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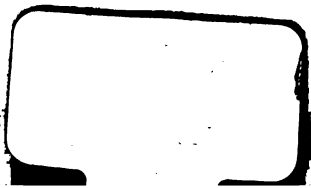
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**CONVERSATIONS**  
on  
*Common Things*



**BOSTON.**

**MUNROK AND FRANCIS**

**CONVERSATIONS**  
ON  
**COMMON THINGS;**  
OR,  
**GUIDE TO KNOWLEDGE.**  
WITH  
**QUESTIONS.**

---

FOR THE USE OF SCHOOLS AND FAMILIES.

---

**BY A TEACHER.**

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The taking a taste of every sort of knowledge is necessary to form the mind, and is the only way to give the understanding its due improvement to the full extent of its capacity. LOCKE.

---

THIRD EDITION,  
REVISED, CORRECTED, AND STEREOTYPED.

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BOSTON:  
MUNROE AND FRANCIS,  
128 Washington-Street.

1828.



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"Conversations on Common Things, or Guide to Knowledge, with Questions, for the use of Schools. By a Teacher. 'The taking a taste of every sort of knowledge is necessary to form the Mind, and is the only way to give the Understanding its due improvement to the full extent of its capacity.'—*Locke.*"

In conformity to the act of the Congress of the United States, entitled "An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies during the times therein mentioned : and also to an act, entitled, "An act supplementary to an act, entitled, an act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies during the times therein mentioned ; and extending the benefits thereof to the arts of designing, engraving, and etching, historical and other prints."

JOHN W. DAVIS, { *Clerk of the District of  
Massachusetts.*

## DEDICATION.

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To you, my young pupils, I dedicate this little volume, with the fervent wish that it may fulfil the purpose for which it is designed, that of informing your minds, and exciting you to seek after that knowledge which will be useful to you through life, and fit you to lay up, by good and virtuous habits here, those treasures which will not, like the riches of this world, take to themselves wings, nor yet by moth or rust be corrupted.

Your minds may now be likened to a garden, which will, if neglected, yield only weeds and thistles ; but, if cultivated, will produce the most beautiful flowers, and the most delicious fruits. Choose then whether your talents shall be buried in neglect, or shall be put to such use as shall make *you wiser and happier*, and *others better* for your having lived in the world.

Your affectionate  
**TEACHER.**

---

At the Bookstore of the Publishers of this work may be found the following works, by the author of "Conversations on Common Things."—

**EVENING HOURS.** Vols. I. and II. "Line upon line, and precept upon precept." This work is printed in Numbers, six of which form a volume. The work will probably be completed in another volume. "Evening Hours contains, in successive numbers, a familiar exposition of the evangelical history, and such practical remarks as a judicious Christian mother might be disposed to make to her children, when perusing with them the Bible."

**HYMNS FOR CHILDREN.** "This valuable little work will furnish pleasing employment for Sunday. The selection manifests both judgment and taste."—*Am. Jour. of Ed.*

**ALICE AND RUTH.**

"T is easy to squander our years  
In idleness, folly, and strife ;  
But oh ! no repentance or tears  
Can bring back one moment of life :  
But time, if well spent, and improved as it goes,  
Will render life pleasant,—and peaceful its close."

**MARRION WILDER,** or the Passionate Little Girl.

**GEORGE MILLS,** or the Little Boy who did not love his Books.

**JOHN WILLIAMS,** or the Sailor Boy.

**LITTLE AGNES AND BLIND MARY.**

**ROBERT WOODWARD.**

**SEQUEL TO MARRION WILDER.**

**THE STORM.**

**JAMES COLEMAN,** or the Reward of Perseverance.

*Preparing for the press,*

**A SEQUEL to Conversations on Common Things.**

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## PREFACE.

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IN the present state of society, and of schools, a Preface to a school-book seems almost superfluous, but, custom having established the usage, it cannot with decorum be infringed.

By offering an apology for the appearance of this volume, I might (and that deservedly) incur the reproach of affectation, for in truth I cannot, in the common trite way of authors, affirm that 'it was written only for the benefit and amusement of a few, and never designed for publication till the pressing entreaties of a few friends overruled my own judgment, and induced me to offer it to the public.' I frankly acknowledge that it was begun and finished with the express intention of being put into print; not that I had the vanity to suppose, or the wish that it should supersede any of the excellent reading books designed for schools, already in use, but I have felt the want, in common with several of my fellow Teachers, of a book which might follow, or take the place of, Mrs. Trimmer's "Knowledge of Nature," and other similar productions, that convey less information than is necessary for the proper understanding of the subjects upon which this volume treats.

If Parents and Teachers shall, on examination, approve and adopt this for their children and pupils, I shall feel a degree of satisfaction, that the hours employed in writing, whether redeemed from sleep, or appropriated after the fatigues and labours of daily school duties were fulfilled, have not been profitless, and that I have attained the object of my highest ambition,—the improvement of children, and their advancement in the path of learning.

I have introduced very frequently the proper names of places, in order that, by a frequent reference to the Atlas, an interest in the study of Geography might be excited, and former lessons perfected; and have also left *unexplained* many words not readily comprehended by children, in order that they might be habituated to refer to the Dictionary for the solution of those words which they do not understand, whether in this or other books. The mere reading a page of definitions leaves but slight, if any impression upon the mind; but if a child has the labour of searching for the word, and learning and applying the definition as it reads, the memory is impressed and the meaning retained.

I have followed the plan of many esteemed writers for children in adopting the form of dialogue, as I think information is more easily conveyed to young minds in familiar discourse,

than in simple narrative. This style is necessarily attended with the inconvenience of repetition ; but perhaps that is not absolutely an evil in a school-book, particularly as every Teacher knows, if Parents do not, that it is neither in telling once, twice, nor the hundredth time even, that information is always retained : but, like the prophet of old, we must impress "*line upon line, and precept upon precept.*" Yet the employment (not always task) of informing the young mind, of advancing its feeble efforts, and of cultivating with care the early buds that give promise of future blossoms and fruit, is an elevating, nay, almost inspiring one, and with a popular modern writer I feel

" It is no unsubstantial good to dwell  
" In Childhood's heart,  
" On Childhood's guileless tongue ;  
" To be the chosen favourite oracle,  
" Consulted by the innocent and young :  
" To be remember'd as the light that flung  
" Its first fresh lustre on the unwrinkled brow."

Viewing as I do the avocation in this light, no apology seems necessary for having made the attempt to enlighten those entrusted to my care in the way my judgment and experience in teaching have dictated ; and what might else be called presumption in the youthful author, may receive a kinder name when her motives are appreciated.

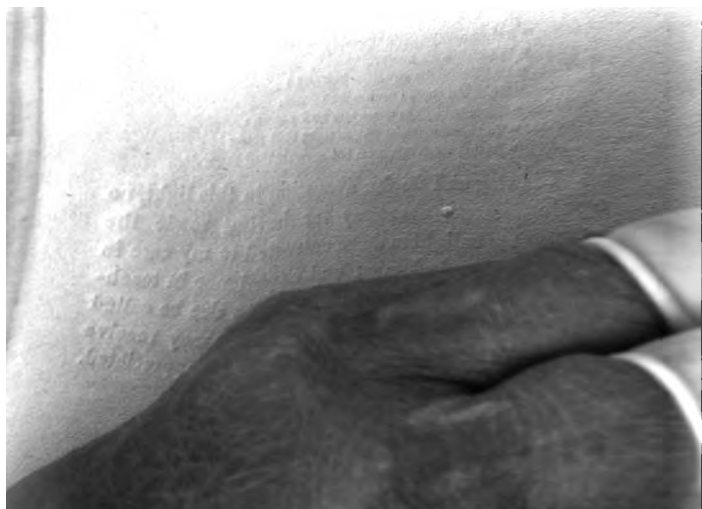
*Boston, January, 1824.*



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CONVERSATIONS  
ON  
**COMMON THINGS.**

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CONVERSATION I.

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DAUGHTER.

WHY, mother, did you spend so much time in the factory the other day? I saw the spindles whirl till I was tired: do tell me why you looked so long at that great pile you called machinery?

