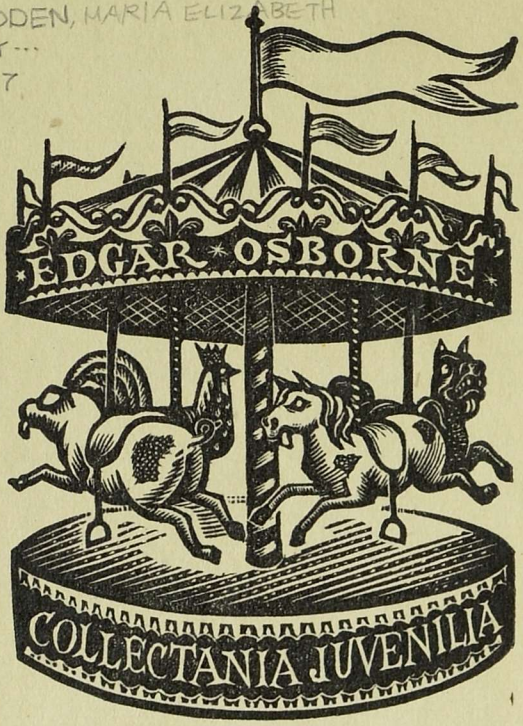
KEY to KNOWLEDGE.

OR

Things in Common Use

EXPLAINED

BI
BUDDEN, MARIA ELIZABETH
KEY...
1837



37131.009 543 059
II 697-8

My [illegible] nt.
Susan read all the stories
in this book of Key to Knowledge.

Susanna Sneyd

Given her by her Grandmam Holley as a small token of her affection on her 10th Birthday

Penelope Dorothea Bamford

1857

Ralph De Tunstall Sneyd

a Xmas present from his Aunt Susan. 1871.

Page 3.

KEY TO KNOWLEDGE.

KEY TO KNOWLEDGE;

OR,

THINGS IN COMMON USE

SIMPLY AND SHORTLY EXPLAINED.

BY A MOTHER.

AUTHOR OF "ALWAYS HAPPY," "CLAUDINE," ETC.

TENTH EDITION,

WITH NUMEROUS ILLUSTRATIONS.

LONDON:
JOHN HARRIS, ST. PAUL'S CHURCH-YARD.
1837.

LONDON:
PRINTED BY SAMUEL BENTLEY,
Dorset Street, Fleet Street.

DEDICATION.

To the two smiling groups, on the hill and in the valley, this little Book is presented, with many a fond wish, and many a tender prayer for their virtue and happiness, by their affectionate mother and aunt,

THE AUTHOR.

PREFACE.

In the following pages, an attempt has been made to supply for the young pupil an easy dictionary, to which he can apply for information, respecting the objects that continually surround him. To give a short, a simple, and a correct answer to youthful inquiry, is all that is here intended; the abstruser elucidations of art, and the deeper investigations of science, were equally beyond the scope and the ability of the Author. Her intention has been to gratify, without misleading; to meet curiosity with satisfactory explanation; to inform, without confounding; to instruct, without fatiguing. As her aim has been limited and humble, she may better hope to have succeeded in the execution. On her own unassisted judgment, she has not presumed to advance any of her explanations. Where, therefore, she has erred, the

fault arises from unintentional oversight, not from presumption or self-confidence. Among the authors, to whose works she candidly acknowledges to have referred, and from whose knowledge she has gleaned whatever adorns or enriches the following pages, she cannot resist expressing her acknowledgments to Dr. Gregory, whose useful and perspicuous work, intitled "The Economy of Nature," has rendered the present effort not only easy but delightful.

CONTENTS.

Page

Alegar 68
Alkali 133
Allspice 205
Alum 103
Amber 94
Ambergris 96
Arràck 57
Arrow-root 93

Barley-sugar 51
Beer 64
Black lead 149
Brandy 56
Bread 7
Bricks 142
Brimstone 41
Brushes 158
Butter 24

Calicoes 192
Camphor 98
Candles 16, 107
Cements 143
Charcoal 39
Cheese 29
China gilding 140
China-ware 137
Chocolate 76
Cider 65

Page

Cinnamon 203
Clothing 197
Clotted Cream ... 26
Cloves 204
Cocoa 75
Coffee 74
Colours 159
Coral 171
Cork 207
Cornelian 171
Cotton 185
Crayons 149

Devonshire Cream 25
Diamonds 169
Distillation 55

Earthenware 139
England 221
Exports & Imports 162

Fermentation 59
Fire 177
Flax 195
Flour 9

Galls 157
Gilding Porcelain .140
Gin, or Geneva .. 56

Page

Ginger 206
Glass 133
Glazing Earthenware 140
Glue 102
Gum Arabic 157
Gums and Resins 98
Gunpowder 37

Hair Powder 11
Hats 198
Hemp 196
Honey 14
Hops 63

Imports & Exports 162
India-rubber 99
Ink 156
Isinglass 12
Ivory 173

Leather 154
Linens 195
Liquorice 206
Looking-glass 135

Mace 203
Machinery 187
Malt 63

Page
Manna 93
Mead 68
Metals..... 174
Morocco Leather.. 155
Mortar 142
Musk..... 97

Needles 175
Nutmegs..... 202

Oil 113

Paper-making.... 150
Parchment 153
Pearls 165
Pencils 149
Pens 156
Pepper 204
Perry 67
Pimento-tree 205
Pins 175
Pitch 99
Porcelain 137
Porter 65
Precious Stones... 170
Printing 155
Printing Calicoes. 192
Putty 132

Page
Rennett 30
Resin 99
Rice 77
Rum 52, 54

Saffron 106
Sago 91
Salt 32
Saltpetre 35
Satins 84
Sealing-wax 157
Seasons 3
Shell-lac 158
Silks 80
Silk Insects 83
Silk Worms..... 81
Size 152
Snuff 160
Soap 112
Spanish Juice.... 207
Spirit of Wine 68
Spermaceti 13
Spices 202
Sponge 119, 143
Starch 10
Steam-engine 189
Steel 174
Sugar 46
Sugar-candy 51

Page
Sulphur 41
Switzerland..... 219

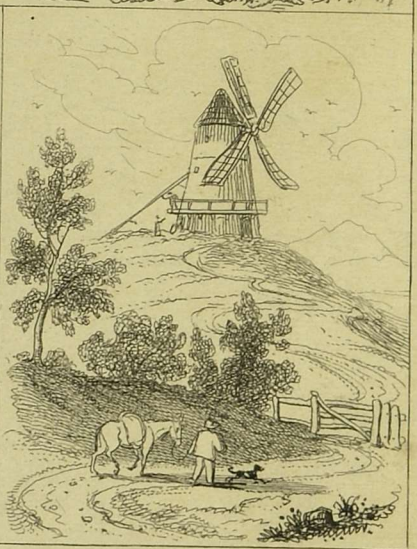
Tallow 107
Tallow-tree..... 111
Tanning 154
Tapioca 93
Tar 99
Tea 43
Tobacco 161
Toddy 57
Treacle 50
Turmeric..... 106
Turpentine 99

Vanilla 77
Varnish 159
Vermilion 158
Vinegar 67

Wafers 11
Warp and Woof.. 210
Wax 15
Weaving..... 210
Whalebone..... 119
Wheat 8
Whiting 133
Wine 59
Woollen Cloth ... 209

REAPING CORN

THRESHING



FLOUR

Pub.d Oct.r 1837, by J. Harris, St. Pauls Ch. Y.d

KEY TO KNOWLEDGE.

DIALOGUE I.

MOTHER—HELEN—LOUISA.

LOUISA. Ah! mother! How loud the wind roars; and how roughly the rain beats against the windows!

MOTHER. It does, indeed, my love.

LOUISA. Does it not make you melancholy, mother?

MOTHER. Until you spoke, I did not remark the weather.

LOUISA. No, mother! How was that?

MOTHER. My thoughts were fixed on a more agreeable subject; and I was so absorbed in it, that I did not hear, or rather did not remark, the storm

LOUISA. You are so happy, mother, you can always amuse yourself.

MOTHER. And why cannot you? I dare say, your sister could help you to a subject.

HELEN. I was thinking, mother, how many poor creatures may be exposed to this heavy wind and rain; and how comfortably *we* are sitting round this blazing fire.

MOTHER. It is right, my child, to make such comparisons; not only to open our hearts to the distresses of others, but to

render us thankful for the blessings we enjoy.

LOUISA. Well, after all, summer is much pleasanter than winter. Such walks! Such beautiful flowers! Such delightful fruit! Even the poor can then be happy.

MOTHER. Summer has, indeed, many charms, and we ought to look back with cheerful gratitude on the pleasures we have enjoyed; but that should not render us insensible to the pleasures of winter.

LOUISA. Pleasures of winter, mother?

MOTHER. What think you of this bright fire; the long cheerful evenings, devoted to conversation, books, or needle-work? What think you of a fine gambol with papa on the frozen pond; throwing snowballs;

watching your brothers as they skate; and admiring the beautiful frost-work, that encrusts each leaf and blade of grass?

LOUISA. Oh! I like all that very much.

MOTHER. Then, the merry Christmas sports; the evening faggot, and the circling tale! The pleasure of bestowing comfort on the poor; working for them; visiting them; giving them part of our good things!

HELEN. That is pleasure indeed!

LOUISA. But that we cannot always enjoy. Storms will come, and confine us to the house.

MOTHER. Do not thunder-storms also occur in summer, to arrest our rambles?

LOUISA. Indeed they do. I remember, last year, just as our hay was going to be

stacked, a frightful storm came on, and stopped our plans.

MOTHER. You find, therefore, every season has its advantages and its inconveniences. These we cannot alter; but we may improve each to our use and benefit.

LOUISA. But what can we do with this long tedious hour, between dinner and tea? —No candles—so we cannot read; and play soon tires.

HELEN. I know what would make it pass delightfully.

LOUISA. What do you mean, Helen?

HELEN. I mean, if mamma would tell us such another story as that of Felix.

LOUISA. That would be charming.—Dear, dear mamma, do oblige us.

MOTHER. Are you not growing too old for stories? Can we not find some better amusement?

LOUISA. What can be better?

MOTHER. Something that will inform as well as amuse. To gain information, is always delightful.

HELEN. It is, indeed, mother!

LOUISA. Well, then, pray begin; I do not mind what it is, if you will but talk to us, dear mother.

MOTHER. But here come candles and tea.

LOUISA. Ill-natured candles! Why did you come so soon?

MOTHER. You wished for them just now.

LOUISA. Yes—but—then—

MOTHER. You had nothing to do; now, that your attention is engaged, you do not any longer want them.

LOUISA. Then shall we have no chat?

MOTHER. Do not look so doleful: come to the table; we will drink tea, and, perhaps, something may arise to amuse us.

HELEN. Mother, I am admiring this bread—how white it is!

LOUISA. Who would think it came from that withered stalk, which we saw cut down last autumn?

MOTHER. And yet the process, through which corn passes from the grain to bread, is much simpler than most others, by which men render the products of the earth useful.

HELEN. Nothing can be more simple.

After the wheat is cut down and properly dried, it is put up into large stacks, which are thatched with straw, to keep out the wind and rain. From these stacks it is removed, as it is wanted, into the barn, where it is threshed out with a flail; and the grain is separated from the chaff.

LOUISA. We saw a man threshing, this morning, at the farm. Papa made us observe the flail, two sticks united by a leathern thong. I tried to use it, but only hurt my fingers.

MOTHER. You had neither strength nor skill; and without one of these qualifications, nothing can be done.

HELEN. After threshing, follows winnowing, by which the dust and lighter grain are

blown away from the heavy corn. It is then ready for the mill.

LOUISA. The miller grinds it; the cook kneads it; the baker bakes it; and we eat it.

MOTHER. Not so fast, little girl: the flour, when it comes from the mill, does not make such white bread as you are now eating.

LOUISA. No!

HELEN. You forget that the bran must be first taken from it. The bran is the outer skin of the grain; and when allowed to remain with the flour, makes the bread brown.

LOUISA. Flour gives us many comforts—bread, pies, puddings, paste to fix the gilded paper, biscuits for sailors, and cakes for little girls.

HELEN. Mamma, has Louisa named all that flour can be useful for?

MOTHER. She has forgotten starch.

LOUISA. Oh! pray tell us something about starch.

MOTHER. Starch is made by steeping wheat in water. The light wheat (which is winnowed from the heavier grains, as your sister mentioned) is generally used for this purpose. By steeping it in water, a floury viscous sediment is drawn from the grain, and remains at the bottom of the water. This sediment is cleansed, and well dried in an oven, or by the heat of the sun.

HELEN. And this is starch?

MOTHER. It is:—you know its use?

HELEN. To stiffen linen and muslins.

MOTHER. Starch exists in a great number of vegetable substances; but chiefly in roots and seeds, and particularly in those employed for food. The potatoe yields it easily, and in abundance.

HELEN. I have heard that hair powder is made from starch.

MOTHER. It is so, indeed. Hair powder is only starch reduced to a fine powder, and perfumed with some delicate essence.

LOUISA. Any thing more, mother, made from flour?

MOTHER. Wafers are composed of flour, isinglass, and a very small portion of yeast. This mixture is coloured, and then spread out in very thin cakes on tin plates, dried on a stove, and cut out into wafers.

HELEN. Pray, mamma, what is isinglass? You say, it is used in making wafers.

MOTHER. It is, my dear, and for many other purposes.

LOUISA. Yes, for jelly and blancmange.

MOTHER. Isinglass is a substance obtained from the sounds of fish. The coarser kinds are made from the intestines of fish. The preparation is simple:—After cleansing the sounds from the sea-water, they are put for a few minutes into lime-water, that all the oily parts may be absorbed; they are then again washed, cleaned, and rolled into round forms of the thickness of the finger; dried in this state, and, being pulled off in little strips, the isinglass appears in the shape in which we buy it.

LOUISA. What a nasty thing! The intestines of fish! I shall never like jelly again!

MOTHER. Make no rash resolves. — Many things besides isinglass are drawn from equally unpleasant substances. What think you of the spermaceti, which you licked up so eagerly, last winter, to ease your cough?

LOUISA. Mixed with sugar-candy, it was very good. Besides, nothing could be whiter and cleaner.

HELEN. And yet, I fancy, you would turn up your nose at the thought of eating the brains of a whale.

LOUISA. To be sure I should.—Why do you laugh, Helen?

HELEN. Because I have read that sper-

maceti is produced from the brains of a particular kind of whale.

MOTHER. You are right, Helen; and it has been lately proved, by experiment, that human flesh, by being long exposed to a running stream, is found to change into a substance very similar to spermaceti.

LOUISA. Oh! mamma—how shocking!

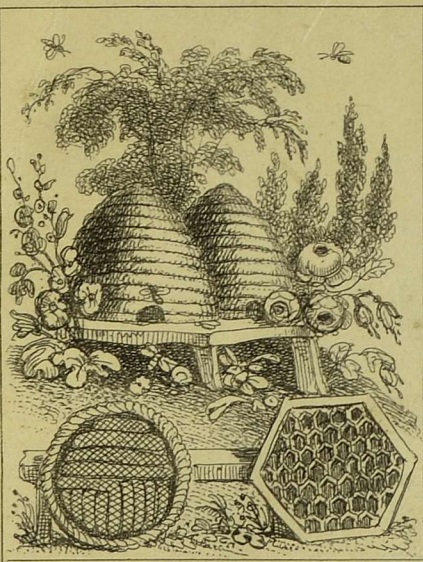
MOTHER. Spermaceti has other uses, besides such as are medicinal.

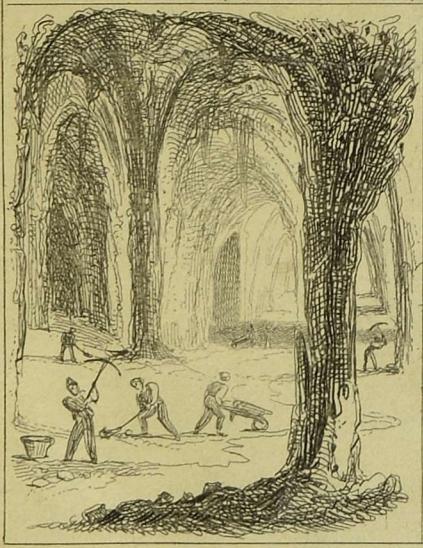
HELEN. What other uses?

MOTHER. It is made into candles, which bear its name, and are considered as a medium between wax and tallow candles.

LOUISA. By-the-by, when I come to think of it, what a dirty thing honey is: first swallowed by bees, and then by us!

HONEY 2 BUTTER





SALT MINE CHARCOAL

Publ.d Oct.r 2 1837, by J. Harris, St. Pauls Church Y.d

MOTHER. Your description is certainly not very inviting. Suppose, rather, that we should call honey the syrup of flowers, drawn from the opening buds by the trunk, or proboscis, of the industrious bee, and thus borne home to the waxen cells.

LOUISA. Now I like honey again.

MOTHER. So much then, my dear child, you find depends on description.

HELEN. Besides, mother, your account is more rational, and, I dare say, more just.

LOUISA. If honey be the juice of flowers, what then is wax?

MOTHER. Wax has been determined by an attentive naturalist (Reaumur) to be the farina, or pollen, of flowers, which is eaten by the bees, and converted by an animal

process into wax. All wax is of one colour, however variously coloured the farina from which it is produced; and this circumstance tends to strengthen Reaumur's discovery. Its whiteness is injured by age, and in time is altogether lost. To be restored to its original purity, the wax must be bleached. —When simply melted, it is yellow.

HELEN. Candles are made of the bleached wax?

MOTHER. They are, and are considered great luxuries. The yellow wax is used for a great variety of purposes.—But we have done tea, and must now begin our evening amusements.

LOUISA. Mamma, we have been already delightfully amused.

HELEN. Only the noise of the wind and rain sadly disturbed us!

LOUISA. Does it blow? Does it rain? Ah! I hear it does: but I never once thought of it.

MOTHER. I am glad, my dear little girl, that I have not only informed, but amused you.

LOUISA. I like this better than stories.

MOTHER. Certainly—for you feel yourself wiser as well as gayer.

