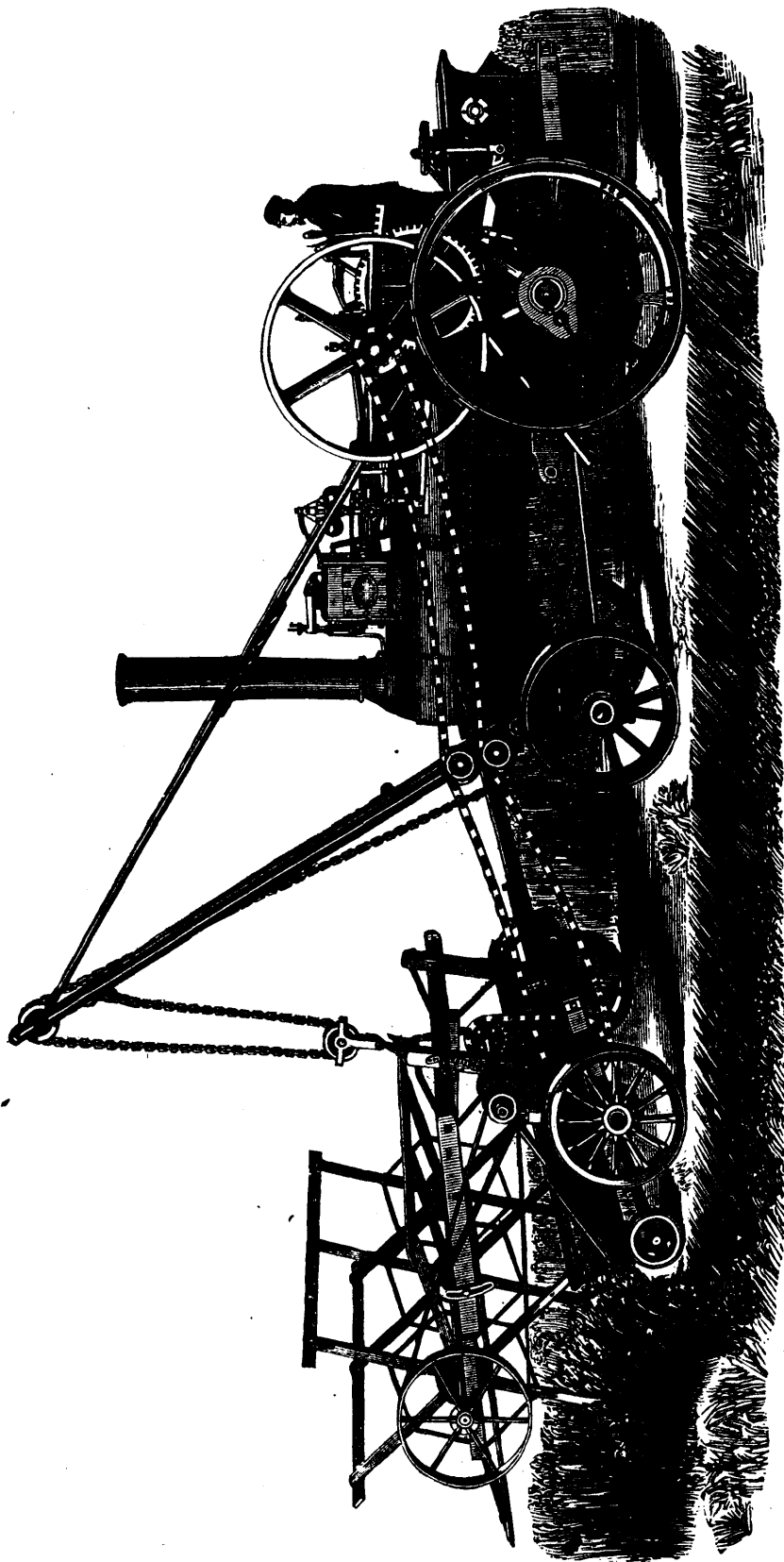
TAR WALKS.—A correspondent recommends the following mode for making tarred walks: First gravel the walk in the ordinary way, but do not give it so thick a coat as usual; beat well down to make a perfectly smooth and even surface, which coat well with tar. When this is done put the final layer of gravel on the top, three-quarters of an inch to one inch will be quite sufficient, and again beat down, using the back of a spade for the purpose. The walk so prepared must not be trodden upon for two or three days, and the end of which time it will have become perfectly hard, and will not be affected by the heaviest fall of rain. The work must be done in fine weather, and the plan will be found better than using cement mixed with gravel.—*English Mechanic.*



THE MONUMENT OF ENGLEBERT III. AND JOHN OF NASSAU; BREDA CATHEDRAL, HOLLAND.

END OF FIFTEENTH CENTURY.

COMBINED AGRICULTURAL LOCOMOTIVE AND REAPING MACHINE.
CONSTRUCTED BY MESSRS. AVELING AND PORTER, ENGINEERS, ROCHESTER.



IMITATION OF MARQUETRY.

The beauty of furniture decorated with that expensive inlay, technically known as marquetry, is acknowledged throughout the world. These surface-inlays of the shell of the marine tortoise, or hawk's bill turtle, with various metals, ivory, and wood stained and shaded by heat, sometimes with pigments, have, since their earliest production, placed a princely value upon them, and given marquetry a position high up in the scale of originality and wealth of design in furniture. The seventeenth and eighteenth centuries produced some fine specimens, noted alike for their originality and beauty.

The imitation of marquetry is no new thing; and the imitations have by no means been of an inferior character. Long ago it was accomplished in the form of painting by hand. The attendant expense in its production, being as much or more than that of the genuine, and in some points superior in workmanship, made the attempt limited to the effort comparatively abortive. This imitation was finer, often times being much superior to the real marquetry, for the trained brush of the artist could make a much truer line than could be cut by the skilled workman for the gems, even than those who had worked so long for the perfection of the true piece. It also possessed another superiority over the genuine marquetry which greatly enhanced its value; notwithstanding the delicacy and care that is exercised in the placing of the precious bits that form the inlay, they will "pull up" or become started if used very much.

In this process of painting the imitation wood, they are obliged to lay their veneers in their actual positions, sand-papering and scraping them down after they are laid. Each separate article has to be begun anew and the whole process gone through with as on the previous piece, sketching, coloring and finishing each different piece of furniture throughout, making a reproduction of labor, and necessarily swelling the expense to a large figure. It was as far from the means of those who desired it as the genuine marquetry.

We have now a process, the one of Spurr & Prang, that is comparatively simple in itself, with results equal to those which it imitates, produced at a small expense. The real is oftentimes inferior to it in appearance. A representative of THE AMERICAN CABINET MAKER recently called upon Mr. Charles W. Spurr, who very kindly furnished him with the particulars of the process, which are as follows:

Let us begin at the very foundation of the process; the wood upon which this ornamentation is made is white holly, which is cut into thin veneers, 125 to the inch, which while yet in a green state and wet, are united at the "extreme of swell," with paper; a pure flour paste being used. This paste stands all extremes of temperature; heat does not affect it nor cold destroy it. In this state the wood is taken to be finished; being subjected to a solution of tartaric or oxalic acid for the purpose of removing any discolorations and cleaning the wood, taking from it all foreign substances, &c. Then a solution of glycerine (one part in four of water) is applied; this renders the veneer pliable and soft, a requisite of great importance, as the wood must be in a very receptive state that the impression which is afterwards given may be clearly executed and sharply defined. After a process of slow desiccation, sand-paper is applied and the surface of the wood made thoroughly smooth, as there is no similar process employed after the work is finished, all the smoothing that the holly veneer gets being given it now.

The wood in this state, the first stages of the production being completed, is sent to be lithographed upon. On it then is printed the ground-work and the fine lines of the design in black, brown, or whatever may be the chosen shade. The work is then given to artists, who with pure water colors fill in the blank space (that which in printing the ground-work was not touched) with whatever tints and shadings are required, following a copy previously painted. This is done in a short time, and then the veneer is varnished, as all this class of work is, with French polish in ordinary furniture varnish, by doing which the colors are prevented from rubbing off a glassy surface is given. The work of painting now being finished, (the veneer having been pasted to the paper backing as already described), it is laid with a thin glue size, one-third the consistency of that used in laying ordinary veneer. The surface on which the veneer is laid, and also the caul must be perfectly smooth and true, from the fact that the surface of the marquetry cannot be disturbed.

What makes this process a possibility and brings it to such a state of perfection is the fact that the paper backing which is put on protects the veneer, preventing any glue whatsoever from penetrating through the pores of the wood, which is the result

on veneers of porous woods put on the ordinary process. It is easy to see from this that the entire success and perfection of the work depends upon this accurate and careful preparation of the veneer. It is not too much to say that the whole feat hinges on this—all the other processes being subordinate to it.

This new work is being used to decorate an upright piano for Hallet & Davis to be exhibited at the Centennial; also on an organ entered by Geo. Woods, and the exhibit of the Home Sewing Machine Company.

That such an invention should be the outgrowth of American ingenuity we are glad; and that such an ornament, surpassing in richness the marquetry that is offered buyers by dealers at so large a price, can be made with which to decorate and beautify our furniture and elaborate the luxuries of our homes, is a gratification which all lovers of refinement and elegance truly enjoy.

For the information of amateurs, white holly of any thickness can be obtained from any veneer merchant in Boston or New York.—*Scientific American.*

THE MONUMENT OF ENGLEBERT III.

BREDA CATHEDRAL, HOLLAND.

(See page 260.)

The family monument of Englebert III, and John of Nassau, of which we give an illustration, is without doubt the most remarkable of all the sepulchral remains in Holland, and has few rivals in Europe. This noble monument is placed in the north aisle of the choir of the former cathedral in Breda, with its back against the solid screen-wall, dividing the choir from its aisles. It is adorned with a great deal of sculpture of very remarkable excellence. The larger figures are rather above life-size, and are most masterly works, both for expression, "pose," and delicate finish. They represent John of Nassau and his wife, and Englebert III. and his wife, Count and Countess of Breda, together with their patron Saints, St. John the Baptist, St. Englebertus, St. Jerome, and St. George. In the centre is a statue of the Madonna,—this is modern, as the ancient one had been destroyed in the seventeenth century.

It is not possible to give the exact date of this monument. It might have been erected during the lives of Englebert III. or John of Nassau, or any time after their deaths. It is, however, undoubtedly a work of the very end of the fifteenth century. Unlike the other tombs in this church, it has escaped mutilation in a very wonderful way: it was probably respected because William of Orange was descended from the Nassau family, and what little restoration was required, which consisted chiefly in replacing the statue of the Madonna, has been admirably carried out under the direction of Mr. Cuypers, at the expense of the present royal family of Holland. There are many other interesting monuments in this church, and it contains two of the finest Flemish brasses in existence, but everything is in the most terrible state of filth, ruin, and neglect; in fact, the condition of the church is a national disgrace. The nave alone is used by the colonists, to whom it belongs, and the only use made of the noble choir and transepts, as far as we could discover, was to air the linen of the pastor and his family, as a very extensive line of very clean linen was suspended from one end to the other of the transepts. There was a very suspicious look to the choir, strongly suggesting the idea that the "wash" had absolutely taken place in this part of the sacred edifice!

We have described the noble tower of this church, and also the remarkable choir-stalls, in a former number. The new Roman Catholic cathedral at Breda,—the only other religious edifice of any importance in Breda,—has also been illustrated in this journal.

In our illustration the iron grille which protects the lower portion of the tomb is omitted, for the purpose of showing the original arrangement of that portion of the monument.—*Builder.*

THE TURKISH NAVY.—Turkey has now a flotilla of 11 gun-boats on the Danube, seven being ironclads. The imperial despatch boat *Rethymos*, after having been refitted in the Admiralty docks, has returned to her station at the Dardanelles.

THE authorities of Reggio-Calabria offer a prize of £2,000 for the best machinery for the extraction of the essence of bergamot. The apparatus must be cheap, and produce the greatest possible quantity of essence in the shortest space of time, and that without impairing the purity, colour, and odour of the product.

THE ALLEN GOVERNOR.

(See page 265.)

During the last fifty years, it has been the constant effort of thoughtful engineers and machinists in all the world to discover the best mode of maintaining a uniform speed in the working of steam engines while variations occur in the amount of work done by them. It is well known that machinery cannot produce its most profitable results without being run at the highest rate of speed consistent with its durability and the production of a perfect fabric, and that no machinery can be run at or near its highest rate when subject to uncontrolled variations.

The ordinary Watt governor, though capable of effecting this object with close approximation to accuracy when the variation in the power is confined within narrow limits, fails in maintaining the speed of the engine when sudden changes occur in the resistance to be overcome. The defect becomes of serious consequence in some cases, such as in the engines driving rolling mills in iron works, where the whole power of the engine has to be exerted suddenly while the iron is passing through the rolls, and the work then ceases, leaving only the resistance of the friction of the machinery to be overcome. The object sought for in the peculiar construction of the Allen governor is the thorough and accurate regulation of steam engines, and especially those with adjustable cut-offs.

This governor was invented by R. K. Huntoon, of Boston, well known among engineers as the inventor of the old Huntoon governor, who has given nearly thirty years' study to regulating steam engines. It is patented in this and several foreign countries, and has come largely into use. It was awarded grand gold medals, at Moscow, in 1872, at Leeds, England, and at Lyons, France, in 1872, and at Vienna, in 1873.

The construction of the Allen governor will be clearly understood from Fig. 1, which represents an elevation of the governor when complete, and Figs. 2 and 3, which show sections of the cylinder and frame. Within a corrugated cylinder, A, which has small projecting ribs on its interior periphery, and which is partially filled with oil, a paddlewheel, B, is caused to revolve by a spindle (Fig. 1) passing through one end of the cylinder, driven by a belt communicating with the fly wheel shaft.

The tendency of the revolving paddlewheel is to cause the cylinder to move in the same direction. On the opposite side of the revolving spindle is a trunnion, or short spindle, fixed to the cylinder, attached to which is a wheel, C, carrying a set of movable weights suspended by a chain, the speed of the engine being regulated by the number of weights. Attached to the wheel and keyed on the end of the short spindle is a pinion, D, revolving with the cylinder and working in a toothed sector, E, the arm of which being fixed on the spindle of the throttle valve, opens or closes it as the oil cylinder moves with the paddle, according to the variation of load thrown on the engine. When used with the variable cut-off engine, the arm is attached direct to the cut-off, as shown in Fig. 1. For other engines, a throttling valve is combined with the governor.

From the above description of the Allan governor, it will be seen that the weights are raised and lowered in a nearly vertical line and, unlike those of other governors, remain the same at every point of their suspension. The high rate of speed used acts advantageously in making the governor very sensitive; and all parts being lubricated, it works with the smallest amount of friction. This governor, in doing its work, makes an entire circuit, passing through 360°.

The peculiar action of this governor allows the use of a valve of large area, thereby admitting to the engine cylinder a large boiler pressure at each stroke of the piston, and this produces, we are informed, excellent results when applied to old engines, in increasing their power or effecting a direct saving in fuel, or both. In running an engine with this governor, with high or low pressure of steam and with all variations of power, the throttle is opened wide in the morning and remains so until closed at night, thus relieving the engineer and giving him time for other duties. The governor valve, when the apparatus is not attached to a variable cut-off engine, is constructed with a double disk in a tubular form, and is perfectly balanced, there being no spindle as in the ordinary throttle valve, to interfere with its equilibrium. The valve is moved by means of a lever, and is opened and closed by a rocking motion of a steel spindle, which is covered with brass, insuring durability. This arrangement we shall probably illustrate in a future number. Upon the least variation from the required speed, we are informed, the governor can instantly exert, upon the valve or cut-off, all necessary force, up to a thousand pounds, if required.

A large number of highly commendatory reports upon its working are submitted. Further information may be obtained by addressing the patentee, Mr. Stillman B. Allen, 5 Tremont street, Boston, Mass.—*Scientific American*.

IMPROVED CHIMNEY COWL.

(See page 260.)

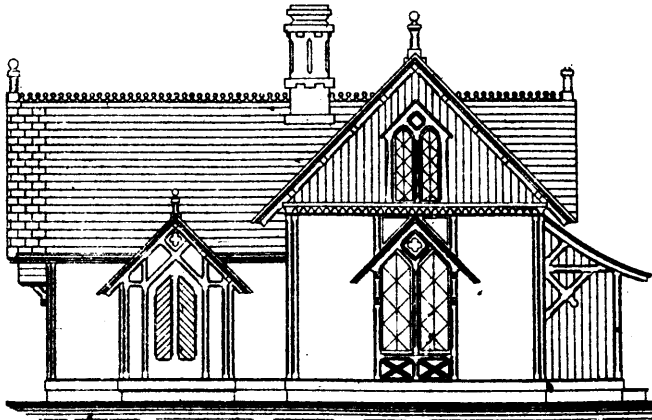
An automatic cowl for correcting smoky chimneys and ventilating buildings has been applied successfully to some public buildings in London. The action is continuous, and there is no mechanism to get out of order. R, is a truncated portion of tube which may be attached to the chimney pot. S, is also a similar portion placed over the truncated tube R. The tubes or cones R and S, are kept apart from each other by means of distance pieces V. At the top of the tube S, are placed a number of annular rings, superimposed, or perforated plates F, separated from each other by means of distance pieces or blocks h. Bands of metal —h*, help to hold together the plates. These plates F, are surmounted by a cap designed to prevent down drafts, which is constructed as follows: G* is a truncated conical cap, provided with upright supports g₃, on the top of which is a flange or ring g*, so as to support a dome or door G. Another conical cap or casing G₂, is placed round the cap G*, and rises above the flap or door g. The outer conical casing G₂, is secured to the uppermost of the plates F, by distance pieces or nuts. A free passage for the air is left between the inner and outer casings. Sometimes the door or dome is a fixture, but, when movable, a bent piece of metal X, acting as a spring, closes it, after the brush or instrument used for cleaning or sweeping the chimney has been withdrawn. This dome or door, besides preventing down drafts, also prevents rain, snow, or other matters entering the chimney. The action of the ventilator is claimed to be that the constant movement of the atmosphere, passing transversely between the plates E, withdraws all smoke, gas and vitiated or noxious vapors.—*Building News*.

