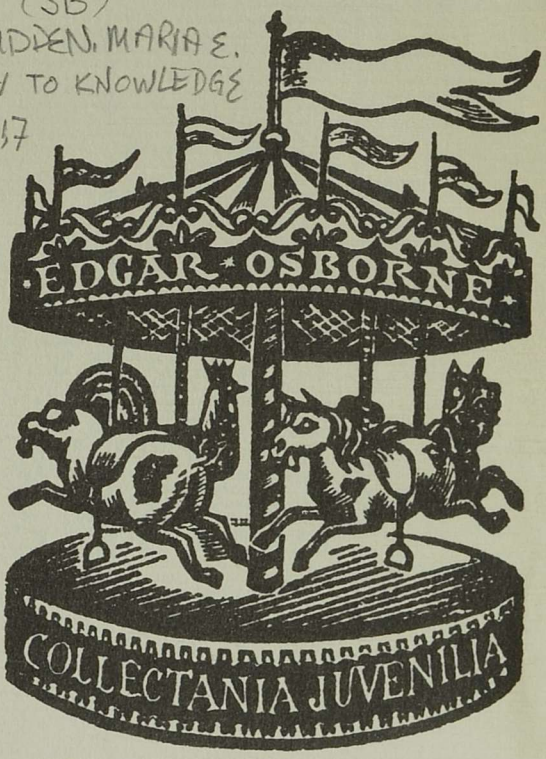

Published Sep. 20-1814, by J. Harris, corner of St. Pauls Church Yard.

A

KEY TO KNOWLEDGE;

OR,

THINGS IN COMMON USE.

SIMPLY AND SHORTLY EXPLAINED;

IN A SERIES OF DIALOGUES.

WRITTEN BY A MOTHER,

Author of "Always Happy;" "First Book for Children," &c. &c.

Know this *work*, is charmed with spells.
* * * * * * *
With invocations to the living God,
I twisted every *humble thought* together,
And, with a prayer, did every *moral* weave.

MORE.

SECOND EDITION.

LONDON:

PRINTED FOR J. HARRIS, CORNER OF ST. PAUL'S CHURCH YARD.

1817.

J. Swan, Printer,
76, Fleet Street, London.

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.

ALTHOUGH there have been many excellent explanatory works published for children, there has not yet appeared, a concise and simple elucidation of the several articles of daily use, and daily consumption. In the following pages, an attempt has been made to supply this deficiency, and provide 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 rests on 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, entitled, "The Economy of Nature," has rendered the present effort not only easy, but delightful.

In reading over this little work, after having finished writing it, the author remembered that the subject of wine and spirits had been already most skilfully elucidated in the "Evenings at Home."—As, however, it is differently managed in this undertaking, the present explanation was allowed to remain.

CONTENTS.

THINGS
IN
COMMON USE.

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 ab-

sorbed 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 were perhaps exposed to this heavy wind and rain, and how comfortably *we* were, 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 ourselves enjoy.

Louisa. Well, after all, summer is much pleasanter than winter—such sweet 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 needlework.—What think you of a fine gambol with papa on the dry frozen pond, throwing snow balls—watching your brothers skate, and admiring the beautiful frost work that encrusts each leaf and each 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 thunderstorms 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, came on a frightful storm, that 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 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 will 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 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; the grain separates 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

leather 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 is 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 crust of the corn, 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 then.

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 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 of those

employed for food. The potatoe yields it easily, and in abundance.

Helen. I have heard that hair-powder is made from starch.

Mother. 'Tis 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 proportion 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. Oh! yes, for jelly and blanc-mange.

Mother. Isinglass is a substance composed 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, it is put for a few minutes into lime-water, that all the oily parts may be absorbed, it is 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, 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. There are many things besides isinglass, that are drawn from equally unpleasing 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 thoughts of eating the brains of a whale.

Louisa. To be sure I should—why do you laugh, Helen?

Helen. Because I have read that spermaceti 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! who could eat such spermaceti?

Mother. Spermaceti has other uses, besides medicinal ones.

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 bye, when I come to think of it, what a dirty thing honey is; first swallowed by bees, and then by us.

Mother. Your description is certainly not very inviting. Suppose rather that

we should call Honey, the syrup of flowers, drawn from the opened 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, my dear child, then you find depends on description.

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

Louisa. If honey is 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 is 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, I think, tends to strengthen Reaumur's discovery. This whiteness is injured by age, and in time is altogether lost. To be restored to its

former purity, it must be bleached. When wax is 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, then, 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 water, and tea, and——

Mother. Stop, stop,—prateapace, 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 after tea, you were so good as to promise to play the geographical game with us; so I must work now.

Mother. Could not you have found time in the day, to complete the job?

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 don't;—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 past 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! saucebox, so you remind me of my half promise!

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

Mother. I will—only first informing Louisa, that she cannot gain 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 laziness, nor 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 shows you are resolved to profit by experience.

Louisa. What experience?

Mother. You know, by having tried, that laziness 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 for 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. Is there, indeed!

Mother. Yes, the method you have jointly described is the most general; but in the western counties of England, Cornwall, Devonshire, and Somerset, another mode is practised.