LOUISA. Then do go on talking; I have fifty questions to ask about sugar, and butter, and tea, and—

MOTHER. Stop, stop—I cannot answer one more question now; but to-morrow, at the same long tedious hour—

LOUISA. Short delightful hour, you mean, mother.

MOTHER. To-morrow, I will again endeavour to gratify you. If you will now begin your work, and give me the book I am reading to you, I will try to interest you with another subject.

HELEN. Thank you, mamma; it is all pleasure.

DIALOGUE II.

MOTHER—HELEN—LOUISA.

MOTHER. Pray, Louisa, put aside your work; it is much too dark for you to see to do it neatly.

LOUISA. But, mother, I ought to finish it to-night; and you were so good as to promise to play the geographical game with us, after tea; so I must work now.

MOTHER. Could not you have found time in the day, to complete the business?

LOUISA. No, mother; because—

MOTHER. Why do you thus blush and hesitate, my dear?

LOUISA. Because I got up so late.

MOTHER. That certainly is a reason for blushes.

LOUISA. I was going to say, I was up so late that I have been in a hurry all day.

MOTHER. Do you like to be in a hurry?

LOUISA. No, indeed, I do not: for, in working, it makes me prick my fingers; in writing, it makes me sprinkle the ink; and, in reading, it makes me blunder.

MOTHER. And these are all the inconveniences of hurry. Well, then, avoid hurry. You know how?

LOUISA. Yes, mother, by getting up in

proper time, and doing things when they ought to be done.

MOTHER. Thus, you see, we can ourselves remedy many of our discomforts.—You remember old nurse's favourite saying?

LOUISA. I am sure I do: "Whoever loses an hour in the morning, may look for it all day, and never find it."

HELEN. How clever that is! And how true!

MOTHER. It is, indeed, my child. Time once passed, can never be recalled. How careful then ought we to be, to improve every hour to some useful purpose!

HELEN. You often tell us, it is the most valuable treasure we possess.

MOTHER. Every day will convince you

that it is so; since from our employment of time, arises not only our wisdom, but our happiness; not only our happiness, but our virtue. To use well the present hour, secures to us future hours of pleasing recollection. Thus we earn double gratification.

LOUISA. Now, yesterday, how pleasantly we passed the twilight!

MOTHER. Ah! So you remind me of my half promise.

HELEN. Make it a whole promise, mother, and fulfil it.

MOTHER. I will: only let me first inform Louisa, that she cannot join the geographical game, till she has completed her intended work.

HELEN. Let us wait for her.

MOTHER. No, my love; she ought to suffer for her sluggishness, and not implicate others in her faults.

LOUISA. Thank you, dearest Helen. But mamma says right: I ought to suffer; and it will make me remember.

MOTHER. That is wisely said, Louisa: it shews you are resolved to profit by experience.

LOUISA. What is experience?

MOTHER. You know, by having tried, that indolence produces trouble, and prevents pleasure. You are therefore determined not to be again lazy.

LOUISA. I now understand.

MOTHER. And I, my dear little girl, am pleased to find you not only solicitous for

improvement, but willing to be advised. What questions were you asking me last night, when we left the tea-table?

LOUISA. I wished you to tell me something about butter, sugar, and tea.

HELEN. Butter, you know, is made from cream; and cream is the richest lightest part of milk.

LOUISA. Yes: when the cows are milked, the dairy-maid puts the new milk into wide shallow pans: in a few hours, the cream collects on the top, is skimmed off, and churned into butter.

HELEN. Mother, how does the churn act upon the cream?

MOTHER. It moves it about quickly, my dear, and by that means expels all the milky

parts; thus leaving the oily particles in one collected mass.

HELEN. Is there only one way of making butter?

LOUISA. What a foolish question, Helen! To be sure, there is only one way.

MOTHER. Your sister's question is by no means foolish, Louisa; there is more than one way of separating the butter from the milk.

LOUISA. Indeed!

MOTHER. Yes, the method you have jointly described is the most general: but, in the western counties of England, namely, Cornwall, Devon, and Somerset, another mode is practised.

HELEN. Very different from ours?

MOTHER. The principle must be the same; but the process is somewhat different: ours, you know, is by quick motion; the other, by the aid of fire.

LOUISA. Fire! that is strange.

MOTHER. The milk, instead of being put into earthen pans, as with us, is poured into copper or brass pans, well tinned; and after standing a certain time, these pans are placed on stoves, heated by charcoal. The heat causes the cream to rise in a few minutes to the surface of the milk, in a thick consistence; this is called *clotted cream.* You have heard of it?

HELEN. Yes, frequently: it must be very rich.

MOTHER. It is; for it is nearly turned

into butter by the heat. When it has remained long enough on the stove to be sufficiently warmed, it is returned to the dairy; and as soon as cold, the clotted cream is skimmed off, put into a large earthen bowl, and, by a slight movement with the hand or a wooden spatula, is almost instantaneously converted into butter. Very little buttermilk, of course, is pressed from cream thus prepared; but that little is remarkably rich.

LOUISA. I should not like such butter.

MOTHER. Never indulge prejudice, my child; it is not only illiberal, but unjust and unreasonable. Why should you not like such butter?

LOUISA. Because, you say, it is beaten up by the hands.

MOTHER. I also said it is often beaten up by a wooden spatula: but, my Louisa, is not all butter pressed and formed by the hand?

LOUISA. I believe it is.

MOTHER. Then you find the objection lies more in the fancy than in the reality: very little difference, in fact, exists; and those who affect disgust at the western mode of producing butter, shew their delicacy at the expense of their good sense.

HELEN. How, mother?

MOTHER. Pray, my dear, is not all pastry, —are not cakes, and even bread, made entirely by the hand? Nay, fifty other things, which I cannot now enumerate, these refined persons will swallow with avidity, at the very moment, perhaps, when they are expressing

their delicate disapproval of the Devonshire mode of butter-making.

HELEN. How silly and unmeaning!

MOTHER. Yes, my dear: let us not imitate such conduct; but always endeavour to preserve candid and liberal opinions, not only towards the actions of other people, but towards the customs and habits of other countries. In all, we may be assured, there is something to approve and admire.

LOUISA. After having described butter-making, we ought next to speak of cheese.

HELEN. Yes; cheese is also made of milk, or cream: but how, I do not know.

MOTHER. Cheese is milk, or cream, curdled by being warmed and mixed with an ingredient, called *rennet*.

LOUISA. Rennet! What is that?

MOTHER. It is the stomach of a calf, perfectly well cleaned and prepared: a piece of this is steeped in water; and that water curdles the milk when poured into it. Nay, Louisa, turn not up your little nose. Is not the liver of a fowl considered a delicacy; and is not the gizzard served up as a savoury dish?

LOUISA. Certainly, mamma.

MOTHER. Well then, my dear, it cannot be less cleanly to eat food prepared by the aid of the inside of one animal, than to eat the inside itself of another. Do not the most delicate epicures eat the whole of the woodcock, without reservation?

HELEN. That they do, indeed.

MOTHER. Early, my children, learn to form just notions; and do not allow yourselves to be carried away by the current of popular prejudice and fantastic sentiment. Were these consistently pursued, their professors must starve; for what preparation of food could stand the test of minute investigation?—But we have wandered from our subject.

HELEN. Yes, mother, you were saying that the milk, or cream, is warmed, and then curdled by the aid of water, in which rennet (that is, the stomach of a calf) has been steeped.

MOTHER. The milk, or cream, is thus divided into two parts; the curd, or thick coagulated part, and the whey, or watery

part. The curd is pressed as dry as possible, salted, and then formed into large masses, which masses are put into moulds, or vats, and then pressed down tightly, to form the cheese.

HELEN. How useful salt is to us!

MOTHER. It is, indeed, my dear; not only in giving a pleasant flavour to food, but also in preserving it from corruption.

LOUISA. Then do tell us something about it.

MOTHER. Salt is procured either from sea-water or salt springs; or it is dug out of mines. In places where it is produced by the first means, the salt water is admitted into open shallow trenches, exposed to the sun, the heat of which evaporates the watery

particles and leaves the salt, which is afterwards refined from its impurities by boiling and skimming.

HELEN. Some, you say, is dug out of mines.

MOTHER. Yes: these mines are found in several places; as in Cheshire, in England; in Italy; and at Cracow, in Poland; which last is thought to be capable of supplying the whole world for a thousand years!

HELEN. How astonishing!

MOTHER. In this mine are houses, chapels, and streets, of rock-salt; which, when illuminated, form a beautiful spectacle.

HELEN. Beautiful, indeed!

MOTHER. Common salt is the most useful of saline bodies; for, though some of

them resist putrefaction equally well, none are so friendly and agreeable to the human stomach. Its agreeable qualities are not, indeed, confined to man; most other animals shew a great fondness for it.

HELEN. Has salt any other use than that of giving flavour to food?

MOTHER. Yes, many other uses: it is used to vitrify—that is, to give a glossy appearance to the surface of some kinds of common earthenware. This is done by throwing a certain quantity of it into the furnace, where, being volatilized, it attaches itself to the surface of the ware.

LOUISA. Volatilized, mother?

MOTHER. Volatilized means that the moist parts are thrown off, or evaporated.

Common salt is also used in making glass, to render it white and clean.

LOUISA. How delightful to know all this!

HELEN. Is saltpetre, mother, a preparation of salt?

MOTHER. Saltpetre, or more properly speaking, nitre, is found in earthy substances; but sometimes it is gathered native and pure. Large quantities are brought from the East Indies. It is considered as a distinct species of salt.

HELEN. And is likewise used for preserving meat.

MOTHER. It is also an ingredient in glass-making. It possesses, besides, a strong inflammable quality; but this may be better explained, when we speak of gunpowder.

Let us now order candles, and prepare for our evening refreshment.

LOUISA. I must not forget my work.

HELEN. No: be industrious; finish that; and then join in our game.

LOUISA. Be assured I will: and, perhaps, to-morrow, mamma will tell us something about gunpowder.

DIALOGUE III.

MOTHER—HELEN—LOUISA.

LOUISA. Now, mother, for your promised account of gunpowder: I have thought of it several times to-day.

MOTHER. Gunpowder is a mixture of nitre, sulphur, and charcoal, in unequal proportions; by far the largest part being nitre. In firing off a musket, the trigger, when pulled, causes the flint, which is fixed in the cock, to strike against the steel hammer;

sparks are instantly produced, which set fire first to the sulphur; this again inflames the charcoal, and the nitre mixed with them becoming thus strongly heated, the inclosed air rapidly expands (the same operation taking place in the barrel, by means of the touch-hole), and, thus expanded, it issues from the mouth of the musket, forcing before it the ball, with which the piece was charged. I have explained this without any technical terms (that is, terms belonging to art), in the hope of giving you a simple and tolerably correct idea of the subject.

HELEN. I think I understand you.

MOTHER. Cannons, you know, are fired by a lighted match, applied to the touch-hole.

HELEN. Yes: but pray what is charcoal?

MOTHER. Charcoal is wood half burned, or charred. The wood, being cut into proper lengths, is heaped up in piles, or stacks; these are covered with turf; and the whole is well coated with a plaster, made of earth and charcoal-dust; leaving only a few vent-holes for the flames to issue from.

HELEN. Yes, without some air being admitted, the fire would go out.

MOTHER. Certainly; that we prove every day, in managing our common fires. At the end of two or three days, the wood is sufficiently charred; then the holes are stopped up, and the fire consequently goes out. To be well done, the branches of the wood ought to preserve their original form.

LOUISA. And this is used in making gunpowder?

MOTHER. Being first reduced to powder.

HELEN. Yes, of course.

MOTHER. Charcoal is used in all arts and manufactures, where a strong fire is required without smoke. Its finest powder is also useful in polishing; and it makes the best tooth-powder known. The fumes of charcoal, when burning, are very unwholesome, and many people have lost their lives by carelessly exposing themselves to it.

HELEN. I suppose it suffocates?

MOTHER. Yes; and ought never to be admitted into sleeping apartments.

HELEN. And what is sulphur?

MOTHER. Sulphur, or brimstone, is a

simple inflammable substance; that is, it easily catches fire: the points of matches are, therefore, dipped in it. It emits a blue flame, and a suffocating fume. It is found generally united with some other body; but, in the neighbourhood of volcanoes, it has been discovered pure and unmixed.

HELEN. Perhaps, mother, the heat of the volcano had purified it?

MOTHER. So it has been supposed. Sulphur is used in bleaching; especially in cleansing straw hats and bonnets.

HELEN. Yes, it is called *stoving* them.

MOTHER. That is, exposing them to the fumes of burning sulphur. Sulphur is also used in medicine.

LOUISA. And very disagreeable it is.

MOTHER. Few medicines, my dear, are very palatable. How thankful ought we to be, that those things which are most necessary to our daily food, are the most agreeable to our taste! Our disgust at medicinal substances is equally fortunate. These are generally very powerful; and were we not restrained by dislike, we might use them too copiously; so wisely, so perfectly, are we gifted with every faculty that can conduce to our comfort and our preservation! It is only when we depart from this implanted reason, that we lose sight of enjoyment.

HELEN. Where is sulphur mostly found?

MOTHER. It is dug out of the earth, in various places; but particularly in Italy, Switzerland, and South America.

TEA PLANT 3 TEA GATHERING

WATERING TEA PLANT

Pub.d Oct.r 2. 1827. by J. Harris. St. Pauls Church Y.d

LOUISA. Now, then, we know each ingredient in gunpowder. May I now ask my next question?

MOTHER. What was that?

LOUISA. I wish to know something about tea. I know it as the dried leaf of a foreign shrub, and that is all I am acquainted with respecting it.

MOTHER. As our hour is not expired, I will cheerfully gratify you; although I have little to add to what you already know. The tea-plant is indigenous in, or a native of, China, Japan, and Siam. That is said to be of the best quality, which grows on a light rocky soil; and it requires a southern aspect. There are many varieties of this shrub; some very small and feeble, others rising into

large and handsome trees. The shape of the leaf is, I believe, very similar to that of our cherry leaf, but generally smaller. We will open some in water, to ascertain their shape.

HELEN. I have heard that what we call green tea is dried on copper plates.

MOTHER. So it has been said; and hence it has been supposed to derive from the metal an unwholesome quality; but this notion is erroneous, since both the green and black teas are dried in cast-iron pans, and copper is never used for the purpose.

HELEN. Do the plants grow from seed, or from cuttings?

MOTHER. From seed: in March they are sown, seven or eight in each hole; probably

one only vegetates, and this is transplanted, at a certain age. The shrubs begin to yield crops of leaves three years after they are sown, and continue in bearing until they are six or seven years old, when they are thought to begin to lose their flavour, and are removed.

LOUISA. What sort of a flower does the tea-shrub bear?

MOTHER. Its flower is thought to resemble our wild white rose; and its root is like that of the pear-tree.

HELEN. Are the leaves dried by the heat of the sun, or by the help of fire?

MOTHER. After they are collected, they are exposed to the steam of boiling water: they are then made to shrivel or roll toge-

five or six feet. The skin is soft, and the inner part of the cane consists of a pulpy spongy substance. The canes are generally half an inch in diameter: how much then must it be in the circumference.

LOUISA. Diameter is across, and circumference around, any circle.

MOTHER. You are perfectly right.

HELEN. The diameter is about one-third of the circumference. If then the sugar-cane be half an inch in diameter, it must be an inch and a half in circumference.

MOTHER. Fairly answered. Each cane is marked by knots, at the distance of about three or four inches from each other. At the top, grow several long green leaves, in the centre of which is a flower.

HELEN. Such is the plant: now pray tell us how the juice is prepared for use.

MOTHER. When the upper leaves of the plant decay, the cane is thought to be fit for cutting, and this is when it is from ten to fifteen months old. It is then stripped of its leaves, cut, and carried to the mill.

LOUISA. To the mill, mother?

MOTHER. Yes; to be crushed, and have the juice pressed from it. These mills sometimes consist of three wooden rollers, covered with steel plates. From the mill, the expressed juice is carried, by a pipe, into the sugar-house, to be boiled. It is first mixed with lime and potash, to cause its unctuous or oily part better to separate from the syrup, which it does in the form of a

thick scum. The juice is boiled six times, until it is cleansed from all impurities. It is then barrelled, and forwarded to England, where alone it can be completely finished.

HELEN. Why is that done?

MOTHER. For the purposes of commerce. When brought to England, it is first clarified by bullock's blood, or sometimes by the whites of eggs; then formed into loaves; and thus prepared for consumption.

LOUISA. Bullock's blood! Shocking!

MOTHER. And yet, I fear, the knowledge of this process will not prevent your continuing to be so fond of sweetmeats.

LOUISA. I will forget the dirty part of the business.

MOTHER. Nay, Louisa, you mistake

this is the cleanest part. The blood, being well stirred into the syrup, from its glutinous or gummy quality, adheres or sticks to every little impurity remaining in it, and, thus charged, rises to the surface in a thick scum. This is removed as it forms, and all vestiges of the bullock's blood disappear.

LOUISA. Oh, that is different from what I thought.

MOTHER. Do not run away with any superficial or incomplete account, and then act upon it as if it were entirely just. Make yourself mistress of every subject, on which you presume to decide.

HELEN. Is not treacle, or molasses, the coarse remains of the syrup?

MOTHER. It is, after a certain process.

LOUISA. And sugar-candy, mother —

MOTHER. Is sugar boiled and clarified; then placed in stoves, crossed by strong threads. These stoves are then heated to a high degree, so that the sugar is crystallized, or rendered hard and transparent, and fixes itself to the threads.

LOUISA. Yes, there is always a thread in sugar-candy. But barley-sugar is a different preparation?

MOTHER. Barley-sugar takes its name from having formerly been boiled in a decoction of barley; but now plain water is substituted, as it renders it much clearer. Lemon peel is added to the syrup when boiling, and it is then formed into twisted sticks.

LOUISA. And is that all that is done with sugar?

MOTHER. Not all: one thing more.

HELEN. What can that be?

MOTHER. Rum is produced from sugar.

HELEN. Rum! That is a spirit.

MOTHER. It is; but yet a preparation of sugar.

LOUISA. Then it must be very curious; so do tell us about it, dear mother.

MOTHER. Not now, my dear; we have spoken of a great variety of things already, and our time is expired.