LIEUTENANT CAMERON AT THE LONDON INSTITUTION. — The theatre of the above institution was crowded to the doors on Monday afternoon, to hear Lieutenant Cameron describe his journey across the Continent of Africa. The lecturer commenced by stating that he should not trouble the audience with the particulars of the first part of his journey, of which he had already given details at the Geographical Society's meeting. He found indications of civilisation in many places. At one village where the men were all ironfounders and smiths, the huts had some architectural pretensions, and were surrounded by regularly planted groves of palm trees, four huts being situated within each grove. Coming to the great river Luabla, the lecturer warmly eulogised the surrounding scenery, and added that it was studded with inhabited islands. One of these islands was a great oyster market, often attended by seven or eight thousand people. The people had ivory and various natural products to dispose of, but they would exchange them for nothing except slaves, alleging that in any other traffic their capital would remain too long unproductive. Having at last reached the shore of one of the lakes, he had the opportunity of seeing a sort of congress of native doctors, who went about each with a row of iron bells hung over his loins, which he kept perpetually ringing to attract patients. Like doctors elsewhere, those eminent physicians were very solicitous about their fees. The lecturer went on to describe with considerable humour a royal levée at which he had the honour of assisting, and after which he proceeded on his journey in a south-south-west direction. He passed over symptoms of coal formations similar to those which existed in England previous to the period when we commenced working the mines. A portion of the country through which he passed was the loviest in the world. In parts it resembled the Wiltshire Downs, and in others the park-like scenery of the Midland counties of England. He saw this during a forced march of 130 miles in five days to the coast. In conclusion, Lieutenant Cameron stated that nearly the whole of the country through which he had passed was unsurpassed in the richness of its fertility. It abounded in mineral products, in ivory, in palms, in palm oil and other valuable articles of commerce. The hideous blot of the slave trade, however, darkened the whole of this beautiful scene, and the only way of abolishing that trade would be to open extensive and easy means of communication with the interior, a thing which could be easily done by cutting a canal of between twenty or thirty miles in length between the Congo and the Zambesi. That once done, they would have uninterrupted communication from the west to the east of Africa.

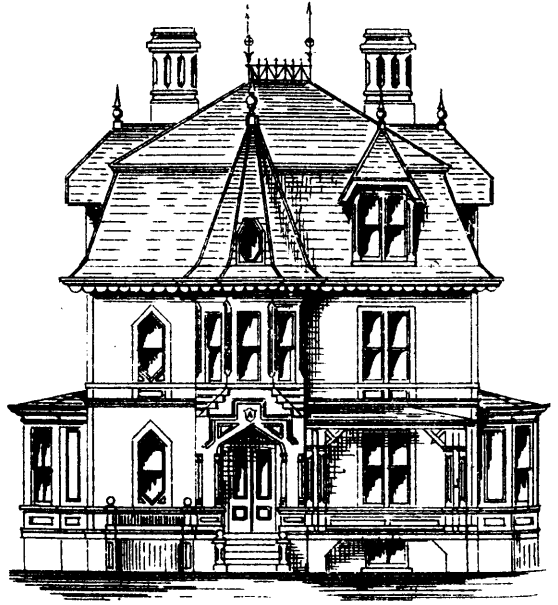
ARCHITECTURAL DESIGNS.

(From Atwoods Modern American Homesteads.)

The third story and basement floor of the Chateau is not shown. Provide on the former 4 rooms and closets, similar to second story; and the latter coal wood and store space; also, space for laundry.

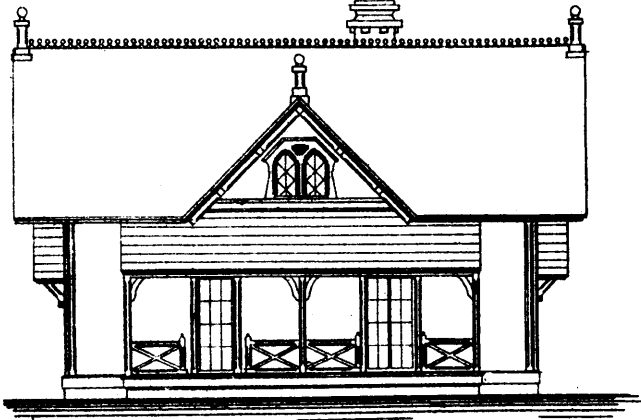


FRONT ELEVATION
of a Southern Cottage

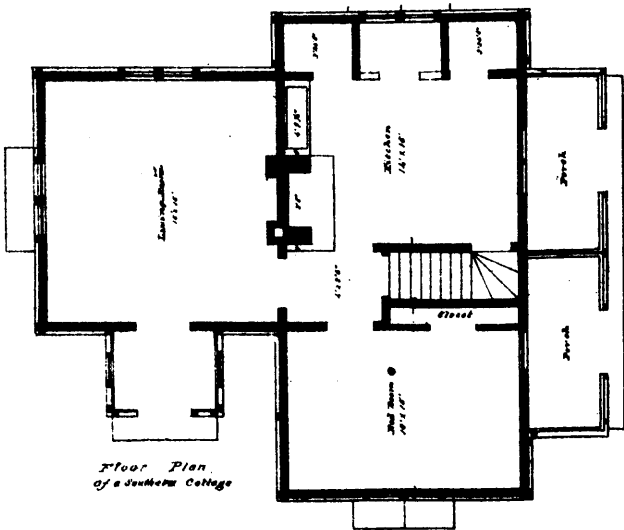


FRONT ELEVATION

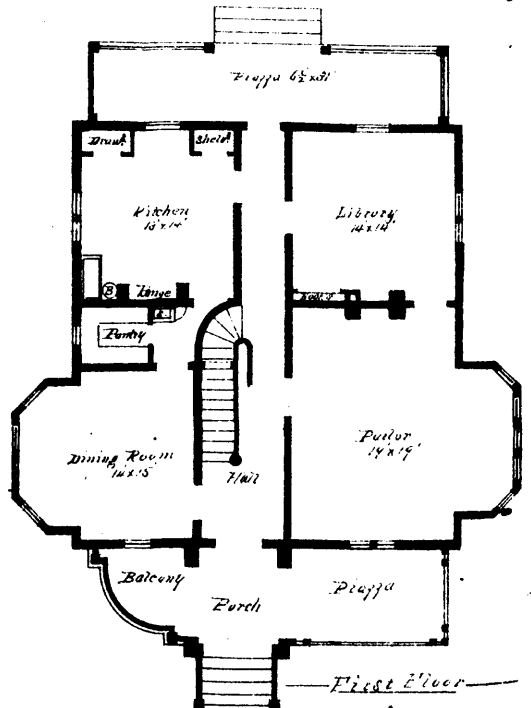
100 feet



SIDE ELEVATION



Floor Plan
of a Southern Cottage



First Floor

THE ALLEN STEAM ENGINE GOVERNOR.

Fig. 1

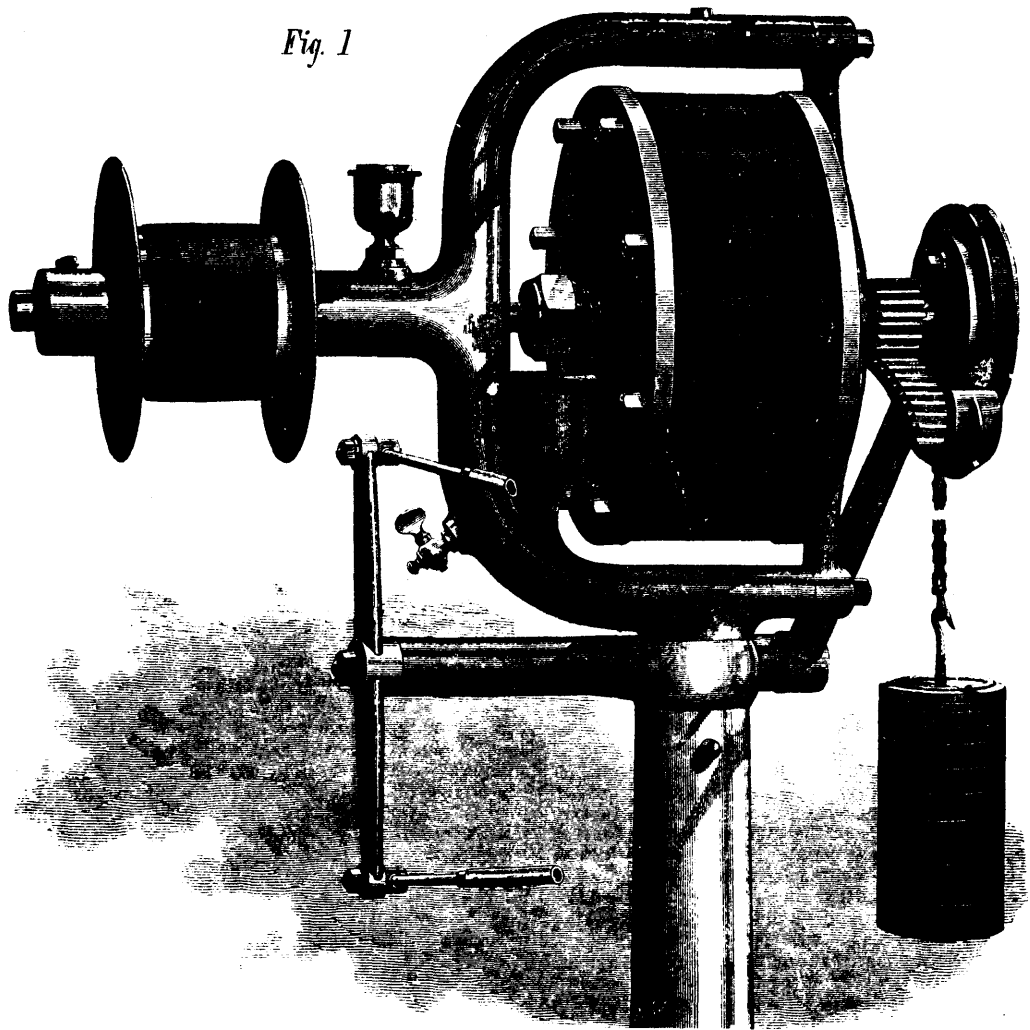


Fig. 2

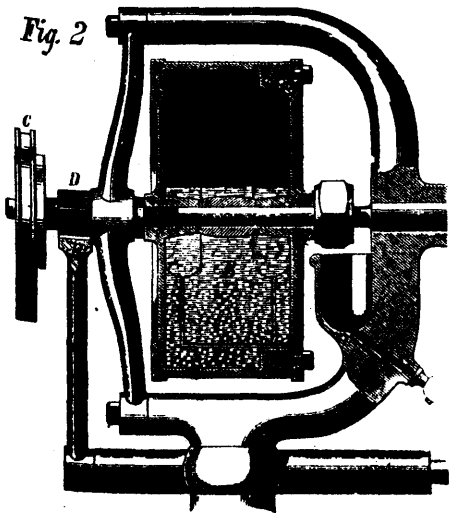
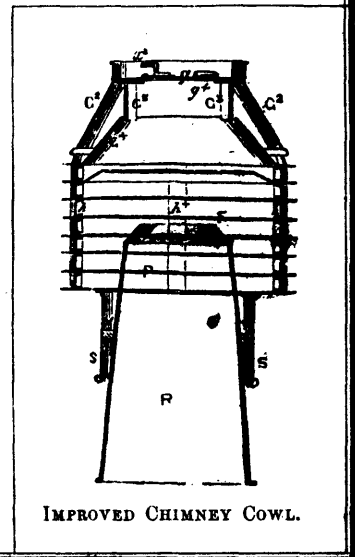
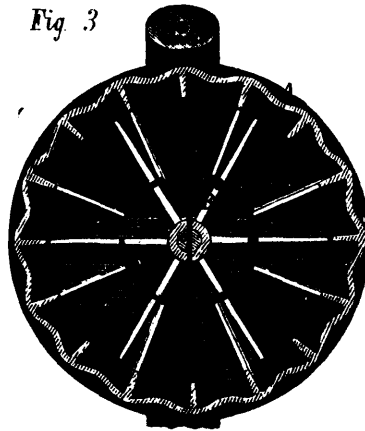


Fig. 3



IMPROVED CHIMNEY COWL.

HOW TO LAY SHINGLES.

Not one-half the persons who lay shingles when making a roof on a building have any correct ideas in regard to making a roof that will be absolutely "rain-tight" during a driving storm of rain. We have frequently seen men shingling, who, when they would meet with a worthless shingle, say once in laying two or three courses, would lay this poor shingle among the good ones, saying: "It is only one poor shingle—one shingle cannot make a poor roof." But one poor shingle will make a leaky one. If first rate shingles are employed and one poor one is worked in among every 100, that roof might about as well have been without any shingles. If any poor shingles are to be used let them all be laid together near the upper part of the roof. The best of shingles will not make a tight roof if they are not properly laid, while the same shingles would make an excellent roof if laid as shingles should be laid.

The correct rule for laying shingles of any length, in order to form a roof "leak-tight," is to lay the courses less than one-third the length of the shortest shingles. For example, when shingles are 18 inches long many of them will not be more than 17 inches in length. Therefore, five inches is all that the courses will bear to be laid to the weather with surety of forming a good roof. The shingles must be three thicknesses over the entire roof. If they are not three thicknesses—if now and then a shingle lacks a quarter or half an inch of being long enough to make three thicknesses—there will, in all probability, be a leaky place in the roof at such points. Moreover, when the lower courses lack half an inch of extending up far enough to receive the rain from the outermost course, in case the middle course were removed, it would be just as well to lay them seven or eight inches to the weather as to lay them only five, or five and a half inches. Many shingles are only 16 inches long and many that are sold for 16 inches long will hardly measure 15 inches. In this case, if the roof be rather flat—say about one-quarter pitch—four and a-half inches is as far as they should be laid to the weather. In case a roof were quite steep it might answer to lay the courses four and three-quarter inches to the weather.

When buildings are erected by the job, proprietors should give their personal attention to this subject, and see that jobbers do not lay the courses a half inch too far to the weather.

There is another important consideration which is too frequently overlooked in shingling, which is "breaking joints." Careless workmen will often break joints within half an inch of each other. When the joints of the different courses come so close together the roof will most certainly leak. Why should it not? There is nothing to prevent it during a heavy rain. Unless a roof is steeper than a quarter pitch much care should be taken to break joints not less than one and a quarter inches. Let all workmen and helpers be taught the vast importance of rejecting every poor shingle, except when the upper courses are being laid.

UTILISATION OF SLAG.

An important process for the utilisation of slag has (according to the *Mining Journal*) recently been introduced on the Continent. The slag is reduced to a fine state of division, in which it becomes capable of a great variety of uses in addition to those for which it was originally supposed to be adapted. The channel through which the molten slag flows from the furnace is made, in this arrangement, to terminate in a running stream of water leading into a pit or excavation. On striking the water the lava stream of slag is blown and broken into a sort of fine porous gravel, which the flow of the water then bears along into the pit. Meanwhile the iron grains contained in the slag, which previously were separated by crushing, are now sorted out by this water process, sinking to the bottom by their weight instead of being carried on with the rest. The slag sand accumulating to the pit is charged thence into waggons or railway cars by means of an endless chain and buckets driven by an engine run by hot gases from the furnace. Thus treated the artificial sand or granulated slag is said to be not merely easier and cheaper to get rid of, but applicable to a number of valuable uses. One of these is for casting sand, pigs made in such a bed coming out exceedingly bright. For this purpose the material is now very largely used in some parts of France, Belgium and Prussia. The next step was a natural outgrowth of the last—to use the finer portions, separated by sifting, to sand the moulds for fine castings; thus employed, it is found cleaner and better than common sand, and the castings are improved. Another use to which this artificial or metallic gravel is put is that for ballasting railroad tracks, for which it is very serviceable. Being

also very porous, packing well, and holding but little wet, this slag-sand forms a valuable concrete-like mortar, and not only this, but is capable of being used for cement. This is regarded, in fact, as its most important speciality, it being found that first-class cement can be thus obtained from almost any slag at a very small cost. Other uses for this substance are likewise mentioned, such as employing it upon land for the lime and silica contained, manufacturing fire-brick, &c., and enamelled bricks of different colours may be manufactured cheaply from this hitherto waste material, and this being the case its industrial value, under the hand of wise improvement, is likely to be very great.

A GERMAN TORPEDO BOAT.

The German papers announce the launching of the "offensive torpedo steamer" Uhlran from the Stettin Engine Company's docks. This vessel will receive a torpedo charged with dynamite, to be carried on a 10 ft. ram lying deep under the water line, which torpedo is to explode on contact with the hostile ship. To protect the torpedo boat from the results of the discharge of its own torpedo, the vessel is built with two complete foreparts, sliding one within the other, and having a considerable extent of intermediate space between them. This space is filled with a tough and elastic material (cork and marine glue), and thus, if even the bows were carried off, there would be a second line of resistance. The object of the filling is to act like buffer, deadening the blow and protecting the stem. Another striking feature is the great power of the engines, the Uhlran carrying an engine of 1,000 indicated horse-power. The steam is supplied by Belleville's tubular generator. The vessel, in fact, is all engine, only a very small space being left for coal and crew. The great power of the engines is necessitated by two circumstances. In the first instance, the steamer has to be propelled at a maximum speed, and then it has a very deep draught so as to offer but little scope to projectiles. In the next place, the greatest facility of steering or manœuvring had to be attained; hence the proportion of width to length—25 ft. to 70 ft. In order to save the crew at the worst, a raft has been constructed, which is fitted with the above mixture of cork and marine glue, and it is placed near the helm. When the Uhlran enters upon action the dynamite cartridge is to be fixed by divers at the point of the ram. The rudder is then to be fixed, and the crew are to open a wide port on the ship's side, and with their raft jump into the water. The steamer is then allowed to rush forward and burst its cartridge on the enemy's armour. The crew, however, are to hold on the torpedo boat by a line, whilst they are awaiting the result of the explosion, and in case their boat is not hurt they are to board it again, in order, if necessary, to repeat the manœuvre. The price of this torpedo boat is about £30,000.

CARE OF THE HAIR.

A writer in *Harper's Bazar* says: To get and retain beautiful hair you must attend to daily brushing it, occasionally washing it, and periodically trimming it, and striving at all times to keep the general health up to the average.

Now as to brushing. The skin of the head, like that of every other part of the body, is constantly being renewed internally, and throwing off minute scales externally, and these are removed by means of the body brush. But it is not so easy to brush the hair as one might imagine. Few hair dressers, indeed, know very much about it. The proper time for the operation then, is in the morning, just after you have come out of your bath, provided you have not wetted your hair. Two kinds of brushes ought to be found on every lady's toilet table, a hard and a soft. The former is first to be used, and used well, but not too roughly; it removes all dust, and acts like a tonic on the roots of the hair, stimulating the whole capillary system to healthy action. Afterward use the soft brush—to give the gloss from which the morning sunshine will presently glint and gleam with a glory that no Macassar oil in the world could imitate. Whence this gloss? you ask. Why, from the sebaceous glands at the root of the hair, nature's own patent pomade, which the hard brush does not spread.

Secondly, one word on washing the hair. This is necessary occasionally, to thoroughly cleanse both head and hair. One or two precautions must be taken, however. Never use soap if you can avoid it; if you do, let it be the very mildest and unperfumed. Avoid so-called hair cleansing fluids, and use rain water filtered.