Helen. Very different from ours?

Mother. The principle must be the same, but the process 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, that are 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 action of the heat.

When it has remained a certain time on the stove, and has sufficiently warmed, it is returned into 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 butter-milk, of course, is prest from cream thus prepared, and what there is, is remarkably rich.

Louisa. I should not like such butter so well as ours.

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 beat up by the hands.

Mother. I also said, it is often beat up by a wooden spatula; but, my Louisa, is not all butter prest and formed by the hand?

Louisa. I believe it is.

Mother. Then you find there is 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, show their delicacy, at the expence of their good sense.

Helen. How, mother?

Mother. Pray, my dear, is not all pastry, cakes, and even bread, made entirely by the hand? nay, fifty other things I cannot now enumerate, which these refined persons swallow with avidity, at the very moment, perhaps, they are expressing their delicate disapproval of Devonshire 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; nay, Louisa, turn not up your little nose: is not the liver of a fowl considered a delicacy, and the gizzard served up as a savoury dish?

Louisa. Yes, to be sure, 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 not allow yourselves to be carried away by the current of popular prejudice and fantastic sentiment.—Were these consistently refined, its 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 milk or cream is warmed, and then curdled by the aid of rennet.

Mother. The milk or cream is thus divided into two parts, the curds or thick coagulated part, and the whey or watery part. The curds are 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 preserving it from corruption.

Louisa. Then do tell us something about it.

Mother. Salt is either procured from sea water, salt springs, or dug in mines.—In England and France it is produced by the former means. The salt water is admitted into open shallow trenches, exposed to the sun, the heat of which draws off the watery particles and leaves the salt. The salt, so procured, is then collected, cleaned, and prepared for use.

Helen. Some, you say, is dug in mines.

Mother. Yes, these mines are found in several places, but the principal one is at Cracow, in Poland, where there is thought to be sufficient for the supply of the whole world for a thousand years.

Helen. How astonishing!

Mother. In this mine there are houses, chapels, and streets of rock salt, which,

when illuminated, form a beautiful spectacle.

Helen. Beautiful, indeed, mother.

Mother. Common salt is the most useful of saline bodies; for, though there are some which resist putrefaction equally well, there are none so friendly and agreeable to the human stomach. Its agreeable qualities are not indeed confined to man, most other animals show a great fondness for it.

Helen. Has salt any other use but to flavour 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 pottery. This is done by throwing a certain quantity of it into the furnace, where it is volatilized, and applies itself to the surface of the pottery.

Louisa. Volatilized! mother.

Mother. Volatilized means, that the coarser parts are drawn off, or evaporated.

This kind of glazing is used in the making of English white pottery. Common salt is also used in making glass; it renders it whiter and cleaner.

Louisa. How delightful it is to know all this!

Helen. Is salt-petre, mother, a preparation of salt?

Mother. Salt-petre, 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 used for preserving meat.

Mother. It is also an ingredient in glass-making. But it has one peculiar property—deflagration, or the possessing a strong inflammable quality. But this we shall better understand in speaking of gunpowder. Let us now order candles, and prepare for our evening meal.

Louisa. I must not forget my work.

Helen. No—be industrious and finish that, and then join our game.

Louisa. Be assured I will, and perhaps, to-morrow, mamma will tell us something about gunpowder. Here come candles.

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, however, very unequal proportions; as by far the largest part is nitre. In firing off a musket, pulling the trigger causes the flint, 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, through the means of the touch-hole,) and thus expanded, issues from the mouth of the musket, and forces before it the ball with which it is 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 being applied to the touch-hole.

Helen. Yes, I have heard of that; but, pray, what is charcoal?

Mother. Charcoal is wood half-burnt or charred. The wood is cut into proper lengths, then heaped up into piles or stacks. These are covered with turf, and then 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, the holes are then stopped up, and the fire consequently goes out. To be well done, the branches of wood ought to preserve their original form uninjured.

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 manufactories, where a strong fire is required without smoke. Its finest powder is also useful in polishing, and 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, therefore, into sleeping apartments.

Helen. And now, what is sulphur?

Mother. Sulphur, or brimstone, is a simple inflammable substance; that is, it easily catches fire. It emits a blue flame, and a suffocating smell. 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, manufactured into 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 that 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 perhaps use them too copiously. So wisely, so perfectly, are we gifted with every faculty, that can conduce to our comfort and our preservation. 'Tis 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.

Louisa. Now then we know each ingredient in gunpowder. May I go on to ask my next question?

Mother. What was that?

Louisa. I wish to know something about tea. I know it is the dried leaf of

a foreign shrub, and that is all I am acquainted with respecting it.

Mother. As one 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, or a native of China, Japan, and Siam. It is said to be fond of a strong soil, and 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 our cherry leaf, but generally smaller.

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

Mother. Yes, my dear, I believe that is the case, and thus its insalubrious property is accounted for. While the black teas, being dried on iron plates, escape the noxious qualities of the heated copper.

Helen. Do the plants grow from seed or 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 losing their flavour, and are removed.