*Mother.* I will tell you, my dear; I wished to understand the principle upon which the spools and spindles were set in motion; the action of the looms; and closely to observe every part of what you thought so uninteresting.

*D.* Of what use will it be to you, mother? you told me the other day I must have a reason for every thing I do, and some useful end in view.

*M.* Suppose, Sarah, I should ever be asked if I had visited any of our manufactories;

and answering in the affirmative, should be further questioned respecting the construction and management of them : should I not, think you, suffer some degree of mortification, if unable to give any explanation of their parts, and the principles upon which they are established ; and would not my friends have reason to suppose me very stupid and ignorant : besides, does not the acquirement of any thing new to your understanding contribute to your lasting enjoyment in a higher degree, than mere superficial observation, or any pleasure you receive from the gratification of your appetite, or mere transient amusements ?

*D.* O yes, mother, for you know as a reward for application to my lessons in school, my Teacher gave me the book I have been reading to-day ; and I am sure I felt much more pleasure in learning from it that Spermæceti, of which our candles are manufactured, is taken from the head of a particular species of whale, than in eating the fine preserved apricots you were so good as to give me.

*M.* The knowledge you have gained of Spermæceti will never be forgotten ; the satisfaction of eating Apricots is already past. I trust, my dear Sarah, your reason is convinced of the utility of observation, and you no longer doubt, why I spent so much time in examining the ingenious Mechanism, which

then interested you so little. For the future, observe and remember every thing that will inform your mind, and enlarge your understanding.

As the evenings are now lengthening, I will, when not otherwise engaged, spend an hour in giving you information on those subjects, which are particularly necessary for your improvement, and which, while they convey to your mind useful instruction, will at the same time amuse you ; on this condition, however, that your regular studies be not neglected for our interesting conversations.

*D.* Dear mother, I will be quite diligent, and learn my lessons very well, if you will be so indulgent as to teach me : but will you answer all my questions, and tell me all I wish to know ?

*M.* Really, my dear, I cannot grant you such an unlimited promise, but will endeavour to give you all the reasonable information you ask.

*D.* Do begin this evening, mother ; I assure you my lessons are all learnt for school.

*M.* Well, what is your first question ?

*D.* I should like to know something of the divisions of time, mother ; you know when I was so very sorry that our beautiful flowers were all withered and dead, you told me that, in another year, the plants would again put



forth leaves and blossoms : I shall be very glad when another year comes, that I may again gather flowers to ornament our parlour : but I wish to know, what is a year ?

*M.* This morning you rose at six, and it is now six in the evening ; tell me how many hours have passed since you rose from bed ?

*D.* Twelve, mother.

*M.* Well, twelve hours more must pass before the sun will again rouse you from your slumbers ; add then these twelve to the twelve of to-day, and what will be the number ?

*D.* Twenty-four.

*M.* Day and night taken together make a solar day, or the space from one sun-rising to another ; or it is that portion of time during which the earth makes one revolution round its axis. Most Europeans begin their day and hours at midnight. The Italians, however, begin their day at sunset, from which to the following evening they reckon 24 hours. The Turks begin their day at a quarter of an hour after sunset. Most of the Italian clocks strike 24 hours ; for instance, an hour past twelve they strike thirteen, instead of one, as do our clocks, and so on to twenty-four. In numbering time, we say, twenty-four hours make one day ; seven days one week ; four weeks one month ;

twelve months, or three hundred and sixty-five days six hours, one year)

*D.* Who named the days, mother ?

*M.* They are derived from certain Saxon objects of worship, as Sunday from the Sun ; Monday from the moon ; Tuisco, the same with the Roman Mars, gave name to Tuesday ; Wednesday from Woden, their god of battle ; Thursday from Furanes, the same with the Danish Thor, the god of winds and weather ; Friday from Friga, otherwise called Venus, who was sometimes worshiped as the goddess of peace and plenty ; Saturday, either from Seator, the god of freedom, or from the planet Saturn.

*D.* I will write these names, mother, that I may not forget them. Will you now be so kind as to tell me from what the months are called ?

*M.* The Romans' named nearly all the months from some of their divinities and emperors, namely, January from Janus, who was represented with two faces, one looking towards the new year, the other towards the old. February named by Romulus from Februa, the mother of Mars. March from Mars, the god of war ; April from the Latin word Aperiio, signifying to open the year or blossom ; May from Maia, the mother of Mercury ; June from Juno, the wife of Jupiter ; July was named by Mark Anthony in

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honour of Julius Cæsar, a celebrated Roman ; August from Augustus Cæsar, also a Roman Emperor ; September from Septem, the seventh month of the Roman year ; October from Octo, the eighth month ; November from Novem, the ninth month ; December from Decem, the tenth month of the Roman year.

*D.* I always thought, mother, that December was the twelfth month of the year.

*M.* It is, according to our reckoning ; but the Romans began to count their year from March, as also did many other ancient nations ; and this seems to be the most natural arrangement, as it is in Spring vegetation commences.

*D.* Did the Romans call the days of the week by the same names as those by which we distinguish ours ?

*M.* No : They were called from the planets, as Dies Solis, of the Sun ; Luna, Moon ; Martis, Mars ; Mercurii, Mercury ; Jovis, Jupiter ; Veneris, Venus ; and Saturni, Saturn.

*D.* Mother, I know there are in the year, or in twelve months, four seasons, Spring, Summer, Autumn, and Winter ; but why was the year so divided ?

*M.* For convenience in reckoning ; it is likely the ancients, observing that the days were not all of a length, together with all

the variations from heat to cold, were led to divide the year thus into four seasons: the changes of the moon were regular and obvious to every eye, and consequently formed another division of the year into moons or months.

*D.* How did they find out the hours?

*M.* It is likely various devices were adopted; but at first it was found necessary to divide the days from one sun-rising to the next.

*D.* And how did they measure time?

*M.* The Romans, one hundred and fifty years before Christ was born, measured time (by means of water) the same quantity pouring from one vessel to another, as sand runs through an hour glass, which was a later invention. They also filled tall narrow-necked vials with water, on the top of which floated a cork; the water ran out very slowly through small holes in the bottom of these vials, and, as it lessened, the cork descended and showed by marks on the outside, how many hours had passed since it began to run. At length sundials came into use. The first, of which we have any notice in the History of Rome, was that erected by Papirius Cursor; we learn from Scripture, however, that dials were in use among the Jews as early, if not earlier, than the reign of Ahaz.

*D.* When were clocks invented, mother?

*M.* Clocks and watches are of still more recent date; great skill in mechanics was requisite to bring them to their present degree of perfection. A striking clock was unknown till the end of the twelfth century; and the first set up in England was at Westminster in (1288.) It is said watches were first made in the city of Nuremburg.

*D.* How are they set in motion, mother?

*M.* Watches are moved by an elastic steel spring, which is coiled up in the case, and, seeking to uncoil itself, gives motion to a wheel which turns all the others. Clocks are moved by a weight which turns a cylinder, and thus gives motion to the wheels.

*D.* Mother, I do not exactly know what you mean when you say in the twelfth century, and 1288.

*M.* That is, I suppose, you do not know what a century is?

*D.* Not certainly.

*M.* A century is a hundred years. Eighteen centuries, and more than one fourth of the nineteenth, have passed since the birth of Jesus Christ. Our years are reckoned from his birth, thus it was not till 1288 years after the coming of Christ that striking clocks were invented. But I have not told you the divisions of day apart from the hours: these

are, morning, noon, afternoon, evening, and night.

*D.* What length of time does the morning include, mother?

*M.* It is that portion of the twenty-four hours, between twelve o'clock at night, and twelve o'clock in the day.

*D.* What then is noon?

*M.* It is that time when the sun has risen to the highest point or meridian, and appears directly south of us who live in the northern temperate zone. Afternoon is when the Sun begins to decline. Evening is the period a little before and after sun-setting.

*D.* Then, mother, what is night?

*M.* It is the period of darkness, occasioned by the absence of the sun.

Go now, my daughter, to your slumbers; and, as you have learnt something of time, value and make a proper use of it. Once past, it knows no return; how necessary then that you spend it in improving your mind and fitting it for future happiness and usefulness. You remember the verse your brother repeated to you the other day?