The yolks of two new-laid eggs are much to be preferred to soap; they make a beautiful lather, and when the washing is

finished, and the hair thoroughly rinsed in the purest rain water, you will find when dry that the gloss will not be destroyed, which an alkali never fails to do. The first water must not be very hot, only just warm, and the last perfectly cold. Dry with soft towels—but do not rub till the skin is tender—and afterward brush. Be always careful to have your brushes and combs perfectly clean and free from grease, and place other brushes on the table for friends of yours who happen to be Macassarites.

Pointing the hair regularly not only prevents it from splitting at the ends, but renders each individual hair more healthy and less attenuated—if I may apply the term to hair—and moreover, keeps up the growing process, which otherwise might be blunted or checked. Singeing the tips of the hair has also a beneficial effect.

It will be seen that I am no advocate for oils and pomades. My advice in all cases is to do without them if you possibly can, for by their clogging nature and overstimulating properties they often cause the hair to grow thin and fall off sooner than it otherwise would. Let well alone.

One word in conclusion, about dyes. Avoid them if you be your own friend. Hair dyeing is very satisfactory as far as dead hair is concerned, but on the living head its perfect success is a chemical impossibility. As to hair restorers, those are not simply stainers but depend upon the action of the light chemically altering and oxidizing the application after it has been used—their incautious use, I must add, is fraught with great danger.

BEMENTS' DRILLING MACHINES.

(See page 268.)

The first of these represented by the left-hand figure is a drilling machine *k*, which presents several specialities of detail. The drill is made to revolve by means of bevel gearing on the head of the spindle, and on the pulley shaft which passes through the frame of the machine. The spindle can be driven either direct through the pulleys or through the gearing marked *a*, which can be put into gear by throwing over the lever *b*. A strap from the pulley *d* passes over *e*, and drives the feed motion, which consists of a bevel pinion, driving a wheel on the vertical spindle *f* carrying a worm at its upper end. This spindle is supported by two bearings *g* and *h*, which are free to move slightly in guides, and by turning the spindle *i* sufficient motion is given to the spindle *f*, to throw the worm at the upper end free of the wormwheel. The spindle may then be thrown up or down by means of the lever *k*, a series of levers and a counter-balance being provided to facilitate this operation. It will be seen that on the shaft of the wormwheel is a pinion gearing into the rack on the upper part of the spindle. By this means the latter is raised and lowered, or when desired the drill may be actuated by the handwheel *l*. The upper table may be thrown round out of the way when greater space is required for the work to be drilled.

The second machine, illustrated on the same page, is a radial drilling machine, the arrangement of which will be clearly understood from the engraving.

The position of the head carrying the drill and attachment upon the radial arm, is regulated by a screw as shown, and the drill holder is driven from the coned pulleys at the foot of the pillar, different speeds being obtained by gearing as in the fixed drill. The pulley shaft carries a bevel wheel which gives motion to a vertical shaft in the pillar and having a bevel wheel at the upper end. The latter gives motion to the horizontal shaft *a*, and this through the system of gearing shown to the drill spindle. A strap passing over the coned pulleys *b* and *c* feeds the drill down through the bevel gearing *d* and the worm and wormwheel contact with the wheel by turning the spindle *g*, and the drill holder may be thrown up and down by the lever *h*. As shown in the engraving the drill is provided with a small table carried by an arm from the main standard, and capable of being raised or lowered by a screw, as shown, while a larger fixed table for heavy work forms part of the base-plate on which the standard is fixed. The drill, it will be noticed, can swing completely round, the turning portion of the former being shaped so as to form apparently a continuation of the fixed standard. The whole design is exceedingly neat.—*The Engineering.*

AMERICAN PATENTS.—The receipts of the United States Patent Office in March, 1876, were 80,459 dols. This is the largest amount yet collected in any single month, and about 10,000 dols. in excess of the collection of March, 1875.

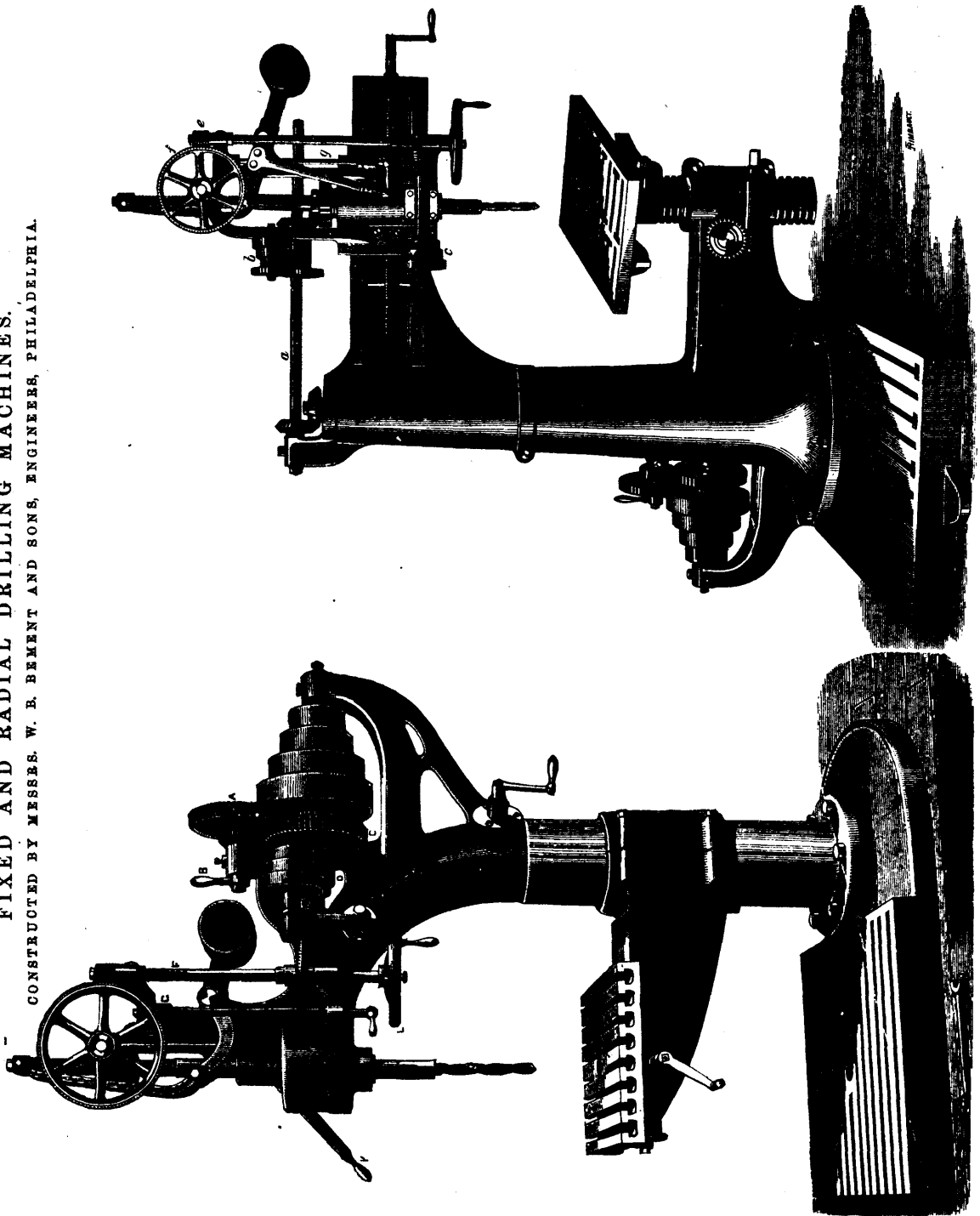
CLIMBING A STANDPIPE. — Some reparations having become necessary upon the standpipe at Spring Garden Station of the Philadelphia Water Works, amongst which the scraping and painting of the exterior, which had become weather-worn and rusted, was the most considerable task, the first step to be taken was obviously to construct a scaffold for the workmen; and, as no means had been provided for the attachment at the top of the pipe of the blocks and falls from which a scaffold should be suspended, the climbing of the pipe for this purpose was an undertaking which preceded all others. This climbing was accomplished by Mr. George Robinson—a working rigger of this city—in the following way:—The standpipe itself is 127 ft. of wrought iron shaft, above a square stone plinth, the shaft being about 6 ft. in diameter at the bottom, and 4½ ft. in diameter at the top—under the cap, or head ornament, which projects 12 in. or 16 in. all round. At the foot of the plinth, a light ladder 30 ft. long, was set up, with the top to rest against the shaft. Climbing the ladder to the top, carrying a bow or ring of ½ in. round iron rod, which was made to surround the shaft loosely, with the ends about 16 in. long, turned downwards, these ends were lashed fast to each side of the ladder. Next, a piece of rope—3 in. = lin. diameter—with an eye in one end, was passed also around the shaft, and was lifted to the top of the ladder, below the ring of iron, when the plain end of the rope formed a “lashing,” and encompassed the shaft tightly. A single block was now hooked on to this lashing, and the end of the fall passed down between the ladder and the shaft, was made fast to the lower round of the ladder, and the ladder itself then hauled up to the lashing; and with its upper end steadied by the ring of iron, was placed vertically against the side of the shaft. Another ring of ½ in. iron was placed around the shaft at the bottom of the ladder, which ring was also lashed to the sides of the ladder, and steadied the bottom whenever it was attempted to lift by the lower round. The ladder being elevated as described, and held in place by making the hauling side of the fall fast to something below, another lashing like the first one, was taken to the top of the ladder—in point of fact, Robinson stood upon the top of the ladder each time it was hauled up, and took with him this second rope; and this rope was then converted into a second lashing like the first one, only about 25 ft. higher up on the shaft. A second block was hooked into this second lashing, and the end of a fall from it was taken down behind the ladder to the lower round, and made fast, while the other end was hauled tight to relieve fall number one. Lashing number one was now cast off, and taken to the top of the ladder, and by means of the second lashing. At this point, the operation merely repeated itself, except that from the reduced diameter of the shaft it was necessary to bring the head of the ladder up to the lashing and make new ends, to the top bow of iron—which could be bent cold—twice in the whole climbing. The bottom ring it was not found necessary to reduce in dimension. Five fleets brought Robinson to the top of the shaft, and as the top of the ladder was then hung far enough from it, he was able to pass at once over the projection of the cap, and mount upon the plates which covered projection—a low ornamental railing surrounds the cap. Having reached the top, the other attachment became easy. The man Robinson, and another rigger to handle the rope, aided by one or two men, when a pull was required, performed alone all the labours of the task. They came to the Spring Garden Works about 10 a. m.; in less than two hours—before 12 o'clock—the column had been climbed, and the ladder was sent down.

—*Journal of the Franklin Institute.*

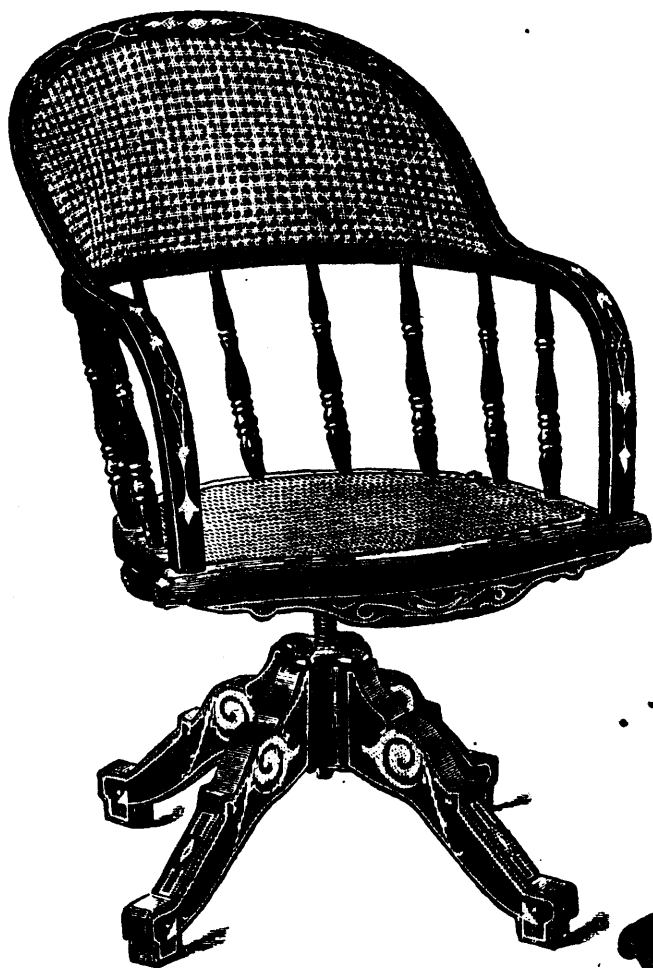
COW HAIR AS A SUBSTITUTE FOR WOOL.—There is now being manufactured in England a class of goods known variously as veloms, Ulster coatings, chinchillas, &c., alleged to be made of hair and vegetable fiber, without the admixture of wool in any shape. These goods are finding their way into the United States and the custom house authorities are not a little puzzled as to where to place them, when scheduling them for duty. Testimony of experts was called in; but it was only another case in which “doctors disagreed.” The solution of the problem has been made the duty of the National Academy of Sciences.

AMERICAN RIVERS AND HARBOURS.—The amount officially proposed to be expended on American rivers and harbours this year is 5,877,000 dols. The outlay, which has not yet received the definitive approval of Congress, is about 1,000,000 dols. less than the corresponding appropriation for 1875.

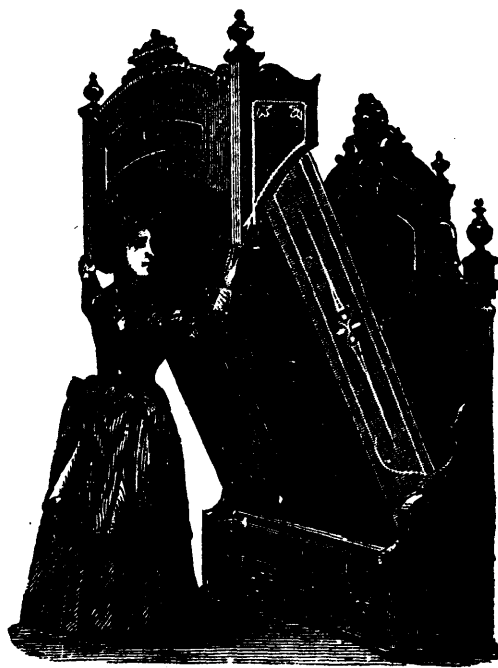
FIXED AND RADIAL DRILLING MACHINES.
CONSTRUCTED BY MESSRS. W. B. BEMENT AND SONS, ENGINEERS, PHILADELPHIA.



FURNITURE DESIGNS.—(FROM THE AMERICAN CABINET-MAKER.)



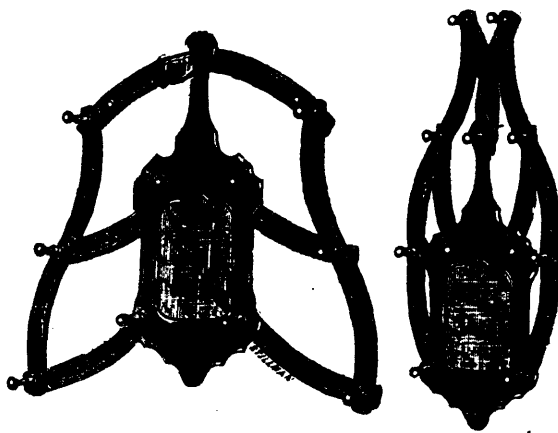
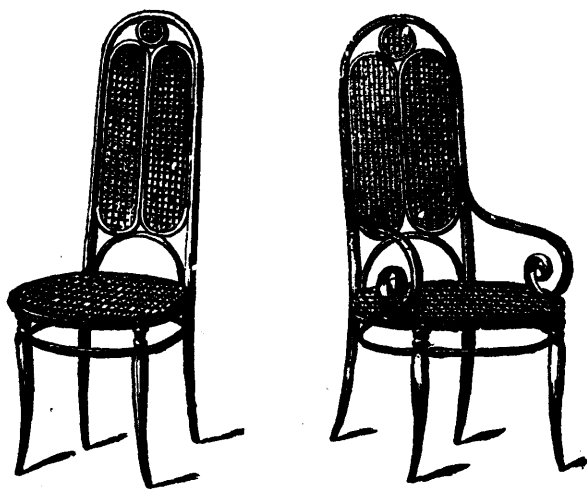
BENT WOOD FURNITURE.



FOLDING-BEDSTEADS.



FOLDING SPRING LOUNGES.



FOLDING HAT RACK.

SINKING OF AN HOTEL INTO THE EARTH.

The St. Louis *Journal* relates the following occurrence, that happened in that city on May 12: "Considerable excitement was created in East St. Louis, yesterday morning, on the discovery that Belleville House, a two-story frame building, just south of the Pittsburgh Railroad and Coal Company's dike, near the southern limits of the city, has disappeared in the quicksand. The circumstances connected with this unusual occurrence are as follows: The house, which is used as a hotel, was built on piles, and but a few days before showed evidences of an inclination to sink into the earth. On Thursday night it sunk about two feet; but the proprietor, Mr. F. Decker, not apprehending anything serious, paid very little attention to the matter. On Friday night, the guests went to bed as usual, but at a late hour the clerk, Mr. George Huebner, discovered that the premises were getting rather unsettled and gave the alarm. Before the inmates could realize what was going on, the building had sunk forty-eight feet, carrying with it ten persons. After considerable difficulty they were all rescued, badly frightened but not hurt. The back water from the river soon surrounded the place where the house stood, and would very probably have carried it away if the gable end, all that is visible, had not been securely fastened to *terra firma*. Mr. Decker's loss on the building is about \$6,000, and on furniture about \$1,000. The house was recently purchased by the present proprietor; and in all probability it entirely disappeared last night, as very little of it was visible at a late hour."

A NEW SUBSTITUTE FOR WOOD-CARVING.

Carved work is one of the most ancient forms of expressing a refined taste, and its examples are to be found in every age and among every people. Even the rudest of communities afford many exquisite illustrations of human skill, and upon its elaborate specimens great sums have been expended. The popularisation of art, which has been the characteristic of society during the last thirty years, has induced many attempts to imitate the sculptured hand-work of the artificer, by means of casting and coloring; but public taste and the voice of authority has condemned them on the ground of their unreal nature and their liability to accidents which exposed their inherent worthlessness.