Louisa. What sort of a flower does it 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 together, by being placed on plates of copper, iron, or baked earth, held over the fire, and are then thoroughly dried by exposure to the sun.

Louisa. We must have sugar to our tea, mother, so pray describe it next.

Mother. Sugar, you already know, is the juice of a kind of cane, principally cultivated in the West Indies; but a little is also grown in China and the East Indies.

Helen. You have often seen it, mother.

Mother. I have, and can very well remember sucking small pieces of it, when I was a child.

Helen. The sugar-cane grows tall, like a reed?

Mother. It does, to the height of about five or six feet. The skin is soft, and the inner part of the cane, a pulpy spungeous substance. The canes are generally half an inch in diameter. How much then must be in the circumference?

Louisa. Diameter is across, and circumcumference around any circle.

Mother. You are perfectly right.

Helen. The diameter is always one-third of the circumference. If then the sugar-cane is half an inch in diameter, it

must be one inch and a half in circumference.

Mother. Fairly answered. Each cane is marked by knots, at the distance of eighteen inches from one another. At the top grows several long green leaves, in the centre of which there 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 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 parts better to separate

from the syrup, which it it does in the form of a thick scum. The juice is boiled six times, until it is purified from all impurities. It is now barelled 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 clarified by bullock's blood, or sometimes by the white of eggs, 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 of the business. 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 scum is removed as it forms, and thus disappears all vestiges of the bullock's blood.

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

Mother. Do not run away with any superficial incomplete account, and then act upon it as entirely just. Make yourself first thoroughly 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 undergoing 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 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 formerly having 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 that is 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 rosewater?

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 are produced afterwards, by the admixture of some other matter.

Louisa. Brandy is not produced from sugar.

Mother. No; brandy is a strong spirit, distilled from wine. That mode in France is esteemed the best, and the pricked, or

spoiled wine is generally used for the purpose?

Helen. And gin, mother?

Mother. Gin, or geneva, (from geniévre juniper,) is an ordinary malt spirit, distilled the 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, certainly: I have often observed the berries, and squeezed them, to extract their perfume.

Louisa. What spirit is that papa so often mentions?

Helen. You mean arrack, I suppose.

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

Mother. Arrack 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. Then, pray describe it.

Mother. The Indians provide themselves with several round earthen pots, and, by the help of a rope, they very rapidly ascend the cocoanut trees. 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 drank in that state, and is called toddy. When allowed to stand, it quickly begins to ferment, and is then distilled into the spirit, named arrack.

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, in time become 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, that sometimes, but not always, succeed one another :—first, the vinous, or spiritous; 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 is, is spoilt.

Mother. Your account is correct: heat is necessary to fermentation, but not 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 the product of vinous fermentation, greatly assists fermentation.

Louisa. Do you call yeast the 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 are 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. 'Tis the boiling of preserves that 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 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 powers, (making the grain grow), and then stopping vegetation.—By being steeped in water, the barley begins to sprout; as soon as this is perceived, a certain degree of heat is applied, which destroys vegetation—the grain is gradually dried in a kiln.

Louisa. And this is malt.

Mother. It is, and from a mixture of malt and hops, that well-known beverage, beer or ale, is made.

Helen. Hops are the dried flower of a plant of that name.

Mother. They are, and bestow a bitter flavour to the beer, which not only assists to correct the mauky sweetness of the malt, but to preserve the liquor from passing to the 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 sweet.

Mother. Yes;—Hop-grounds must form a very graceful view.—The principal ones are near Farnham, in Surry.

Helen. Porter is also a liquor made of hops and malt, and worked with yeast.

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 all entirely omitted.

Louisa. Cyder is made from apples.

Mother. Yes—cyder 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 spiritous liquor is obtained.

Louisa. You have seen cyder 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, and the scum is removed as it rises; after a certain time it is barrelled.

Louisa. And so ends the process of cyder-making.

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 received into leaden, instead of wooden, vessels.

Louisa. Then perry is pear-juice, and cyder—apple-juice!

Helen. Vinegar can be procured from any liquor, I imagine.

Mother. Yes, if it is 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. Cyder 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 spirits 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 complained, but bore 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 — sometimes I forgot my pain, in listening to your remarks, so that the exertion, you see, repaid itself.

Louisa. I am glad you sometimes forgot your pain.

Mother. It is always the case.—When people honestly enter into the pleasure of others, they forget the extent of their 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-controul, 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 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. Their sufferings may be great, though we cannot understand them. If we never experience any thing beyond slight pain, we must not, therefore, suppose a high degree of bodily agony does not, or cannot exist.—Such incredulity is the expression of a cold heart and contracted mind. But enough of this—you will, I hope, always sympathize in the sufferings of your fellow creatures.

Helen. Yes, I hope so, mother.

Mother. Pity is a kind and soothing gift, which, like Shakespeare's description of mercy—"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 there is no use in filling 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. Louisa! what did I promise to speak of to-day?

Louisa. Coffee, cocoa, chocolate.