*D.* O yes, mother;

"In books, or work, or healthful play,  
Let my first years be passed;  
That I may give, for every day,  
Some good account at last."

*M.* Good night, my daughter.

## PRACTICAL QUESTIONS.

How do we number time ?

Who named the months ?

Did the Romans distinguish the days of the week by the same names as we do ours ?

How did the Romans measure time ?

When were watches first made ?

What is a century ?

When is it noon ?

When night ?

*THANKS*

## CONVERSATION II.

## DAUGHTER.

I HAVE often heard you speak of manufactures, mother, but I do not understand what they are : will you this evening be so kind as to tell me ?

*M.* Yes, manufactures include an important branch of commerce, and are those things which are made into articles of use and merchandize from various materials.

*D.* Is then the fruit of our garden manufactured ? the gardener spends a great deal of time in digging round the trees and pruning them.

*M.* No ; the gardener does not make the fruit : he only prepares the ground and prunes the shrubs and trees, to quicken and increase their growth.

*D.* Will you give me one or two instances of manufactures, and of the arts, too, mother ?

*M.* The making of shoes is a manufacture, as is also the fabricating of all kinds of cloths ; such, for example, as linens, cottons, broadcloths, silks, laces, &c. Sculpture,



painting, and engraving are included in the arts.)

*D.* You say, mother, lace is a manufacture ; I am curious to know where the best laces are made ?

*M.* (Brussels, Antwerp, Valenciennes, Bremen and Mechlin have long been famous for their laces. The manufactories at Antwerp declined after the Dutch obstructed the entrance to their harbour, by sinking vessels loaded with stones at the mouth of it, which prevented ships from entering ; but the river is now open, and its commerce in a more flourishing state. )

*D.* Is the bobbinet, of which your cap is made, called lace, mother ?

*M.* Yes, it is a kind of lace wrought by machinery like thread lace ; narrow lace for ruffles and caps is woven on cushions with bobbins by the hand.

*D.* Have we no lace manufactories in this country, mother ?

*M.* None of much importance ; that at Ipswich is, I believe, at present, the most considerable.

*D.* But we have cotton and calico factories, I suppose ?

*M.* Yes ; the cotton manufactories are very numerous ; and there are several establishments both in Massachusetts, Rhode-Island, and New-York, for printing calicoes ;

but our most beautiful calico prints are imported from England and France ; our country is yet in an infant state in respect to manufactures and the arts ; in a few years we may, with industry, rival older establishments.

*D.* I have been thinking, mother, what was worn, before people knew how to make cloth ?

*M.* In warm climates the inhabitants wore very slight coverings ; no doubt the leaves and flexible bark of trees were used in the first attempts towards making garments. In those countries where the cold was severe, clothes were made of the skins and furs of animals. After the lapse of a few centuries, the arts and manufactures began to appear and make some progress. Your cousin was reading a passage from Thomson's Seasons yesterday, representing Industry as teaching man the arts of life ; here is the book, you may read the lines yourself.

*D.* ————— " Industry approached, and  
Taught him how to chip the wood, and hew the stone ;  
Till by degrees the finished fabric rose :  
Tore from his limbs the blood-polluted fur,  
And wrapt them in a woolly vestment warm,  
Or bright in glossy silk, and flowing lawn."

*M.* Thank you, my dear, you have read them very well.

*D.* It seems, from what Thomson says, people had not even houses to live in at

first ? they must have been very uncomfortable.

*M.* The Bible teaches us, my child, that all mankind are descended from Adam ; and that God created both him and Eve, and placed them in the garden of Eden ; now you remember telling me the other day, you had learnt that this garden was situated in Asia, near the river Tigris and Euphrates ?

*D.* Yes, mother.

*M.* Well, in that part of Asia the climate is very mild all the year ; therefore the first inhabitants of the earth would not suffer from the cold without houses to shelter them, as we should, who live in a colder latitude, where there is snow and frost in winter.

*D.* But it rained in that country, I suppose, mother ; the people must have been very uncomfortable in the rain.

*M.* Yes ; and it is likely the suffering, caused from this inclemency of the weather, gave them the first hint of attempting to provide some kind of shelter to guard them from storms.

*D.* And what did they first make, mother ?

*M.* It is probable they first found shelter in the decayed trunks of trees, and in caves, and from them they first thought of building huts, or making tents, which were more convenient for them, as they were seldom stationary, but removed with their families from one place to another.

*D.* Why, mother, did they lead such wandering lives ?

*M.* Because, as the arts of life were not understood by them, they must necessarily move from one part of the country to another in order to gain a subsistence for themselves and families, and pasturage for their cattle ; their chief food being wild fruits and milk. The wandering tribes inhabiting Arabia, Chinese Tartary, and some parts of Africa, to this day have no other habitations than these moveable tents.

*D.* Other nations have learnt to build houses, mother ?

*M.* Yes. Huts were at first constructed with the trunks of large trees rudely put together ; till, as says our descriptive poet,

“ By degrees the finished fabric rose.”

*D.* I like to hear you apply poetry, mother, in our conversations, for you always explain the obscure passages to me. I did not understand those lines yesterday when cousin Elizabeth read them to you, but now I know what Thomson means by representing man as having “ torn from his limbs the blood-polluted fur, and wrapt them in a woolly vestment warm.”

*M.* You must never read poetry without attempting to understand it ; and if you cannot, unassisted, comprehend the sense, always

apply to those who can explain the difficult passages.

But to return to our subject of houses ; can you name to me the materials of which they are built ?

*D.* Of wood, stone, marble, and bricks ; but I believe chiefly of bricks, mother, for we have in Boston many more houses built of brick than of any other material.

*M.* It is true, that our houses here are built chiefly of bricks ; and in most large cities they are constructed either of this material, or of stone. But the houses in villages and in country towns are commonly built of wood, at least in those countries where timber is readily obtained. The houses in Italy, however, are almost all constructed of stone and marble, which is found abundantly in that country.

*D.* Mother, what is marble ?

*M.* It is a very fine, compact, calcareous stone, susceptible of a fine polish, and which, by being submitted to a high degree of heat, may be reduced to lime. I see you wish to know the meaning of calcareous. It is a term derived from calx, which means any substance consisting of chalk or lime. Lime, besides its many other uses, is, you know, used by masons, in constructing the walls of houses, for cementing the bricks, and when prepared for this purpose it is called mortar ;

the hair of cows and oxen is mixed with mortar to make it adhesive when used for plastering walls and ceilings. You can tell me of what bricks are made, I dare say ?

*D.* Yes, mother, I believe I can. Bricks are made of clay after it has been kneaded in water. Last summer when we walked with father and Henry to South Boston, we stopped, you know, at the brick yards, and one of the workmen showed me how he made the bricks, and shaped them in little moulds or frames, just the size he wanted, and from being the colour of clay they were made red by being burnt a proper length of time in a kiln. The mould was about eight inches long, four wide, and two high. Father told me the other day that the art of making brick was very ancient ; and that the tower of Babel, and the walls of Babylon were built of brick. My uncle gave me a brick which really came from the place where Babylon once stood ; I will show it to you, mother ; it is in this box, and see it is not red like our bricks. The tower of Babel, mother, was built on the plain of Shinar. I learnt that from a little book I found on your work-table the other day : I remember the very lines ; they were—

*“ So when one language bound the human race,  
On Shinar’s plain, round Babel’s mighty base.”*

*M.* Very well, I am glad you have so well recollected them. But let me tell you further of brick-making, that of late years machinery is used in most brick yards, by which the manufacture is so greatly facilitated, that many thousands are wrought with comparatively little labour. Can you tell me now why wooden houses are usually painted on the outside ?

*D.* For beauty, are they not, mother ?

*M.* That is not all the reason, my dear ; paint preserves the wood and timber from decaying by excluding the rain and moisture.

We must now close our amusement for this evening. Good night, my daughter.

*D.* Good night, dear mother.

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### PRACTICAL QUESTIONS.

What is a manufactory ?

Give me some example of manufactures ?