LOUISA. Another evening, then?

MOTHER. Yes, I hope so: but your papa is ready for his tea. Ring the bell, and order it in.

DIALOGUE IV.

MOTHER—HELEN—LOUISA.

HELEN. Do not let us talk to mamma this evening; her head continues to ache.

LOUISA. No, we will sit very still, and amuse ourselves with some quiet play.

MOTHER. I hear what you are whispering together, my dear children, and thank you for your kind consideration; but my head is easier this evening.

HELEN. I am glad of that; it was very bad last night.

LOUISA. Yes; and, I fear, is still very bad.

MOTHER. I am not quite free from pain; but, by a little exertion, I can answer your questions.

HELEN. No, mother, we will not ask any.

LOUISA. Do not think of us; we can be content to be silent.

MOTHER. I admire your self-denial, and hope you will always continue to think of the comfort of others as well as of your own. I will copy your disinterestedness, and forget my own pain in your pleasure. You were asking me about rum?

HELEN. Yes, mother.

MOTHER. It is a spirit, distilled from molasses, or the coarse part of sugar.

HELEN. Distilled! What is that?

MOTHER. Distillation is a chemical process, which, by the application of heat, separates the volatile from the grosser parts of matter. Helen, did you not observe the method by which we procured rose-water?

HELEN. Yes, mother; you filled a large tin vessel with rose-leaves and water, then placed it on a moderate fire. The heat caused the finer part to rise in steam to the upper part of the vessel, where it was condensed, and, gradually collecting into large drops, fell slowly from a tube connected with the vessel.

MOTHER. Well remembered, my love.

LOUISA. What does Helen mean by condensed?

MOTHER. When a liquid body flies off in

steam, and meets with a cold body, it is immediately condensed or restored from steam to liquid again. Thus you may observe on the lid of a tea-pot drops of water.

LOUISA. But those drops of water are not like tea; they are colourless.

MOTHER. All distilled liquids are colourless: and the brown hue of rum and brandy is produced afterwards, by the admixture of some other matter.

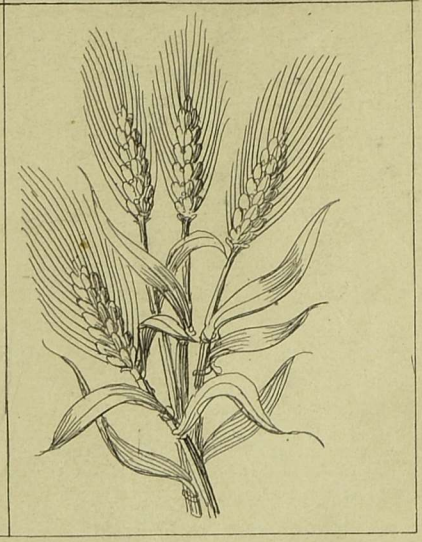
LOUISA. Is brandy produced from sugar?

MOTHER. No: brandy is a strong spirit distilled from wine. That made in France is esteemed the best; and pricked or spoiled wine is generally used for the purpose.

HELEN. And gin, mother?

MOTHER. Gin, or Geneva, (from *genèvre*,

JUNIPER 5 ARRACK



WINE GRAPES BARLEY

Pub.d Oct.r 2, 1837, by J. Harris, St. Pauls Church Y.d

juniper,) is an ordinary malt spirit, distilled a second time with the addition of juniper-berries. You remember the juniper-tree, that grows in the shrubbery, and the small purple berry it bears?

HELEN. Yes; I have often squeezed the berries, to extract their perfume.

LOUISA. What spirit is that which papa so often mentions?

HELEN. You mean arràck, I suppose.

LOUISA. Yes, I do. From what is it procured, mother?

MOTHER. Arràck is procured by distillation from a vegetable juice, called *toddy*, which flows by incision from the cocoa-nut tree. In Batavia, I believe, the same name is given to a spirit distilled from a mixture

of rice, sugar, and water. The way of procuring toddy is curious, and will amuse you.

LOUISA. Pray describe it.

MOTHER. The Indians provide themselves with several round earthen pots, and, by the help of a hoop, they very rapidly ascend the cocoa-nut tree. — Arrived near the top, they fasten the earthen pots round the tree, and make incisions near the mouth of each. The next morning, the jars are found generally full of a sweet liquor, which is often drunk in that state, and is called *toddy*. When allowed to stand, it quickly begins to ferment, and is then distilled into the spirit named arràck.

HELEN. How curious!

LOUISA. You say brandy is distilled from wine. Pray how is wine made?

MOTHER. Wine is the fermented juice of vegetables; of these there are a great variety; but the wine made from grapes is esteemed the most valuable.

HELEN. What is fermentation?

MOTHER. Fermentation is the state into which vegetable substances pass, when deprived of the vital principle. Thus, the juices of fruit, when gathered, will shortly ferment; and even if allowed to remain too long on the trees, the fruit in time becomes fermented.

HELEN. I have often observed, that, in very ripe gooseberries, there was a peculiar sour over-ripe flavour.

MOTHER. There are three kinds of fermentation, which sometimes, but not always, succeed each other: first, the vinous, or spirituous; second, the acetous, or acid; third, the putrid fermentation.

HELEN. The first, I suppose, produces wine; the second, vinegar; and the third is when the substance, whatever it may be, is spoiled.

MOTHER. Your account is correct: heat is necessary to fermentation, but not in too great a degree, since that will produce the acetous fermentation instead of the vinous.

HELEN. Yes, I know the cook, last year, complained that the hot weather had turned her raspberry wine into vinegar.

MOTHER. The addition of yeast, which,

you know, is also a product of vinous fermentation, greatly assists fermentation.

LOUISA. Do you call yeast a product of vinous fermentation? I thought vinous meant wine.

MOTHER. That is the general acceptation of the term; but, in chemistry, vinous fermentation means the first fermentation of all vegetable juices; and, you know, yeast is the product of the fermentation of malt.

HELEN. But, mother—

LOUISA. And, mother—

MOTHER. Speak one at a time. Helen, what were you going to ask?

HELEN. I was going to ask if sugar prevented fermentation?

MOTHER. The presence of sweet juices,

or saccharine, as the chemists call it, is absolutely necessary to fermentation.

HELEN. Then why do we put sugar to fruits when they are preserved?

MOTHER. Well objected. Not so much to keep them, as to render them more palatable. The boiling of preserves prevents fermentation; and if fruit could be sufficiently boiled in their own juices, I imagine, they would keep perfectly well; but the difficulty would be to draw out sufficient syrup for this purpose. Sugar, you know, assists in extracting the juices of fruits.

HELEN. Yes, I remember, you covered peeled apricots with sugar, and, the next day, they were swimming in liquid.

LOUISA. And I have observed, when the

currant jelly is likely to spoil, the cook boils it over again.

MOTHER. What was your question, Louisa?

LOUISA. You mentioned malt, and I do not perfectly understand how it is made.

MOTHER. Malt is a preparation of barley. It is produced by first exciting the vegetative power (that is, making the grain grow), and then stopping the vegetation. After being steeped in water, the barley is laid in heaps, and soon begins to sprout; as soon as this is perceived, the vegetative process is stopped by spreading the grain upon the floor; after which it is gradually dried in a kiln.

LOUISA. And this is malt?

MOTHER. It is; and from a decoction of malt and hops, is made that well-known beverage beer, or ale.

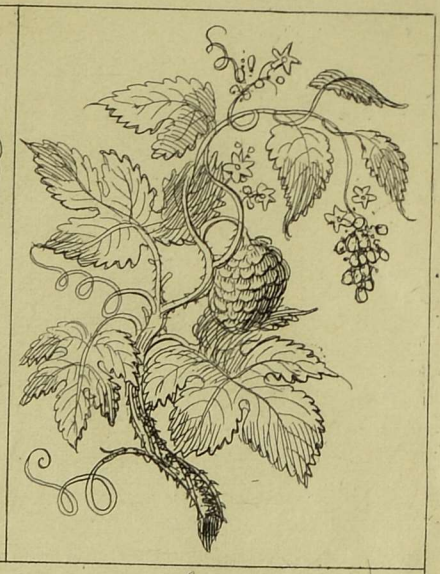
HELEN. Hops are the dried flower of a plant of that name?

MOTHER. They are, and impart a bitter flavour to the beer, which not only assists to correct the mawkish sweetness of the malt, but preserves the liquor from passing to the state of acetous fermentation.

LOUISA. I think the hop-plant is very elegant. The tendrils twining so gracefully round the supporting poles; the leaves so beautifully shaped; and the perfume of the flower particularly fragrant!

MOTHER. Yes, hop-grounds form a very interesting view. The most esteemed hops

HOP FLOWER 6 HOP BINE



HOP PICKING

Pub^d Octr 2, 1837, by J. Harris, St Pauls Church Yd

are those of Herefordshire and Kent, and such as are grown near Farnham in Surrey.

HELEN. Porter is also a liquor made of hops and malt, and worked with yeast, as well as ale?

MOTHER. It is; with no other difference but what arises from the peculiar management of the wort, or sweet liquor, produced from water and malt. Many ingredients have been supposed to be mixed with these; but, I believe, in the London breweries, they are entirely omitted.

LOUISA. Cider is made from apples?

MOTHER. Yes: cider is the expressed juice of apples, without any admixture of water or any other ingredient. When first drawn from the fruit, the juice is perfectly

sweet, but in a few hours it ferments; the sweetness is more or less destroyed, and a clear, vinous, or spirituous, liquor is obtained.

LOUISA. You have seen cider made?

MOTHER. I have, very frequently. The apples, when gathered, are laid in heaps, and allowed to become somewhat mellow; they are then crushed, or broken to pieces, in a mill, of which there are many kinds. The fruit, thus prepared, is placed in piles, with intervening layers of clean straw, to render it more compact. The whole mass is then pressed down, and the juice carefully received into large tubs. In these tubs, it remains to ferment, the scum being removed as it rises; and after a certain time, it is barrelled.

HELEN. Perry, I suppose, is made in the same way?

MOTHER. I believe it is; except, I understand, that, instead of straw, the fruit is pressed through hair bags; and the juice is received into leaden instead of wooden vessels.

LOUISA. Then perry is pear juice, and cider apple juice.

HELEN. Vinegar can be procured from any liquor, I imagine?

MOTHER. Yes, if it be allowed to pass on to the acetous fermentation; which may be hastened by the application of heat, and the addition of sweet ingredients; as sugar.

HELEN. Sugar and water alone, exposed to continued warmth, make tolerable vinegar.

MOTHER. Cider makes excellent vinegar, as does ale, or strong beer; in the latter case, it is called *alegar*. Vinegar, properly so called, is produced from acid wine alone.

LOUISA. Pray, mamma, what is mead?

MOTHER. Mead is a liquor made from honey and water, properly fermented by the aid of yeast.

HELEN. And what is spirit of wine?

MOTHER. It is produced by distilling brandy.

HELEN. But, my dear mother, you are looking very pale;—your head is worse!

MOTHER. It is, indeed, my child. The pain is greatly increased.

LOUISA. And you have not once com-

plained, but borne it all without a single murmur.

MOTHER. Complaint would have hurt you, without relieving me: why then complain?

LOUISA. But it is so bad to bear pain.

MOTHER. Patience, my Louisa, lessens all suffering: of this be assured. For I have known pain in almost every form, and have ever found that a quiet submission softened its severest throbs.

LOUISA. But how could you go on talking so much to us?

MOTHER. There was a secret satisfaction to me, in contributing to your amusement: though incapable of selfish enjoyment, I was still able to enter into yours. Some-

times, I forgot my pain in listening to your remarks; so that the exertion, you see, repaid itself.

LOUISA. I am glad you sometimes forget your pain.

MOTHER. When we honestly enter into the pleasure of others, we forget the extent of our own pains and sorrows.

HELEN. But do not any longer exert yourself to amuse us.

MOTHER. I shall be better soon; a cup of coffee generally relieves me.

HELEN. I will order it for you.

MOTHER. Do so, my love.

LOUISA. Coffee! mother.—Oh! no—never mind—nothing.

MOTHER. You are a considerate little

girl, Louisa, in checking your curiosity. To-morrow, I hope, I shall be able to reward your self-control; and talk to you, not only about coffee, but also chocolate and cocoa.

LOUISA. Thank you, mother; I will remind you of these things, if you are better. But your coffee is brought in—drink it, dear mother; I hope it will give you ease.

DIALOGUE V.

MOTHER—HELEN—LOUISA.

HELEN. You are better to-day?

MOTHER. I am quite well, I thank you; and doubly enjoy ease, after having endured so much pain. Health is indeed one of the greatest blessings of life; and those who possess it can never be sufficiently thankful.

LOUISA. All the riches in the world would be of no use, if people were sick, and unable to enjoy them.

MOTHER. No, my dear, indeed they would not. You see, therefore, health is more than an equivalent for riches.

HELEN. Yes; I always sincerely pity those who are sick, or in pain.

MOTHER. Freedom from suffering should never render us unfeeling or unbelieving to the complaints of others. Though we may never experience any thing beyond slight pain, we must not therefore suppose that a high degree of bodily agony does not nor cannot exist; such incredulity would be the expression of a cold heart and a contracted mind. You will, I hope, always sympathize in the sufferings of your fellow creatures.

HELEN. I hope so, mother.

MOTHER. Pity is a kind and soothing

gift, which, like mercy, as described by Shakspeare, "blesses him that gives, and him that takes."

LOUISA. Oh? I know which lines you mean.

MOTHER. Well, then, remember them, to profit by them; for it is useless to fill the memory with ideas, however excellent, if we neglect to amend our hearts, and direct our conduct by them. To improve in virtue, is all the use of wisdom. But, Louisa, what did I promise to speak of to-day?

LOUISA. Coffee, cocoa, chocolate.

MOTHER. Coffee is the berry of a plant that grows in a very warm climate, and is cultivated principally in Arabia and the West Indies. It is produced from seed, sown in a light

rich soil, and requires frequent watering. At a certain age, the plants are transplanted; at two years old, they yield a slight crop; but at three years they come into good bearing. The fruit, when ripe, is red, and not very unlike our cherries: these are not gathered, but shaken off the trees, and then dried on mats placed in the sun. The outer pulp is then carefully removed by the aid of mills; the berries are more completely dried, and afterwards packed up for sale.

HELEN. The coffee is then roasted, ground, and boiled in water.

LOUISA. How much trouble, before we can drink a cup of coffee!

MOTHER. Cocoa, or more correctly cacao, is also the nut of a tree, cultivated in South

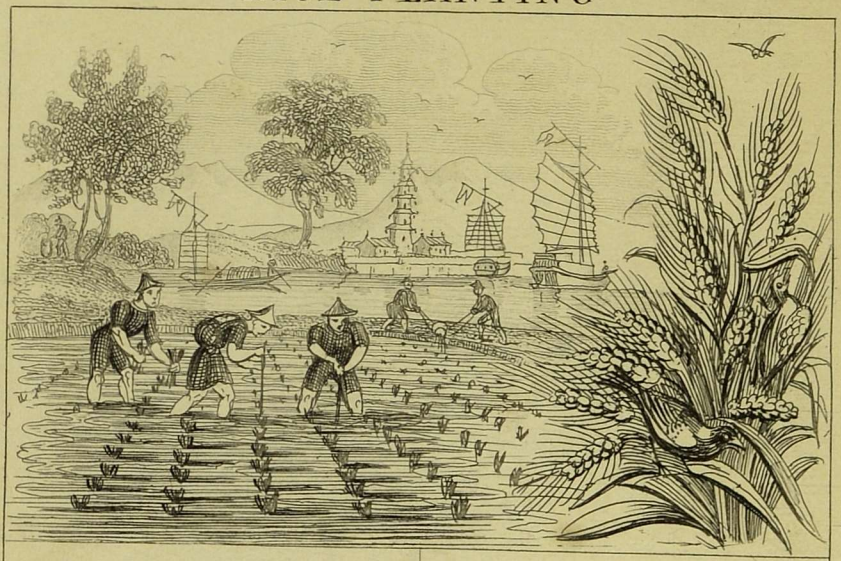
America; the kernel of which, when dried and prepared, is used not only by itself, and then called cocoa, but it forms the basis of the paste known by the name of chocolate. The cocoa-tree is planted in rows, and is not in full vigour until the seventh or eighth year. It remains in bearing for fifty years, yielding two principal crops every year. After the nuts are gathered, they are deprived of their outer shells, and dried.

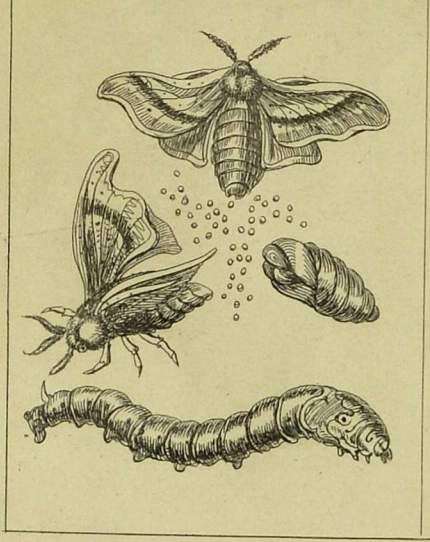
HELEN. And then they are called cocoa?

MOTHER. Yes; but to produce chocolate, the dried kernels must be ground into a fine powder: this, formed into a paste, is moderately heated, and then put into moulds, to give it the intended form.

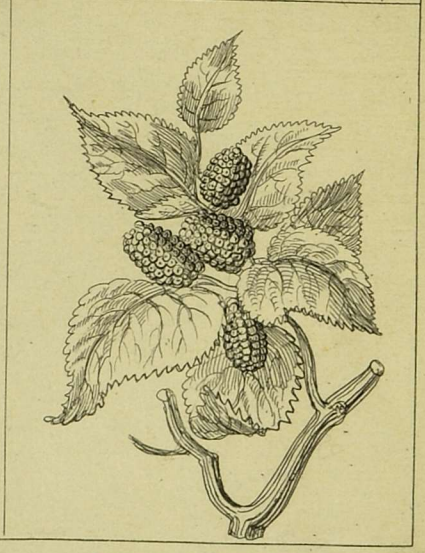
In Spain, many spices and drugs are mix-

RICE PLANTING





SILK WORM



MULBERRY

Pub.d Oct.r 2 1837, by J. Harris. St. Pauls Church Y.d

ed with the chocolate. In England and France, vanilla, sugar, and, occasionally, cinnamon, are added, in the composition of chocolate cakes.