Mother. Coffee is the berry of a plant that is cultivated, principally, in Arabia and the West Indies. It is produced from seed sown in a light rich soil. The plants require frequent watering, and, when at a certain age, are transplanted; they yield a slight crop when two years old, but, at three years, they come into good bearing. The fruit when ripe is red, and not very unlike our cherry; these are gathered, or 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 more completely dried, and then 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 is then called cocoa, but also forms the basis of the paste known by the name of chocolate. The cocoa-tree is planted in rows, or walks, and is not in full vigour until the seventh or eighth year. It remains in bearing for fifty years. There are two principal crops every year. After the nuts are gathered, they are deprived of their outer shells and dried.

Helen. In that state, they are called cocoa.

Mother. Yes, but to produce chocolate, the dried kernels must be ground into a fine powder, this is moderately heated, and then put into moulds, to form the flat cakes we purchase from the shops. In Spain, many spices and drugs are

mixed with the chocolate. In England and France, vanilla, sugar, aud occasionally cinnamon, are added, in the compositiou of chocolate cakes.

Helen. Pray, what is vanilla?

Mother. A plant, whose small black seeds are used to give a perfume to chocolate, and I believe also to snuff and tobacco. It grows in hot climates.

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 some parts of America. In China two crops are sown every year, in March and July; 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 it is said to have the peculiarity of growing to keep pace with the rise of water, so that even when the water lies many feet deep on the

rice lands, the summit of the plant always appears on 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, that formed the endless, astonishing variety. To raise the mind to such contemplations, is indeed the noblest end of study.

Helen. I think it is impossible to study without such thoughts.

Mother. You are right, my child, only 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 adopted 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, warm our hearts to gratitude.

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 silk-

worms 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. I think 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 become 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 hid from view, and on the tenth the work is finished. It is then best to wind off the silk, or the insects would pierce the cocoons, or balls, in their 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 a short time, it dies.

Louisa. And the silk is wove into satins, sarsenets, and ribbons.

Helen. Silk-worms 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 silk worm, which produces a silk-like thread, but I fancy 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 carefully collected by the Chinese, and made into a kind of silk, not so rich and bright as that produced by silk-worms, but yet sold at a much higher price, as it possesses the valuable quality of washing well, lasts long, and is not so liable to stain from grease and oils.

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 description must give a very inadequate idea of the complex machinery, 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 but of one way—and 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 while it will be useful to make yourselves acquainted with the different raw, or unworked, materials, from which the numerous manufactured articles are produced, or of which they are compounded.

Helen. In this undertaking, 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 mutually 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 perseve-

rance and patience, they gradually acquired the knowledge they possessed.

Helen. That is some comfort for us.

Mother. Yes, and therefore bear it always in your mind, that an earnest desire for knowledge, and an unremitting attention to the means of attaining it, must always meet 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, the knowledge that teaches 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—only 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 a 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.

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 palateable, 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 the small globules, 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. Then, I suppose, tapioca and arrow root are also produced from some such 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 we use comes principally from Calabria and Sicily.

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

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 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 continually dug from mines.

Louisa. Perhaps there are two substances so much alike as to be mistaken for one another.

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 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 not decide by a solitary one.

Helen. Is amber-gris another name for amber?

Mother. No, my dear, they are different substances. Amber-gris, as its name implies, is of a grey colour.

Helen. Yes, gris is French for grey.

Mother. Amber-gris 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 a disease, is uncertain.

Louisa. What is the use of amber-gris?

Mother. It was formerly used as a medicine, but, being found of little efficacy, it is now laid aside, and 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 tail. There are some other animals that possess a strong perfumed matter.

Helen. Camphor is a strong perfume.

Mother. It is, but not one of those obtained from animals. Camphor is a concrete juice, found in laurus camphora, a large tree growing in the islands of Sumatra and Borneo. It is picked out with knives from the centre of the oldest trees, through the trunk 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 synonimous 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 in water, but resin is indissoluble in water; it is soluble in spirits of wine alone. Resins exude from the fir and pine.

Helen. Then pitch, tar, and turpentine, are called resins.

Mother. They are. The coarsest of these is called rosin.

Helen. How useful the juices or sap 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 Indian rubber?

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

Mother. Indeed, my dear, it is not. Caoutchouc, or, as you call it, Indian rubber, is obtained from two South American plants. The juice is procured by incision; (cutting the tree,) it is spread over earthen moulds, of any form, in numerous layers, until it is thought to be sufficiently thick.

The whole is then hung over smoke, produced from burning vegetable substances, and, when sufficiently hardened, the inward moulds are broken, and taken out in pieces, and the gum remains.

Louisa. Why, mother, this is beyond belief!

Mother. I do not wonder at your incredulity. Wiser heads than yours have been astonished by this account, and it was a long time before it was fully credited. I believe, however, it is now established beyond controversy.

Helen. I have often observed the bottle, 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 I have 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, and made from the skins of different beasts. The older the creature, the better the glue produced from its hide. Whole skins are rarely used, but parings and scraps, and even the strong sinews of the feet, are applied to the purpose. These are boiled in water, to the consistence of thick jelly, strained through open ozier baskets, then 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, that we think such delicate food, is in fact glue!