Where are the best laces manufactured ?

With what were men clothed before cloth was manufactured ?

What is the chief food of the wandering Arabs ?

How are the Arabs sheltered ?

What is marble ?

How are bricks made ?

## CONVERSATION III.

—  
DAUGHTER.

**MOTHER**, of what is paper made ?

**M.** It is manufactured from fragments of cotton and linen cloth.

**D.** I suppose the art of paper making is very ancient ; for you know, mother, Moses wrote the five first books of the Bible ; and he must have had paper to write upon.

**M.** The sort of paper which we now use was unknown to the ancients ; it is of modern invention, and was first manufactured at Basle in Switzerland.

**D.** How then could Moses write ?

**M.** You remember the law of the ten commandments was given on Mount Sinai, written on two tables of stone, and Joshua was commanded, when he came into the promised land, to set up tables of stone that he might write on them the words of the law. Inscriptions upon stone were of a monumental nature : we now cut similar inscriptions on public buildings, monuments, and tombs. Job speaks of writing in lead, but for more familiar and private use it would



seem that the bark and leaves of trees were used, as is now in Ceylon and other parts of India. Parchment was among the first things applied to this purpose.

*D.* Pray, mother, what is parchment?

*M.* Parchment is the skin of sheep and goats, properly prepared.

*D.* Can you tell me how it is made, mother?

*M.* After the hair is stripped off, the skins are soaked in lime-water, and then pared very thin; this is the work of the skinner. The parchment-maker rubs the surface smooth with pumice-stone, and it is fit for use. Vellum is a more delicate kind of parchment, made from the skins of calves.

*D.* Thank you, mother; did the ancients use any other substance to write upon, than those you have named?

*M.* Yes, the Egyptians wrote upon rolls of linen; some are preserved to this day, on which the inscriptions are very legible. Another invention was also used for many years; this was forming the inner bark of the rush papyrus (a beautiful plant which grows on the banks of the Nile) into a smooth sheet. This art was not known until after the building of Alexandria by Alexander the Great. From the term papyrus comes our modern word paper.

*D.* Will you describe to me how our paper is manufactured?

*M.* The first process after the rags are taken to the mill, is sorting them according to their different degrees of fineness, into three parts ; this is done by women and children. The rags are next conveyed to a mill and washed perfectly clean, in hot water ; then ground into a kind of pulp by means of an engine which consists of a round solid piece of wood, furnished with long sharp steel knives ; this is fixed in a large trough, half filled with water, in the bottom of which are bars of sharp steel, similar to those on the roller : this engine is put in motion, and turning with great velocity, reduces the rags to a pulp in a short time. In this state the pulp is called by the paper-makers half stuff, and is next conveyed to a vat, into which the workman dips a sieve, consisting of a square frame about an inch deep, made of small brass wires, exactly the size of the intended sheet of paper ; the frame causes the wires to retain enough of the pulp for a sheet of paper ; the workman shakes the frame to clear the water from the pulp, and then passes it to another workman, who is called a coucher, who turns out what remains in the mould upon a square of felt which lies upon a flat board or table ; the felt rapidly absorbs the moisture from the pulpy substance ; another felt is laid upon this, and so on. The coucher returns the

mould to the maker, who by this time has another sheet ready prepared upon a similar frame. He thus continues to make sheet by sheet until the pile contains six quires or 144 sheets of paper ; in this state it is called post : the whole is placed under a screw press, where it remains until the water is thoroughly squeezed out, after which the paper is carried to an air room, and hung upon lines to dry. When this is effected, the workmen take it down, and smooth each sheet, removing all the small knobs which may be on the paper.

*D.* Now, mother, I suppose the paper is ready for use ?

*M.* No, it must be sized with a sort of glue, which is sometimes made of the shreds of parchment, and in which a little alum is mixed ; into this several sheets of paper are dipped at a time. This prevents the ink from spreading and blotting. The sheets are again hung up to dry, and again pressed quite smooth, and divided into quires of twenty-four sheets each, and lastly into reams consisting of twenty quires. The paper is now ready for sale. This is the process for fine paper, which is made of various sizes and different qualities according as it is wanted for printing, writing or drawing. Coarser sorts of paper are made of coarser materials, even of old rope, &c.

*D.* How is marbled paper coloured, mother? I have often wondered how the veins and spots are laid on so beautifully.

*M.* A trough is provided, the size of the paper to be marbled; this is filled with water strongly saturated with gum arabic. Various colours are sprinkled with a brush upon the surface of the gum water in such proportions as may suit the taste of the maker. These colours spread themselves over the surface of the water, and the sheet being adroitly laid on, they adhere to the paper, which is carefully taken off, and hung to dry; afterwards it is polished with a roller.

*D.* I should like very much to see this process; will you some time take me to the place where it is coloured?

*M.* Yes, my love, with pleasure, if you continue as attentive to my instructions as you have hitherto been.

*D.* Well, I shall be much more careful of paper, now I know the labour there is in the manufacture of it. I had no idea before that it was made of old worn-out fragments of cloth. Our beautiful paper hangings are made of them. I shall now save all the scraps and fragments of cloth I find, instead of burning or throwing them away.

*M.* A very commendable and prudent resolution, my dear; I am glad you are disposed to be so economical, as the waste of

any thing that can be applied to useful purposes is sinful.

*D.* I suppose we had no books before paper and printing were invented ?

*M.* Only in manuscript, and we are much indebted to the ingenuity of those who have brought this art to its present degree of perfection.

*D.* What nation first possessed the art of printing ?

*M.* The Dutch claim that honour, and celebrate at Haarlem, with great rejoicings and ceremony, a yearly festival in commemoration of the invention of this art. Printing, like all the arts, was long in being brought to perfection ; but we can set no bounds to the ingenuity and persevering energy of man. Types were at first made of wood ; but not being found sufficiently durable, metal was substituted, and found to answer the desired purpose.

*D.* There could have been little ingenuity in finding out that quills would make pens, I should think.

*M.* You mistake ; people wrote for a long time, before they thought of going to the poor harmless goose for their instruments.

*D.* With what then could they write ?

*M.* First with bits of wood, sharpened to a point. You will readily suppose their writing could not be very beautiful with such

awkward instruments. After a while they substituted a pointed slip of iron or silver, which was called stylus, and from the use of this, our English word style, applied to writing or composition, is derived! We read that the Romans made frames and filled them with wax: these they could write upon with a stylus, and erase what they wrote, as the wax was soft and could easily be smoothed. Reeds were also employed to write with, and at last quills were used. The best quills are plucked from the wings of geese; those of the swan and other large birds are less common. We derive the name pen from the Latin word penna, signifying a large feather or quill.

*D.* Why are some quills yellow and transparent, while others are white and thick?

*M.* The first are clarified; the last are used in the same state as when plucked from the bird. Dutch quills are clarified by being passed through hot ashes, which destroys the oily matter that impregnates them.

*D.* Which are the best, mother?

*M.* Some prefer one kind, some another. You see me always use the unclarified Russia quills, for I find them more elastic and durable than the others.

*D.* Will you tell me how Ink is made; I shall then know, when I write, from what all

the articles are obtained. Let me think ; paper, pens, and ink.

*M.* Ink is made of various substances according to its colour and quality. Common writing ink is black, and sometimes made of a portion of sulphate of iron, (otherwise called green vitriol, or copperas,) together with an infusion of nut-galls, gum-arabic, and vinegar, mingled with a due proportion of water. Let me now guard you against the pernicious habit of putting pens containing ink into your mouth, for as vitriol is of a corrosive quality, it will not only injure your teeth, but poison your lips.

*D.* I will remember your caution, mother. Please to tell me what are nut-galls ?

*M.* Little excrescences which are formed by insects upon oak and other trees. They are plentiful near Aleppo and Tripoli ; and hence they are often called Aleppo or Tripoli galls. Galls are also brought from Smyrna and other places.

*D.* Are they applied to any other use besides the making of ink ?

*M.* Yes, they are an ingredient in dyeing black ; and are sometimes used medicinally.

*D.* Gum-arabic must be the juice of some tree or plant, I suppose ?