HELEN. Pray what is vanilla?

MOTHER. A plant, which grows in Mexico and some parts of the East Indies. Its small black seeds are used to give a perfume to chocolate, and, I believe, also to snuff.

LOUISA. Now we have got into hot climates, how much I wish you would tell us something about rice!

MOTHER. Rice is the seed of a grass-like plant, that is cultivated in Asia, and in the warmer parts of Africa, and America. In China, two crops are sown every year, in March and July: and it forms the principal

food of all the lower orders of people, in almost every part of Asia. This plant requires a great deal of water, and is said to have the peculiarity of growing to keep pace with the rise of the water; so that even when the water lies many feet deep on the rice lands, the summit of the plant always appears above the surface.

HELEN. That is wonderful!

MOTHER. All nature is one continued scene of wonders—and the more we investigate (that is, search out and examine) the objects of creation, the more we shall learn to admire and adore the great presiding Power which formed the endless variety. To raise the mind to such contemplations, is indeed the noblest end of study.

HELEN. I think it must be impossible to study without such thoughts.

MOTHER. You are right; nothing but wilful blindness can render man unconscious of the source of all that is curious in nature, or wonderful in creation. That such wonders exist, the slightest observation serves to ascertain: that they are beyond the nicest skill of the wisest human artist, the most learned philosopher must acknowledge. How superior then must be the wisdom that created, how diffusive the benevolence that adapted, such miracles to the use, the beauty, the perfection of the world! Let us continue our research; and, whilst we open our minds to knowledge, let our hearts glow with gratitude for the benefits conferred upon us.

LOUISA. How fortunate for the countries that gain two crops of grain in one year!

MOTHER. China is one of these favoured lands; and the population there is so prodigious, that, without such an advantage, the ground could not feed half the inhabitants.

HELEN. China seems to produce many valuable commodities—tea, sugar, rice.

MOTHER. And many others, equally profitable; among the rest, rich silks and satins.

LOUISA. Rich silks and satins, the work of dirty crawling worms?

HELEN. What immense numbers must be reared, to produce the quantity of silks we see every day!

MOTHER. The management of silkworms

differs very little in China from our method. The houses in which they are reared, are generally placed in the centre of mulberry plantations; and these little insects are carefully watched night and day.

HELEN. It is very amusing to keep silkworms, and observe their several changes. First, a small worm, issuing from the egg; growing larger and larger, and casting its skin three or four times, until it becomes a large white worm. It then ceases to eat, and begins to form its silken ball—

LOUISA. Which, you know, it artfully fixes to the prepared paper cones.

HELEN. On the third day, it is hidden from view; and on the tenth, the work is finished. It is then best to wind off the silk,

or the insect would pierce the cocoon, or ball, in its way out.

LOUISA. The worm is now changed into a dark brown grub, or chrysalis, which appears almost lifeless; but, at a certain time, out flies a white moth from the dark covering.

HELEN. This moth lays eggs for the supply of worms the next year, and then, after fluttering about for a short time, it dies.

LOUISA. And the silk is woven into satins, sarsenets, and ribbons.

HELEN. Silkworms principally feed upon mulberry leaves; but sometimes they will eat lettuce leaves.

MOTHER. Yes; but, I believe, the silk is

always best when the insects have fed entirely on mulberry leaves. In China, they have another insect, besides the silkworm, which produces a silk-like thread; but it is considered of an inferior quality to that of the worm.

LOUISA. What is it called?

MOTHER. The Chinese call it the *silk-insect*, though it somewhat resembles a caterpillar. These insects propagate without culture, and feed upon the leaves of a variety of trees. They do not spin their silk in balls, but in long filaments, which are caught by the trees and bushes, as they are carried about by the wind.

LOUISA. How pretty that must look!

MOTHER. These long filaments are care-

fully collected by the Chinese, and made into a kind of silk, not so rich and bright as that produced by silkworms, but yet sold at a much higher price, as it possesses the valuable quality of washing well, lasting long, and being less liable to receive stains from grease.

HELEN. The weaving of satins must be very ingenious, to produce that fine glossy surface.

LOUISA. Mamma will tell us something about it.

MOTHER. I would willingly, my dear, could I hope to make myself intelligible to you; but I do not see how that is possible, since the best verbal descriptions must give a very inadequate idea of the complex ma-

chinery, by which such articles are manufactured. Many excellent books, containing such descriptions, have been published already, and, when accompanied by correct drawings, may give some notion of the different processes, although, I fear, a very superficial one.

HELEN. Then, mother, how shall we become acquainted with these things?

MOTHER. I know of but one way; that is, by visiting the several manufactories.

LOUISA. That would be charming!

MOTHER. At some future time, I hope we may be able to procure this pleasure; in the mean time, it will be useful to make yourselves acquainted with the different materials, raw, or unwrought, from which the

numerous manufactured articles are produced, or of which they are compounded.

HELEN. In this, books will assist us.

MOTHER. They will, very essentially. It would also be an excellent plan, to visit the manufactories with some well written book, descriptive of what we are about to see, in our hands. Our reading and observation would then naturally assist each other, and combine to make us perfectly acquainted with the subject.

HELEN. I will not fail to remember your kind hint, mother.

LOUISA. And, for my part, I will take care to ask my dear mother all the questions I can think of; for I do love to learn things in this pleasant chit-chat way.

MOTHER. You cannot employ your chattering propensity better; and I will promise to answer you to the best of my knowledge.

LOUISA. I wish I knew as much as you do.

MOTHER. I know very little, my dear, compared to thousands; and the wisest of these are far from the possession of all possible knowledge. But take courage; the most learned were once ignorant young children like yourselves. By perseverance and patience, they gradually acquired the knowledge they possess.

HELEN. That is some comfort for us.

MOTHER. Yes; and therefore bear always in your mind, that an earnest desire for knowledge, and an unremitting attention to

the means of attaining it, must always meet with some degree of success.

LOUISA. But I should like to be remarkably clever.

MOTHER. That falls to the lot of few; however, the most useful knowledge, (that knowledge which teaches us our duties, and leads to our happiness,) is within the scope of every ability. To be good and to be happy, is the best wisdom, and what we can all attain, if we heartily desire it.

HELEN. Every body must wish to be happy.

MOTHER. Undoubtedly; but some mistake the way. Riches, honours, and learning, may be made helps to happiness; but without a contented temper, good-will to

our fellow creatures, and sincere piety, neither riches, honours, nor learning, can make us happy: never forget this. Strive to be virtuous, and you cannot be entirely miserable.

DIALOGUE VI.

MOTHER—HELEN—LOUISA.

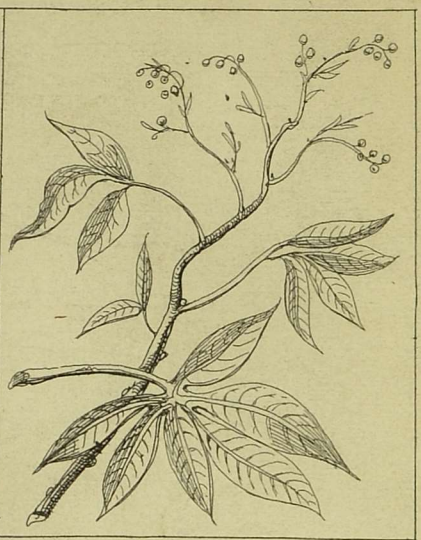
LOUISA. When you were eating your basin of sago, last night, you promised to give us some account of it this evening.

MOTHER. What do you imagine it is?

LOUISA. A grain, to be sure: I know that very well.

MOTHER. I am sorry you are so peremptory. What say you, Helen?

HELEN. I have been accustomed always to think it was a grain; but I am not sure.



ARROW-ROOT MANNA

Pubd Octr 2, 1837, by J. Harris, St Pauls Church Yd

MOTHER. By being so positive, Louisa, you have exposed yourself to the risk of being wrong, and also to the censure of being conceited in your ignorance. Helen's less decisive and more modest answer, saves her from all blame. Not to know all things, is no wonder, especially in young children; but to speak with certainty in the midst of ignorance, is equally silly and presumptuous.

LOUISA. Then, mamma, is not sago a grain, like corn and rice?

MOTHER. No, my dear: sago is produced from the inner pith of a tree, growing in the Moluccas. You know where these islands are situated?

HELEN. Yes; in Asia, between New Holland and China.

LOUISA. The pith of a tree?

MOTHER. Yes; this pith is very palatable in its native state; but to prepare it for sago, it is reduced to a fine powder. This powder is passed through a sieve, and, being thus separated from the coarser parts, is mixed with water into a thick paste. The paste is then dried in a furnace, either as bread, or in the form of those small globules which we call sago.

LOUISA. I think this is the most curious preparation you have yet described.

MOTHER. You think so, because you so little expected it; but surely there are many others equally, if not more, strange.

HELEN. Are tapioca and arrow-root also produced by some similar process?

MOTHER. Tapioca and arrow-root are procured from the roots of plants, by a process nearly similar to the making of sago.

LOUISA. Well, this is all very wonderful.

HELEN. Pray, mother, is manna obtained in the same way?

MOTHER. Manna is a sweet syrup, or sap, that exudes from several kinds of trees.

LOUISA. Oh! as the gum does from our plum-trees!

MOTHER. Exactly in the same way. This is carefully gathered and dried. The manna which we use comes principally from Calabria and Sicily.

LOUISA. I remember Sicily; it is an island, at the extreme point of Italy, and famous for its volcano of Ætna.

MOTHER. You are right; and Calabria is the coast opposite to the eastern shores of Sicily.

LOUISA. Now we are amongst wonders, pray what is amber?

MOTHER. The exact origin of amber has not yet been ascertained; by some it is thought to be a mineral production, by others a vegetable gum.

HELEN. I should think it was a gum, from the circumstance of small insects and other substances being seen inclosed in pieces of transparent amber.

MOTHER. Your reasoning is very fair; I am inclined to think with you: although it somewhat shakes our hypothesis, or supposed system, to hear that amber is often found

floating in the sea, and is also continually dug from mines.

LOUISA. Perhaps there may be two substances, so much alike as to be mistaken one for the other.

MOTHER. That is not very likely; as naturalists do not class substances from their external similarity, but from their possessing the same properties. Now amber has a very striking property.

LOUISA. What is that?

MOTHER. Its power of attraction.

HELEN. Oh! After amber has been briskly rubbed, it draws, or attracts, light substances, such as paper, which, from a certain distance, fly towards the amber, and stick to it.

LOUISA. Then, mamma, it must be a mineral; for this property is like that of the loadstone.

MOTHER. Another positive decision, Louisa! If naturalists grounded their opinion on single qualities, how frequent must be their errors, and how confused their systems! No: they consider *all* the properties of a substance, and do not decide by a solitary one.

HELEN. Is ambergris another name for amber?

MOTHER. No, my dear; they are different substances. Ambergris, as its name implies, is of a grey colour.

HELEN. Yes, *gris* is French for *grey*.

MOTHER. Ambergris is found floating in

the sea, but more commonly in the intestines of a particular kind of whale. It is most probable, therefore, that it is produced in the whale; but whether it is the cause or effect of disease, is uncertain.

LOUISA. What is the use of ambergris?

MOTHER. It was formerly used as a medicine; but, being found of little efficacy, it is now only employed as a perfume: in its scent, it somewhat resembles musk.

LOUISA. Pray, what is musk?

MOTHER. Musk is a dark-coloured substance, obtained from an animal, called *moschus*, or *the musk*: it is found in a pouch under the belly. Some other animals also possess a strongly perfumed matter, as the civet cat.

HELEN. Camphor is a strong perfume.

MOTHER. It is; but not one of those obtained from animals. Camphor is a concrete juice, found in the *laurus camphora*, a large tree, growing in the islands of Sumatra and Borneo. This concreted juice is picked out with knives from the centre of the oldest trees, through the trunks of which it runs in perpendicular veins. But the most general method of extracting it, is by the aid of fire.

HELEN. Then it is a gum, or resin?

MOTHER. Gums and resins are by no means synonymous terms; that is, they do not mean the same thing.

HELEN. They both come from trees?

MOTHER. They do; but possess different properties. Gum, you know, will dissolve

CAMPHOR 10 MUSK

INDIA RUBBER SAFFRON

Publ.d Oct.r 2, 1837, by J. Harris, St. Pauls Church Yd.

in water; but resin will not; it is soluble in spirits of wine alone. Resins exude from the fir and pine.

HELEN. Then pitch, tar, and turpentine, are resins?

MOTHER. They are. The coarsest of these is called *resin*, in an absolute sense.

HELEN. How useful the juices or saps of trees prove to us!

MOTHER. They do, indeed; and, in a great variety of forms, conduce to our health, our comfort, or our amusement. What think you of your India rubber?

LOUISA. I could not draw without it; for I make so many mistakes, that I rub out almost as often as I mark; but India rubber is, I suppose, the skin of some animal?

MOTHER. Indeed, my dear, it is not. Caoutchouc, or, as you call it, India rubber, is obtained from two South American plants. The juice, procured by incision (cutting the tree), is spread over earthen moulds, of any desired form, in numerous layers, until the substance of the intended article is of sufficient thickness. It is then hung over the smoke of burning vegetables, to dry; after which the inward mould is broken, and taken out in pieces, and the elastic gum remains in the shape imparted to it.

LOUISA. Dear mother, this is almost beyond belief!

MOTHER. I do not wonder at your incredulity. Wiser heads than yours have been astonished by this account; and it was long

before it could be fully credited. I believe, however, the fact is now established beyond controversy.

HELEN. I have often observed the bottle-shaped rubber, and been surprised that it could be rounded without any seam, or joining.

LOUISA. True, I did not think of that.

MOTHER. But, now remembering it, such a circumstance must confirm the account given you.

LOUISA. Certainly, it does.

MOTHER. I do not wish you inconsiderately to adopt every account offered to you; but when your own observation induces you to believe the truth of what is advanced, its marvellous appearance must not check your

conviction. Things may be very wonderful, and yet very true.

HELEN. Speaking of gums, reminds me of glue. Is that also drawn from trees?

MOTHER. No, my dear: glue is an animal substance, made from the skins of different beasts. The older the creature, the better is the glue produced from its hide. Whole skins are rarely used, but parings and scraps; and even the strong sinews of the feet. These are boiled in water to the consistence of thick jelly, which, being strained through ozier baskets, is poured into flat moulds, and dried in the wind.

HELEN. Now I know the materials of which glue is composed, I do not wonder at its very disagreeable smell when heated.

MOTHER. It is certainly very offensive.

LOUISA. Then calves' feet jelly, which we think such delicate food, is in fact glue?

MOTHER. Assuredly of the same nature; but, by being made from cleaner, fresher, and more delicate materials, the product is consequently more pure.

HELEN. I am trying to remember every thing that I think belongs to the class of resins. Pray is alum one?

MOTHER. No: alum is a mineral salt, extracted from certain clayey earths by calcination, or burning. Near Whitby, in Yorkshire, the principal English alum works are situated. The ore, or earth, is laid up in heaps, and burned with wood until it becomes white. It is then macerated, or

steeped in water, for a certain time. This water is afterwards boiled for twenty-four hours; then allowed to stand, that all the grosser parts may subside to the bottom. When clear, it is run into coolers, where the alum crystallizes, or forms itself into a transparent substance. I have not very minutely described this operation, as my view was only to give you a tolerable idea of its general principles; a deeper knowledge you may hereafter gain.

HELEN. What you have said enables me to form a very good notion of the method of procuring alum.

MOTHER. I am glad I have succeeded so well. You know the principal uses of alum?

HELEN. It is used to fix the colours in dyeing; is it not?

MOTHER. Yes, that is one of its uses.

LOUISA. I remember, you desired the servant not to forget the alum, when she dyed the muslin.

MOTHER. Alum is much employed in medicine; also in the process of tanning; and is added to tallow, to give hardness to candles.

LOUISA. Oh! mamma — candles! We see them every night, and have not spoken of them yet.

MOTHER. Well, then, remind me the next evening we converse together, and I will give you the best information in my power respecting candle-making.

LOUISA. That will be very entertaining!

HELEN. Mother, may I ask one more question now?

MOTHER. What is it?

HELEN. Louisa spoke of dyed muslin. It was of a yellow colour, produced by saffron and turmeric. What are these two substances?

MOTHER. Saffron is the stamen of a flower of the crocus tribe, properly gathered and dried; and turmeric is the root of a plant growing in the East Indies.

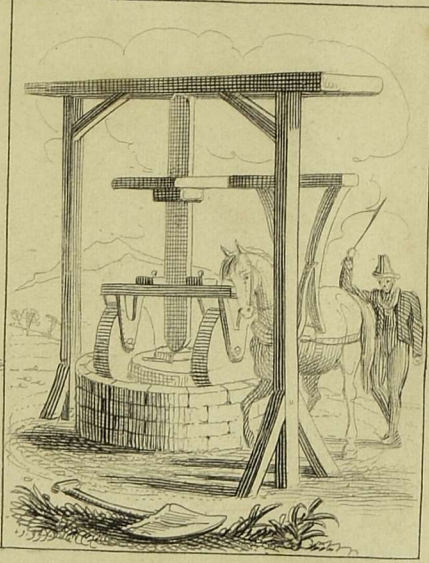
HELEN. Thank you, mother.

MOTHER. We will now close the conversation, and commence our other evening occupations.

TURMERIC

11 TALLOW TREE

OLIVE TREE



OIL MILL

Pub.d Oct.r 2 1837. by J. Harris, St Pauls Church Yd

DIALOGUE VII.

MOTHER—HELEN—LOUISA.

LOUISA. Now, mother, for your promised account of candles. I have been all impatience since the evening you made the promise.

MOTHER. I am ready to oblige you. You already know that candles are made of tallow.

HELEN. Yes, and that tallow is the fat of sheep and oxen.

LOUISA. The part, I suppose, which we call suet?