Mother. Assuredly of the same nature, but, by being made from cleaner and more delicate materials, the production is consequently more elegant and 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 burnt 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 gross parts may subside to the bottom. When clear, it is run into coolers, where the alum crystalizes, 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 princi-

ples; 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 maid 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 candles hardness.

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 dyeing muslin. It was a yellow colour, produced by saffron and turmeric. What are these two substances?

Mother. Saffron is the stamens 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.

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 from tallow.

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

Louisa. The part, I suppose, 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 very nourishing, when mixed with barley, and 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 differently 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, 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, whose fruit 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 chesnut.

Louisa. Such candles must be very delicate, and much purer, than those formed from animal fat.

Mother. Yet this same animal fat

which you mention with so much 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, 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 converted into different kinds of soap. The principal part of this, is boiling the grease, in what is called a ley: that is, a mixture of water, and the white powdery ashes that remain from burnt vegetables. Some common salt is also used in the process, and, when sufficiently boiled, the soap is dried in long 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 we use for sallads, and culinary or cooking purposes, and which we purchase in those thin glass flasks, inclosed in light wicker work, is indeed the expressed juice of olives; but another coarser vegetable oil, much used in manufactories, is extracted from rape seed, a grass-like plant, frequently cultivated in England, in large fields, in the same manner as other grains.

Helen. What animal yields oil?

Mother. The whale is the animal that

chiefly produces oil, although there are one or two other fish that have been found to yield a quantity of oil.

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

Mother. English and other merchants, annually fit out a number of vessels to visit that snowy region, and bring home large cargoes of blubber, or that part of the whale which contains the oil. This is stowed into barrels, and, on its arrival in England, or any other civilized port, is boiled down, and thus animal oil is produced.

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's blubber to be a very great

dainty, and 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 would rather starve than eat such wretched food.

Mother. My dear child, such a declaration 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 extreme thirst, and may, therefore, judge how trying extreme hunger must be.

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

Mother. The hunger you experience, so slight, and so regularly appeased, is certainly 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 fainting 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 wished 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 them 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 beneath water, and torn from thence by the violence of winds and waves, and

thus floated to land. But, now, a very different account is given of this substance: it is discovered to be an animated body.

Louisa. Alive! 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 eye-sight alone give us!

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

Helen. Then the pleasure of speak-

ing, 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, so that 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 from place to place, 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 the loss of her pretty calf!

Mother. This proves they are capable of attachment. The fidelity of the dog also shows 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 blessing, beyond all other joy, he can look forwards to a life beyond the grave. The

tender hen performs her stated duties; the faithful dog, to his last hour, guards his master. These die, and die for ever: their good actions are promised no future reward, no future existence compensates 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 is he assured of a state, still more blest, still more propitious. His virtues are not only recompensed, by being attended with peace and content during their exertion, but are assured of a reward, after they have ceased to exist. Can any thing, my dear children, be more invigorating, 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 without wonder.

Mother. Such is the effect the con-

viction 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 learnt every day, and, every day, something found to be admired.

Mother. Indeed, my dear Louisa, you say very true; every thing consipires 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 faults, not that of the prospect; and, if they will not use their sense in the delightful service of gaining knowledge, they must not, therefore, say, that knowledge cannot be gained, or that the gaining it is not a very great pleasure.

Mother. Well done, 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 usefulness 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. Broke 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 conceal and 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 handball, 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 forbid your doing so.—The loss of the glass is a very secondary mischief, although you have thus wasted an useful article, without the least benefit to any body.

Helen. It was quite by accident.

Mother. But, if she 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 of this be assured, that no one sincerely wishes, and strives to improve, but, sooner or later, they 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 not say any 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 will remain in my re-

membrance; but, by your future good conduct, you may give me more pleasing recollections, and thus, this act of your disobedience 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 in a frame, on each side on the wood, and dried by the air, holds the glass firm and fixed.

Helen. And what is putty?

Mother. Putty is a kind of thick paste,

made by mixing whitening and linseed oil together, sometimes a little white-lead is added

Helen. Whitening 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 flint, sand, and alkali.—I understand your inquiring look, Louisa, and will inform you that alkali means a kind of salt found in the ashes of burnt 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, sand, and alkali.

Mother. These three ingredients are mixed in certain proportions, and being

put into pots, are placed in a furnace, where the intense heat melts the whole mass into a thick tough matter, not liquid, but sufficiently pliable to be worked into any form. The glass matter is then taken out of the pots, by a long iron tube, through which the workman blows out the glass, and with great dexterity forms whatever he intends.

Helen. To think that such a brittle substance as glass, should once be a soft paste!

Mother. And when soft, easily cut with shears, or pincers, into every variety of shape.

Louisa. Is this the whole of glass-making?

Mother. The glass would be too brittle, for any purpose, if thus suddenly removed from intense heat, to the temperament 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, where it cools, in thin cakes, or sheets. In this state it also answers for window panes. But, to render it reflective, that is, give it the power of so faithfully reflecting objects presented to it, the back of the sheet glass, is plated with an amalgam of mercury and tin.—That is, mercury mixed with tin.