We have had the opportunity of inspecting the samples of a new process for the reproduction of wood-carvings, and believe it will become valuable and popular. The secret must necessarily lie in the preparatory treatment of the wood, and the power of obtaining an enormous pressure. The inventor and patentee, Mr. Ley, requires about 1,500 tons force by means of hydraulic pressure on cut steel of art in relieve to the depth of one inch. The possibility of obtaining this he has demonstrated in the samples on view at 43, Hart Street, Bloomsbury, one of them in particular has actually that depth. Those productions illustrate what can be done, and it will not be long before the invention obtains a prominent position in the decorative arts. Especially is it adapted for panels, pilasters, friezes, centers, medallions, moldings, borders, or ornamentations proper to every style that can be used in quantities; because, in most cases, the cost of reproduction is about a tithe of the outlay required for hand-work. In truth hand-work, from its costliness, never can obtain a general demand, and from that very circumstance it is evident that this discovery opens a new chapter in the history of taste as applied to the adornment of dwellings without interfering with the venerable art of the artificer in wood. In fact, the *bois repousse* work, as it is termed, must come to be an incentive to the ancient method by diffusing taste and thereby increasing a demand. Then, again, for the business of the cabinet maker it cannot but become a most important auxiliary. Household furniture ornamented by its agency, is beautiful and true. It is wood, and not an imitation. We can have it employed on walnut, mahogany, oak, or, indeed, any of the woods commonly in use by the trade; the variety in style, size, and material included within its power involve an assurance of its ultimate and profitable popularity. It is not a sham, and has therefore a claim for durability and solidity which has never been possessed by any previous discovery; and, moreover, the grain of the wood being horizontal, in contradistinction to an American device which could give the pattern only upon the end grain of the wood — an obviously false principle — gives the work exactly the same appearance as if produced by the wood carver.

For the innumerable elegances of the boudoir and drawing-room essential in modern residences, such as desks, cabinets, frames, carved bellows — so much known in ancient times — plasters, whether mediæval or modern, this invention opens up what is practically a new industry.

The grand old bookbinding, in which the carved wood cover was a most distinguished feature, can now be reproduced in all its integrity by an additional new process for producing dies so terribly expensive by hand labor, in absolute facsimile of the most elaborate and, to us, classical models.—*The Practical Magazine*.

We have some very beautiful specimens of imitation carved work in our office, and can highly recommend its use for all costly and richly furnished cabinet-work.—Ed. *C. M. Magazine*.

IS THE EARTH HOLLOW?

If the earth were a plenary solid body throughout, as mathematicians imagine it to be, or even if its interior were filled with molten rock, as some geologists fancy, there would necessarily be an enormous pressure propagated towards the centre by the weight of the superincumbent strata. Sir John Herschel calculates this pressure to be equal to 300,000 atmospheres; whilst Dr. Young estimates that a block of solid granite, at the centre, would be compressed into half its linear or one-eighth of its cubical dimensions. Now the superficial specific gravity of hard rock is about 2.8, and if this were increased eight-fold at the centre, it would give the earth a mean density of about 12 or 13 times that of water. We know, however, that it is only 5.4 times that amount; consequently, that the central parts are not subjected to that enormous pressure, and therefore, in all probability, that the earth is not a solid body, or composed of ponderable materials throughout its interior group of primary planets—Mercury, Venus, the Earth, and Mars, which differ but little in size and period of diurnal rotation—have all very nearly the same mean density; whilst the great planets of the external group—Jupiter, Saturn, Uranus, and Neptune—exceeding the Earth some eight or ten times in linear dimensions, rotate about their axes in less than half the time—the diurnal motion of Jupiter being upwards of 27,000 miles an hour—whilst their mean density, in the words of Sir John Herschel, is little more than the specific gravity of cork! Now, the laws of philosophy prohibit us from supposing the planets to be composed of imaginary or unknown materials, different from those of which we have actual experience on the earth. Here, then, is a paradox which admits of no solution on the hypothesis of plenary solidity, but which becomes perfectly reconcilable to fact and experience when we conceive the planets to be hollow spheroids, in each of which an extensive vacant nucleus compensates for the denser mass of a more limited solid shell.—*Athenæum*.

DOORWAY OF THE CHURCH OF SANTA MARIA DELLE GRAZIE, MILAN.

(See page 272.)

All visitors to Milan know the church of Santa Maria delle Grazie, with its chevet and cupola joined on somewhat inartistically to the nave, and they know it the better as it is in the refectory of the more ancient convent here that Leonardo da Vinci painted the well-known "Last Supper." The Dominicans had commenced the church, and Ludovico il Moro, when he became Duke, gave them warm assistance, and, if tradition is to be believed, became also the architect.

When the church was nearly finished it became evident that the nave wanted depth, that the choir united badly with it, and that if the cupola were completed the evil would be irreparable. Leonardo having been called in at this moment to paint the frescoes in the convent, pointed out the position of things, and led to the stoppage of the works. The duke invited a competition of architects, but, according to the story, adopted the plan of none. Somehow or other, however, the choir having been knocked down, the present chevet and its remarkable cupola were built, and they constitute one of the most remarkable monuments of the Renaissance in Italy.

In 1497 the cupola was not finished, and the works were languishing for want of funds, when Beatrice d'Este died. The Dominicans obtained her body, and the grief of the duke, her husband, vented itself in a perfect shower of marble and gold to render the church a fitting place of sepulture.

The doorway represented by the accompanying engraving is at the end of the nave, the centre of what we should call the west front. The design of this doorway, as well as that of the cupola, has been ascribed to Bramante, though a comparison with known works by him scarcely justifies the ascription.

One Pere Gattico, who wrote a chronicle at the commencement of the seventeenth century, states that the duke directed the work, himself, with the co-operation of several architects, including probably, Bramante.—*Builder*.

PRACTICAL HINTS.

HOW TO MANIPULATE GOLD LEAF.—Get a piece of paper, thin enough to show shadow of gold leaf through, slightly wax it, lay it on gold leaf, the latter will then adhere, and can be easily worked, and will come off clean. The paper should be slightly larger than the gold leaf, and the fingers passed over the paper to make the gold leaf adhere. For gilding a picture frame use gilders' size. The gold leaf must not be applied for at least twenty-four hours after the size has been put on; it will remain "tacky" for two or three days.

GRAINING GROUNDS.—Subjoined are a few recipes for mixing the ground colors for the

Light Wainscot Oak.—White lead and yellow ochre, mixed to the required tint. Some grainers prefer a perfectly white ground for very light oak for inside work, but it is always difficult for any but a perfect master of the art to proceed on a white ground, and the work, when completed, is apt to have a chalky effect, even though a dark varnish be applied.

A Darker Wainscot Oak.—Mix white lead, middle chrome, and yellow ochre.

Dark Oak.—White lead, Venetian red, and yellow ochre.

Very Dark Oak.—White lead, raw sienna, burnt umber, and Venetian red; or burnt and raw sienna, white lead, and burnt umber.

These colors, mixed in different proportions, will produce a multiplicity of tints suitable to receive the graining color, their strength being of course determined by the greater or lesser preponderance of white lead.

Mahogany Grounds.—There are various notions extant amongst grainers as to the best grounds for mahogany graining, some preferring a ground of a deep yellow cast, whilst others choose one approaching a bright red. The reds and yellows used are Venetian red, red lead, vermilion, raw sienna, burnt sienna, orange chrome, middle chrome, &c. These colors can be mixed to the tint required, an addition of white lead being made in each case, as the positive reds and yellows are too powerful unless diluted in turn by white. Venetian red, orange chrome, and white lead are the colors most generally used, and these three will according to their predominance or subordination, make such a variety of tints that the most fastidious grainer need have no misgiving that the result will not come up to his expectation, if he exercise due discretion in mixing the colors.

Rosewood Ground.—Venetian red, vermilion, and white lead. A little scarlet lake is added for superior work, but this of course is too expensive for general use. Some painters mix with the reds a small quantity of raw sienna or chrome yellow.

Bird's Eye Maple.—White lead alone is preferred by some grainers, but the majority of painters use a little yellow ochre to kill the rawness of the white, and this is much the better plan to adopt. Beginners are apt to make the ground too yellow, a mistake that should be avoided at the outset, as the varnish which has subsequently to be coated over the work will give transparency, and add a pale creamy tone, whereas, if the ground be too yellow, the result will be heaviness.

Satin Wood.—The preceding remarks apply equally to satin-wood grounds.

For these light woods it is of the utmost importance to have the grounds painted with finely stained colors, and perfectly smooth. Too much time can hardly be spent in their preparation.

REMOVING VARNISH FROM WOOD.—A strong application of ordinary spirits of camphor will remove almost any kind of polish or varnish. Give the spirit time to evaporate before re-polishing, or it will injure the new polish.

Another.—The plan I adopt to remove varnish from wood is to make a strong solution of soda, soap and water, and keep the place constantly wet while I go on scraping. This softens the varnish, and I afterwards rub down with paper previous to re-varnishing.

POLISHING WOOD CARVING.—Take a piece of wadding, soft and pliable, and drop a few drops of white or transparent polish, according to the color of the wood. Wrap the wetted wadding up in a piece of old linen, forming it into a pad; hold the pad by the surplus linen; touch the pad with one or two drops of linseed oil. Pass the pad gently over the parts to be polished, working it round in small circles, occasionally re-wetting the wadding in polish, and the pad with a drop or so of oil. The object of the oil is merely to cause the pad to run over the wood

easily without sticking, therefore as little as possible should be used, as it tends to deaden the polish to a certain extent. Where a carving is to be polished after having been varnished, the same process is necessary, but it can only be applied to the plainer portions of the work. Plain surfaces must be made perfectly smooth with sand paper before polishing, as every scratch or mark will show twice as badly after the operation. When the polish is first rubbed on the wood, it is called the *bodying in*; it will sink into the wood and not give much glaze. It must, when dry, have another body rubbed on, and a third generally finishes it; but if not, the operation must be repeated. Just before the task is completed, greasy smears will show themselves; these will disappear by continuing the gentle rubbing without oiling the pad.

FURNITURE CREAM.—1 Yellow wax, 4 oz.; yellow soap, 2 oz.; water, 50 oz.; boil, with constant stirring, and add boiled oil and oil of turpentine, each 5 oz. 2. Soft water, 1 gallon; soap, 4 oz.; white wax, in shavings, 1 lb. Boil together, and add 2 oz. of pearlsh. To be diluted with water, laid on with a paint brush, and polished off with a hard brush or cloth. 3. Wax, 3 oz.; pearlsh, 2 oz.; water, 6 oz. Heat together, and add 4 oz. of boiled oil and 5 oz. of spirits of turpentine.

White Furniture Cream.—Raw linseed oil, 6 oz.; white wine vinegar, 3 oz.; methylated spirit, 3 oz.; butter of antimony, 1-2 oz.; mix the linseed oil with the vinegar by degree, and shake well so as to prevent separation; add the spirit and antimony, and mix thoroughly.

CLEANING AND POLISHING MAHOGANY.—Take 1 pint of the furniture oil, mix it with 1-2 pint of spirits of turpentine and 1-2 pint of vinegar; wet a woollen rag with the liquid and rub the wood the way of the grain, then polish with a piece of flannel and soft cloth.

TO RENOVATE WICKER TABLES.—Paint them over with Brunswick black; it is used for work and fancy baskets, is not expensive, and can be procured at the grocer's.

PROFESSIONAL PRACTICE IN AMERICA.

A case of professional practice has just come before the Chicago Chapter of the American Institute, and the *American Architect* gives the following particulars:—

Mr. Cochrane, one of the members of the Chapter, had been employed by the county to design the County Hospital, and after having furnished the necessary drawings and tracings for the work, was requested by two of the contractors in the work to supply them each a set of the general drawings in addition. This he did, charging them each \$200 for the drawings, a price which he thinks brought him no profit. In a report of the grand jury this charge was referred to as matter of reproach against Mr. Cochrane, who then laid the question before the Chapter, and requested their opinion whether the charge was an honourable one, and also whether there should be a limit to the amount of work which could be required from an architect. The questions were referred to a special committee, Messrs. Cleveland, Bauer and Wight. The committee, reporting on the subject, quote the fourth article of the Constitution of the Institute, which after saying that the condition of membership shall be the honourable practice of the profession, adds that "no member shall accept direct or indirect compensation for service rendered in the practice of the profession, other than the fees received from his client." They say that in this case Mr. Cochrane's client was the County Board, and that the mechanics to whom he furnished the drawings were only contractors, and they consider Mr. Cochrane's acceptance of money from them an indiscretion.

With regard to professional usage in such a case, the committee call attention to the fact that the former custom of architects in charging contractors for working-drawings furnished them has been out of date for at least fifteen years (we doubt if it has prevailed at the East within a much longer period), and that it is the custom among architects at this day to furnish all the drawings that are needed, and even extra ones, without added compensation; they holding that to receive money from a contractor is likely to create suspicion, and wishing to carefully preserve their independence. The question, whether a limit is to be set to the work required from architects, they defer to the Chapter for future consideration. The committee exonerate the transaction of any dishonourable character, in view of the entirely open and business-like manner in which the thing was done.—*The Builder*.



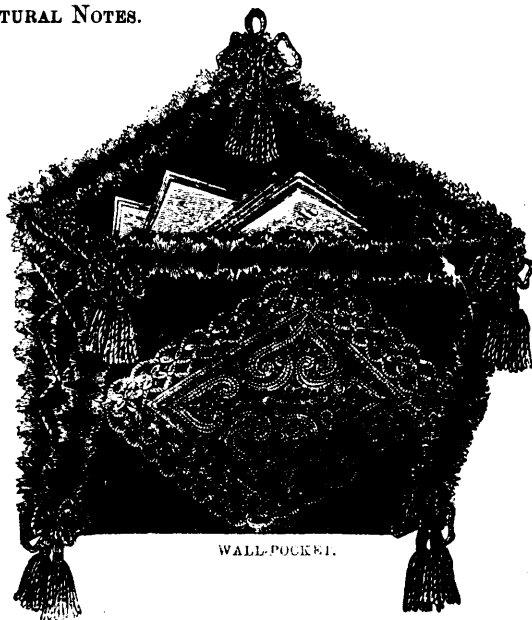
DOOR OF THE CHURCH OF "SANTA MARIA DELLE GRAZIE," MILAN.—FIFTEENTH CENTURY.

THE FAMILY FRIEND.

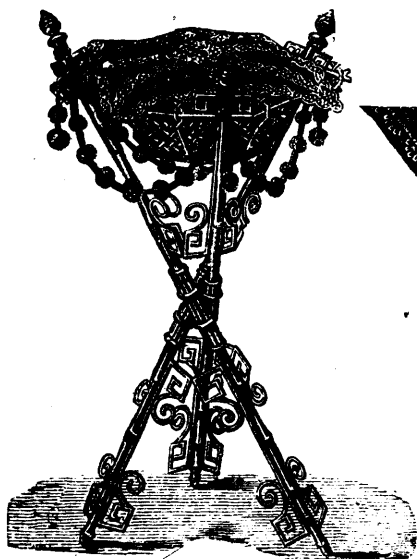
This part of the MAGAZINE, for the future, will be devoted to instructive domestic reading for the *Home Circle*, such as SHORT PLEASING STORIES, DRAWING, MUSIC, BOTANY, NATURAL HISTORY, POPULAR GAMES, and amusements for boys and girls, NEEDLE WORK, AMATEUR MECHANICAL PURSUITS, and all the elements of a *practical domestic education*; also GARDENING and AGRICULTURAL NOTES.



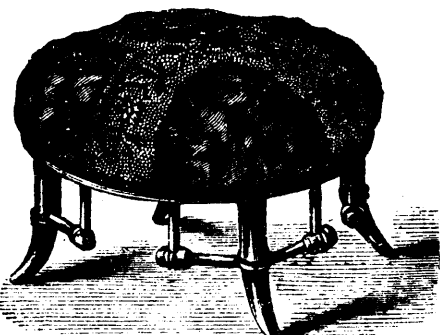
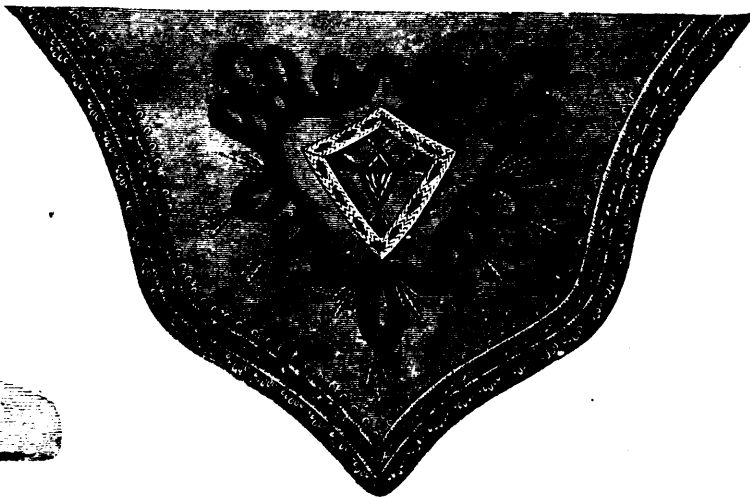
WORK-BASKET.



WALL-POCKET.



WORK TABLE.



OTTOMAN.



KNITTING-BASKET.

HOUSEHOLD PARLOUR CONVENIENCES.

CROQUET RULES.

THE NEW ENGLISH CODE.

The English croquet clubs held a conference in January 1870, at which a code of laws were adopted which are characterized by simplicity, good sense, and straightforwardness. The rules have since been revised by the votes of the clubs represented in the conference, and seem worthy of universal adoption. We have been guided by them for three seasons and like them better. The principal points are as follows:—

1. No "Booby."—Rule 4.—"The striker's ball, when placed on the starting spot and struck, is at once in play and can roquet another or be roqueted whether it has made the first hoop or not."

2. The Turn.—"A player, when his turn comes, may roquet each ball once, and may do this again after each point made."

3. No Tight Croquet.—"In taking croquet the striker is not allowed to place his foot on the ball." There has been a gradual abandonment of the "tight" or "foot" croquet, and a growing opinion that the "loose" or "roquet-croquet" is fairer and more scientific. At first the foot was obliged to be on the ball. Then, in the treatises of Mayne Reid and the Newport Club, the loose croquet was allowed to the rover only. Afterward (Bradley's rules) the method was optional. Now we have the scientific stock as the only one admissible. All the rules about the finch and the rover are now unnecessary.

4. Croquet Imperative after Roquet.—"A player who roquets a ball must take croquet, and in so doing must move both balls." This sets at rest all questions about "declining."

5. Ball in Hand after Roquet.—When a ball strikes another it instantly becomes "in hand," and must be taken up and placed beside the roqueted ball in order to take croquet. "No point or roquet can be made by a ball in hand." For example, if the red ball in commencing its turn hits the blue and rolls on through a wicket, the wicket is not made, because the ball was in hand from the moment it struck the blue. Again, if the red should by the same blow hit first the blue and then the yellow, he could roquet only the blue, but would have the privilege of striking at the yellow afterwards and croqueting it if hit. You may, therefore, stop a ball which has roqueted another without the risk of its owner saying: "If you had not stopped my ball it would have made the wicket."

6. Wrong Playing.—When a ball is played out of turn, or the wrong ball used, or a foul stroke made, the general principle is that the points so made are lost, and the remainder of the turn is forfeited, and the adversary may elect whether the balls shall be replaced or remain where they lie. But if the adversary plays on without claiming the penalty, the false play holds good. Specific rules are given for the various cases under this rule.