*M.* You are right in your conjecture ; gum-arabic is a mucilaginous exudation from a small tree of the cassia species, which

grows abundantly in Egypt and Arabia. It takes its name from the last mentioned place. Gum-arabic is very glutinous ; and is used for many purposes, medicinally, in painting, as a glue, &c.

*D.* And vinegar is made of cider, is it not ?

*M.* Yes, and likewise of other liquids.

*D.* What are some of them, mother ?

*M.* Wine, beer, mead, and almost any other liquid, if allowed to ferment, will become vinegar. Now, my dear, learn your lessons for school.



### PRACTICAL QUESTIONS.

From what is paper manufactured ?

Where and when was it invented ?

Upon what substances did the ancients write ?

Describe the process of manufacturing paper.

Of what is common writing-ink composed ?

What are nut-galls ?

Of what is vinegar made ?

Who were the supposed inventors of printing ?



## CONVERSATION IV.

—◆—  
DAUGHTER.

LAST evening I learnt a great deal I did not know before ; and this evening I hope to increase, what father calls, my little stock of knowledge, and he says too I must study very long and very diligently, if I desire to acquire a solid education. Books, mother, now that paper, printing, and ink are invented, can be had without much difficulty I suppose ; but can you tell me what the first printed book was called, and when it was executed ?

*M.* The learned differ among themselves in determining this question, and it really is not of much importance. Near the middle of the 15th century, after several ingenious attempts to print letters and words, and indeed whole pages, first by characters carved in small tablets of wood, then with moveable characters cut in wood, and afterward with metallic types, the art had attained such improvement that some small prayer books, called Missals, were printed. But the first regular production of the typographic art,

is a Bible in the Latin language, printed in two large volumes, about the year 1450. But this much, however, may be gathered from the best authorities, that all the copies were first sold as manuscripts ; but it was soon discovered that they were not so. A second edition was issued in 1462. Since that time, books have been so multiplied that we may consult them on all occasions, and upon all subjects. Think how slow would be your progress in learning, without printed books : you could study only manuscripts, and those necessarily must be very few in number. Learn from this to value your books, and always handle them with care ; keep them neat and clean, and let it be no apology for careless usage, that they are in daily and hourly use and can be cheaply obtained. You can be as careful as if you opened them but once a week ; and do not imagine that, because others can be supplied, your own are lessened in value.

*D.* I will certainly be more careful of my books, mother, than I have hitherto been. I acknowledge I have taken less care of them than I ought, but for the future, I will endeavour to give you no cause to reprove my negligence.

*M.* I trust and believe your resolution will not be forgotten. You should be careful never to make resolves lightly ; but when

you have once determined upon rules of action, have the firmness to abide by them.

I must inform you—that books were not always as usefully and neatly bound as we now have them. Much ingenuity has been called into exercise to improve the execution and binding, since they were first printed, and considerable improvements have been made within the two last centuries.

*D.* Mother, what are libraries ?

*M.* They are miscellaneous collections of books, and may be divided into three classes, viz. public, private, and circulating libraries.

*D.* Will you explain the difference between them ?

*M.* (Public libraries are those belonging to public institutions, corporations, or cities. An example of the first is the Bodleian library at Oxford in Great Britain ; that attached to Harvard University in Cambridge, and the Athenæum in Boston, are of the second ; and of the third, the celebrated library at Paris, founded by Francis I, about 1520, and that of the Escorial, at Madrid in Spain, established by Philip II. in 1557. The first American library was founded by Dr. Franklin at Philadelphia, in 1742. It is now one of the largest in the United States.

*D.* Were the two first, which you mentioned, the earliest public libraries ?

*M.* No; among the first of which we have any account, was that founded at Athens, by the tyrant Pisistratus, about 526 years before Christ. The second of any note was that of Alexandria; the manuscripts were collected from many countries, about 284 years before Christ, by Ptolemy Philadelphus, king of Egypt, who purchased many of them for more than their weight in gold. This famous and valuable library was burnt, when Julius Cæsar set fire to Alexandria, 47 years before the birth of our Saviour. The scriptures speak of a library of the kings of Persia, deposited at Achmetha, or Ecbatana. The house where it was deposited was called the "house of treasures," or "house of rolls."

*D.* I suppose, mother, because their books or records were written upon rolls of linen, or some other substance?

*M.* Undoubtedly; but I am going to tell you that the Egyptians probably took the hint of collecting and preserving books, from observing the great care with which the Hebrews preserved their sacred writings.

*D.* But, mother, the arts of paper-making and printing were not invented till a great many years after the birth of Christ. How could people found libraries without books?

*M.* Very wisely proposed, little girl; I must recal to your memory what substances

I last evening told you were employed for recording events anterior to the invention of paper-making and printing. You cannot have forgotten that the ancients wrote upon the bark of trees, rolls of linen, papyrus, parchment, &c ; besides, you have this evening mentioned some of them yourself.

*D.* O, mother, at the moment I did not recollect that. But how much labour it must have been for the ancients to write all their books ?

*M.* Yes, it was indeed a great expence of time and labour to fill a manuscript with neatness and accuracy ; but with care and patience people may accomplish things, which to an indolent person would appear impossible.

*D.* Yes, mother ; and you think I might have learnt my lessons more readily the other day, if I had not been discouraged at the first reading, by finding them a little longer and more difficult than usual.

*M.* I certainly do think so ; but when I spoke just now, I had no reference to your want of patient application and effort last week. Your conscience told you my remark might be intended as a reproof. Those who do wrong, very often think others are censuring them, when they are not even thought of. I will proceed with the explanation of libraries.

*D.* Do, mother.

*M.* Private libraries are those owned by individuals or families, and appropriated to their own particular use. They are composed of such books as either the owner's taste or profession leads him to collect. For instance, the library of a lawyer will be found to consist chiefly of law books ; a physician's of medical, and a clergyman's of theological books.

*D.* What are circulating libraries, mother ?

*M.* Those from which books are let to persons who, on paying to the owner a stipulated sum, take them for a limited time. Such libraries are very useful and convenient. We have many of this kind in Boston, and some of them contain large and valuable collections of books.

*D.* There are many classes, or kinds of books, I suppose, mother ?

*M.* Yes, I have already named several ; however, among the most valuable, for general reading, are historical and biographical works. Historical books are distinguished into many kinds, as general and particular ; civil and ecclesiastical. Civil history relates to the laws and government of nations ; ecclesiastical to their religious history. Then we have many entertaining periodical works, such as magazines of various characters, &c.

*D.* / What are periodical works, mother ?

*M.* Those which are published at stated intervals of time ; as for instance, the Athenæum, which is printed in Boston every fortnight ; the North American Review, every three months ; and the Theological Review, every second month. Newspapers are also periodical works. )

*D.* I wonder who first thought of printing newspapers ?

*M.* ( We are indebted to the Italians for the idea of newspapers. The first ever published was at Venice ; it was issued monthly. Other nations very soon followed this example. ) (The first English paper was called the "English Mercurie," and was published during the reign of Elizabeth, at the time England was threatened with an invasion from Spain. Papers became more generally diffused during the civil wars of the usurper Cromwell, and were, in their origin, devoted to political purposes. ) (There was in the reign of queen Anne, but one paper published daily ; others appeared only monthly, and it was at this time that they were in part first devoted to literary subjects. ) (The first newspaper, published in America, was at Boston, in 1704 ; it was called the " Boston Newsletter." Many thousands, devoted to religious, literary, political, and other subjects, are now annually circulated. )

It is now nine o'clock, my dear, and our conversation must end for to-night.

*D.* Yes, mother, and I have been so much interested, that I am sorry to hear the bells ring.

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### PRACTICAL QUESTIONS.

When were books first printed, and what were they ?

What are public libraries ?

What are private ?

What are circulating libraries ?

Where were the first libraries founded ?

What are periodical works ?

Who first printed newspapers ?

To what subjects were they at first devoted ?



## CONVERSATION V.

—  
DAUGHTER.

WHEN you showed me those specimens of gold and silver ore which my father brought from South America, you promised me, dear mother, that you would, in the course of our evening conversations, give me some information respecting the nature and use of metals ; if you will please to make them the subject of this evening's instruction, I shall be much obliged to you.