MOTHER. A kind of suet, but of a coarser nature than what is brought to table as food. Well, then, this fat, or tallow, as soon after it is taken from the animal as possible, is *rendered*, as it is called; that is, melted in water, to separate it from the bits of skin, &c. with which it is combined. The liquid tallow is then drawn off, and the remaining sediment is well pressed, to extract every particle of fat. The sediment then remains in the form of a cake, which is given as food to dogs and other animals.

LOUISA. What wretched food!

MOTHER. Yes; but it is considered as very nourishing, when mixed with barley-

meal; and its use in this way prevents all waste of the material. The tallow is then again rendered. Indeed, I imagine, this operation is repeated till every impurity has been perfectly removed.

HELEN. It must then become very clean, and lose all its unpleasant smell.

MOTHER. That it should do so, is the perfection of candle-making. When sufficiently purified, the liquid tallow is poured into leaden moulds, in the centre of each of which a cotton wick has been previously fixed. These are placed in the air to cool, and when perfectly hard, are carefully drawn out of the moulds.

LOUISA. These we call mould candles.

MOTHER. Yes: kitchen candles are dif-

ferently managed. The wicks are tied at regular distances on a long stick, and each being made somewhat stiff by being rubbed with tallow, they are dipped into a vat of melted tallow two or three times, then hung up to dry: after a short time, they are again dipped, and again dried; and this is repeated till the candles become of a proper size, which is ascertained by weighing them.

HELEN. This is the process for kitchen candles.

MOTHER. Rushlights are made in the same manner, only that a wick of dried peeled rushes is substituted for the cotton.

HELEN. Rushlights are used for burning during the night, because they do not require snuffing?

MOTHER. Yes; and as they emit a duller light, they would not answer so well for general purposes.

LOUISA. Candles are made of wax, spermaceti, and tallow.

MOTHER. In China, we are told, there is a very remarkable tree, called the tallow-tree, the fruit of which is a nut inclosing three kernels, embedded in a substance, that answers all the purposes of tallow.

LOUISA. Will it make candles?

MOTHER. Yes; it is commonly used for making candles, and burning in lamps. The tree is about the size of a cherry-tree; its leaves are of a deep red colour, and its fruit not very unlike a chestnut.

LOUISA. Such candles must be very de-

licate, and much purer than those formed from animal fat.

MOTHER. Yet this same animal fat, which you appear to mention with disgust, is the source of all our cleanliness.

LOUISA. Nay, mother, now I am sure you are joking!

HELEN. I think, I know what mamma means; she is going to speak of soap.

LOUISA. Soap cannot be produced from grease; because we use it to remove grease in washing.

MOTHER. But suppose I tell you that all soap is composed of tallow, or oil?

LOUISA. You astonish me!

MOTHER. Yet nothing is more true. By a certain process, the tallow, or oil, is con-

verted into different kinds of soap. The general principle of the process is, boiling the grease in what is called a *ley:* that is, a mixture of water, and the white ashes obtained from burned vegetables. Some common salt is also used; and, when the mixture has been sufficiently boiled, it is converted into soap, and dried in wooden moulds.

HELEN. I suppose the vegetable ashes absorb, or draw off, the oily particles of the grease, and thus purify and harden it.

LOUISA. Then I am sure we are much obliged to the vegetable ashes. They turn a very nasty thing into a very useful one.

HELEN. Then, pray, mother, is oil an animal production? I thought it was the expressed juice of olives and other plants.

MOTHER. The sweet oil, which we use for salads, and culinary or cooking purposes, and which we purchase in those thin glass flasks inclosed in light wickerwork, is indeed the expressed juice of olives; but another coarser vegetable oil, much used in manufactures, is extracted from rape-seed, a plant frequently cultivated in England, in large fields, in the same manner as other grain. From lin seed, or the seed of the flax plant, an oil is also expressed, which is used by painters. From mustard seed, almonds, and nuts of several kinds, oils are obtained.

HELEN. What animal yields oil?

MOTHER. The whale chiefly furnishes oil; but one or two other species of fish yield it in considerable quantities.

HELEN. I remember hearing my father speak of the whale fishery, carried on in Greenland.

MOTHER. English and other merchants annually fit out a number of vessels to visit that snowy region, whence they bring home large cargoes of blubber, or that part of the whale which contains the oil. This is preserved in barrels, and on its arrival in England, or the country to which the ships belong, it is boiled down; and thus animal oil is obtained.

HELEN. Which is burned in lamps.

MOTHER. And made useful in many other ways.

LOUISA. It must have a horrible smell, and look extremely disgusting!

MOTHER. To our English senses, it is very offensive; but the Greenlanders conceive whale blubber to be a very great dainty; and they swallow it greedily, and in large quantities.

LOUISA. They must have a most peculiar taste!

MOTHER. Habit reconciles human beings to many strange things. The inhabitants of Greenland have a yet more powerful stimulus—necessity. Their country yields so few means of subsistence, that, if they did not feed on the whales, with which their seas abound, they must inevitably starve.

LOUISA. I think I could rather starve than eat such wretched food.

MOTHER. My dear child, such a declara-

tion proves how little you are acquainted with the cravings of real hunger. May you never know, by experience, the extent of such an evil! But, be assured, it is great and agonizing.

HELEN. We sometimes feel great thirst; and may thereby judge how trying extreme hunger must be.

LOUISA. I like to be hungry; it makes me enjoy my food.

MOTHER. The hunger which you experience is so slight, and so regularly appeased, that it is rather a welcome sensation than otherwise, as it denotes health and unvitiated appetite. But, consider, my Louisa, if, instead of hours, you were to remain days without food, your appetite weakened to faint-

ing and sickness, your limbs enfeebled and your body tortured by incessant pangs!

LOUISA. Oh! mother! How terrible!

MOTHER. And yet such a description, I fear, falls very short of the real suffering. But we will now change the subject. I wish not to distress you by its continuance, but only to impress on your minds a fuller conviction of the blessings you enjoy: to remind you of your exemption from trials, with which many of your fellow-creatures are continually oppressed.

LOUISA. Indeed, we know, mother, we have a great many blessings.

MOTHER. Remember then to be thankful for yourselves, and kindly alive to the less happy fate of others.

HELEN. A whale seems a very useful animal to us. From the brains, we obtain spermaceti; from the blubber, oil; and it also gives us whalebone for our stays, umbrellas, and whips.

LOUISA. Is what we call whalebone, the real bone of that fish?

MOTHER. Whalebone is an elastic substance, taken from the mouth of the whale. Its original length is considerable, but it is cut and split for the different uses to which it is applied.

HELEN. Now we are talking of the sea, let me ask if sponge is not a marine substance?

MOTHER. Sponge was long thought to be a marine fungus, adhering to rocks be-

neath water, and torn from them by the violence of wind and waves, and thus floated to land. But now a very different account is given of this substance: it is discovered to be an animal production.

LOUISA. Is that possible?

MOTHER. What is not possible, Louisa, to the great Creator of all things? After feeling His power and His wisdom in the formation of ourselves, how can we wonder on beholding inferior creatures? My dear child, raise, if you can, your thoughts to the astonishing Power that gave man, not only such a perfect, such a beautiful, such an useful frame, but also endowed him with a mind replete with capacities, with sense, how delicate! with affections, how lively! My

children, my heart warms beneath the conviction, with unspeakable gratitude.

HELEN. Mother, how many delights does eyesight alone give us!

LOUISA. Yes, the blind must lose half the pleasures we enjoy.

HELEN. Then the pleasure of speaking, and telling those we love how much we love them!

MOTHER. Many are the joys that spring from pure and benevolent affections. The heart is the source, whence arises all that gives tenderness to character and value to existence. Let us, therefore, endeavour to purify our bosoms from all harsh and unkindly sentiments, and to nourish gentle, complying, forgiving sensations; that so we

may render our hearts sources of as much enjoyment as possible.

HELEN. But, above all things, mother, how delightful is the power of thinking!

MOTHER. Yes, thought, or, more justly, reason, is the distinguishing prerogative of human creatures. The beasts of the forest, and the birds of the air, share with man the pleasures of sense; they can see, they can taste, they can move about; they cherish their young with care, and must therefore possess delight in rearing and attending them.

LOUISA. Indeed, animals love their young; for only remember how our poor hen defended her brood from that barking little dog; and how our cow moaned all day for the loss of her pretty calf!

MOTHER. This proves that animals are capable of attachment. The fidelity of dogs, also, shews that they are possessed of good qualities; whilst the sagacity of many other animals—as the bee, the elephant, the beaver—mark a wonderful instinct. But man, favoured man, rising higher in the scale of existence, and leaving behind all other creatures, stands pre-eminently great. Endowed with reason, and assured of immortality, he can think, reflect, hourly improve his mind by fresh advances in knowledge, new sources of wisdom; and, beyond all other blessings, beyond all other joy, he can look forward to a life beyond the grave! The tender hen performs her stated duties; the faithful dog, to his last hour, guards his master; but these

die, and die for ever: their good actions are promised no future reward; no hope of future existence compensates to them for the sufferings of this world. With man, how great, how glorious is the distinction! Happy and favoured as he is in this world, yet he is assured of a state still more blessed, still more propitious. Can any thing, my dear children, be more cheering, more delightful, than such contemplations? If so much better our fate than that of all other living creatures, how much nobler ought to be our aims! How important our motives!

HELEN. I think, mother, nobody can feel their superiority to the brutes without gratitude and wonder.

MOTHER. Such is the effect which the

conviction ought ever to produce; and if we were often to recal the peculiar advantages we possess, it would not only rouse us to higher exertions, but silence every murmur of peevish discontent.

LOUISA. I think it must be impossible to be unhappy in a world so full of wonders and so full of beauty; where something new may be learned every day, and every day something found to be admired.

MOTHER. Indeed, my dear Louisa, you say very true; every thing conspires to produce happiness. When this happiness is not felt, the fault must be in the blind and ungrateful complainer.

LOUISA. If people will not look at beautiful prospects, it must be their own fault,

not that of the prospect; and if they will not use their senses in the delightful service of gaining knowledge, they must not therefore say that knowledge cannot be gained, or that the gaining of it is not a very great pleasure.

MOTHER. Well said, my little moralizer! If you will only act as wisely as you speak, I have hopes of seeing you always as happy as you are now.

HELEN. For my part, I think there is so much to be done, and so much to be enjoyed, that it is quite wicked to lose time in idleness or murmuring. To be busy and useful at once, makes one always sure of being happy at the same time.

MOTHER. Well, then ACTIVITY AND USE-

FULNESS shall be our motto. We will never be idle; but be always employed either in making ourselves wiser, or our friends and neighbours happier.

LOUISA. Helping the poor, or enjoying ourselves with the rich.

MOTHER. Happily concluded! Now, then, with glad hearts and enlivened minds, we will continue the pleasing duties of the day.

DIALOGUE VIII.

MOTHER—HELEN—LOUISA.

LOUISA. I fear, mother, you will say I have been very careless just now.

MOTHER. What have you done, Louisa?

LOUISA. Broken one of the large panes of glass in the drawing-room window.

MOTHER. How did you contrive to do that, my dear?

LOUISA. I do not like to tell you.

MOTHER. Then your conscience informs

you that you have been guilty of some error. The innocent are always bold, and can speak of what they have done. It is only for the faulty to be ashamed of their actions.

LOUISA. I will not conceal what I have done, for that will only add to my fault.

MOTHER. That was bravely and honourably said. To know our error, is said to be the first step towards amendment; to acknowledge it, is the sure mark of a noble mind.

LOUISA. I was playing with my hard ball, and in a moment it smashed through the window.

MOTHER. You certainly were wrong in playing with that ball in the house, after I had so expressly forbidden your doing so.

HELEN. It was quite by accident.

MOTHER. But if Louisa had attended to my direction, such an accident could not possibly have happened. Thus it is that disobedience leads to certain evil.

LOUISA. I am very sorry for it; and, I assure you, I will not be so careless again.

MOTHER. Stay, my dear; do not make such a promise, without well considering it. To break a promise, earnestly given, is no small fault.

LOUISA. Then I will try to be more careful in future.

MOTHER. That is better said; and be assured, that no one sincerely wishes and strives to improve, but, sooner or later, he must succeed.

HELEN. Come, Louisa, cheer up! — Mamma is not angry with you.

MOTHER. No; as I see she really regrets the accident, and is resolved to conquer her carelessness, I shall say no more on the subject.

LOUISA. But you cannot help thinking of it.

MOTHER. Our thoughts are certainly in some degree involuntary; and, perhaps, the broken window may remain in my remembrance; but, by your future good conduct, you may give me more pleasing recollections, and thus this act of your disobedience will gradually vanish from my memory.

LOUISA. Thank you, mamma, for telling me this; I certainly will try to make you forget the past in future good.

MOTHER. And I, my dear little girl, will cheerfully receive every good impression your future improved conduct shall allow. And now we will talk of something else.

HELEN. Do, mother, if you please; and if Louisa would not dislike the subject being continued, I was going to ask how the fresh pane will be fixed in the window.

MOTHER. By means of putty, my dear; a soft sticky substance, which being formed into a kind of frame around the glass, and dried by the air, holds it firmly to the wooden sash.

HELEN. And what is putty?

MOTHER. Putty is a mixture of whiting and linseed oil; with, sometimes, a little white lead added.

HELEN. Whiting is a soft chalk?

MOTHER. It is; and often used in cleaning silver, and other metals.

LOUISA. And, perhaps, mother, you will also be so good as to tell us something about glass.

MOTHER. All I know, I will willingly impart to you. Glass is produced from a mixture of powdered flint, or sand, and alkali. I understand your inquiring look, Louisa; and will inform you, that alkali is a kind of salt, found in the ashes of burned vegetables, or minerals.

HELEN. The same thing that, you told us, made a part of the composition of soap?

MOTHER. Yes; soap-boilers call it the ley.

LOUISA. Flint, or sand, and alkali.

MOTHER. For the best glass, flint is used; for the common sort, as bottles, sand is sufficient. These ingredients, mixed in certain proportions, are placed in pots in a furnace, where an intense heat is kept up, so that the whole mass is melted into a thick tough matter, not liquid, but sufficiently pliable to be worked into any form. This is glass; into which the workman dips a long iron tube, through which he blows, and with great dexterity forms the adhering mass into the shape required.

HELEN. That such a brittle substance as glass should once be a soft paste!

MOTHER. And, when soft, easily cut with shears, or pincers, into any variety of form.

LOUISA. Is this the whole of glass-making?

MOTHER. The glass would be too brittle, were it suddenly removed from the intense heat of the furnace to the temperature of common air. It is therefore allowed to cool gradually in a stove, which is at first moderately warm, and by degrees becomes of the usual temperature.

HELEN. Are looking-glasses made in this way?

MOTHER. In making looking-glasses, the fused or melted matter is poured into large shallow frames, over which a roller is passed while the metal is still soft, to produce a smooth surface; after which it is ground and polished. In this state, it answers for win-

dow-panes; but to render it reflective,—that is, to give it the power of reflecting objects presented to it,—the back of the glass is plated with an amalgam of mercury and tin; that is, mercury mixed with tin.

HELEN. How is glass polished?

MOTHER. This is done by laying two plates of glass, one upon the other, with a small dusting of fine sand between, and then carefully rubbing them backwards and forwards, with a weight upon them.

LOUISA. So that two sheets of glass are thus polished by each other.

MOTHER. I have, in this description, given you but a slight sketch of the art of blowing and casting glass. To understand perfectly the delicacy, the skill, the labour,

requisite in this undertaking, it is necessary to view the whole process; and, as glass manufactories are to be found in different parts of England, I trust I may one day procure you that gratification.

HELEN. I should much enjoy the sight.

MOTHER. You will be prepared to understand it better by this previous conversation, which is all that I attempt to effect by my descriptions.

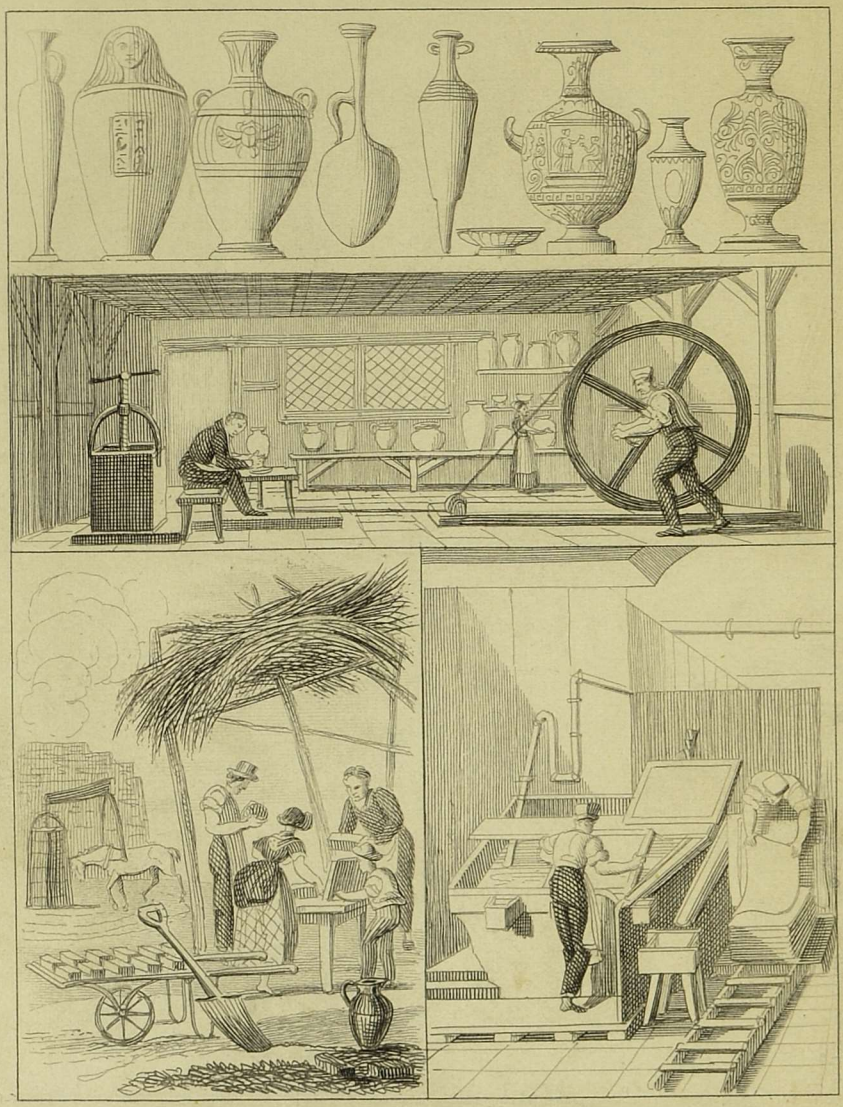
LOUISA. I suppose chinaware is also made from burning or baking some particular kind of clay?