There are a number of little special rules in the game as usually played, which destroy the symmetry of the game. It is a mistaken idea that the complication of rules makes it "more interesting." This is shown by the fate of all such contrivances as the crossed hoops in the centre, little bells on the wickets, etc. No croquet player who understands the game thoroughly, and can play the "split shot," the "fellow," and the "hold back," needs any such aids to give interest to the game. The following are some of the usages referred to which are omitted from the English code:—(1) Taking "two shots" or a "mallet's length" as a reward for running two wickets at the same blow. The two wickets are, like virtue, their own reward. (2) "Spotting a ball" which has struck the turning-stake. It should play from where it lies, like any other ball. (3) The idea that a ball must move six inches to constitute a stroke. Who can measure the distance traversed by a rolling ball? If it is moved at all it is a stroke.—(Scribner.)

A HINT TO PLUMBERS AND HOUSEKEEPERS.—A trap in a vertical lead pipe is utterly useless if it is intended to prevent the ascent of sewage odor, as its contents will be extracted by the vertical pipe joining the trap, and form with its upper curve a siphon, which will certainly empty the trap each time the water runs down. Therefore be sure that the branch pipe from the trap goes horizontally, or very nearly so, to the main waste-pipe, and let the lowest bend of the trap be lower than the joint of the horizontal pipe to the main waste-pipe. For this reason it is best not to use Y-joints in vertical pipes, as they will probably cause the longer leg of the siphon to be on the side of the trap toward the waste-pipe, which will cause the water to be siphoned out of the trap.

A SAGACIOUS CAT.

The daily disappearance of the milk at our place was a source of wonderment for a considerable time. As it was placed on a high shelf out of the children's reach, and the neck of the jug which contained it was far too narrow to admit of the insertion of even so much as the nose of either of our two big Tom-cats, we were on the point of coming to the conclusion that "Simpson" was wont to put too much "driers" in his compound, and that it, therefore, too speedily "evanesced" by the process of evaporation. Simpson, however, was exonerated, one day, by a member of the family coming unexpectedly on the most intelligent of our "tame tigers," who was engaged in "evaporating" the milk in a rather remarkable fashion. Forming one of his fore-paws into a hollow scoup, he generally let it down the slim neck of the jug, bringing it up filled with a fair supply of milk, which he was not slow in getting rid of by diligent licking, though he was so careful as to avoid spilling a drop during the whole time his operations were silently observed. He was permitted to go on to the end of his amusing performance till the jug was empty; but he was now to pay a never-ending penalty for his rogueries by being compelled to drink all the milk which falls to his share out of the same jug, which has been for his exclusive use. The other cat, though it has often watched its brother Grimalkin's queer tricks with apparent astonishment, never has attempted to emulate him in it, though often coaxed and tempted to do so.

TO AVOID INJURY FROM BEES.—A wasp or bee swallowed may be killed before it can do harm, by taking a teaspoonful of common salt dissolved in water. It kills the insect and cures the sting. Salt at all times is the best cure for external stings; sweet oil, pounded mallows, or onions, or powdered chalk made into a paste with water, are also efficacious.

TO PREVENT THE SKIN FROM DISCOLOURING AFTER A BLOW OR A FALL.—Take a little dry starch or arrowroot, and merely moisten it with cold water, and lay in on the injured part; this must be done immediately, so as to prevent the action of the air upon the skin; however, it may be applied some hours afterwards with effect. I learned this when resident in France; it may already be known here, but have met with none amongst my own acquaintances who seem to have heard of it. Raw meat is not always at hand, and some children have an insurmountable repugnance to let it be applied. I always make use of the above when my children meet with an accident, and find that it keeps down swelling, and cleanses and facilitates the healing of scratches, when they happen to fall on the gravel in the garden.

BALLOONS FROM TURKEYS' CROPS.—Free the crop from a thick coat of fat; turn the inside out, and wash the food away; soak it in water for a day or two, then lay it on a cloth, and with a bone or knife scrape off the internal coat of the stomach, wash it well, and dry it with a clean cloth; then turn the crop, and make an incision through the external coats, taking particular care not to cut through the membrane; draw the coats at once over the neck, which must be cut long for greater convenience in using the balloon when finished. Proceed with the other neck in the same way; tie it firm with silk, and cut it close to the body of the balloon; it must be then distended with wind and hung up to dry. It may then be painted and varnished, but will not require it if properly prepared. It may be made large enough to contain a gallon of gas, and so light as to weigh only thirty grains.

A HOME-MADE CARPET.—An Eastern lady says: Have any of you a spare bed chamber, seldom used, which you would like to carpet at little expense? Go to the paper hanger's store and select a paper looking as much like a carpet as you can find. Having taken it home, first paper the floor of your bed-room with brown paper, or newspapers. Then over this, or these, put down your wall paper. A good way to do this will be to put a good coat of paste upon the width of the roll of paper and the length of the room and then lay down, unrolling and smoothing at the same time. When the floor is all covered, then size and varnish. Only dark glue and common furniture varnish may be used, and the floor will look all the better for the darkening these will give it. When it is dry, put down a few rugs by the bed side and before the toilet table, and you have as pretty a carpet as you could wish; a carpet, too, that will last for years, if not subject to constant wear, and at a trifling expense.

RATS.

MUSKRATS.

Muskkrats have a curious method of travelling long distances under the ice. In their winter excursions to their feeding grounds, which are frequently at great distances from their abodes, they take in breath at starting and remain under the water as long as they can. Then they rise up to the ice, and breathe out the air in their lungs, which remains in bubbles against the lower surface of the ice. They wait till this air recovers oxygen from the water and the ice, and then take it in again and go on till the operation has to be repeated. In this way they can travel almost any distance, and live any length of time under the ice. The hunter sometimes takes advantage of this habit of the muskrat, in the following manner:—When the marshes and ponds where muskrats abound are first frozen over and the ice is thin and clear, on striking into their houses with his hatchet for the purpose of setting his traps, he frequently sees a whole family plunge into the water and swim away under the ice. Following one of them for some distance, he sees him come up to renew his breath in the manner above described. After the animal has breathed against the ice, and before he has had time to take his bubble in again, the hunter strikes with his hatchet directly over him and drives him away from his breath. In this case he drowns in swimming a few rods, and the hunter, cutting a hole in the ice, takes him out. Mink, otter, and beaver travel under the ice in the same way; and hunters have frequently told me of taking otter in the manner I have described, when these animals visit the houses of the muskrat for prey.”—*The Trappers Guide*.

RATS IN SWEDEN.

The black rat becomes every year more scarce in Scandinavia wherever the large brown rat gains a footing. Was once common throughout the whole country. In the days of Linné, the brown rat was unknown in Sweden; about 90 years since the first was seen in Scania. It has now, however, become gradually spread over the land, and is met with in every part of the North Cape. Although at deadly enmity with its smaller brother, it does not interfere with the little mouse. Strange to say, much as this country is overrun with rats, I never saw either a ferret or a rat-trap till I got some over from England. I know no country where a good ratcatcher could make a better living than in this. I one saw the rats drummed out of a house here which was full of them. It was a large wooden building. Two regimental drummers were sent for, who began at the very top of the house, and drummed in every room. The rats bolted very fast, and I had some capital shooting outside. It was long before any came back.—*Ten Years in Sweden*.

COLOUR OF THE SEA AND OF ICE.

The learned Director of the Roman Observatory printed in the year 1868, at Florence, an extensive memoir, which contains the whole of his observations on Stella Spectra up to the present date. In offering this interesting little work to the Academy of Sciences at Paris, the author brings forward an interesting observation relating to the colour of the sea. He found some time ago that the spectrum of the colour of the sea lost its red rays at a very slight depth; on going still deeper it lost successively its yellow and its green, at least partially, when the water appeared violet-blue. It was interesting to ascertain whether the same kind of absorption would occur with ice; and Professor Secchi profited by a visit to an artificial grotto excavated in a glacier over Grindewald, in Switzerland, to determine this point.

The grotto in question is about 100 metres deep, and its sides are transparent, and lighted by the sunlight transmitted through the ice was of a beautiful blue tint, in which the red rays were very faint, so that in the interior of the grotto the human countenance had a very ghastly appearance. On looking from the inside towards the entrance, the grotto appeared as if illuminated by a red light, which was doubtless an effect of contrast. The whole effect was quite fairy-like. On analysing the light by means of a spectroscope an almost complete absence of red, and a great diminution of the yellow, were observed. The thickness of the ice was not sufficiently great to produce a more complete effect. This thickness was about 15 metres, or perhaps somewhat less. The texture of the ice was quite compact and continuous, and it was as limpid as crystal, containing only here and there a few bubbles of air.

It appears, then, quite evident, since the ice of the Alps acts exactly as did the water of the sea, and since the former cannot be supposed to contain any extraneous colouring matter, such as might be supposed to occur in the ocean, that the true colour of water is blue mixed with violet, and that this colour increases in strength as the layer of water through which the light passes increases in thickness.

VARIOUS SPECIES OF ANT LIONS.

The *Neoptera* are an order of insects known by the possession of four equal-sized membranous wings, divided into a great number of little cells technically called areolets. The mouth is furnished with transversely movable jaws, and the females do not possess a strong or valved ovipositor. In this order are comprised the dragon flies, May flies, termites, lace wings, and lastly, the very curious insects which form the subject of our engraving on page 276, viz. the ant lion.

The interesting period of the life of these creatures occurs during their larval state. They then appear as represented at 4 *a* in the illustration. The shape is ovoid, color a red dist grey, and the body is covered with down. They resemble flattened maggots with rather long legs and very large jaws, the legs being apparently useless as organs of progression, all movements being made by the abdomen. It is on account of this inability to pursue and capture its prey, which is wholly composed of living insects, that nature has provided the insect with instinct to resort to strategic means to bring its victim within its clutches.

It is common to find in sandy fields of the old world small cavities varying in depth from one tenth of an inch to two and a half inches in diameter, and about three quarters deep as wide. These are the pitfalls (see engraving at 4 *b*) made by the ant lion, and closer examination will show the claws of the insect protruding as it lies in ambush buried in the sand. With wonderful perseverance it excavates its pitfall, commencing at the outer surface and working down a spiral form, and gradually diminishing the diameter of its path until the conical pit is formed. Its trap once constructed to its liking, the larva buries itself as already stated, spreads its jaws and waits. Any insect whether caterpillar, ant, spider, or fly, serves as food so long as it is living and active. And it is rarely any crawling insect escapes from the pit after once entering into it, for the particles of sand slip between its feet, and it gradually slides down to the bottom, and into the jaws of the watcher. Should the victim, however, attempt to stop its downward course by thrusting its claws into the sand, the ant lion converts its head into a catapult and throws up sand, which deepens its hole and renders the sides steeper, and also covers the unfortunate insect with a shower of particles by which it is compelled to let go its hold. The instant the ant lion grasps its prey, its ferocity redoubles, and neither wasp nor bee can resist its strength, but is shook and dashed about in its terrible pincers until it becomes stupefied and motionless, the larva then quietly devours it.

Previous to assuming the pupa state, the larva forms a globular cocoon (5 and 6 in the engraving) of less than half an inch in diameter, of fine sand glued with silken thread spun from a slender telescopic spinneret placed at the extremity of the body. The pupa is small and lies with its limbs folded upon the breast. When ready to assume the perfect state, it uses its mandibles, which are quite unlike those of the larva, to gnaw a hole in the cocoon, and pushes itself partly through the aperture in which it leaves its pupa skin. The abdomen then extends to nearly three times its previous length, and the perfect insect closely resembles the dragon fly, save that its wings are lighter, softer and broader.

Various species are represented in the engraving, for which we are indebted to *La Nature*. Nos. 1 and 1*a* is the *acanthaclisis occitanica*, during flight and in repose. It is of a reddish brown color, marked with black lines. Its larva larger than those of the ordinary species of ant lion, and are also lighter of colors, and instead of digging a pit, they back into the sand for a short distance, thus concealing themselves so as to seize passing prey. No. 2 and 2*a* represent the *myrmeleon fornicarius*, the true pit digging ant lion. No. 4 is another species known as *myrmeleon formicolyx*. No. 3 is the *palpares tibelluloides*, the larva of which takes its prey in the same manner as that of the *acanthaclisis*.—*Scientific American*.

PHILADELPHIA.—In April, 1876, Philadelphia possessed a population of 817,448. In 1870, the corresponding population did not exceed 675,022.

NATURAL HISTORY.



ANT LIONS.

FLORAL CULTURE.

AMARENTHUS. — Nat. Ord. *Amarantaceæ*. *Linn.* — *Monœcia Pentandria*. Ornamental foliaged plants of an extremely graceful and interesting character, producing a striking effect, whether grown for the decoration of the conservatory or out-door flower garden. If the seed be sown early in heat, and the plants put out in May or June in very rich soil, they make exceedingly handsome specimens for centers of beds or mixed flower borders. *Bicolor* and *tricolor* should be grown in poor soil to increase the brilliancy of their colors. *Half-hardy annuals*.

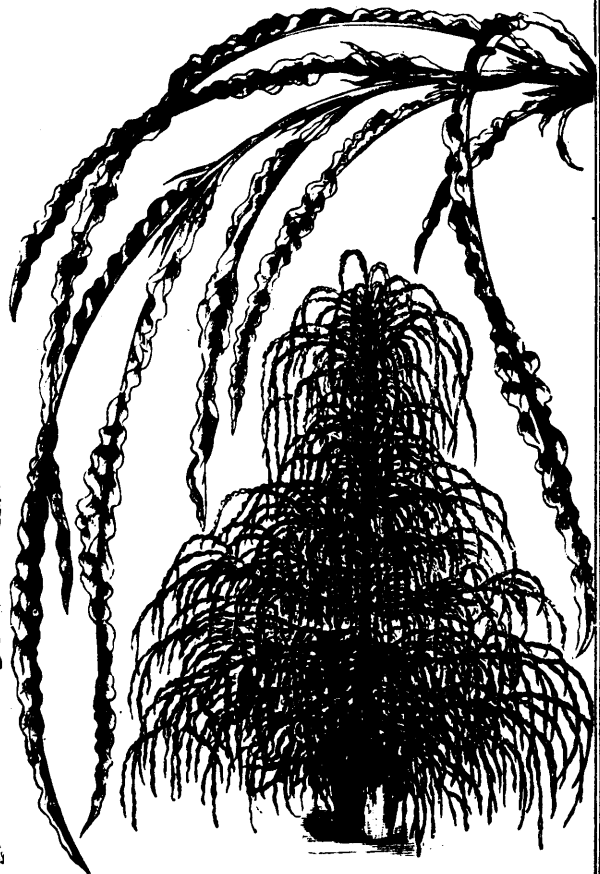
SALICIFOLIUS, a novelty of 1872, and one of the finest in cultivation, grows from three to ten feet high in a beautiful pyramidal form, branching close to the ground, the lower branches extending in a horizontal position; the leaves vary in the early stages of growth from a green to a bronzy green shade, and as the plants get stronger assume a bright orange red color, and become more elongated, forming magnificent bright-colored plumes, and giving the plant a most elegant and picturesque appearance.

ASTER. — Nat. Ord. *Compositæ*. *Linn.* — *Syngenesia Polygamia Superflua*. For beauty and variety of habit, form and color, the Aster stands unrivalled, and of all flowers is best adapted to gratify the taste and win the admiration of every lover of floral

beauty. It is not only one of the most popular, but also one of the most effective of our garden favorites, producing in profusion flowers in which richness and variety of color is combined with the most perfect and beautiful form. Some of the flowers are unusually large, others quite small; some are beautifully incurved, others reflexed; while some of the varieties are tall and others dwarf. Amongst the tall kinds most worthy of note, TRUFFAUT's magnificent varieties of the PEONY-FLOWERED PERFECTION with their beautifully incurved ball-shaped blossoms, and the NEW GIANT EMPEROR with its immense double blossoms, stand unrivalled. The IMBRIQUE POMPONE with its numerous miniature flowers, and the COCKADE with its showy large white center and variously tinted borders, are equally attractive, and are particularly suitable for large flower beds or intermingling in the borders with Dahlias, Gladioli and Roses. Of dwarf varieties the principal beauties are the CHRYSANTHEMUM, its large flowers almost hiding the foliage, and the BOUQUET ASTER with its profusion of blossoms. They are splendid either for small flower beds or edgings. All the varieties require rich, light soil, and in hot, dry weather should be mulched with well rotted manure, and frequently supplied with manure water; this labor will be amply compensated by the increased size, beauty, and duration of the flowers. *Hardy annuals*.



Group of French and German Asters, about two-thirds average size.



AMARENTHUS SALICIFOLIUS.

Incidents in the lives of Naval Officers during the Wars of the first Napoleon.

TALE FOR BOYS.

WRITTEN FOR THE "FAMILY FRIEND."

(Concluded from our last.)

The coxswain had conjectured rightly—the brigantine was less protected for boarding on the land side, and all her crew were fiercely engaged in repelling the assault in front. As our boat glided alongside, under cover of the smoke, I felt my left arm suddenly seized in the muscular grasp of the coxswain, who helped me to gain a footing upon deck, and seemed to consider me under his especial protection; the crew rapidly followed. A few feet from me stood, amidst the smoke, the figure of a tall officer hotly engaged in endeavouring to repel the efforts of our men, in front, to gain the deck. He turned quickly around, on hearing behind him the cheers of my boat's crew, as they rushed to the assault from this unexpected quarter. Rapidly giving an order to his men to assist him, he rushed upon the coxswain and endeavoured to cut him down. The latter, however, was an active and expert swordsman, and quickly parried the stroke, and would, probably, have soon ended the combat, had not a heavy stroke with a handspike from a sailor behind him, brought the old officer to his knees. With such rapidity did this occur, that I had hardly time to comprehend the situation, or to think of taking part in the affray. What was I but a boy, scarcely fourteen years of age, armed as a boy, and here mixed up in a death struggle with fierce and powerful men. As the tall officer sunk upon his knees, and the blood ran down his pallid countenance from a cutlass wound on his head, and I saw the blow about to be repeated by the fierce sailor behind, impulsively I rushed forward, exclaiming, "Oh, spare—spare his life!" but almost at the same moment a random bullet, from a volley fired by a part of his own crew in the fore-castle at the attacking party in rear, pierced his heart, and he rolled over on the deck—a corpse. What took place immediately after that I cannot recall to mind—for a few minutes there seemed to be a deadly struggle, a sharp clashing of steel against steel; a subdued and choking, gasping sound, like bull-dogs with their teeth in each other's throats struggling for the mastery; a sharp cry of agony; a groan; a splash; then a ringing cheer, and all was over. For a few seconds there came a pause—men wiped their bloody brows and drew a deep inspiration. But the thrilling sounds of command—"Cut away the moorings, my boys—men to your boats—be quick there—tow her down the stream" awoke me from a momentary trance, as I heard the sharp commanding voice of the officer next in command, and saw him rush by me rapidly giving his orders. In a few moments British discipline soon brought every officer and man, not *hors de combat*, to his place and duty, and already were we moving down the stream, when a faint, but favourable breeze sprung up, clearing off the fog and smoke, and showing us, at the distance of about a quarter of a mile further up the river, the formidable teeth of a fort, which hitherto had been unable to take any part in the action; however, every sail was soon set, and now wind and tide being in our favour, we were soon out of reach of her shot, a few only of which passed through the rigging.