*M.* I am ready to indulge your reasonable request, and the more so, as I learn from your preceptress, that your application to your studies in school is such as to win her entire approval, and convince her that you attend at home to those lessons appointed for your daily recitations to her, and that you really desire to improve.

Metals may be defined as simple, ponderous, shining bodies, that become fluid by heat, and harden by cold. The common character of metal is, that, with few exceptions, they are the heaviest of all known bodies.

(*D.* Where are they found, mother?)

*M.* Metals are dug from excavations in the earth, called mines. There are forty-two metals. I shall describe to you only the principal, or primary, as they are sometimes called, viz. Gold; Platina, Silver, Quicksilver or Mercury, Copper, Iron, Lead, and Tin, together with several which are artificially prepared.

*D.* Will you tell me if I am right in supposing South America, the richest country in the world for gold?

*M.* Yes, and the most productive gold mines are in the province of Peru; yet the finest and richest ores are in the northern provinces of the island of Nippon, a dependency of Japan. You must not suppose however, that these countries alone yield gold; it is found in every quarter of the globe. The chief places where it is found in Asia, are China, Thibet, Hindostan, and Japan. Ireland, Spain, Portugal, Dalmatia, Cremnitz, and Norway, in Europe, are known to yield it. Passing south to Africa, we find gold in the kingdoms of Guinea, Mozambique, Monomotapa, and Sofala. Crossing the Atlantic, we arrive at South America, where it is found in almost every province: advancing still to North America, we find it in the once prosperous empire of Montezuma. In the United States, Iron seems to take the place of Gold, and is far more useful. The latter

mineral, however, is found in some of the States : the richest ores have been dug in the Carolinas.

*D.* What are some of the uses to which gold is applied ?

*M.* It is coined into money, differing in value, according to its weight or nominal estimation. This metal is wrought by goldsmiths into cups, vases, &c. also into various ornaments, such as chains, rings, &c. ; it is greatly alloyed for many purposes ; the gilding on looking-glasses and picture frames, is not gold, as you suppose, any more than the leaf, which the book-binder uses to embellish the covers of his books, and the paper-maker to ornament our finest letter paper. Gold has many uses, with which you will hereafter become acquainted.

*D.* What are the alloys of gold ?

*M.* Jewellers commonly alloy their gold with copper. What we call pale gold, is alloyed with silver. In France gold-leaf is ground with honey, and in this state is called gold powder ; it is used for painting in miniature, &c.

*D.* What is Platina, mother ? I never heard of such a metal till you mentioned it this evening.

*M.* Platina, which in the Peruvian language signifies *little silver*, is nearly as white as silver, and is the heaviest of all the metals.

It is melted with great difficulty, and used chiefly for making spoons, crucibles, and chemical utensils: it is employed in enamel painting, instead of silver, being less liable to tarnish, and is also used to ornament porcelain.

*D.* Where is platina found, mother ?

*M.* It has been brought chiefly from St. Domingo, and from Santa Fé in Peru ; it is also found in Spain, united with silver ore.

*D.* Thank you, mother ; will you now tell me of Silver ?

*M.* Silver is a rich white metal, and like gold is found in the four quarters of the globe.

*D.* Excuse my interrupting you, but I thought there were five great distinct divisions of the earth : there is New-Holland, you know, which has been discovered since America.

*M.* Yes ; but at present it is very little known, and geographers have usually classed it under the head of islands. I will, however, allow it the fifth rank in the place of continents, since you consider it so important.

*D.* You were speaking of silver.

*M.* Yes, with the exception of New-Spain, the upper part of the Viceroyalty of La Plata is the richest country in silver which has yet been discovered. The mountain of Potosi alone, produces from thirty to forty thousand

dollars weekly. An Indian accidentally discovered this mine in 1545. The mines of Guanaxuato yield this metal in much greater quantities than those of Potosi; indeed all the provinces of New-Spain are rich in silver. Silver, like gold and iron, is mostly found in a state of ore, but it sometimes occurs pure, in masses. This metal was used in commerce more than eleven hundred years before the foundation of Rome. Silver, like gold, is used for current coin, and is wrought into plate, such as spoons, cups, urns, &c. and for all these purposes is generally alloyed.

*D.* What are Ores, mother? you have mentioned them several times, and I have seen specimens; but do not exactly know how they are defined.

*M.* Ore is any metal in an impure or imperfect state, that is, mixed with earthy and other substances; these must be separated from the metal. Various methods are employed for obtaining gold and silver in a pure state; in Spain and Peru quicksilver is chiefly used.

*D.* I am impatient to know something of Quicksilver; is that also found in mines?

*M.* Yes, and the most celebrated are those of Guançavelica in Peru, Almaden in Spain, and Idra in Austria. The manner in which the last mentioned mines were discovered is novel, and worth relating. Till

1497, that part of Idria, where the mines are situated, was inhabited only by a few coopers, and other artificers in wood, with which that territory abounds. One evening a cooper placed a new tub under a dropping spring to try whether it would hold water ; on returning for it the next morning he found it so heavy that he could not lift it ; and being superstitious, he at first supposed it was enchanted ; but at length perceiving a shining fluid in the bottom, with the nature of which he was unacquainted, he collected it and proceeded to Laybach, where, meeting an apothecary, who was an artful, dishonest man, he was prevailed on to sell it for a trifling recompence, and requested to supply more. It was not long before the extent and value of the mine was discovered ; and it has ever since proved a source of considerable revenue to the country. I have only told you where this metal is found ; you must know that it is very useful, both in the arts and medicine. It is the only metal that retains the fluid form in moderate temperatures of the atmosphere. Quicksilver combines easily with gold and silver, and for that reason is used in separating them from the impurities with which they are mingled in the state of ores. Gold-beaters make use of it to collect the particles of gold contained in the sweepings of their shops. Vermilion,

a red paint, is prepared from a mixture of mercury and sulphur. The silvering on looking-glasses is an amalgam of mercury and tinfoil. Barometer and Thermometer tubes are filled with quicksilver.

*D.* I had no idea that quicksilver was so useful. I shall remember what you have told me, if it be only for the interesting manner of its discovery in Idria. Idria is on the gulf of Venice, I believe, mother?

*M.* No; it is on the river Idria, and is twenty-five miles north of Trieste. You must not blend this place with Istria, which is situated farther south, and is on the Gulf of Venice, where you supposed Idria to be.

*D.* Mother, are the mines of Idria very deep?

*M.* More than 100 fathoms. The miners are chiefly criminals, who are condemned to that dreary abode for life: Owing to the deleterious qualities of the quicksilver, their miserable existence is rarely protracted beyond two or three years.

Next to those of quicksilver, the working of copper mines is most pernicious. Gold, silver, and iron mines are less so than copper, but salt mines are least injurious of all subterraneous excavations.

We come next to consider Copper; it is a useful metal, of a red colour, is easily hammered into leaves, or drawn into wire, and

readily melted. The purest copper is brought from the province of Dalecarlia in Sweden. This mine is 1200 feet deep : it was formerly occupied as a place of banishment. There is a rich copper mine in the county of Wicklow in Ireland. Pary's mountain, in the island of Anglesea, yields very rich ores. The country around is wild, rocky, and desolate. The pestilential fumes arising from the furnaces extend for miles, and the labourers have a most wretched appearance. Kitchen utensils are often improperly made of copper ; for these vessels are liable to be corroded by the salts and acids used in culinary preparations, and these salts united with copper possess very poisonous qualities. Cornwall in England, has many copper mines ; and the ore itself is there found to yield *lapis caliminaris*, from the oxid of which Zinc is obtained, a metal much used in the making of brass.

*D.* Mother, what is Brass ?

*M.* Brass is an artificial metal, prepared in the proportions of one part oxid of zinc to three of copper.

*D.* What is the colour of zinc ?