MOTHER. Chinaware, or porcelain, is composed of two ingredients: a certain hard flinty stone, which, ground to a very fine powder, is mixed with a white clayey sub-

stance. These are thrown into a well-paved pit, and kneaded together, generally by the feet of the workman. From this mass, small quantities are taken as wanted, and each is separately kneaded upon a slate, till brought to a proper state for moulding. In forming the article, whatever it may be, this paste passes through the hands of about twenty workmen, each of whom assists in shaping it. When completely fashioned, other artists sketch the ornaments, and paint the outside of the vessel. It is then placed in a small wooden frame, and baked in the furnace.—This is an outline of the mode pursued in China.

HELEN. How much trouble is bestowed on what is so frequently destroyed!

EARTHENWARE & POTTERY



BRICKS PAPER

Publ.d Oct.r 2. 1837. by J. Harris. St. Pauls Church Y.d

MOTHER. In England, a kind of clay and ground flints are used in the potteries; the materials differing according to the kind of earthenware to be produced. The vessels are also formed by the help of a lathe, or wheel, into the required shape.

LOUISA. Do they not use the wheel in China?

MOTHER. I believe not. The population of that country is so great, that its inhabitants reject all machinery, which tends to lessen the demand for labour. With us, the case is different; we eagerly seize every means of shortening and simplifying all manual operations, for the sake of reducing the price.

HELEN. You told us, that salt was used in glazing earthenware.

MOTHER. Pottery would be porous, or pervious to fluids, without the operation of glazing, which is usually effected by the mixture of salt and white lead, into which, sometimes, the ware is dipped when half baked, and the baking is afterwards completed.

HELEN. The colours of chinaware you have described as applied before burning; and thus it is baked into the ware. Pray how is the gilding managed?

MOTHER. The gilding of porcelain is generally effected by applying the gold-leaf to its smooth surface, and then a slight degree of heat fixes it. This is afterwards burnished, or brightened, principally by the friction of the human hand. I have seen this

part of the operation performed. It was at a small gilding establishment, in the neighbourhood of Edinburgh; and I was astonished to discover the continued labour it required, and the slowness with which the gilding was restored to that brightness which the action of the fire had destroyed.

HELEN. Is nothing used except the hand?

MOTHER. A particular kind of stone, called, I believe, the blood-stone, is used at the beginning of the operation; but the last and highest polish is invariably given by rubbing the lower part of the thumb rapidly on the gilding.

HELEN. We seem indebted to the earth for a great variety of luxuries and comforts:

from elegant glass and porcelain to useful homely bricks.

LOUISA. Yes: I remember having seen brick-kilns, where bricks were burning.

MOTHER. Bricks are formed from a composition of a rich yellowish earth, called loam, and sand, or even ashes, moistened with water. They are dexterously shaped in a wooden mould; and, after having been partially dried, by being placed in rows in the open air, they are piled up in square heaps, called clamps, and properly burned.

HELEN. When used for building, they are joined together, or cemented, by mortar. What is mortar?

MOTHER. Mortar is made by a mixture of lime and sand with water; to which, for

the purpose of plastering, some cut cow hair is generally added.

HELEN. I understand the reason of that: the hair assists to bind, or connect, the mortar.

MOTHER. Well imagined. We are not considered to understand the art of making cements so well as the ancients: the mortar used in the Saxon and Norman buildings is observed to possess a hardness equal, and even greater than that of the stones it cements together. Suppose we now close the conversation.

LOUISA. First, dear mother, finish the account you began, the other evening, respecting sponge.

MOTHER. I have already told you that

it is now determined to be an animal substance, which, remaining fixed to the rock where it was originally produced, is continually pierced and injured by many marine animals. Its power of imbibing moisture, and thereby swelling to a considerably increased size, renders it highly dangerous when swallowed. A small piece taken into the stomach might thus occasion certain death.

LOUISA. I will take care how I put sponge into my mouth.

MOTHER. I hope you will, now that you are acquainted with its fatal effects.—But it is always the wisest plan to avoid tasting or swallowing anything, until you are well assured of its qualities.

DIALOGUE IX.

MOTHER—HELEN—LOUISA.

HELEN. I have been drawing, to-day, till I have quite stupefied myself.

MOTHER. That is turning a pleasure into a pain. You are wrong, my dear Helen, to sacrifice your health and other acquirements to this, your favourite art.

HELEN. But I am so very fond of it.

MOTHER. I know you are, and therefore my caution is the more necessary. What we

do not like, we seldom allow to absorb too much of our time; nor do we pursue it to the injury of our health. Loss of health, Helen, can never be compensated; and we ought, also, always to reflect on what we *ought* to do, as well as what we *like* to do.

HELEN. Ah! mamma, I know what you mean: I have omitted attending to my arithmetic to-day.

MOTHER. But I suppose, when you become a woman, and make a mistake in your accounts, you will plead, as an apology, your skill in drawing flowers.

HELEN. Now you are laughing at me.

MOTHER. I am certainly ridiculing your conduct, which, if persisted in, would lead to serious consequences: where use is sacrificed

to ornament, or duty to pleasure, the effects are, indeed, most important.

HELEN. Yes, mother, I am aware of that.

MOTHER. Then, my child, profit by the knowledge, and avoid an error, which you may hereafter deplore. Here is Louisa, so passionately fond of dancing, that, I fancy, she sometimes thinks me unkind because I call her from her Scottish steps to plain reading and working.

LOUISA. I never think you unkind, mother; though, I confess, I sometimes wish there were no such things as reading and working.

MOTHER. Then you would like to be a little playful monkey?

LOUISA. Shocking!—What! without reason?

MOTHER. You could dance perfectly well without reason; for reason would only serve to remind you of your deficiencies. Without reading, how vacant and insignificant would be your mind! Without needle-work, how naked and exposed your body!

LOUISA. Oh! mother, I see it is nonsense to talk of doing without reading and work.

HELEN. And I am sure it is equally silly to give up every thing for one favourite occupation.

MOTHER. Be assured, that a mixture of business with pleasure gives to that pleasure its highest zest; and that, by varying our occupations, we render each more delightful. Thus, you see, I am teaching you the most

certain way of being happy as well as wise. But where is this drawing, which has so fatigued you, Helen?

HELEN. Here, mother; a head sketched in pencil, and shaded with crayons.

LOUISA. What a brittle thing this crayon is!

MOTHER. Their composition renders them so. Crayons are produced from earths reduced to paste, and dried in long slips. Red crayons are a preparation of blood-stone, or red chalk; and black crayons are made of charcoal and black lead.

HELEN. Are not pencils also prepared from black lead?

MOTHER. Yes, my dear. The finest black lead is found at Borrowdale, in Cumberland.

It is cut into thin square lengths, which are fitted into a semi-cylinder of wood; the other half of the cylinder is then glued on, and the pencil is finished.

HELEN. That is simple enough. — The manufacture of paper is not so easy.

MOTHER. Indeed it is not: paper is produced by a total change in the original material; for, you know, it is manufactured from soft linen rags.

LOUISA. Yes, and very surprising such an alteration is.

MOTHER. The rags, after being properly sorted, for the different kinds of paper which each kind is best calculated to produce, are well dusted, and then torn to shreds by an iron instrument with long sharp teeth: du-

ring this last operation, they are immersed in clean water, which not only assists in cleansing the rags, but in softening them into a mash, or pulp. This process generally takes six hours. The fine pulp, now become snowy white, is next put into a copperful of warm water, whence it is taken out, by dipping the mould, a kind of iron sieve, sideways into the copper. This mould takes up a sufficient thickness of pulp to form a sheet of paper; the wires which cross the bottom permitting the water to escape, though they are too close for the pulp to pass.

LOUISA. I have often observed long line marks in some paper. I suppose these are occasioned by the wires?

MOTHER. Yes; though in some paper

they are avoided by the use of close-woven wires. The pulp in the moulds having thus taken the form of paper, is turned out on a cloth of thick felt. Paper and felt are added on each other, till a sufficient pile is raised. The whole is then placed in a press, where the remaining moisture is squeezed from it. Each sheet of paper is then hung up separately to dry. It hangs for several days, and is then sized, to render it capable of bearing ink and other liquids. Size is a kind of glue, made from shreds of parchment, or vellum. Into this the paper is just dipped, and then dried; after which it is put up into quires and reams, and sent to the stationer, who sometimes adds a gilt edge, and otherwise prepares it for his customers.

HELEN. A ream of paper contains twenty quires, and a quire twenty-four sheets.

MOTHER. Exactly so. The whole process of paper-making occupies about three weeks.

LOUISA. You just now mentioned that parings of parchment produced the glue used for sizing paper: what is parchment?

MOTHER. Parchment is the skin of sheep or goats, prepared for writing upon. After the wool, or hair, is stripped off, the skin is immersed in lime-water, the fleshy part is completely pared off, and the whole rendered flexible. This is the work of the skinner: from him it passes to the parchment-maker, who proceeds to pare off half the thickness of the skin, and rubs the surface smooth with pumice-stone; and then the

parchment is ready for use. Vellum is a more delicate kind of parchment, prepared from the skin of a very young calf.

HELEN. Books are also bound in calf-skin,—are they not?

MOTHER. They are so: but the calf-skin for this purpose undergoes a different preparation. It is first tanned.

HELEN. I know that process; for I once went into a tan-yard with papa, and he shewed me how it was managed:—First, the hair is taken off by steeping the skin in lime-water, and then scraping it clean with a knife and pumice-stone; after this, it is stretched in a pit, covered with tan, or oak bark, and the pit is filled with water. This process changes the skin into leather, properly so called.

MOTHER. After tanning, the leather is sold to the currier, who, by the various operations of scouring, greasing, waxing, sizing, and blacking, finishes it for the use of shoemakers, saddlers, &c.

LOUISA. I think Morocco leather the smartest of any.

MOTHER. Morocco leather is the skin of a goat, dressed in sumach, a shrub yielding a peculiar juice.

HELEN. We now understand how leather is prepared for the shoemaker and bookbinder. But how curious must be the art of printing!

MOTHER. It is, indeed, my dear; and proves the skill and ingenuity of man. I shall not, however, attempt to describe it

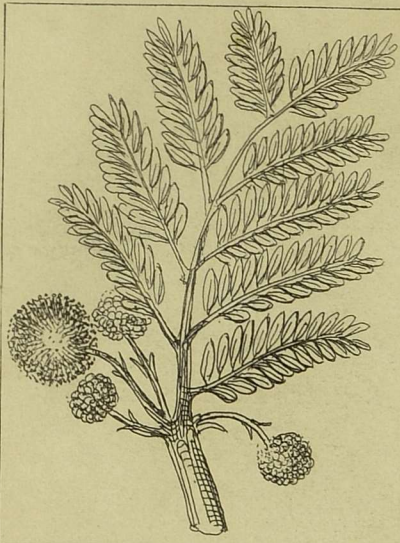
to you; for I think no description can convey a just idea of the process. Should you, however, wish for information on the subject, there are many excellent books that will give it you, as well as it can be given.

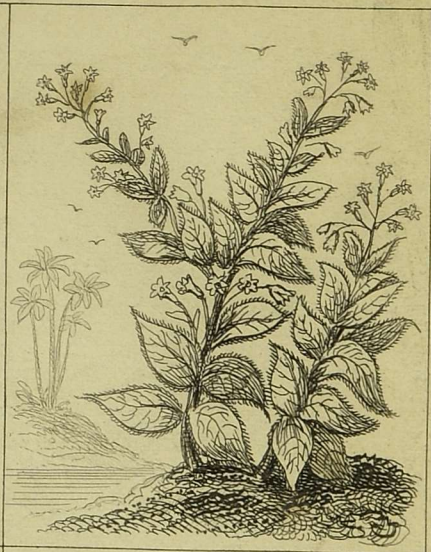
LOUISA. You have told us of paper; and pens are the quills or strong wing-feathers of the goose. Pray say something about ink.

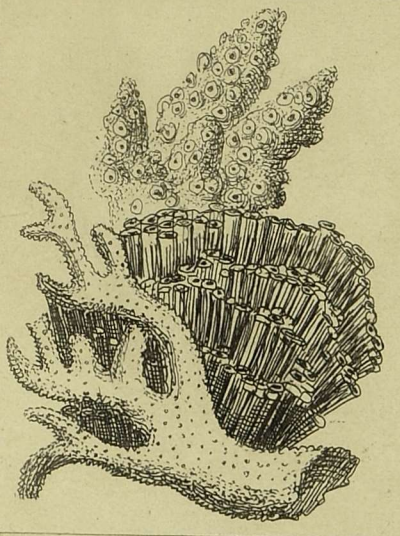
MOTHER. There are many ways of making ink; also many sorts of ink, as for writing, for printing,—red, blue, green ink.

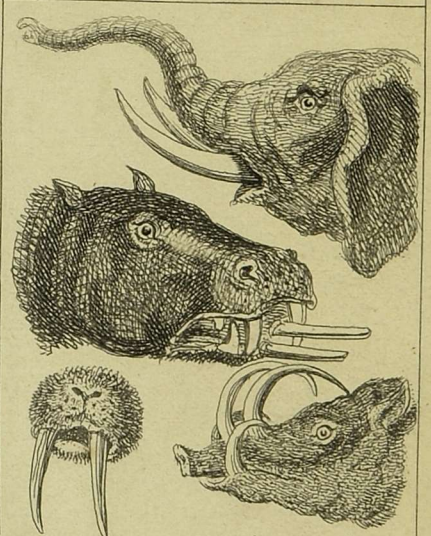
HELEN. We will be satisfied with knowing the common way of making writing ink.

MOTHER. Common writing ink is usually a composition of galls, copperas, gum-arabic, and water. Try and explain these several materials.









CORAL IVORY

Pub^d Octr 2, 1837, by J. Harris, St Paul's Church Y^d

HELEN. I believe, by reading Mrs. Barbauld's "Evenings at Home," that galls are swellings, or protuberances, on the leaves of the oak, occasioned by the bite of a small insect; and as for copperas, it is another name for vitriol.

LOUISA. Gum-arabic, I suppose, is the sap of some tree?

MOTHER. Yes; a species of acacia.

LOUISA. We now are acquainted with all the materials we use in writing a letter, particularly if we seal it with a wafer. But should we prefer sealing-wax, we should be puzzled to know what we were using.

HELEN. But our mother will also explain that, I am sure.

MOTHER. Sealing-wax is composed prin-

cipally of shell-lac, with a small portion of rosin, and coloured with vermilion, or, for common purposes, with red lead.

HELEN. What is shell-lac?

MOTHER. Lac is a substance deposited on many species of trees, in the East Indies, by an insect. In its native state, adhering to small twigs, it is called stick-lac; but when melted into a thin crust, it is shell-lac.

LOUISA. And pray what is vermilion?

MOTHER. A certain preparation of quicksilver; and red lead is a preparation of lead.

HELEN. The making of brushes is easily understood; quills filled with camel's hair or hog's bristles: but how are colours produced?

MOTHER. Some colours are mineral, as the different chalks and earths; and others are vegetable, as indigo, and many more.

LOUISA. Pray, mother, of what is that beautiful varnish composed, with which you so elegantly finished the work-basket that Helen painted for my aunt?

MOTHER. There are many varieties of varnish, adapted to different purposes, all chiefly composed of the several gums, dissolved in spirits of wine. To learn the manner of preparing each different kind, you must consult the most approved receipts.

LOUISA. Helen, what must be our next question?

HELEN. Oh! I have fifty yet unasked.

Indeed, I can scarcely touch any thing, or look around me, without seeing something, about the properties of which I wish to inquire. Even at this moment, my eyes have discovered an object, which has not been yet explained.

LOUISA. Where are you looking? Oh! I see—on the mantel-piece; and papa's snuff-box is the object you mean. I do not like snuff, but I wish to know what it is.

HELEN. Then, without farther hesitation, pray, mamma, what is snuff?

MOTHER. Snuff is the powdered leaves of the tobacco-plant, dried, and occasionally enriched by certain perfumes.

LOUISA. And what sort of a plant is the tobacco-plant?

MOTHER. The tobacco-plant is propagated by seed, and requires to be frequently watered, and much sheltered from the excessive heat of the sun. When it has attained maturity, which is known by the leaves becoming brittle, it is cut down, and hung up in the shade to dry. When dried, the leaves are pulled off the stalks, and made up into bundles; they are then steeped in sea-water, and afterwards tied up in bunches, called *hands*, or formed into ropes, by winding them in a kind of mill, around a stick. In this condition, it is imported into Europe, where it is cut up for smoking, or dried and powdered for snuff.

HELEN. I often hear of import and export: what do these words mean?

MOTHER. Import means bringing any thing into a country; export, sending any thing out of a country.

HELEN. I shall remember the distinction perfectly well. *Exit*, or going out, will assist to remind me.

LOUISA. Now then, I think, we must export the decanters and glasses, and import the candles!

MOTHER. You are a giddy girl; but you have used the words correctly—so do as you propose.

DIALOGUE X.

MOTHER—HELEN—LOUISA.

LOUISA. What a delightful party we had yesterday! How much I like large parties!

MOTHER. I do not know a more pleasant manner of spending time, than in the society of well-informed unaffected persons.

HELEN. I think formal companies must be very irksome.

MOTHER. No companies ought to be formal; when they prove so, the error must

arise from the individuals that form it. We were not formal yesterday.

HELEN. Oh no! Because we all liked each other, and met determined to please and be pleased.

MOTHER. My dear Helen, you have very artlessly, but very exactly, defined the means of rendering all social meetings what they ought to be, sources of pleasure, of information, and of general benevolence.