We were soon clear of the intricate navigation of the river, and stood out to join the frigate, in the offing. The decks were quickly cleared of the dead Dutchmen, and the wounded placed under the care of the surgeon and his mate; but the body of the brave old commander, by my brother's order, was not consigned to the deep—he, himself, was lying on the deck with his leg bandaged and looking pale and weak from loss of blood. The old man's body was carefully lifted and laid upon some matting; they placed him as he fell, with his sword still tightly clenched in his right hand, his teeth firmly set, his eyes open and turned upwards towards heaven, and his long gray hair, disheveled and bloody, fell in masses around his neck—he was a noble-looking man, even in death. The flag of his vessel was then thrown over his body.

A brace of pistols was found upon the deck and handed to my brother—they belonged to the dead captain. "William," he said, "come here. I am glad to hear that you have done your duty so well, (in what way I could never understand), and that even in the midst of a deadly conflict you would, if possible, have spared that old man's life; that is, my boy, the true feeling of a man and a British sailor. These pistols, as a trophy

of war, I present to you in remembrance of this, your first action, and never use them, my lad, to take a human life, except "in self-defence or in the battles of your country." I remember the tears ran down my cheeks, I leaned over the vessel's bulwark, and sobbed like a child—as I really was—the conflict was over, a reaction of my feelings had set in, which was too great for me to bear out, like men more hardened to such scenes in life. Beside me lay my kind, good mess-mate, poor Jones—dead—gone—in one short hour! and many faces, familiar to me, lay around stiffened in death, no wonder my heart felt sad.

"And those are the pistols," said Bilgewater. "A neat pair, "I must say, but rather too much toggery about them for my fancy. Now I tell you what Standard, had that old Dutch captain only used a sensible tool, and not one of those fanciful dangles on the table there, I'm blowed if he would not have shown daylight through Sir Sidney's coxswain, have saved his ship besides, and you would not have been here to tell the tale; however, messmate, I am glad he didn't, or we should not be now drinking your port and twisting yarns together. "But, pardon me, mate, I have interrupted you in your story." "What remains to be told," my father replied, "can be said in a few words. It is a sequel to the first part.

"Hardly had we crossed the bar, and got safe to sea, when it was discovered that there was a child locked below out of reach of shot. She was brought on deck in the arms of the mate in an almost senseless state from fright, and the stifling heat and smoke that had found its way below during the engagement.

"She was placed at the side of my brother in a fainting condition, who immediately sent for the surgeon, if he could be spared for a moment. A little crowd gathered round the poor child, who, after some restoratives had been given, and benefitting from fresh air, opened her large light blue eyes, looked wildly around, and essayed to speak; but was yet unable to find her voice. She placed her hands over her face and fell back on the hammock which had been brought up for her to recline upon. Some stimulant was again offered to her, but this was resolutely refused. Suddenly she rose to her feet, her bosom swelled and heaved with some great struggling emotion, and she seemed to gasp for breath—then her voice burst forth, and in a piercing tone of wailing agony, shrieked out in the language of her country, 'Father! father! where is my father? Oh, take me to my father!' I tell you, Bilgewater, many a rough seaman who, but an hour before, would, in the sternness of his character, have dared the D—l in his den—turned round and coughed, or blew his nose; the mate turned up his eyes aloft to hide the unaccustomed fluid that suffused them, and blew up a seaman who was properly doing his duty. As for myself, the sight of anguish and distress in that poor child's fair face, as, with clasped hands and eyes uplifted, but tearless, her flaxen hair fallen in careless ringlets around her shoulders, as she gazed upwards, as if supplicating sympathy from her heavenly Father—often comes across my vision, and perhaps will never be effaced. In less than an hour we reached the frigate. Sir Sidney alone spoke her language. She was conveyed to his cabin, where he tried everything he could, for he was a polished gentleman, to soothe her distress and to break, softly, the melancholy intelligence of her father's death. She was the dead captain's daughter—his only child, and but twelve years of age."

"Next morning Sir Sidney sent for me to his cabin. "Youngster," he said, "I am pleased to hear so good a report of you yesterday, and that in the midst of a deadly struggle for life you forgot not the feelings of humanity. I have informed the young lady that you made an effort to save her father's life, thinking, that as her conductor to the shore, with such a remembrance in her mind the feelings of gratitude will soften the apparent harshness of having to sit by the side of an enemy, who had helped to slay her parent. You will immediately proceed on shore with a flag of truce, and hand this letter to the officer of the garrison of the fort, and deliver over the corpse of the late Capt. Von Jucland—for such was his name—and restore to her countrymen the orphan child."

At noon I left; a flag, half-mast high, was raised, with one of truce above. Mournfully we proceeded up the river; the cottagers again came out wonderingly gazing; not a word had been said by the little girl; she sat in the stern of the boat motionless, with her face buried in her hands, and a shawl thrown over her head. Everything appertaining to her wardrobe, and of value belonging to her father, had been carefully packed up and restored. As we approached the fort, and they recognized the flag of truce, a white flag was also hoisted, and a group of officers and soldiers came down to the wharf to meet us at the landing. Stepping

upon the wharf and returning the salute of the commandant, I handed him the letter from our captain; it ran thus:—

“Sir Sidney Smith, commanding H. M. Frigate ———, presents his compliments to the Commandant of the Fort, and begs to inform him that, much as he deploras the necessity of war and its stern attributes, he never loses sight, when possible, of mingling humanity with its horrors. Being so near to the shore, he would not consign the body of the gallant captain of the brigantine to the deep, feeling that a brave enemy would appreciate this sentiment, which allowed him to perform the last rites of sepulture to his fallen countryman. He sends, therefore, the corpse back with the honors of war, the sword still in the grasp of the gallant officer who wore it. He restores the child to your protection (with deep feelings of sympathy in her affliction), under the escort of a young officer, whose best introduction is that he made an effort to save the life of her father, who died from the effect of a stray bullet from the fire of one of his own crew.”

Upon reading the letter first to himself, and then aloud to his officers, they took off their hats and bowed, and the commandant, who spoke French, a language I then slightly understood, came forward and offered me his hand, which he warmly pressed. The little girl, meantime, sat motionless in the boat, as before, almost as still as the draped corpse which lay before her eyes across the thwarts. A messenger was quickly despatched to the fort, and two ladies hastened down to the wharf. The little orphan had now been gently lifted from the boat and stood upon her feet; poor child, she could hardly stand, and trembled exceedingly and would look up furtively to the face of the commandant, and once endeavored to find her voice, but could not; but when his kind wife came forward, and put her arms around her, and softly whispered, “Emiline, my own dear niece!” the spell was broken, she threw herself into her embrace, and sobbed convulsively.

“My orders were to return immediately. After a few kind words of thanks from the officers around, I approached the ladies and bowed respectfully; there must have been some deep sympathy in my countenance, and the child evidently felt it. She gazed at me for a moment with a deep look of sorrow, and yet interest, and drawing down the face of her friend, sobbed a few words in her ear. The lady came forward, lifted off my cap, placed her hands upon my head and said a few words. I knew it was a blessing from the child. I pressed her hand to my lips, grasped those of friends—for such they seemed now—friends in all the perfection of the human heart—enemies to-morrow in battle—for what? “Push off, my lads,” I cried, glad to shut the scene of strife and sorrow from my eyes, and was soon again on the deck of the frigate, which was waiting our return to sail with the valuable information obtained in the despatches captured in the brigantine.”

“Capt. Standard,” said Bilgewater, “when you tell that story again, please leave out the sequel, as you call it; or, first of all order off the port, and let us have something hot with more spirit in it. I don’t often pipe my eye, but that yarn of yours although very fine in its way, is a d—d deal too sentimental.”

DISEASES OF CANARIES.

BROKEN LIMBS.

It happens occasionally that a canary has the misfortune to break one of its legs. When an untoward event of this kind takes place, remove the perches from the cage in which the bird is placed; supply it with a nice clean bed, made with soft hay or straw (the former preferred), cut it into short lengths and tease it well out, and remove anything of a hard or prickly nature that may by accident have been placed amongst it; make it as smooth as possible in the centre for the bird to rest upon, and in a few weeks the limb will become perfectly sound. Nothing further needs to be done, as it will heal by the process known in surgery by the name of adhesion. It will be necessary, however, for you to supply the little invalid with food and water, and these should be put into suitable vessels, and placed in such a position that the bird can supply its wants without being necessitated to move about for them. Place the cage containing the patient where there is a good and clear light.

LOSS OF VOICE.

Canaries lose their voices sometimes, and this event takes place more frequently during the process of the moult than at any other season. I don’t mean their ceasing to sing, for all birds stop singing at this time of year, but they are unable to say “pretty dick,” or “peat,” and when the season of song returns,

the voice of the bird so afflicted is mute. It probably arises through cold which may produce inflammation of the respiratory organs or larynx, or it may originate from cramp, weakness, or paralysis. I have invariably found that a little gum arabic and a few drops of paregoric (twenty to thirty drops), put into their drinking water twice or thrice a week, and a liberal supply of lettuce, and linseed, mixed, given to a bird so affected, removes the complaint. When a bird is suffering from this affection, he will distend his throat to the utmost of his power, and if otherwise in apparent good health, he will throw his head back, open his mouth to its widest extent, and, in fact, go systematically through all the movements usually made by a vocalist of this kind, and with all the energy he can muster; but not a sound can be heard as he attempts to pour forth his *amour propre*—for canaries are very vain little gentlemen.

CRAMP.

All birds are more or less liable to this troublesome complaint; sometimes it attacks the limbs, at other times the stomach. It may arise from a vitiated state of the bile, or from having eaten something indigestible. The most effectual remedy I know of is, when in the limbs, to immerse them in warm water and administer some gentle aperient. When in the stomach, give twenty drops antimonial wine and ten drops of laudanum to one and a half ounces of water, in place of the regular drinking water.

SURFEIT.

This complaint is usually produced either by a bird eating to excess, or from its being fed too long upon one particular kind of food without having a change. During this affection the insensible perspiration is impeded, and the skin is generally covered with a small, almost invisible, eruption, and the feathers gradually disappear from the head of the bird. A change of diet, something cooling, should be given, and add a few drops of lime juice to the bird’s drinking water. Give it once or twice a week a drop or two of castor oil internally, and anoint its head with a little pure olive oil (free from scent), lard without salt, or spermaceti ointment, and the ailment will speedily disappear.

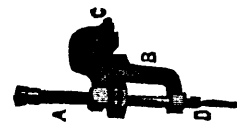
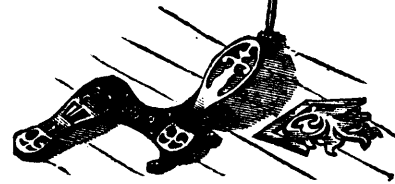
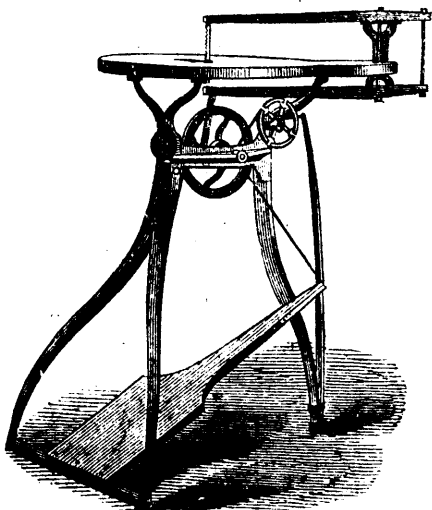
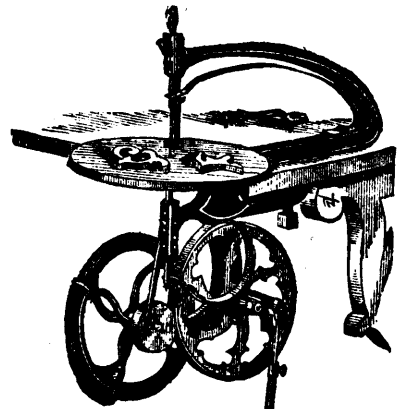
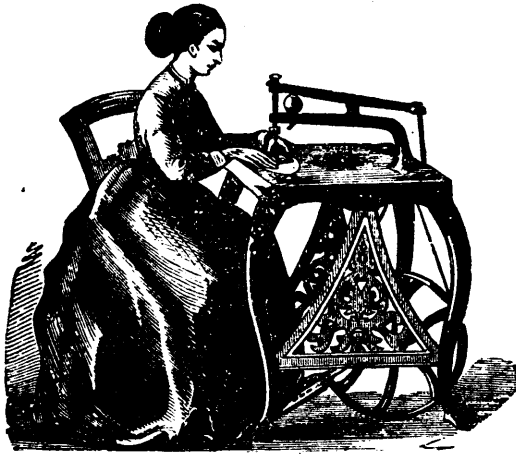
EPILEPSY.

There are said to be three different species of this disease—the cerebral, sympathetic, and occasional. The one from which birds most frequently suffer is the last-named. The existing cause seems to be a nervous tendency, allied with a delicate constitution, and is probably the result of continual confinement. The fits are generally brought on whenever a bird, subject to this ailment, is surprised or frightened; anything likely to create terror must be carefully guarded against. I have known birds subject to these fits go off in one every time they were brought into the open air, or every time you put your hand in the cage to take hold of them. Whenever a bird is seized with one of those occasional fits, sprinkle it freely all over with cold water, but more particularly about the head; dip your fingers into a basin containing some of that element and dash it vigorously over the affected bird. It is not considered a dangerous complaint, although, if it occurs frequently, it is very apt to impair the health of birds and predispose them to disease. A mild aperient given occasionally, with a little tonic medicine beside, such as the carbonate of iron, quinine, infusion of quassia, or gentian, are the best remedies.

APOPLEXY.

There are several species of this fearful disease. There is the atabilious, cataleptic, hydrocephalic, &c. They are, nevertheless, all of them of such a tendency as to lead to a fatal termination in the lives of birds, as it would be physically impossible to subject these minute objects to a process of treatment similar to that resorted to in human beings. Prevention is by far the best curative of this frightful disease. The most fruitful source of this complaint in birds is luxurious living, which leads them to intemperance in diet. Male canaries which are permitted to revel in Mormonism to any extent are likewise prone to this serious disorder. If you are present at any time when a canary drops from its perch in a fit, and lies struggling at the bottom of the cage in apparent agony, lift it gently out of its cage and carry it to an open window, bathe its head with cold water, and if there should happen to be any spirit of ammonia (hartshorn) at hand, or to be procured readily, dilute a little of this with cold water, and let the bird inhale it. Should it revive, keep it cool and quiet for some time, and afterwards give it some laxative medicine. You might give it two drops of castor oil to begin with, and put a small quantity of Epsom salts among its drinking water. The diet of the patient should be of the most simple

ITALIAN PANEL. CHURCH OF S. DEI MIRACOLI, VENICE.



FRET WORK.

THE POULTRY YARD.**THE MALAY COCK.****GENERAL CHARACTERISTICS.**

The body smaller than that of the Cochin; form more erect than of any other variety; flesh ordinary, hard, and dense; feathers long and straight, lying close on the body; thighs, shanks, and feet strong and long; shoulders projecting; tail slender and short; comb triple and very thick; skin red; beak and feet yellow.

Weight.—Eleven pounds.

Height.—Twenty-nine inches and a half from the head to under the feet.

Body.—Conical, large in front, and becoming gradually smaller to behind, where it becomes pointed. This shape and the plumage is so slippery and close-fitting on the bird that it is difficult to hold it. The body is much inclined from before to the tail, and the arched back forms an angle of 45°. The thighs and shanks are long, strong, and thick. There is no variety that has so much flesh on the breast and pinions. The wings are placed very high and very close to the sides, which makes the shoulders very large.

Head.—Strong, short, and conical, flattened on the skull, and wide between the eyes. The red fleshy part which envelopes the whole head is very apparent.

Comb.—Thick in a single lump, yet one of the triple combs covering the base of the beak and extending to the middle of the skull.

Wattles.—Middle-sized.

Ears.—Proportioned to the length of the wattles.

Checks.—Large, bare, and red.

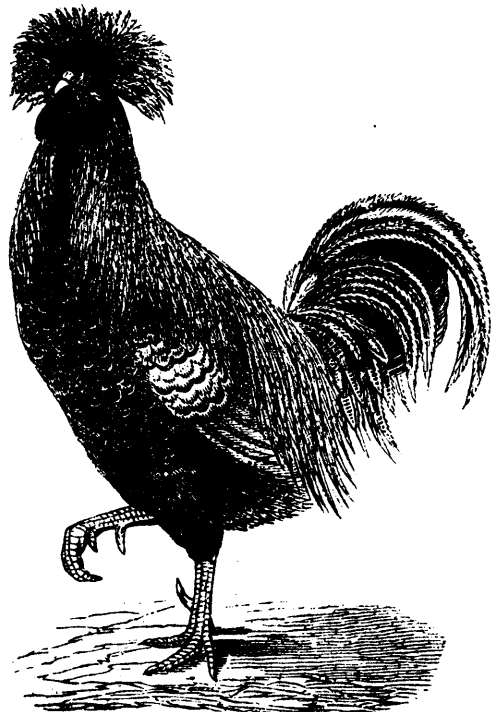
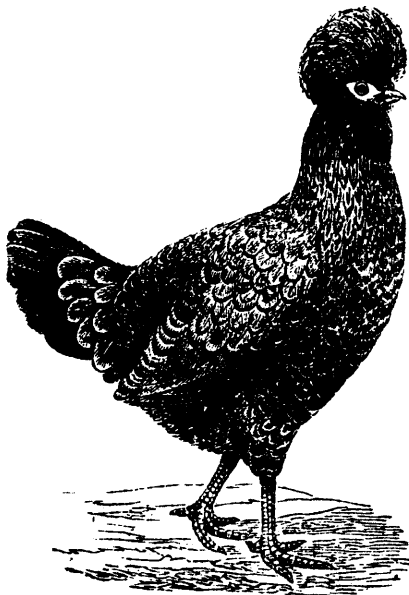
Beak.—Short and conical, very strong, bent down, and clear yellow.

Eye.—Malicious, having the expression of that of an eagle; iris rosy yellow; pupil very dark; eye covered by an eyelid so much developed that when seen in front the eye is not visible. The bird's look is always savage and menacing.