*M.* It is of a brilliant white with a shade of blue. But to return to copper ; besides the places I have already named, it is found in the Isles of Japan, and in North America. Verditer and mineral green, which are used



as paints, are prepared from copper. Copper, melted with fine tin, makes bell-metal. Brass, I have told you, is a mixture of copper and zinc; when cold, it breaks easily, and to prevent this, seven pounds of lead are added to every hundred weight of brass, which makes it more soft, and less liable to be broken. Equal quantities of brass and copper melted together make an artificial metal called bronze, which is employed for the casting of statues, &c.

It is now time, Sarah, for you to prepare for bed: to-morrow evening, if nothing unforeseen prevents, I will give you an account of iron, lead, and tin. Good night.



### PRACTICAL QUESTIONS.

How are metals defined?

How are they obtained?

What countries yield gold in the greatest abundance? And what are some of its uses?

What is silver?

What countries yield it?

What are ores?

What is quicksilver?

What countries yield the richest copper ores?

## CONVERSATION VI.

## DAUGHTER.

HERE we are again seated in this pleasant little room, mother ; and as nothing has prevented our being together this evening, I hope you are not so much engaged in sewing, that you cannot give me an account of the other most valuable metals. But why do you always say, when you promise any thing for the time to come, that you will do it, if nothing unforeseen prevents ?

*M.* It is proper to make such reservations, as we cannot control future events. Would it not, for instance, have been well for you to have made this reserve, when you, last week, promised your cousin that you would spend the following afternoon with her ? The appointed time came, but you were sick, and the weather inclement ; consequently you could not go. Your cousin expected you, however ) for instead of accepting her invitation conditionally, you said, you should certainly visit her ! We must proceed to our proposed subject of metals, or we shall not have time this evening to speak of all you wish to hear.)

*D.* I will remember your precepts, dear mother. Will you begin with Iron, and tell me what are its characters ?

*M.* Iron is of a bluish white, or grey colour, and is of all metals the most useful, and abundant ; like gold and silver, it may be found in almost every part of the world. It is hard, dry, and difficult to melt. Iron ore is converted into *wrought-iron*, *cast-iron* and *steel*.

*D.* O, mother ! is steel made of iron ? I thought it was a distinct metal.

*M.* Yes ; iron is made steel by being bedded in charcoal, and for six or eight days submitted to a high degree of heat in a furnace. This process is called *cementation*. A quantity of carbon during this operation combines with the iron, and it is converted into blistered steel. This is rendered more malleable by being fused and cast into small bars, thus forming *cast-steel*. Steel is tempered by repeatedly plunging the heated metal into cold water. The Japanese have the art of tempering steel beyond any other nation ; but they hold it a great secret, not being willing even to sell any of their edged tools to foreign nations. Tempering renders the metal harder, more elastic, and more brittle. Steel thus hardened may have its ductility restored by being again heated, and very slowly cooled. Swords, knives, scis-

sors, watch-springs, and a great variety of useful instruments, and ornamental articles are made of steel. The Spanish are celebrated for the art of tempering sword blades. Anciently the artizans of Damascus possessed this art in the highest degree.)

*D.* In what countries is the best iron found?

*M.* Swedish iron is considered superior to that of all other countries. One of the most remarkable mines, if it may be called a mine, is that of Tabern, a mountain composed entirely of iron ore. This mountain has been wrought more than three hundred years, notwithstanding which, its ore has not failed. But the richest iron mine in Sweden is that of Danamora, in the province of Upland : it affords employment to 1300 workmen. Throughout the whole extent of Sweden, the iron mines employ about 25,000 persons. Japan, Russia, and Norway yield great quantities of good iron ; but in the United States this metal is found in the greatest abundance.

*D.* What are all the uses of iron, mother?

*M.* It would be impossible to tell you at this time all the uses to which this valuable metal is applied ; you must rest satisfied with knowing that without it neither the arts of agriculture nor commerce, mechanics nor manufactures, could flourish. Ploughs, hoes, shovels, axes, harrows, &c. are made of iron.

It is used in all the mechanical arts ; instruments and engines are in part or wholly made of it. Neither public buildings, nor commodious houses, merchant ships nor frigates of war, could be built without its aid. In short, my dear, iron is almost indispensable to man ; its uses are innumerable, and there is no other metal which could be substituted in its place. We may from this derive a lesson to admire and value not those things only, which are beautiful and glittering, but rather those which are solid and useful.

*D.* Will you now tell me something of Lead ? I find it is softer than iron, for the lead in my pencil marks my paper, but iron leaves no impression.

*M.* You have blended lead with plumbago, or black lead ; they are different substances. Lead is a heavy metal of a bluish white colour. It is rarely found in a native state, but chiefly mineralized with sulphur, and is then called galena. Lead is easily fused. From the oxids of lead are obtained red lead or minium, litharge, which is the basis of the common glazing for earthen ware, white lead, which enters into the composition of various paints, sugar of lead, &c. This metal is much used by artificers, and among other things, is shaped into aqueduct pipes, and moulded into bullets, shot, &c. It is also used in covering houses and piazzas, and in refining gold and silver. While

I am speaking of lead, I will describe to you the manner of making cartridge balls.

*D.* Do, mother.

*M.* They are cast two together, in a mould, a little bar an inch and a half long connecting them. The bar is cut off and thrown back into the melting pot. The ball is wrapped, first in a piece of cloth, then in a paper cone, which is filled with powder and closed at the top. One boy may fill 4000 of these cartridges in a day.

*D.* Mother, where is the best lead procured ?

*M.* The richest lead mines in the world are those of Missouri ; the mines are very extensive, and the ore uncommonly pure. Great Britain has numerous lead mines ; those in Wales are particularly noted.

*D.* Will you now explain to me the nature of Plumbago ?

*M.* Plumbago is not a metal, as you just now supposed, but a carburet of iron ; containing nearly nine parts of carbon to one of iron. It is found abundantly in Great Britain, on the European Continent, and in the United States. The best plumbago crayons and pencils for drawing, are manufactured in England : of late years, however, we have them made here of very good quality. Plumbago is useful to rub over wooden machinery to prevent friction.

*D.* (I do not know the meaning of Carbon, mother.)

*M.* (I suppose not, and will tell you. Carbon makes a part of all animal and vegetable bodies, and is the same in substance as charcoal after it is wholly purified.) Diamonds are composed of pure carbon.)

*D.* Can diamonds be made of charcoal then ?)

*M.* (No, if that could be done, diamonds would lose much of their value by being common. Carbon obtained from charcoal differs from diamonds both in shape, colour, and hardness.)

*D.* (Tin comes next, I believe, mother ?)

*M.* (Yes: Tin is of a silvery white colour, and alters very little by exposure to the air. It is a useful metal.) With copper, antimony, and bismuth, it forms pewter, which, made into plates and dishes, you know, was formerly in greater use, than at present; Earthen and China-ware seems to have taken its place on our tables. (What is called tin-ware, is nothing more than plates of iron dipped into melted tin, and afterwards wrought into various utensils; such, for instance, as pans, kettles, roasters, &c.) Pure tin is much employed by dyers to give a brightness to red and scarlet dyes. The putty of tin is used for polishing mirrors, lenses, &c. and for rendering glass white and opaque: it al-

loys with other metals, forming solder : united with mercury it is employed for silvering mirrors : it entered into the composition of the ancient bronze.)

*D.* (What countries afford tin, mother?)

*M.* (The tin mines of Cornwall in England are the richest and most extensive that are known, and have been famous for many centuries.)

*D.* (O yes, mother, you read me the other day a chapter from Ezekiel, in which tin is spoken of as an article of merchandize from Tyre & a little geography which I have at school informs me that the islands on the coast of Cornwall were called Cassiterides, or islands of tin, and that probably they were known to the Tyrians at that early period.)

*M.* (I am pleased to find that you observe and retain what you have read ; but I am inclined to believe that the islands, which are described as being opposite to Celteberia, were on the coast of Spain, and that, in the days of Ezekiel, ships had never sailed so far north of the straits of Gibraltar as Cornwall. Britain was very little, if at all known at that time. However that be, the art of working tin has been long known. As it is not late, and you have been attentive, I will tell you something of Foundry.)

*D.* (What is foundry, mother?)