LOUISA. Did you not admire the beautiful large pearls which Miss Mildmay wore so tastily disposed in her hair?

MOTHER. I admired them particularly; but I was still more attracted by the unaffected manners and gentle deportment of their wearer.

HELEN. She is a sweet girl, indeed.

MOTHER. And one whom I should be most happy if you would endeavour to copy.

LOUISA. She told me, her pearls came from the East Indies.

MOTHER. Yes; the seas that surround that country yield the oyster, from which pearls are obtained.

LOUISA. Come, Helen, leave off poring over that map, draw your stool to the fire, and let us listen to mamma; for she is going to talk to us about pearls.

MOTHER. You are very quick in forming your conclusions, young lady. I did not say, that I intended describing the mode of getting pearls.

LOUISA. But you intended it, without saying it; and here we are, all attention.

MOTHER. An eagerness for acquiring information is so laudable, that I cannot resolve to disappoint you.

LOUISA. That 's my dear mamma!—In oysters, you say, are found pearls; but pray how do they get there?

MOTHER. It is well ascertained that pearls are formed in the shells, where they are found; but whether they are produced for any useful end to the animal, or merely caused by some disease, continues a controverted point.

HELEN. Are they easily procured?

MOTHER. By no means: the search is attended with considerable difficulty and

danger. As this kind of oyster lies generally at the bottom of the sea, the only mode of procuring them is by diving.

LOUISA. What! diving down to the bottom of the sea?

MOTHER. Even so, Louisa; strange as it may appear, this is the general mode of collecting pearl oysters.

HELEN. How is this done, mother?

MOTHER. The men employed in this undertaking sink themselves, by tying stones to their bodies, in the places where the fish are supposed to lie; and when arrived at the bottom, they instantly commence filling their bags with the surrounding oysters. Some divers can remain a quarter of an hour, others only a few minutes, under water;

when drawn up, they empty their bags, and almost immediately descend again.

HELEN. How surprising is the power of habit!

MOTHER. When a considerable number of oysters have been collected, they are thrown into a large hole, dug on the shore, and heaps of sand, to the height of a man, are raised over them.—Here they remain till the fishy parts have decayed, and the pearls are disengaged from the animal; the sand is then carefully removed from the shells and grosser parts, and sifted several times, to discover the pearls that are intermixed with it.

HELEN. I suppose they are then cleaned, polished, and bored.

LOUISA. Yes; and next appear on the flowing locks, or graceful limbs, of beauty.

MOTHER. You are quite poetical on the subject, Louisa.

HELEN. The diamond is the most precious of all the various gems, or stones?

MOTHER. Yes, not only from its scarcity, but also from its surpassing brilliance. It is so hard, that it can be cut only by itself.

LOUISA. And I have heard that the glaziers use a pointed diamond to cut their glass.

MOTHER. That is very true. Diamonds are found in many parts of Asia, and in some countries of America. They are sometimes discovered embedded in earth, and sometimes have been gathered in the currents of

rivers, carried thither, I suppose, from their native beds.

LOUISA. They are not found bright?

MOTHER. No — when first discovered, they have an opake (that is, a thick) earthy crust covering them. This is removed in the polishing, and then the diamond appears in all its splendour.

HELEN. There are many other gems, or precious stones.

MOTHER. Yes: the sapphire, remarkable for its soft blue colour; the topaz, for its transparent yellow; the emerald, for its dark green; the amethyst, for its rich purple; and the ruby, for its varied red.

LOUISA. What a charming diversity of colours!

HELEN. But I think none of these, except the sparkling diamond, is superior to the cornelian.

MOTHER. The best cornelians, or rather carnelians, are imported from the East Indies; but, I understand, an inferior kind is sometimes found in Great Britain.

LOUISA. Coral is also, I think, very pretty; and I suppose is a mineral.

MOTHER. You will be surprised to hear that coral is solely of animal origin; and that it is produced by a species of polypus.

HELEN. Beautiful red coral produced by a polypus? That poor half-animated worm!

MOTHER. Nothing can be more true: the creature is supposed to form the coral for its habitation, and thus a constant sup-

ply of this admired substance is continually forming.

HELEN. Where is this wonder most generally observed?

MOTHER. Coral is found on rocks, at a considerable depth in the sea, where it is regularly gathered by established collectors, who call themselves coral fishermen. The principal coral fisheries are at Marseilles, and in the Straits of Messina.

HELEN. Marseilles is a seaport of France, situated on the shores of the Mediterranean.

MOTHER. And the Straits of Messina divide the Island of Sicily from the extreme point of Italy.

HELEN. Among precious and delicate substances, we may, I think, venture to place

ivory. I know, we have to thank the elephant for this article; but I am not quite sure of the part of the animal it is taken from.

MOTHER. Ivory is the tusk of the elephant; and is in some degree analogous to the horns of other animals. Horn, you know, by long and intense boiling, can be reduced to a jelly; and the shavings of ivory can be equally softened.

LOUISA. Horns of animals, I know, are very useful for a variety of purposes, as lanterns and knife-handles.

MOTHER. Ivory-shaving, burned in a crucible to a black powder, is used in painting, under the name of ivory-black: a crucible is a chemist's melting pot, made of earth.

HELEN. Ivory will take many colours; but I think its original creamy white is the richest and prettiest.

MOTHER. Yes; ivory is frequently dyed red, green, or black.

LOUISA. Gold, silver, iron, lead, copper, and tin, are all metals?

MOTHER. They are: for me to give you any farther account of them would be superfluous, after the excellent description you possess in the "Evenings at Home."—To that I, therefore, refer you.

HELEN. I have frequently read the "Dialogues on Metals," with particular pleasure.

LOUISA. Steel is made from iron?

MOTHER. Yes: iron bars, surrounded by charcoal, and kept in an intense heat for a

certain time, produce steel. Steel is therefore considered as an intermediate condition between cast iron and forged iron; as, in making the former into the latter, the metal must pass through the state of steel.

LOUISA. Needles are made of steel; but what are pins made of?

MOTHER. Pins are made of brass wire, afterwards whitened, by being laid in a solution of tin and lees, or dregs, of wine. Nothing can be more amusing than the sight of a pin manufactory; but I should find it very difficult to explain the long and varied process.

HELEN. Well, then, we must be content with the hope of one day visiting a pin manufactory.

MOTHER. It is surprising through how many hands, and what a variety of operations, that little unvalued article, the pin, passes.

LOUISA. How many hundreds have I wasted, without once thinking how much trouble there was in making them! Indeed, I scarcely knew they required any trouble.

MOTHER. But, now you do know, I hope you will be more careful. Carelessness can only lead to some evil; reasonable prudence must ever tend to some good.

DIALOGUE XI.

MOTHER—HELEN—LOUISA.

MOTHER. Remove farther from the fire, Louisa. Besides being very unwholesome, it is very dangerous, to sit so close to the fender.

LOUISA. I am so very cold.

MOTHER. Then get up, and jump about the room. That will circulate your blood, and make you comfortably warm all over; whereas the fire scorches one side of you, and leaves the other shivering.

HELEN. That is very true, I am sure; I

never take a walk in the coldest weather, but I feel warmer than by sitting a whole day close to the brightest fire.

LOUISA. This blazing wood is so inviting and delightful.

MOTHER. Do not forget how many accidents have occurred, from carelessness in approaching too near to such an inviting delightful blaze.

HELEN. Yes, poor Miss Forester always comes into my mind, when I hear of accidents by fire.

LOUISA. What was that? I never heard of it before.

MOTHER. Then I am sure you ought to hear it now, to render you more cautious in approaching fire.

LOUISA. Then pray tell it to me.

MOTHER. Miss Forester was about Helen's age; a healthy, happy girl, merry as the day, and surrounded by many dear relations. Many and many were the times that her anxious parents warned her of the danger she risked, by her thoughtless habit of sitting or standing close to the fire: sometimes, she would attend to their requests, and retire from her dangerous situation; but, much oftener, she only laughed at their fears; and, though she confessed she had heard of some dreadful accidents, she did not suppose that she herself would suffer by one.

HELEN. Poor, thoughtless girl!

MOTHER. Her mistake was a very common one. For many people fancy, because

they have long escaped from danger, by practices under which others have suffered, that therefore they shall always escape. Nothing can be more unreasonable. Like others, we are mortal: like others, sensible to pain, and liable to accident: why, therefore, should we not, like others, pay the penalty of carelessness and rashness?

HELEN. Poor Miss Forester found, to her cost, that she could not always escape.

MOTHER. Indeed she did. One day, as usual, taking her place close to the fire, her mother reminded her of her danger; she made a slight move, but, on her mother leaving the room, she returned to her former situation. Deeply engaged in reading, she sat, inattentive to her danger, till a cinder

falling on her muslin gown, set it in a blaze. The frightened girl, scarcely conscious of what she did, attempted, in vain, to extinguish the flames;—each moment they gathered strength, and spread rapidly over her dress.

LOUISA. What agony she must have suffered at that moment!

MOTHER. Yes, both of body and mind; for her arms were already scorched. Her sister, the only person in the room, stood shrieking at her side.

HELEN. Oh! mother, what a scene!

MOTHER. And yet such an one as Louisa is likely, some day, to realize, if she continues her imprudent custom.

LOUISA. Indeed, I will try not.

MOTHER. The shrieks of the two girls, at length, reached the ears of a female servant, in an adjoining apartment. She rushed into the room, and, with admirable presence of mind, snatched up the hearth-rug, and wrapped it round her young lady. Thus were the flames extinguished. But, unhappily, the relief came too late; the hapless girl was writhing in the severest torture.

HELEN. What a change, from ease and pleasure, to such cruel sufferings; and all so shortly effected!

MOTHER. All the work of a few minutes.

LOUISA. How awful!

MOTHER. Every thing that medical skill could devise was immediately tried, but without success. After suffering twelve

hours of excruciating pain, she expired at midnight.

HELEN. At that hour, the night before, she was most calmly and sweetly asleep!

MOTHER. And, under the blessing of Heaven, might have looked forward to many nights of equal peace; but one rash obstinate act destroyed for ever all her earthly prospects.

LOUISA. I shall never forget this story!

MOTHER. I hope you will not; but learn from this fatal catastrophe to avoid an equal risk.

HELEN. Muslin and calicoes are so very easily set on fire.

MOTHER. To relieve your minds from the pressure of my melancholy tale, I will

tell you something about cotton, the material with which muslins and calicoes are formed.

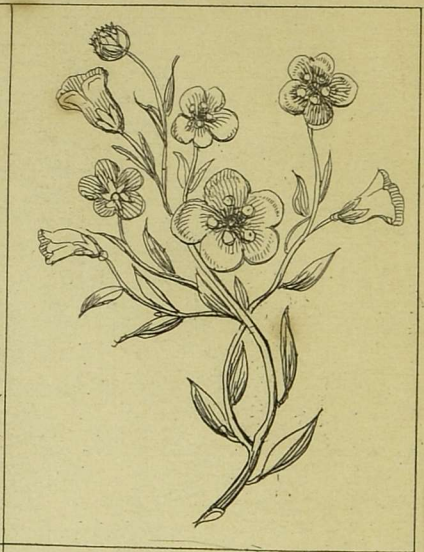
HELEN. That will be very kind.

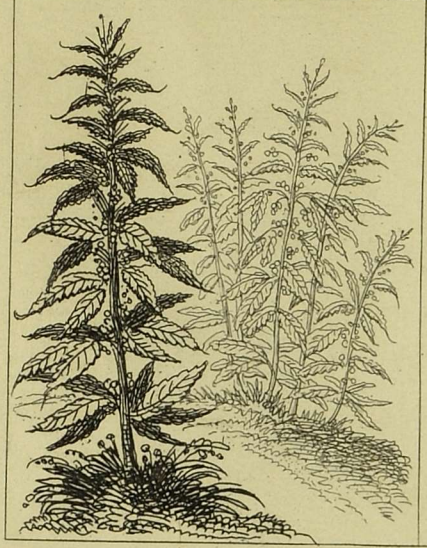
MOTHER. So, Louisa, dry your twinkling eyes, and brush from your rosy cheeks that rolling tear.

LOUISA. Listening to you, will make me cease to think of poor dear little Miss Forester.

MOTHER. That her sufferings are now over, must assist to console you. But, to return to my proposal : you know that cotton is a vegetable product ?

HELEN. Yes ; and such as is used in England comes principally from the East and West Indies.





HEMP NUTMEGS

Pub.d Oct.r 2, 1837. by J. Harris, St. Pauls Church Yd.

MOTHER. Some of the cotton plants are annuals (that is, they die within the year); others are perennial (or continue for many years); but, for the convenience of gathering the pods, the trees are pruned, and not allowed to grow beyond four or five feet high.

LOUISA. How pretty the cotton plantations must look!

MOTHER. The pods are gathered twice a year, and the picking season lasts six weeks: the first is from the end of October to December, and the second commences in February. When the cotton has been gathered, it is dried in the sun. The pods are frequently as large as good sized apples. After the husk has been taken off, the seeds are separated from the cotton by a mill, and

afterwards picked clean from broken seeds, dried leaves, or yellow locks of cotton, by women.

LOUISA. I think that it must be easy pleasant work.

HELEN. Not, I fancy, if you were obliged to do it for days together.

MOTHER. When the cotton is thus prepared, it is packed up in large bales, and sent to distant countries.

LOUISA. Yes, exported from India, and imported to Europe.

MOTHER. Very correctly expressed.

HELEN. Next comes some description of the manufacturing of cotton into fine threads.

MOTHER. Which I find quite impossible

to describe to you. Suffice it that I tell you, it undergoes a great variety of operations, such as picking, beating, carding, stretching, plying, drawing, and twisting.

HELEN. Seven different operations.

MOTHER. The machinery by which these are effected is more curious and beautiful than you can imagine.

LOUISA. Machinery means an engine, or machine?

MOTHER. A common spinning-wheel may be called a piece of machinery, as also a clock.

LOUISA. I perfectly understand.

MOTHER. In Manchester, a large town in Lancashire, the art of spinning cotton is carried to high perfection, and performed to a

considerable extent. The different processes I have described are all completed by machinery, merely superintended by a few work-people, whose business it is to supply the different machines with cotton, carry away what is completed, and take care that the different parts of the machinery are properly performing their several operations.

HELEN. Then the thread is not spun by hand?

MOTHER. No, my dear: in entering a spinning-room you may see many hundred threads spinning at once, entirely by the aid of machinery, and perhaps a few men and women passing backwards and forwards, busy in supplying cotton, or superintending the moving machine. Nothing can be more

striking than such a sight! It appears almost magical! Large beams moving up and down, and communicating action to swiftly revolving wheels: these again giving motion to innumerable lesser wheels, cylinders, rollers, and spindles. The cotton, picked by females, but undergoing every other alteration by means of this beautiful and varied machinery, enters the building in its rough state, and issues a fine delicate snowy thread, fit for all the purposes of the weaver—for cambrics and muslins of the finest quality.

HELEN. Mother, how is this astonishing power produced?

MOTHER. By an equally astonishing invention: you have heard of a steam-engine?

HELEN. Yes, frequently.

MOTHER. Well, then, a single engine worked by steam gives power and action to all operations of an extensive manufactory.

LOUISA. How astonishing!

HELEN. I know that steam rises from water; I suppose, therefore, a very large portion of steam, rushing from a considerable quantity of boiling water, forces forward the engine, and produces its action.

MOTHER. Your idea, as far as it goes, is correct; but there are other parts of the machinery of the steam-engine that are more complex, and must be viewed to be understood. Indeed, to understand it perfectly, you must first gain some deeper knowledge of mechanism and the power of steam.

LOUISA. To see one, must indeed be necessary to understand its power.

MOTHER. I do not know any event that produces a more pleasing sense of wonder and awe, than to be present at the stopping of one of these vast engines: a single man, with his own effort, and that a very moderate one, in a few seconds stops this tremendous and enormous machine, and, by doing so, also stops the whole business of an extensive pile of building. The deafening noise of the ponderous wheel, and the deep and confused whizzing of varied machinery, is all instantaneously silenced. I cannot describe to you the sensation it produces; the wonder, the awe, with which the beholder is constrained to reflect on the

astonishing ingenuity and skill of his fellow-man.

HELEN. Such is the method of preparing cotton thread—

MOTHER. Which is afterwards woven into almost innumerable varieties of muslins, calicoes, and other fabrics.

LOUISA. The weaving is also performed by machinery?

MOTHER. Yes; but each separate loom is worked by hand.

HELEN. It must be very entertaining to inspect the printing of calicoes.

MOTHER. The smaller patterns are generally effected by stamps.

LOUISA. As we sometimes stamp letters?

MOTHER. Yes; except that the stamps

are larger. A few patterns, I have heard, are printed by running the calico under a roller.

HELEN. How are furniture prints managed? Those large bunches of flowers must be very difficult.

MOTHER. For furniture prints, the outline of the pattern is first given by a stamp, or cylinder. The cloth is then stretched on a long table, on each side of which are arranged the different painters. These severally throw in their certain portions of colours. For instance, one paints all the red flowers in the pattern before them, another all the blue. Some work the brown stalks, and others tint the leaves, first with yellow, and secondly with blue.

HELEN. Blue and yellow—that is to produce green.

LOUISA. Now, Helen, I think you will allow this would be a very amusing occupation.

MOTHER. The smell of the paint, the noise produced by so many people, and the heat necessary to the well-doing of this branch of the business, greatly diminish the pleasure of the artificers. As the calico receives the different colours, it gradually passes along the tables, till the whole piece is completed.

HELEN. Calicoes and muslins are made from cotton; but what we call brown Holland and Irish linen are produced from flax?

MOTHER. Yes, from the fibres of the

stalk of flax, those articles are manufactured. This is a beautiful grass-like plant, adorned with flowers of the softest blue.

LOUISA. I remember a field in flower, which we much admired, in one of our walks, last summer.

MOTHER. When the flax, otherwise called lin, is ripe, it is gathered. It is then steeped in water for a certain time, and dried, that the outer rind of the stalk may crack, and more easily separate from the fibrous substance within: afterwards follow the different operations of breaking, scratching, and heckling. The flax, so prepared, is next delivered to the spinners, who form the thread; it is then reeled, or wound into skeins, or hanks. The weaver then receives

it, and weaves it into cloth in his loom; after which it is bleached, and made up for the market.