Shank of Leg.—Very long and very strong, of a bright yellow colour.

Toes.—Strong, long, and well clawed, of the same colour as the leg.

(Continued on page 286.)



PADUAS OR POLANDS.

and plainest description, more especially if the bird is of a full habit of body. There is likewise a species of apoplexy which is produced by the effect of the sun's rays—this is called *coup de soleil*. I have known birds hung in a window where the sun has poured upon them his most refulgent rays during the hottest days in summer, but, fortunately, in most cases, with the upper sash of the window lowered to let in the fresh air; and I have known ladies who kept their birds in this manner, despite many repeated warnings, until they have had what they please to term "the misfortune to lose my poor dickie; and, on asking the cause, they coolly tell you that it "took a fit—the dear creature." How many birds die from this cause alone I am unable to say, but I am only astonished that there are not far more.

SORE FEET

are almost invariably produced through dirt and neglect. Birds get their feet littered up with filth, which forms into little balls, hardens, and produces sores; this state of things ought not to exist. I have known fanciers supply their birds with horsehair or cowhair for the purpose of building their nests, and the birds have worked on with it until it has got so twisted and wrapped round their toes and feet that the disentanglement became a work of considerable difficulty and patience to overcome; and if birds are permitted to go about with the hairs fastened round their toes in this manner for any length of time together, they will most probably lose some of them. When you discover a bird in this plight, catch it, immerse the feet in warm water to free them from dirt, dry, and proceed to cut away the hairs with a sharp penknife or a pair of scissors, and, lastly, anoint any place which appears sore with a little sweet oil.

SWOLLEN JOINTS.

I have known instances of birds having had their feet or legs caught in a loose wire, or in the thin wire used for securing the upright wires to the cross-bars of the cage front, and with struggling in their endeavours to free themselves they have injured their knee or ankle joints, or other portions of their limbs, which have become swollen and inflamed in consequence. When an event of this kind happens, catch the maimed bird and place the injured leg in hot water, as hot as you can bear your hand without flinching; allow it to remain immersed for five minutes, afterwards dry the limb, and apply a little compound tincture of myrrh to the affected part with a feather.

Overgrown claws and beaks are treated upon at the beginning of this subject; hens egg-bound and sweating their young; parasites, and how to get rid of them, will be found fully treated under the head of bird-breeding.

CONSTIPATION

can be relieved by putting a few drops of molasses in the bird's drinking water, or by giving it a plentiful supply of green food, if during the summer months; if in the winter, a little white bread sopped in milk and well sweetened with moist sugar.

THE PIP.

So-called from a small pimple on the rump; in fact, it is the bird's lubricator, so to speak, it being an oil gland, and contains oil used for trimming the plumage; it occasionally gets deranged, and swelling ensues. If it appears to contain a matterly substance, it should, when ripe, be let out with a fine sewing needle, and a little oil or moist sugar applied to the part. When it is ready to be operated upon, the bird appears heavy and sleepy. Whenever a bird is ill it should be removed to a cage kept expressly for invalids—a sort of hospital—and when the disease is of a contagious character it should be removed as far away from the locality of your bed-room as circumstances will permit.

I have now, I imagine, enumerated all the principal ills from which canaries suffer, and pointed out, as far as my experience has enabled me, the best mode of treatment and the best means of cure; and I hope that those who try them will receive as much benefit from the application of many of the ingredients I have recommended as I have done myself, in which case they will have no cause to regret the efforts they made to relieve their little suffering friends; but as many of the ailments from which they suffer can obviously be prevented, I must conclude by calling the attention of fanciers to that ever-to-be-remembered adage, "Prevention is better than cure."—R. L. WALLACE, in *The Country*.

TO MAKE FIRE FLASH FROM WATER.—Pour a small quantity of clear water into a glass, and put a piece or two of phosphoretted lime into it. In a few seconds flashes of fire will dart from the surface of the water, and end in curls of smoke rising in regular succession.

FRET WORK.

(Concluded from page 251.)

The accompanying engraving shows the Machine bolted down as a slide or tee-rest, connected close to the centre—where, say half-an-inch stroke, as will be readily understood. In the figure will be seen clearly illustrated the over-head motion, blower and pipe, and drilling apparatus in front.

To the pattern-maker this modification of the Fret-Saw Machine is truly invaluable. It enables him to do his work with an ease and truth obtainable by no other means. Being portable, the machine can be stowed away in any corner.

The sewing machine occupies the post of honour in the lady's own apartment; why should not the Fretting-Machine be equally honoured? As an ornament nothing truly useful can excel it; as a developer of artistic feeling, as a positive art-teacher, it has no equal. Pleasant it is to see the work grow, as it were, under the hand of the operator. Church or chapel, boudoir or bazaar, all may be beautified and made more attractive by the aid of this machine. Even a superficial glance at the few patterns on the frontispiece will satisfy any one of this; but the number which may be executed—each one differing from the rest—is "legion;" there is positively no limit. In working this there is, perhaps, less labour than in working the sewing machine; so that no lady need fear sitting down to execute even the most complicated pattern—indeed, to foot, as it were, beats time to the dictation of the mind, and the work of the one is quite absorbed in the satisfaction momentarily acquired by the other.

We give an illustration of Barnes' patent foot-power Scroll-Saw, which is adapted to the entire range of scroll or fret sawing, from the cornice bracket three inches thick to the finest wall bracket one-eighth of an inch thick. It takes up no more room than a sewing-machine, it runs but little harder, and weighs but 56 pounds. Being so light and taking so little room, it can be used beside the workman's bench, and for most straight sawing he will turn to the machine and do it quicker and better than he can fasten it in his vice or lay it on his horse and do it. The ordinary motion of the machine when sawing is from 800 to 1,200 strokes per minute. This motion is obtained from a very plain device, only one continuously revolving wheel is used, to which the saw-arms are attached. For driving it there is no crank used, neither pawls nor ratchets—no dead centres: it moves positive on treading down the pedal. The stroke of the pedal can be made long or short between the limits of its throw, to suit the operator, for high or low speed. The saw leaves the work as smooth as it is possible for a saw to do, and it needs no finishing before putting up. The saw blade can be taken out in an instant for inside work. Its special advantages will be found in the perfect and direct application of foot-power, in the saw-blade being attached directly to the blade of the pitman, obviating any possible spring to the parts giving motion to the saw, and in the absence of any crank to annoy the operator by starting it off the centre. Being without pawls or ratchets, all the power applied is used directly on the saw. The stroke of the pedal can be made to suit the operator any distance within the limits of its throw, and it runs, without extra exertion, from 800 to 1,200 strokes of the saw per minute.

For cabinet makers' use, Barnes' Saw is made to work by steam power. The table is 28 inches high, and it will swing 24 inches under the arm.

The Fleetwood Scroll Saw is a meritorious and attractive little machine. It is specially commended for simplicity of construction, the strength of all its parts, its compact and graceful form, quiet movement, and the ease and rapidity with which it works.

It supplies not only to the young, but to older persons, great delight as a pastime. It can be taken to sitting-room or parlor, affixed readily to a table, soils nothing, disturbs no one. Young persons who are apt with tools, will find enticing work in the many beautiful articles they can develop, almost at will, with this machine.

The Saw is adjustable, and can be taken out and replaced in an instant; thus enabling the operator to saw out the inside parts of scroll work readily. A very small hole, through which the saw passes, being required as a starting point. The finest fret saws can be used in this machine.

The drilling apparatus is a new attachment for the Fleetwood Scroll Saw, much needed—indeed, almost indispensable—secured to the machine in a few minutes, and capable of boring rapidly a smooth clean hole 1-64 to 1-8 of an inch in size, in wood or metal; boring in walnut at the rate of 1 inch in depth in 10 seconds or less.

Using the Morse twist drill, and with the rapid motion that can be obtained, there is no danger of splitting the most delicate piece. The two machines last mentioned may be had of Mr. C. Churchill, Wilson street, London, and would be imported by any hardware merchant if desired.

Some of the most popular fret cutting machines have been described, and we would advise the industrious amateur to possess himself of one of them, as the work performed is superior.

We have described the fret-cutting machines, and but few remarks will be required in the method of working them. The patterns will have to be perforated as an entrance to the saw, the same as for hand work, and each particular machine will require different handling. While some of the wooden fret-cutting machines work with a treadle and the saw vibrates up and down but once with the motion of the foot, the iron machines vibrate very rapidly with the up and down motion of the treadle. Whatever machine the amateur may possess we should advise that both feet should be practised to work it, as it would be a relief from the fatigue of a long run. In each machine there will be a particular knack to produce the most power to cut quickly a piece of wood an inch or more in thickness as well as the light stroke required to turn a corner or clear out an angle in some very delicate work. If the sawdust should clog the saw through the wood being damp or other causes, don't force the saw or you may break it. Loosen the saw and draw it out of the cut.

DESCRIPTION OF FANCY-WORK ENGRAVINGS.

(See page 285.)

No. 1.—EDGING: MIGNARDISE.

* One double in a picot of mignardise, two chain; repeat twice more; one chain, pass over fourteen picots; repeat from * for the entire length. The inner picots of scallops are joined with chain-stitch, worked with a needle and cotton.

No. 2.—BUTTERFLY: POINT LACE.

All materials for the lace designs may be had from Mrs. Gurney, 186, Atlantic Street, Brooklyn, New York, P.O. Box 3527. Prices upon application. The Point Lace Supplements also may be had from Mrs. Gurney, for 10c.

MATERIALS REQUIRED: 1½ yard of braid, 1½ yard of cord, 1 yard of pearl-edge, ½ yard of lacet braid, one ball of thread, one reel of cotton.

No. 3.—EDGING: MIGNARDISE.

The pattern must first be traced on linen or paper from the design, and the rings sewn firmly where they fold. Take off the work, and sew down the picots that are not shown in the design. Four distinct picots are shown for the heading, eight picots for outside of scallop. For the-heading, work one chain, one double into each picot.

For the outer edge of scallop * one double in the third picot, * two chain, one double in the next; repeat from last * twice more, then from first * for the entire length.

Nos. 4 AND 5.—TRIMMINGS FOR DRESS, &c.

No. 4 consists of mohair braid, laid on at intervals, fastened down with a few stitches of silk, so as to draw it tightly together at the bottom. The ends are then frayed out to form tassels.

No. 5 consists of threads drawn out across the material, and those lengthwise of the material are knotted together at regular distances.

Nos. 6 AND 8.—ROSETTE AND BUTTON.

Rosettes of braid, with a small button in the centre, form pretty trimmings for dresses, jackets, &c. No. 6 is made of two sorts of braid, which must be sewn upon a foundation of stiff net or buckram. No. 8 is a large, thick button, ornamented with cord and passementerie.

Nos. 7, 9, AND 10.—WALL-BASKET.

No. 7 is a pretty wall-basket of cane-work, ornamented with drapes, for which designs Nos. 9 and 10 are suitable.

No. 9 has a foundation of scarlet cloth, pinked at the edges, and ornamented with blue silk braid, and an embroidered design in gold, green, and blue purse-silk.

No. 10.—The foundation may be of pale blue cloth or silk. The edge is straight, and is button-holed round with silk. The design may be worked in chain-stitch, or with braid in gold colour. A few gold or steel beads are needed, and the long stitches are in two shades of crimson silk. The edge is of fine lacet-work.

The basket is lined with bright-coloured silk. When the drapes are worked and fixed in their places, a leaf trimming of satin ribbon is put on. A silk tassel is placed between each drape, and bows of ribbon are put on according to design.

NOS. 11 AND 12.—DESIGNS IN EMBROIDERY.

These little sprays are pretty for ornamenting pin-cushions, toilet-cushions, &c. They may be worked in cruel, embroidery cotton, or silk, according to the material to be ornamented.

No. 13.—TOILET-BOX.

The foundation may be of thin wood or stout cardboard. The box may be lined with quilted, fluted, or plain silk. The sides are trimmed with a pleated ribbon flounce. The top is covered with silk, with a pleating round the edge. An embroidered square of muslin, or any other material, or white velvet, painted with a spray of flowers, would be very pretty for the top, edged with lace or blonde.

No. 14.—EMBROIDERED BORDER.

The border is suitable for a variety of purposes. Pretty serviette-rings may be made with it, on a foundation of silk, cloth, or velvet. The edge should then be straight, and, after mounting on cardboard, and lining with ribbon or silk, a cord or row of beads could be sewn on to finish the ring. The flowers and foliage may be worked in their natural colours, or in two shades of one colour, according to taste.—*The Young Ladies' Journal.*

WASTE-PAPER BASKET.

The foundation is of pasteboard or thick cardboard. Six sections will be required, each measuring 14½ inches in height, 8 inches in width at the top, and 5½ inches at the bottom. The covering is of unbleached holland, ornamented with appliqué in two shades of brown silk, or in the natural colours of the flowers. The sides are bound with brown braid, and are joined on the inner side with strong thread. The lining may be of paper or of thin glazed calico, which must be cut to shape and carefully gummed on. The top is then bound with brown braid.

Nos. 14 and 15 give designs for the drapery. The design for ornamenting the sides is given on a larger scale. The framework of wood must, of course, be made by an upholsterer. Tassels of two shades of brown complete the ornamentation. Cloth foundation and appliqué will be handsomer and more substantial if required.

FLOWER-POT STAND.

This stand is made of varnished bamboo. The foot is 7 inches high; the upper part is six-cornered, and 8 inches high. The bottom of it, which is made of deal, measures 9 4-5 inches round, and the top 12 inches. The medallions inside the six divisions of the upper part are worked on white cloth. In the centre of this cloth sew on a small oval piece of green silk with button-hole stitch, on which a small landscape cut out in cork is sewn on in appliqué. This can be worked instead on perforated cardboard, in point russe or satin stitch.

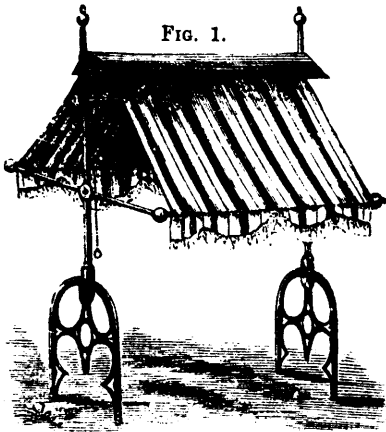
The vandyked edge which borders the oval is worked partly in satin stitch, partly in point russe, with purple-silk of different bright colours, and with gold thread. The white cloth ground is mounted on cardboard, and tacked on the bamboo edge of the medallions with small nails. The stand is lined with purple cashmere ornamented with cords and tassels, as can be seen in our illustration.

EXPERIMENTAL AMUSEMENTS.

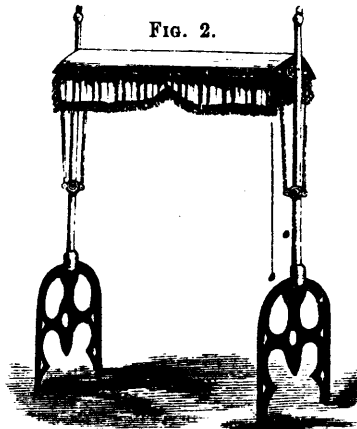
TO PLACE A LIGHTED CANDLE UNDER WATER WITHOUT EXTINGUISHING IT; OR A HANDKERCHIEF WITHOUT WETTING IT.—Take a glass, and fastening a small bit of wood across the mouth, stick thereupon a piece of candle lighted, and with a steady hand, convey the glass to the surface of the water; then push it carefully down, and the candle may be seen burning under the water, and it may be brought up again alight. In the same manner you may put a handkerchief rolled tight together, and it will not be wet. The principal art in performing this feat consists in the nicety of bringing the mouth of the glass exactly level with the surface of the water; for, if it be put the least on one side, the water will rush in, and consequently defeat the object. The experiment may serve in some degree to elucidate the principle of the diving-bell.

GARDEN FURNITURE AND DECORATIONS.

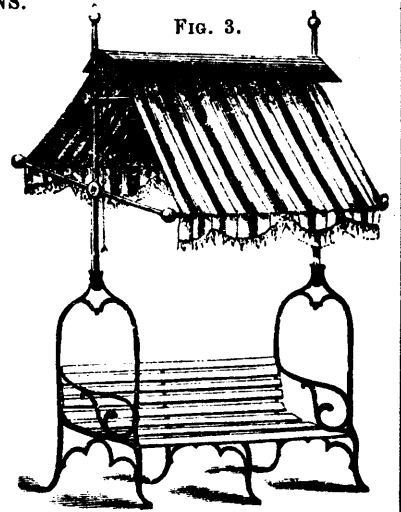
PORTABLE LAWN TENT



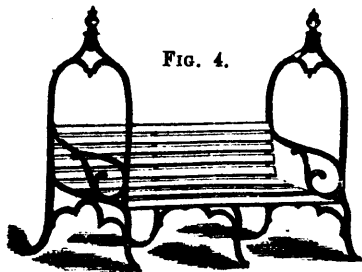
LAWN TENT EXTENDED.



LAWN TENT CLOSED.



COMBINATION TENT AND SEAT.



SEAT WITH TENT REMOVED.



FIG. 5.



EDGING TILES.



RUSTIC STUMP VASE.



ROCK-BED.

FIG. 7.

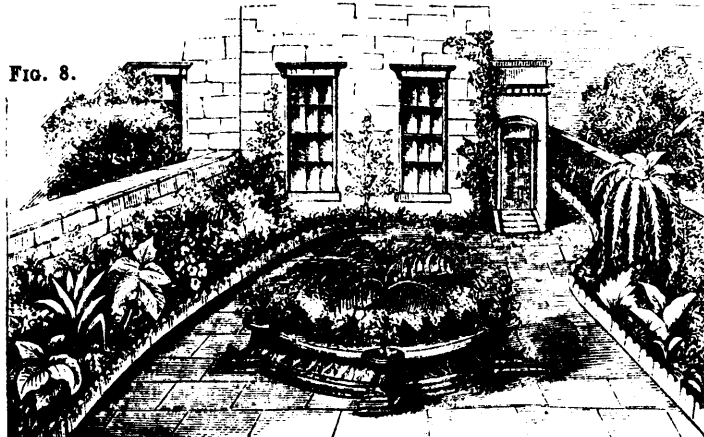
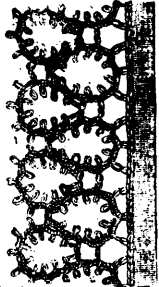
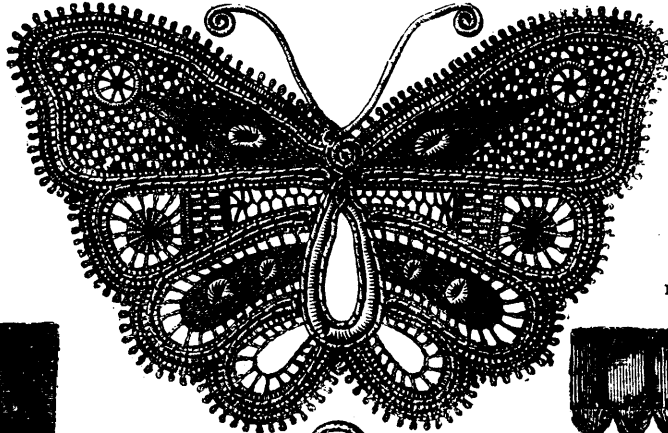


FIG. 8.