Helen. Some glass is polished. Pray, how is that done?

Mother. Glass is polished, by laying two plates of it on each other, with a small dusting of fine sand between, and then carefully rubbing the plates backwards and forwards.

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, can only be gained by viewing the whole process, and, as glass manufactories are frequent in different parts of England, I trust I can one day procure you that gratification.

Helen. I should particularly enjoy such a 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 china-ware is also made from boiling, or baking some particular kind of clay?

Mother. China-ware, or porcelain, is composed of two ingredients—a certain hard rocky stone, ground to a very fine powder, and mixed with a white earthy substance. These are thrown into a well-paved pit, and kneaded together, generally by the feet of the workmen. From this

mass a small quantity is taken, and separately kneaded upon a slate, till it comes to a proper state for moulding. In forming the article, whatever it may be, this paste passes through the hands of sometimes twenty workmen, each of whom assists in shaping it. When completely fashioned, other artists sketch and paint the outside of the vessel in the manner directed. It is then placed in a small wooden frame, each article separate, and baked in the furnace.—This is the mode of proceeding in China.

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

Mother. In England, a kind of clay and ground flints are used in the potteries; but, of course, the materials differ according to the different sorts of earthen ware to be produced. The vessels with us are also formed by the help of a lathe, or wheel, into the required shape.

Louisa. They do not use the wheel in China.

Mother. I believe not. The population of that country is so great, that its inhabitants reject all machinery that tends to lessen the demand for labour. With us it is very different, and we eagerly seize every means of shortening and simplifying all manual operations.

Helen. You told us salt was used in glazing earthen ware.

Mother. Pottery would be porous, or pervious to fluids, without undergoing 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 then completed.

Helen. The colours of china-ware, you have described, as applied before burning, and thus 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 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 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 com-

forts.—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 loom. These are dexterously shaped, in a wooden mould, next partially dried, by being placed in rows in the open air, and then piled up into square heaps, and properly burnt.

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

Mother. Mortar is made by a due mixture of lime and sand, with water, to which some cut horse-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 the cements so well as the ancients did;—

the mortar, used in gothic buildings is observed to possess an astonishing hardness and tenacity. Tenacity means the power of holding fast. Suppose we now close the conversation.

Louisa. First, dear mother, finish the account you begun, the other evening, respecting sponge.

Mother. I have already told you that it is now determined to be an animal, which, however, shows very small signs of life, remains fixed to the rock, on which it is originally produced, and is continually pierced and injured by many marine animals. Its power of imbibing moisture, and thereby swelling to a considerable increase of 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 you

are acquainted with its fatal effects.—But it is always the wisest plan to avoid tasting or swallowing any thing, until you are well assured of its qualities.

DIALOGUE IX.

Mother.—Helen.—Louisa.

Helen. I have been drawing, to-day, till I have quite stupified myself.

Mother. That is turning a pleasure into a pain. You are wrong, my dear Helen, to sacrifice your health and your 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 more necessary. What we do not like, we seldom allow to absorb too much of our time, or pursue 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, persisted in, it 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 the error 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 Scotch steps, to plain reading and working.

Louisa. I never think you unkind, mother, though, I confess, I sometimes wish there was no such thing as reading and working in the world.

Mother. Then you would like to be a little playful monkey.

Louisa. Shocking!—what, without reason!

Mother. You could dance perfectly well without reason, and 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 know 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 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, that has so fatigued you, Helen?

Helen. Here, mother, a head sketched with pencils, and shaded by 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 of charcoal and black lead?

Helen. Are not pencils also prepared from black lead?

Mother. Yes, my dear; black lead is chiefly found at Borrowdale, in Cumberland. It is cut into a thin plate, and fitted into a semi-cylinder of wood, the other

half of the cylinder is then glued on, and the pencil finished.

Helen. That is simple enough.—The manufacture of paper is not so easily completed.

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 kind of paper each is best calculated to produce, are well dusted, and then torn asunder by an iron instrument, with long sharp teeth; during this last operation, they are immersed in clean water, which not only assists in cleansing, but in softening the rags into a mash, or pulp. This process generally takes six hours. The fine pulp, now becomes snowy white, is next put into a copper of warm water, from whence it is taken out, by dipping the mould, or iron

sieve, sideways into the copper. This mould admits of a sufficient thickness of pulp to form a sheet of paper, and the wires, that cross the bottom, permit the water to escape, but are too close to pass the pulp.

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 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 screw-press, and the remaining moisture 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 the paper 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 again dried. After which it is put up into reams, and quires, and sent to the stationers, who sometimes adds a gilt edge, and otherways 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, the parchment is then ready for use. Vellum is a more delicate kind of parchment, prepared from the skin of a calf.

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

Mother. That is the leather most commonly used for book-binding; but the calf-skin, for this purpose, of course, undergoes a different preparation. It is then first tanned.

Helen. I know that process, for I once went into a tan-yard with papa, and he showed 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 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 various ope-

rations 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 certain 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, as I think no description can convey a just idea of the process. Should you, however, wish to read some account 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 I know that pens are the quills, or strong

wing feathers of the goose. Next then, pray, say something about ink.