LOUISA. Is hemp also used for cloth?

MOTHER. Yes, and undergoes nearly the same process as flax. The finer kinds only are used for weaving cloth; the coarser hemps are woven into canvass, or twisted into ropes and cables.

HELEN. Is the hemp plant also pretty?

MOTHER. The hemp plant generally grows to the height of six feet; some have been known to reach twelve feet. It is said to be very noxious to every species of insects, and is therefore frequently planted as a protecting border to gardens. Linen made from hemp never attains the delicacy of

that made from flax, although it is thought to be much stronger.

LOUISA. Coarse towelling and other dark rough linens, I suppose, are made from hemp.

HELEN. I think now, mother, we are acquainted with the materials that compose every article of our dress.

LOUISA. Let me see—shoes, made from the skins of animals, tanned into leather. Cotton stockings, woven from the cotton plant. Linen frocks, produced from the fine threads of flax.

HELEN. Ribbons, drawn from the spinning of silk-worms; and worsted and flannel, made from the wool of sheep.

LOUISA. Our bonnets, sometimes com-

posed of twisted straw, or long shreds of the willow, delicately woven. And papa's hat—

HELEN. There, now you are puzzled.

LOUISA. Pray, mother, how is papa's hat produced?

MOTHER. Hats are made from the fur of the beaver. There are, however, other animals, as the sheep, the goat, and the rabbit, that also yield wool and hair for the purpose.

LOUISA. Hair and wool! I thought hats were made from skins.

MOTHER. No, my dear; hats are composed of a mixture of wool and hair.

LOUISA. I am quite surprised.

MOTHER. These are well mixed together, and then beaten into one mass, called a felt,

by a simple process, which you may one day see; and, after certain operations, the hat is shaped on a mould, and reduced to the form required.

HELEN. I have learned something quite new.

LOUISA. And, respecting dress, I fear we have no more questions to ask.

MOTHER. That is fortunate; as I have no more time to give answers. We have already talked past our usual hour, and tea has been long ready.

DIALOGUE XII.

MOTHER—HELEN—LOUISA.

LOUISA. How delightfully we have passed the dull hours of twilight this winter! I shall always look back upon them with pleasure.

MOTHER. And recal them with improvement; for our occupation has been useful, as well as entertaining.

HELEN. Last night, whilst you and papa were from home, I was trying to remember

all the things you had spoken of and described.

LOUISA. And I made a capital proposal to Helen; which was, to make a list of whatever had been forgotten, and ask you about them, the first opportunity.

MOTHER. That was certainly a good thought. Where is your list?

HELEN. Here, mother. I wrote it.

MOTHER. It seems to comprise a curious assemblage of things.

LOUISA. Yes: we could not help making a strange mixture. But, I hope, you will not therefore object to explain them.

MOTHER. By no means. Though unconnected with each other, these several articles ought to be known to you.

HELEN. Shall I read the list?

LOUISA. No, dear Helen; pray let me; and I will name each separately.

HELEN. Well, then, begin.

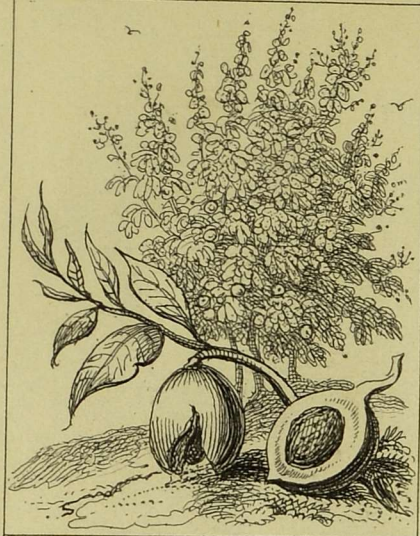
MOTHER. I hope, Louisa, you observe the good temper with which your sister gives up her own wish to yours.

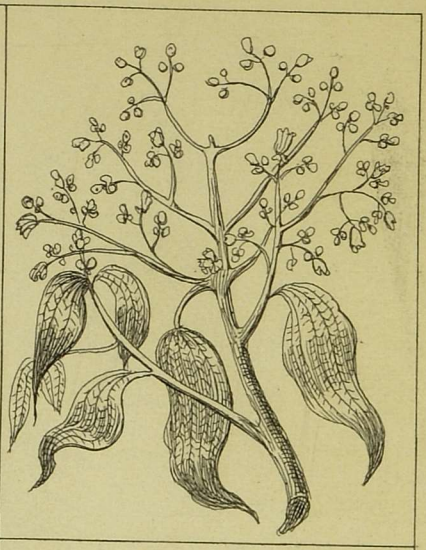
LOUISA. That I do, mother, and love her for it.

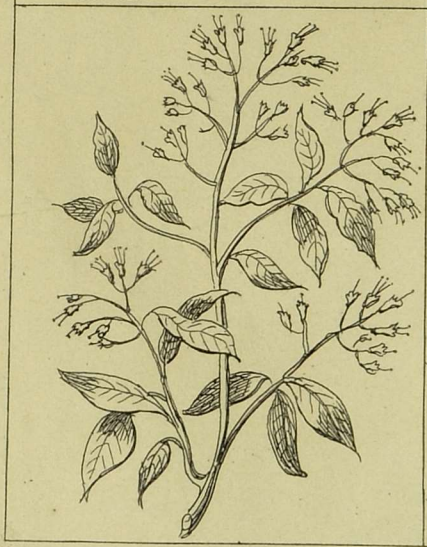
HELEN. Are not spices first in the list?

LOUISA. They are. Pray, mother, what are nutmegs, cinnamon, cloves, mace, pepper, and allspice?

MOTHER. All vegetable productions. Nutmegs grow on a tree found in the East Indies, and are somewhat like a walnut, being enclosed in a similar fleshy coat.







CLOVE ALLSPICE

Pub.d Oct.r 2, 1837, by J. Harris, St. Pauls Church Y.d

When this coat is removed, a delicate network is discovered, which is mace; next comes the hard shell, after that a spongy film, and, fifth and last, the nutmeg.

HELEN. Here are two questions answered in one, nutmeg and mace growing so close to each other.

MOTHER. The nutmeg-tree is a large and handsome tree.

LOUISA. Now for cinnamon.

MOTHER. Cinnamon is the dried bark of a tree. There are two kinds; one very inferior to the other, thicker, and less fragrant. The cinnamon-tree is principally cultivated in the island of Ceylon. It never grows very high; and its bark forms the principal article of exportation from that island.

HELEN. Ceylon is in Asia, at the entrance of the gulf of Bengal.

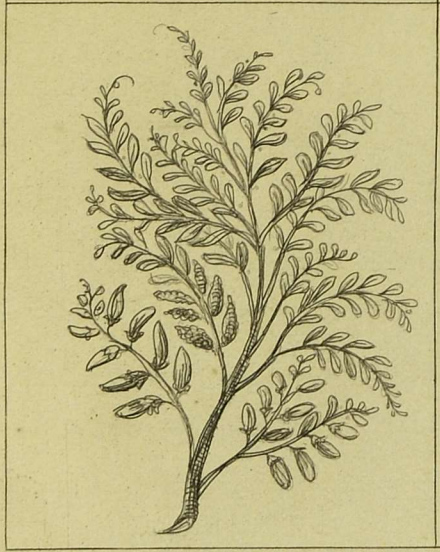
LOUISA. Cloves? —

MOTHER. Are found in many parts of Asia, particularly in the East Indies. They are the fruit of a tree, which grows to a considerable size.

LOUISA. Next appears pepper.

MOTHER. Pepper is the berry, or fruit, of a creeping kind of shrub, also found in several parts of the East Indies. The berries, which grow in clusters, are first green, then red, and lastly black. These are gathered and dried, and thus we have black pepper. White pepper is only the black pepper stripped of its outer rough covering, by steeping the berries in sea-water, and afterwards dry-

PEPPER 16 GINGER



LIQUORICE CORK

Pub.d Oct.r 2, 1837, by J. Harris. St Pauls Church Yd

ing them under a hot sun. The skin shrivels, and is easily rubbed off by the hands: of course, therefore, white pepper is less pungent than black.

HELEN. Allspice, I suppose, is another kind of pepper?

MOTHER. That article has obtained its common name from its being supposed to possess the flavour of all other spices. Its proper name is pimento. It is found in large quantities in Jamaica, and in most other parts of the West Indies. The pimento-tree is very beautiful; its leaves diffuse a most fragrant perfume, and its large white flowers bloom in great profusion.

LOUISA. Helen, I do not see ginger in your list.

MOTHER. Ginger is the root of a plant cultivated in the West Indies, and also at Calicut, in the East. The plant resembles a rush, and the knotty root spreads under the surface of the ground. When fresh gathered, it is soft, and in that state is eaten by the Indians as a salad; or, prepared with sugar, it forms a delicious preserve.

HELEN. I do not think there is a greater delicacy than preserved ginger.

LOUISA. We now come to liquorice.

MOTHER. Liquorice is the juice of a plant of the same name, that is cultivated in England. I have seen whole fields of it, in the neighbourhood of Pontefract, in Yorkshire, in which town the principal preparation of liquorice juice is carried on.

This little low shrub is planted by slips in April or May, and at three years old, I believe, it is considered fit for being dug up. From the long sticky roots, the syrup is extracted, and formed into small cakes.

LOUISA. I suppose Spanish juice is also prepared from liquorice?

MOTHER. Yes; liquorice is cultivated in considerable quantities in Spain.

HELEN. According to Don Quixote, there is another useful article much cultivated in Spain.

LOUISA. You mean cork; it is here in my list.

MOTHER. Cork-trees are found in most of the southern countries of Europe, and are also indigenous, that is, they are natives

of some parts of Asia. From Spain and Portugal, however, we procure most of this useful article.

HELEN. The cork-trees are very handsome?

MOTHER. They are a species of oak; and it is the bark, which is freshly formed annually, (every year,) that is the part in use. When the trees are fifteen years old, the bark is fit to be taken from them.

LOUISA. I suppose it comes off in large round pieces?

MOTHER. Yes; and to make these flat, they are piled up in damp situations, with the hollow sides undermost, and pressed down by heavy stones: afterwards they are dried over a strong fire.

HELEN. The other night, in speaking of the different parts of dress, we omitted asking about woollen cloths. I dare say, mother, you can tell us something about them.

MOTHER. The operations by which wool is made into cloth are various, and generally too complex to be easily understood from description.

LOUISA. What does complex mean?

MOTHER. Whatever has many parts involved in each other; whatever is not simple.

HELEN. Some wool is brought from Spain; some from Saxony: and some English wool, I suppose, is also used.

MOTHER. Yes. The first operation is scouring, or washing, the wool, and depriv-

ing it of all its natural greasiness. After it has been dried in the shade, it is well beaten, and cleared of every particle of dirt. It is next oiled and carded, and spun. Then it is slightly sized, or stiffened, and delivered to the weavers, who weave it in their looms. The thread for the warp ought to be one-third smaller than that for the woof.

HELEN. Pray explain warp and woof.

MOTHER. The warp means the threads that extend lengthwise on the loom, and across which the weaver throws the woof, by means of his shuttle.

HELEN. I shall remember that.

MOTHER. After the cloth is woven, it is carried to the fulling-mill, where it is repeatedly washed with water and soap, and

dried between each washing. This operation of fulling not only purifies the cloth, but also thickens it, as it shrinks in the water, and consequently becomes closer and thicker. The rough and long fibres that stand off from the cloth are then cut off, and the piece is brushed, pressed, and marked for the market.

LOUISA. You have not told us when it is dyed.

MOTHER. Mixed coloured cloths are dyed in the wool, before spinning; all others are generally dyed in the piece. The best cloth is made from Saxon wool; although that of our own country is rapidly rising into estimation. Till within these few years, Spanish wool, of the Merino breed, was preferred.

LOUISA. What a charming country Spain must be! So warm! And such plenty of oranges and grapes!

HELEN. Give me delightful France, or Italy; or, above all, Switzerland.

MOTHER. I cannot help smiling, my children, to hear your ardent admiration of countries you have never seen.

HELEN. But we have often read about them.

MOTHER. Then probably you have read of the tremendous storms, or hurricanes, to which some of these countries are liable; and the dreadful earthquakes and volcanoes, with which others are frequently threatened, or destroyed; also, of the frightful avalanches, or enormous detached bodies of snow, which

roll from the mountains that skirt Switzerland, and in a moment overwhelm whole villages! —

HELEN. That certainly must be dreadful!

MOTHER. You recollect the terrific rivers of burning lava, or liquid fire, which roll from Vesuvius, and turn some of the loveliest plains of Italy into barren deserts; whilst the sirocco (a scorching wind) rushes along the blooming country, and dries up every bud and blossom in a moment.

LOUISA. Oh! terrible! terrible!

MOTHER. You may also have read of the fatal earthquake, that swallowed up nearly the whole of Lisbon; and the different shocks which still affect that land of oranges and grapes, and spread their destructive

influence into Spain; and sometimes even alarm the inhabitants of France.

HELEN. Surely nothing can be more distressing than an earthquake!

LOUISA. Nor more terrible than a volcano, or an avalanche!

MOTHER. However, to compensate you for the disgust I may have caused against these countries, I will describe one, which is free from all these terrors, and possesses a thousand advantages unknown to other places.

LOUISA. Do tell us, mother; I long to hear.

MOTHER. A country, adorned with every beauty of woods, and hills, and dales; with rivers rushing amid rocks, or stealing their

gentle way along the peaceful valley, now fringed with waving woods, now rippling by the green and sloping meadow.

LOUISA. Oh! how lovely!

MOTHER. Its valleys dotted with many a straw-roofed cottage, whose humble door, overarched with woodbines, or whose simple casement, decked with white and ruddy roses, presents the view of comfort and cleanliness within. Perhaps an aged grandmother, spinning amidst her children; or a rosy lass, weaving rich laces on her bobbined cushion, while her simple song denotes a heart devoid of care.

HELEN. Happy cottagers!

MOTHER. Close by the village green, appears the rustic church, whose turrets, ivy-

crowned, emit the welcome sounds of joyous merriment, or call, with deep and solemn tones, the surrounding peasantry to pious rites. Here all meet—the master and his servant; the rich lord and his humble tenant: all unite to breathe a prayer to their heavenly Father: all unite their songs of praise.

LOUISA. What a good and happy people! How I should like to live amongst them!

HELEN. How is it, that we have never read of this country?

MOTHER. The charming gaiety of summer is followed by the rich luxuriance of autumn; and the social comforts of winter are succeeded by the lively beauties of spring. No earthquakes, no volcanoes, no siroccos,

no avalanches, destroy the delights of each revolving season. All is beauty, variety, and comfort.

LOUISA. But have these people any rich fruits and wines?

MOTHER. They possess an endless variety of fruits and flowers; and, by a little care, rear many fertile vines, but not enough to produce wine. To compensate for this, their orchards bend with luxuriant loads of ruddy apples and rich-flavoured pears; from these they extract sweet sparkling liquors, which, well managed, afford most delicious beverage. In autumn, it is a most interesting sight, to see the groups of peasants gathering the luxuriant crops. Perched on the bending boughs, the active father sits, and

shakes a grateful shower of ripened fruit. His children run below, to pick the scattered treasure, and, laughing as the falling apples strike their rosy cheeks, or press their flaxen curls, bear to their mother the well-filled apron. She, with ready basket, receives the welcome load, and, thanking her numerous prattlers, hastens to pile away the gathering heaps.

HELEN. What a charming scene!

LOUISA. O, mother, is not this some fairy tale?

MOTHER. Autumn has other beauties, as cheering even as these: when the golden grain nods on its slender stalk, and the warm sun has ripened the enclosed seed, the sober joys of harvest hours commence; the busy

train spread over the embrowned fields; some cut the luxuriant crop; some bind the graceful sheaf; some, on the rolling cart, in cheerful bustle, bear away the plenteous harvest, or raise the well-formed stack. Even poverty can smile in scenes like these, and gleans from the wide field a rich though humble dole.

LOUISA. I love these people, for their kindness to their poor.

MOTHER. Switzerland is poorly guarded by her mountain walls; and the liberty of that once favoured country has fallen a sacrifice to fierce invaders. But the country of which I speak, no foe can reach. That dearest blessing, freedom, for ever smiles upon its brave and honest tenants; while

rolling seas and mighty navies form a firm and impenetrable barrier, to guard the sheltered land!

HELEN. You are speaking of an island?

MOTHER. With a mild climate, never intensely cold, nor intensely hot; a fertile soil, which, with moderate labour, yields all the comforts, and most of the luxuries of life; laws open to the lowest as well as to the highest ranks of men, protecting the humble, curbing the great; a religion founded on the purest, simplest, and most benevolent doctrines;—what have these people to desire, but grateful hearts, to enjoy the blessings they possess?

LOUISA. Quick, quick, mother, tell me where is this country; for I like the account

of it better than that of any other I have ever heard or read of.

MOTHER. That the account is just, yourselves can bear me witness. For this land of which I speak—this fertile sheltered land of freedom—is ENGLAND! Because we live in it, we are apt to overlook its superiority, and fancy that other climes can yield higher joys. But this is a dangerous mistake; it makes us lose the pleasures within our grasp, in fanciful dreams of delight existing only in the imagination. Let us, my children, be wise! Let us acknowledge—let us feel—the real advantages our native land possesses! Let us be thankful that we were born in such a favoured country; and, pitying rather than envying the inhabitants of other

climes, let us extend to them, whenever it is in our power, a share of our good things! If we travel, let us admire all that is beautiful in foreign countries, and respect all that is virtuous or wise in foreign nations; but let us never forget the high advantages of our dear native land! Let us do nothing to dishonour her present respected name! But let us firmly protect, and dearly love, our home — our favoured home — *Happy England!*

THE END.

London: Printed by Samuel Bentley, Dorset Street, Fleet Street.

This book forms part of
The Osborne Collection of Early Children's Books
presented to the Toronto Public Libraries by

MR. AND MRS. EDGAR OSBORNE