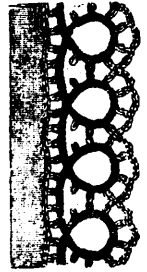
EMBROIDERY WORK.



No. 1.—EDGING: MIGNARDISE AND CROCHET.



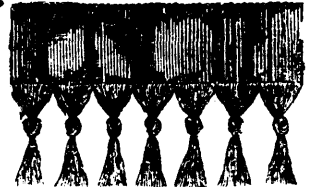
No. 2.—BUTTERFLY: POINT LACE.



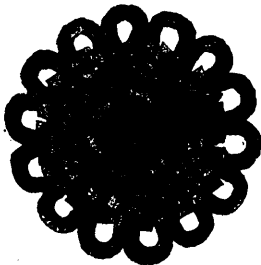
No. 3.—EDGING: CROCHET AND MIGNARDISE.



No. 4.—TRIMMING: BRAID.



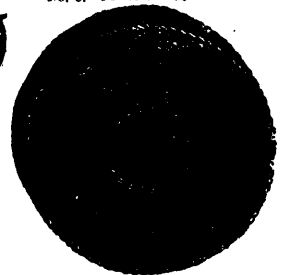
No. 5.—TRIMMING.



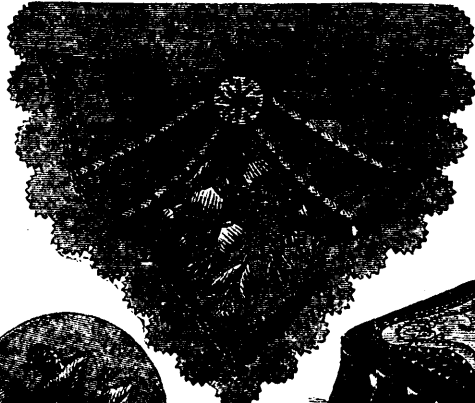
No. 6.—ROSETTE: BRAID.



No. 7.—WALL-BASKET.



No. 8.—BUTTON.



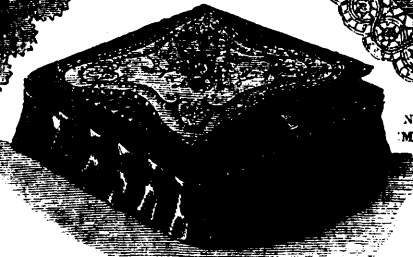
No. 9.—DRAPE: EMBROIDERY.



No. 10.—DRAPE: EMBROIDERY WITH LACET EDGE.



No. 11.—SPRAY: EMBROIDERY.



No. 13.—TOILET-BOX.



No. 12.—SPRAY: EMBROIDERY.



No. 14.—EMBROIDERED BORDER.

THE POULTRY YARD.

(Continued from page 281.)

The Malay cock is one of those hardly to be classed among the fighters. His gait is restless and threatening. His physiognomy is cruel, impatient, fierce. He carries the head very high; his neck, straight and slender, gives an angular form to the shoulders. His body is very much raised in front and set on long legs, and finished by a slender horizontal tail, composed of short feathers straight and pointed. Somewhat fleshy and large in the body, its plumage is smooth and close.

Plumage.—The feathers are very long, very straight, and without any down, fitting close to the body in layers like the scales of a fish. They seem varnished and are very slippery.

There are Malays of many colours, but the principal types are—the White variety, the most esteemed for the good effect they produce when the cocks and hens are together, the pure white of the feathers, the yellow beak and feet, and the red which surrounds the head are effective.

Of the Black variety, the cock is always marked with red on the shoulders, though the rest of the plumage is black, and the hen is all black.

The Red variety is bright red on the hackle; the lancets and the large wing-feathers of a deep mahogany red to the shoulders, on the breast and thighs, of a paler red on the sides, on the abdomen and legs; coverts of the wings and the whole of the tail brilliant green. The hen of this variety is entirely red with rosy tints in patches in all the varieties. The hackle feathers are short, and make more apparent a very long neck. The tail is short and thin.

The Malay hen has the same characteristics as the cock, and has also fighting propensities. She has, like him, a conical shape, fierce look, and a dark and cruel eye. The hackle feathers are extremely short and close-fitting on the neck, giving to this part a very slender appearance, making still more than in the cock a greater prominence of the shoulders. She weighs from 6 lbs. 10 ozs. to 7½ lbs. Lays a pretty large number of eggs, having a yolk light yellow, very solid. She sits well and brings up her chickens well.

The English esteem this variety highly, using it for a cross to give weight to birds for table. I think it should be used with great circumspection, especially with Cochins or Brahmans. Malays often are sold in France under the name of "the Brazil," "the cock of Gros-Marne," sent to the Society of Acclimatisation under the name of "the Reunion cock," and an amateur member of this society wished, under pretext of a difference hardly discernible, to call "the Malacca."

The variety is useless, and its fierce habit makes it impossible to associate it with our indigenous fowls. The detestable fowls known under the fallacious names of "Ganges," "Bengal," "Russian," and American, are degenerated or mixed descendants of the real Malay.—*Cottage Gardener.*

THE PADUA BREED.

Dutch Crested Variety.

In the most of these varieties the hen has much richer and more characteristic plumage than the cock, and as the principal interest attached to them is the pleasure they give to their appearance, I shall begin by describing the female first, as it is with her we find the most striking points. Though these varieties are almost entirely selected as being ornamental, they are not less good for the table. Their flesh is very fine, and they are generally excellent layers. The chickens are very precocious, but their tenderness render them very difficult to rear. But after several generations in the same country they become more hardy.

Paduas or Polands.

This variety is one of the strongest among the fancy varieties. The flesh is delicate, their laying very good, and they are non-sitters. It is remarkably well crested, which forms its principal ornament. Its plumage is one of the most rich as well as variegated, and wonderful in regularity. These essential characteristics are—the crest, the plumage, and the complete absence of comb, the ear-lobes and cheeks being what amateurs call "without flesh." The cheeks only appear a little with the cock. The crest, very largely developed in both sexes, is not always alike. With the cock it is composed of lance-shaped feathers like a parasol, and altogether much larger than the hen's, which is perfectly rounded and separates in two parts by a sort of cleft, which goes down the beak and disappears at the back of the head. The crest is very large, grown on a fleshy mass called "the mushroom," which covers the skull and is a little thrown back behind, so as to be off the eyes. This "mushroom" should be very much

developed in well bred birds. Each feather of the crest is in bands of colour; in the silver variety surrounded with white, then marked with black, then white in the middle. After the second and third moulting a part of the crest feathers become white, which always increases as they get older. The feathers of the hackle are like those of the crest, but less pointed.—*Journal of Horticulture.*

PORTABLE LAWN TENTS.

On page 284, we give specimens of Lawn Tents, such as are now very much in use on almost every lawn in Europe, and form quite an ornament to garden grounds. The canvas, as represented in the engraving, is 6 feet long by 5 feet wide, forming a complete protection from the sun and rain, and is easily raised and lowered by pulling a cord attached to the roller above. It can be taken down and adjusted in any part of the lawn or garden in a few minutes. When drawn up it is entirely protected by the metal covering at the top from rain and dew. The process of raising and lowering is also most simple and effective. It is long enough to accommodate a full sized garden settee, or two or three garden chairs. Figs. 3 and 4 is an improved pattern, as it combines the lawn tent with a substantial garden seat. When shade is not needed, the upper part or covering can be easily removed.

The frame work is made of iron, and the slots of ash, but persons not having opportunities of purchasing these lawn tents might have them made entirely of ash, with some variation in the design. The cost of one such as shown in Figure 3, is about \$40.

Fig. 5 shows ornamental borders for the sides of beds, and are represented on the side of the bed on Figure 8. These borders are made of common burnt clay and are reasonable in price. Ornamental garden edgings can also be made out of pine, with two wire spikes about 4 inches long driven in the bottom to fasten them into the ground.

Fig. 6 is a rustic stump vase with openings for the insertion of plants and are very fine and appropriate decorations for any grounds, and look exceeding well if kept in good condition with leafy and healthy plants; as the evaporation from baskets and vases is very great, being exposed on all sides to air and sun, they must receive a copious supply of water every evening to keep the plants in a healthy condition.

Fig. 7 is a rock-bed, which forms beautiful and appropriate structures for ferns and for many of the wild and luxuriant flowers, grasses, mosses and other plants which grow in our native woods. The stones forming the bed should be rather rugged in shape and of irregular sizes. The soil should be rich and loomy.

Fig. 8 is an example of how a very small lot, hardly twenty-five feet in width, can be made, by taste and skill, an exhibition of neatness and rural beauty. It is wonderful what a beautiful effect is given to a row of even inferior houses, by each having an ornamental garden in front laid out in a tasteful manner, instead of the unsightly plots that disfigure the approaches to so many of our suburban residences.

TO MAKE ARTIFICIAL FIREBALLS.—Put 30 grains of phosphorus into a Florence flask, with three or four ounces of water. Place the vessel over a lamp, and give it a boiling heat. Balls of fire will soon be seen to issue from the water, after the manner of an artificial firework, attended with the most beautiful coruscations.

DOMESTIC READING.

BROILED TOMATOES.—Slice the tomatoes in halves, rub a piece of fat pork on the heated bars of a gridiron, put the tomatoes upon them, and broil on each side. Cooked either with beefsteak, or separately, they make a fine relish.

TOMATO PRESERVES.—The small yellow tomatoes make preserves equal to those of the West Indies. Select well-ripened fruit, stem and wash well. To every six pounds of tomatoes add five pounds of white sugar. Put the tomatoes into a kettle, with just enough water to prevent them from burning. Steam, with a tight cover over them, until the skins break. Skim out the fruit and add the sugar, with a little more water, if needful, to melt it. Boil for twenty minutes; put in the tomatoes again. Let them boil up once, and turn the whole into a closely covered jar. In the late winter slice up two lemons and add to the tomatoes.

TOMATO MARMALADE.—To each pound of tomato add one pound of white or brown sugar, first scalding, peeling and slicing the red tomatoes. Put over a slow fire, and boil down until it is well thickened; then add one tablespoonful of powdered ginger and the juice and grated peel of two lemons to every three pounds of tomatoes. Boil from two to three hours, skimming off all froth. When very thick, turn into small jars and cover tightly. This is a delicious relish for lunch or supper, and no one could recognize that taste of tomato in it.

BAKED TOMATOES.—This is my favorite method of cooking them: Select large ripe tomatoes, wash and wipe them clean; cut in halves around the tomato; place each half, with the cut side uppermost, into a dripping pan, and cover its surface with grated bread crumbs, bits of butter, a teaspoonful of fine sugar, and a seasoning of pepper and salt. Pour in at the side of the pan two tablespoonfuls of boiling water. Put the pan into the oven and bake two hours, taking care, however, not to burn the upper surface of the tomatoes. Serve on a platter. It is delicious for either a breakfast or dinner dish.

TOMATO OMELET FOR BREAKFAST.—Peel and chop fine five tomatoes of good size; season them with salt and pepper; add to them half a teacup of grated bread. Beat four eggs to a foam and stir into the tomatoes. Heat a "spider" hissing hot, put in a small piece of butter, turn in the mixture, and stir rapidly until it begins to thicken. Now let it brown for two or three minutes on the bottom, then lay it half over, slip on to a hot dish, and serve for breakfast, garnished with sprigs of parsley and slices of hard boiled eggs. It is an appetizing and also a handsome dish.

HOW TO MAKE THE TEA GO FURTHER.—A method has been discovered for making more than the usual quantity of tea from any given quantity of the leaf. The whole secret consists in steaming the leaf before steeping. By this process, it is said, 14 pints of good quality may be brewed from one ounce of tea.

PULLED BREAD.—Pull the soft portion of a new loaf into pieces; let them be of equal size, say about two or three inches each way. Dry the pieces in a slow oven or before the fire till they become a nice light brown color, and when they are quite crisp they will be ready for use. They are very nice with coffee.

CORN STARCH CAKE.— $\frac{1}{2}$ lb. of sugar, 4 oz. of butter, 5 eggs, 1 teaspoonful cream of tartar, $\frac{1}{2}$ teaspoonful soda, $\frac{1}{2}$ pound of corn starch, $\frac{1}{2}$ a gill of sweet milk.

RAILROAD CAKE.—A pint of flour, 1 teaspoonful of cream of tartar, $\frac{1}{2}$ a teaspoonful of soda, a teaspoonful of butter, a teaspoonful of sugar; bake the batter in the square pan twenty minutes.

MOUNTAIN CAKE.—1 cup of sugar, 2 eggs, half cup butter, half cup of milk or water, 2 cups of flour, teaspoonful of cream of tartar half a teaspoonful of soda, nutmeg.

POOR MAN'S CAKE.—1 cup of sugar, $\frac{1}{2}$ cup of butter, 1 cup sour cream, 1 egg, flour enough to make a good batter, $\frac{1}{2}$ a teaspoonful of saleratus.

FRUIT CAKE.— $1\frac{1}{2}$ lbs. sugar, $1\frac{1}{2}$ lbs. flour, $\frac{3}{4}$ lb. butter, 6 eggs, a pint of sweet milk, 2 teaspoonfuls saleratus, 1 glass of wine, 1 of brandy, and as much fruit and spice as you can afford and no more.

BAKED POTATOE PUDDING.—Baked potatoes skimmed and mashed 12 oz., suet 1 oz., cheese, grated fine, 1 oz., milk 1 gill. Mix the potatoes, suet, milk, cheese and all together; if not of a proper consistence, add a little water. Bake in an earthen pot.

COLLEGE PUDDINGS.— $\frac{3}{4}$ lb. of stale bread, grated; the same quantity of beef suet, chopped very fine; 1 lb. of currants, $\frac{1}{2}$ nut meg, a few cloves, a glass of brandy, 2 or 3 eggs, 2 spoonfuls of cream or milk; mix these well together, and make into a paste in the shape of eggs. Fry them gently over a clear fire, in $\frac{1}{2}$ lb. of butter; let them be of a nice brown color all over. You may add blanched almonds and sweetmeats. Serve them up with wine.

FAMILY PUDDING.—1 quart of sweet milk, 1 pint of bread crumbs soaked in the milk, 3 eggs well beaten, 1 teacupful of sugar, little mace, 6 good tart apples, pared, cores dug out, and stand them in the pudding, and steam until the apples are well done. An hour will suffice.

COTTAGE PUDDING.—1 egg, 1 cup of sugar, 1 of sweet milk, 1 teaspoonful of soda, 2 of cream of tartar, 1 pint of flour, and a little salt. To be eaten with milk and sugar.

LEMON PUDDING.—Melt 6 oz. of butter, pour it over the same quantity of powdered loaf sugar, stirring it well till cold, then grate the rind of a large lemon, and add it with 8 eggs well beaten and the juice of 2 lemons: stir the whole till it is completely mixed together, and bake the pudding with a paste round the dish.

SAUCES AND CREAMS FOR PUDDINGS.—1. Take equal quantities of sugar and molasses, boil them together, and stir in a little flour. 2. Take the juice of an orange, a cup of sugar and the same of good cream. 3. Good sour cream made very sweet with sugar, with or without seasoning, makes a good sauce. 4. Beat 2 eggs well, then add a cup of stewed apples and a cup of sugar.

HOW TO DRY PLANTS.

The following instructions for drying plants are communicated to the *Gaedners' Chronicle*, by the Rev. G. Henslow:—The materials required are common cartridge paper, thick white blotting paper, cotton wadding and mill board, all cut to the same size. The plants should be gathered in dry weather, and soon after the flowers open, when their colours are brightest. Succulent plants (such as daffodil, orchis or stonecrop), should be put into scalding water, with the exceptions of the flowers, for a minute or two, then laid on a cloth to dry.

Arrange the specimens and papers in the following order:—Mill-board, cartridge paper, wadding (split open, and the glazed side placed next to the cartridge paper), blotting paper; the specimens, having small pieces of wadding placed within and around the flowers to draw off all the moisture as quickly as possible, blotting paper, wadding as before, cartridge paper, mill-board. When the specimens, &c., are thus arranged, heavy weights should be put on them; about 30lb. the first day, 60lb. afterwards. Remove them from under pressure, in a day or two; carefully take away all the papers, &c., except the blotting papers between which the specimens are placed; put these in a warm air to dry, whilst the removed papers, &c., are dried in the sun, or by the fire. When dry (but not warm) place them in the same order as before; put all under the heavier pressure for a few days when (if not succulent) they will dry.

Flowers of different colours require different treatment to preserve their colours. Blue flowers must be dried with heat, either under a case of hot sand before a fire, with a hot iron, or in a cool oven. Red flowers are injured by heat; they require to be washed with muriatic acid, diluted in spirits of wine, to fix the colour. One part of acid to three parts of spirit is about the proportion. The best brush with which to apply the mixture is the head of a thistle when in seed, as the acid destroys a hair-pencil, and injures whatever it touches (except glass or china); therefore it should be used with great care. Many yellow flowers turn green even after they have remained yellow some weeks; they must therefore be dried repeatedly before the fire, and again after they are mounted on paper, and kept in a dry place. Purple flowers require as much care, or they soon turn a light brown. White flowers turn brown if handled or brushed before they are dried.

Daisies, pansies, and some other flowers must not be removed from under pressure for two or three days, or the petals will turn up. As all dried plants (ferns excepted) are liable to be infested by minute insects, a small quantity of poison, corrosive sublimate, dissolved in spirits of wine, should be added to the paste, which it will also preserve from mould. The best cement for fixing the specimens on to the paper or cardboard is gum-paste. It is composed of thick gum-water, and flour mixed in warm water, by adding the two together, warm, and of a consistency that will run off the hair pencil.

MUSIC.

At Set of Sun.

Words by E. W.

(BALLAD.)

Music by BOSSISSIO.

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If we sit down at set of sun, And count the things that we have done, And, count-ing, find-
But if through all the life-long day, We've eased no heart by yea or nay; If through it all-

and, count-ing find . . . One self-de-n-y-ing act, one word, That eased the heart of him who heard;
if through it all . . . We've done nothing that we can trace, That brought the sun-shine to a face;

One glance most kind- one glance most kind, . . . That fell like sun-shine where it went, Then
No act, most small- no no act, most small, . . . That help'd some soul, and no-thing cost- Then

we may count that day well spent-Then we may count that day well than spent. . .
count that day as worse than lost-Then count that day as worse than lost. . .

D.C.