Mother. There are many ways of making ink, also many sorts of ink, as that for writing, for printing, red, blue, green ink.

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

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

Helen. I believe, by reading Mrs. Barbauld's Evenings at Home, that galls are a swelling or protuberance 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 my mother will also explain that, I am sure.

Mother. Sealing-wax is composed principally of shell-lac, with a small portion of rosin, and coloured with vermillion, 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 vermillion?

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 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, Helen painted for my aunt?

Mother. There are many varieties of varnish, adapted to different purposes, all chiefly composed of the several gums and 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, of whose properties 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 mantle piece, and papa's snuff-box is the object you mean. I do not like snuff, but I should like to know what it is.

Helen. Then, without further hesitation, pray, mamma, what is snuff?

Mother. Snuff is the powdered leaves of the tobacco plant, dried, and carefully prepared, 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 being 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 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, to go out, will assist to remind me.

Louisa. Then now, 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 pleasanter 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, a source of pleasure, of information, and of general benevolence.

Louisa. Did you not admire the beautiful large pearls Miss Mildmay wore, so tastefully 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 I should be most happy 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 large oyster from which pearls are obtained.

Louisa. Come, Helen, leave off poring on 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 these kinds of oysters lie 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, 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, of the height of a man, 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 carefully 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. Diamonds are 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 only cut 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 current of rivers, carried, I suppose, there 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 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. Yet 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 there is an inferior kind 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 supply 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 the straits of Messina.

Helen. I remember Marseilles perfectly. 'Tis a sea-port 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 what part of the animal it is taken from.

Mother. Ivory is the tusk of the elephant, and answers to the horns of other animals. Horn, you know, by long and intense boiling, can be reduced to a jelly.

The shavings of ivory can be equally softened.

Louisa. Horns of animals, I know, are very useful for a variety of purposes.—As lanthorns, and knife handles.

Mother. Ivory shavings, burnt 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 further account of them would be superfluous, after the excellent one 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 lying in a solution of tin and lees, or dregs of wine. Nothing can be more amusive than viewing 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 require 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 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 and 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 is 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's 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 instantly in a blaze. The frightened girl, scarce conscious what she did, attempted, but 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 a one as Louisa will one day 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 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' excruciating pain, she expired at midnight.

Helen. That hour the night before she was calmly and sweetly asleep.

Mother. And under the blessing of Heaven, might have looked forwards to many nights of equal peace, but one rash obstinate act, discharged for ever all her earthly prospects.

Louisa. Mother, I shall never forget this story!

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

Helen. Muslins 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 materials 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 cotton is a vegetable produce.

Helen. Yes, and that which is used in

England comes principally from the East and West-Indies.

Mother. Some of the cotton plants are annuals, that is, they die within the year, others are perennial, 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 from the end of October to December, and the second commencing 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 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 such fine threads.

Mother. Which I find quite impossible to describe to you. Suffice it that I tell you that 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 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 of 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 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 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 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 the ponderous, and all the minute operations of a large 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 man, in a few seconds, stops this tremendous and enormous machine; and by doing so, also stops the business of the whole extensive pile of building. The deafening noise of the ponderous wheel, and the deep and confused murmur of distant varied machinery, is all instantaneously silenced. From wild uproar succeeds a stilly silence. I cannot describe to you the sensation it produces. The awe-struck wonder with which the beholder reflects on the astonishing ingenuity and skill of his fellow man.

Helen. Such is the method of preparing cotton thread.

Mother. Which is afterwards wove into an innumerable variety of articles, muslins, calicoes, and others.

Louisa. The weaving is also performed by machinery.

Mother. Yes, but each separate loom is worked by hand.

Helen. The printing of calicoes must be very entertaining to inspect.

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 imprinted, 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 portion 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 diminishes the pleasure of the artificers—as the calico receives the different colours, it gradually passes along the table 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 of flowers that we much admired in one of our walks last summer.

Mother. When the flax is considered as ripe, it is gathered. It must then be steeped in water a certain time, and dried, that the outer rind of the flax stalk may crack, and more easily give up the fibrous substance within—afterwards follows the different operations of breaking, scratching, and heckling. The flax is next delivered, so prepared, 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 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 merely a similar process with flax.—The finer kinds are only used for weaving cloth, the coarser hemps are wove into canvas, and 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 obnoxious 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 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 skin of animals tanned into leather. Cotton-stockings, wove from the cotton-plant, linen-frocks produced from the fine threads of flax.

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

Louisa. Our bonnets sometimes composed 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 skin of the beaver. There are, however, other animals, as the goat and the rabbit, that also yield hair and wool for the occasion.

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

Mother. No, my dear, hats are composed of the long and short hair which is found on the skin of the before named animals.

Louisa. I am quite surprised.

Mother. These two kinds of hair are carefully taken off from the skin, and are well mixed together. The whole is then beat into one mass, and from this the workman takes what he requires to form the hat. This is done, 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 learnt 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, I was, last night, whilst you and papa where from home, 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. There seems to be a curious assemblage of things.

Louisa. Yes, all the odds and ends; 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 nutmeg, 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 inclosed in a similar fleshy coat. 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 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. This is done by steeping them in sea-water, and afterwards drying them under a hot sun. The skin shrivels, and is easily rubbed off by the hand; of course, therefore, the white pepper is the least pungent.

Helen. Certainly. Allspice, I suppose, is another kind of pepper?

Mother. The allspice has obtained its name from being supposed to possess the flavour of all the spices. Its proper name is the pimento. It is found in large quantities in Jamaica, and in most other parts

of the West Indies. The pimento tree is highly beautiful; its leaves diffuse a most fragrant perfume, and its large white flowers bloom in great profusion.

Helen. What a charming object it must form amid dark woods!

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

Mother. Ginger is the root of a plant cultivated at Calicut, and other places in Asia. The plant resembles a rush, and the knotty root spreads itself over the surface of the ground. When fresh gathered, it is soft, in that state, is eaten by the Indians, as a sallad, or prepared with sugar, 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

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 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. This is done by steeping them in sea-water, and afterwards drying them under a hot sun. The skin shrivels, and is easily rubbed off by the hand; of course, therefore, the white pepper is the least pungent.

Helen. Certainly. Allspice, I suppose, is another kind of pepper?

Mother. The allspice has obtained its name from being supposed to possess the flavour of all the spices. Its proper name is the pimento. It is found in large quantities in Jamaica, and in most other parts

of the West Indies. The pimento tree is highly beautiful; its leaves diffuse a most fragrant perfume, and its large white flowers bloom in great profusion.

Helen. What a charming object it must form amid dark woods!

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

Mother. Ginger is the root of a plant cultivated at Calicut, and other places in Asia. The plant resembles a rush, and the knotty root spreads itself over the surface of the ground. When fresh gathered, it is soft, in that state, is eaten by the Indians, as a sallad, or prepared with sugar, 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, is considered fit for being dug up. From the long sticky roots is then the syrup 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; 'tis here in my list.

Mother. Cork trees are found in most of the southern countries of Europe, and are also indigenous, that is, 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 fresh 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. To make these flat, they are piled up in damp situations, the hollow sides undermost, and pressed down by heavy stones; after this 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 very clever about them.

Mother. The different operations by which wool is made into cloth are various, and many 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, and some English wool, I suppose, is also used.

Mother. Yes. The first operation is scouring, or washing the wool, and depriving it of all its natural greasiness. It is then dried in the shade; afterwards well beaten, and every particle of dirt picked out of it. It is next oiled and carded, and spun on a wheel. It is then 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 to us.

Mother. The warp means the threads that extend length-wise on the loom, and across which the weaver throws the woof, by means of his shuttle.

Helen. I shall remember that.

Mother. When the cloth is wove, 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 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 that made from Spanish wool, although that of our own country is rapidly rising into estimation.

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 to which some of these countries are so liable, and the dreadful earthquakes and volcanos with which the others are frequently threatened, or destroyed. The frightful avalanches, or detached enormous balls of snow, that fall from the mountains that skirt Switzerland, and, in a moment, overwhelm a whole smiling village!

Helen. That, certainly, must be dreadful.

Mother. The terrific rivers of burning lava, or liquid fire, that roll from Vesuvius, and turn some of the loveliest plains of Italy into barren deserts, whilst the sirrocco (a scorching wind,) rushes along the blooming country, and dries up every bud and every blossom.

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 that still affect that land of oranges and

grapes, and spread their destructive influence into Spain; and sometimes alarm the inhabitants of France.

Helen. Surely nothing can be more distressing than an earthquake!

Louisa. Or a volcano, or an avalanche!

Mother. However, to compensate to you, for the disgust I have caused against these countries, I will describe one to you, which is free from all these terrors, and yet possesses a thousand advantages.

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 on the green and sloping meadow.

Louisa. Oh! how lovely!

Mother. Its valleys dotted with many a straw-roofed cottage, whose humble door o'erarched with woodbines, or whose simple casement, decked with white and

ruddy roses, presents the view of comfort and of cleanliness within. Perhaps an aged grandmother, spinning amidst her children; or a rosy lass, weaving rich laces on her bobbined cushion.

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!

Mother. The charming gaiety of summer is followed by the rich luxuriance of autumn, and the social comforts of winter, succeeded by the lively beauties of spring. No earthquakes, no volcanoes, no sirroccos, 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 a sweet, sparkling liquor, which, well managed, affords a 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, and 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!

Mother. Autumn has other duties, 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 mirth 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 glean 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 to 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 skilful 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, that, with moderate labour, yields all the comforts and most of the luxuries of life.—Laws open to all ranks of men, protecting the humble, and 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, that makes us lose the pleasures within our grasp, in fanciful dreams of delights that exist 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 no nothing to dishonour her present respected name. But let us firmly protect, and dearly love, our home—our favoured home—"*England!*"

FINIS.

J. Swan, Printer, 76, Fleet Street, London.

James Wood

1822

James Wood had this
book given him when
he was at Burton
Deverill by Mrs
Pilkington 1818

I shall never forg
it
Till I do