*M.* (The art of melting and casting all



sorts of metals, particularly iron, brass, and bell-metal. On a sort of table, round which is a ledge, is put a quantity of wet sand : this being done, the workmen take wooden or metallic moulds, patterns of the things intended to be cast ; these are pressed into the sand so as to leave their form indented. The metal to be cast is melted, and then poured, while very hot, into the prepared moulds. When these are filled, cold water is thrown upon them ; the frames or moulds are removed, and the cast works are taken from the sand. This is the method for small articles only ; a different process is followed for the casting of statues, artillery, and bells.

*D.* I remember reading of the famous Colossus, or statue of brass, at Rhodes, which was destroyed by an earthquake.

*M.* You are right, this was a wonderful statue certainly, and you do well to remember so particularly the facts which you read. The Colossus was the workmanship of Chares, who spent 12 years in making it ; its height was 105 feet. The art of casting statues in brass is very ancient ; it is not known who were the first inventors of it. We are informed that the Greeks brought the art of statuary to perfection, and that it was afterward introduced at Rome. The number of statues consecrated by the Grecians to their

gods and heroes was immense ; the city of Athens and Delphos had each more than 3000. The casting of statues was introduced into England in the seventeenth century, and all authors are agreed that the first cannon used by them was at the battle of Crécy ; they had been known in Europe but a short time before. The Asiatics possessed a knowledge of fire arms long before this period.

*D.* When were bells invented, mother ? I was going to ask, when I heard them ringing this morning, but you were busy, and I did not like to interrupt you.

*M.* Bells were invented about the beginning of the fifth century. Several were sent by the Venetians to the Emperor Bazilius, at Constantinople, in 872, which was the first knowledge the inhabitants of that city had of them. They were first introduced into Churches at Rome, A. D. 900, and are now in very common use in all countries. The Russians are exceedingly fond of bells. The Chinese sound their bells by striking them with a wooden mallet. |

Now, my daughter, it is quite time to close our evening's amusement, and for you to bid good night. If you are studious, and your father disengaged, I will endeavour to find leisure soon to accompany you to the Iron-Works at South Boston.

*D.* Thank you, mother ; good night.

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## PRACTICAL QUESTIONS.

What is iron ?

How is steel obtained ?

What nation excels in the art of tempering it ?

Is iron a useful metal ?

What are the uses of lead ?

What is the process for making cartridges ?

Where are the richest lead mines ?

What countries yield tin ?

What are founderies ?

Who brought statuary to the greatest perfection ?

Where were bells invented ?

How do the Chinese ring their bells ?

## CONVERSATION VII.

—  
DAUGHTER.

MOTHER, I was thinking, while you were this morning paying for the goods you purchased, whether money had always been in use ?

*M.* The use of money is so ancient, my dear, that we find no date of the time when it was first employed as an equivalent for articles purchased. As the world became peopled, men found it convenient to exchange their possessions, in order that they might more generally share the comforts and necessities of life : but this was attended with some trouble and difficulty.

*D.* What sort of money was first used ?

*M.* The precious metals seem to have been the most usual medium of commerce. It is likely that the metal, given in exchange, was carried, by those who wished to make purchases, to the place of sale, where the purchaser provided himself with instruments suitable to cut as much from the mass as should be demanded. The Lacedemonians used iron bars quenched in vinegar ; and

the early inhabitants of Great Britain used small tin and iron plates, and also rings of metal.

*D.* Then money has not always been coined from metals in a circular form ?

*M.* No; in some parts of India it is made square, in others of a globular form, and some of the Spanish coins are of very irregular figures. But metals have not always been employed to represent money: we read of stamped leather having been very anciently considered as current money. The Dutch in 1574 circulated great quantities of pasteboard, and to this day some nations in Asia, Africa, and South America, employ little shells to represent money. As society advanced in the arts of civilization, different governments affixed some stamp to designate their own coin.

*D.* You say different governments used different stamps; will you tell me some of them ?

*M.* Yes; the Athenian coins were marked with the image of an ox or owl; the *Ægæans* impressed a tortoise upon theirs, they have a tradition that money was first coined in their island: I consider this as doubtful, however. The Jewish coin had a shekel stamped on one side, and a pot of manna upon the other with a representation of Aaron's rod. The Romans sometimes

impressed upon their coins the images of persons who had been eminent amongst them. This was never done in honour of the living, till after the fall of the commonwealth, when it became customary to impress the head of the reigning sovereign; and this is now common among many civilized nations. The Mahomedans dislike images, and usually inscribe only the name of their prince, and the year of the Hægira, or flight of Mahomet their prophet. (Our American coins are stamped on one side with the image of an Eagle, and on the other with the head of Liberty, with thirteen stars representing the thirteen states which were first settled and erected into separate state governments, though united under the General or Congressional government.)

*D.* Of what are cents and half cents made, mother?

*M.* Of copper, which is here coined into money of no higher value. (Our silver coins are, half dimes, valued at five cents; whole dimes, at ten cents; quarter dollars, at twenty-five cents; half dollars, at fifty cents; and whole dollars, at one hundred cents.)

(Our smallest gold coins are quarter eagles, valued at two dollars and a half; half eagles at five dollars; and whole eagles at ten dollars.) Thus we say, 10 mills make one cent; 10 cents one dime; 10 dimes one

dollar ; 10 dollars one eagle. Mills have never been coined, but we have half cents which are in value five mills.)

*D.* Why are our largest gold coins called eagles, mother ?

*M.* Because they are stamped on one side with the image of that bird, which is the national emblem of our country.)

*D.* But you have not mentioned all our silver coins, mother ?

*M.* All American coins I have, my dear ; but we have Spanish coins in circulation, as half reals, valued at six and a quarter cents ; whole reals, at twelve and a half cents, together with others of various sizes and denominations.

*D.* Pence, I know, belong to English sterling money ; I learned that at school.

*M.* I suppose, then, that you have sufficient knowledge of arithmetic to tell me how many dollars of American currency make a pound sterling ?

*D.* Four dollars and forty-four cents, mother ; my teacher told me that in school this morning, after I had puzzled a long time to find it out.

*M.* I am glad you do not forget what is taught you ; it convinces me you are desirous of improving yourself : and your kind preceptress will be encouraged to give you further assistance, when she finds you profit by what she has already taught you.

*D.* /I often hear shopkeepers use the word shilling, in giving the price of goods ; is there such a piece of money, mother ?

*M.* Not in New-England, my dear, although in Virginia and New-England the word signifies about  $16\frac{1}{2}$  cents. A shilling varies in value in different parts of the world. An English shilling is 22 cents ; a Halifax shilling is 20 cents ; a New-York shilling is  $12\frac{1}{4}$  cents. The currency of the American colonies, before the revolution, was in pounds, shillings, and pence. After these colonies became independent, and the Federal constitution was adopted, the present kind of money, reckoned in dollars and cents, was established by law. This is more easily reckoned than any other. I presume the English custom of packing articles in dozens of twelve, and grosses of 12 times 12, arose from the nature of their money in order to make the reckoning easier. For instance, if one dozen straw hats cost 15 shillings, one hat will cost fifteen pence ; or if a gross of buttons cost 36 shillings, one dozen will cost 36 pence or 3 shillings, and a single button 3 pence.)

*D.* I think, mother, according to this rule, American articles ought to be packed in parcels of tens instead of twelves.

*M.* Their single value would certainly be more readily determined, and those people



who are not very quick at computation would find much less difficulty in reckoning their accounts. For 15 dollars a hundred is 15 cents a-piece ; but 15 dollars a gross, requires more calculation to come at the true value of a single article.

*D.* Why have the English called one of their gold coins, Guinea ?

*M.* Because the gold, of which they at first made this kind of money, came from that part of Africa called Guinea. The first coinage of guineas was in the reign of Charles II. The coinage of gold was not generally adopted in Europe till the 14th century, when the discovery of America, where this precious metal abounded, brought it into more common use.)

*D.* Mother, how is money stamped ?

*M.* It was formerly done with hammers and small instruments, made for the purpose ; but a machine is now used, by which the coinage is much facilitated and improved ; so that many thousand pieces may be struck or stamped in an hour. The English mint or office for coinage is in the Tower of London ; our national mint is at Philadelphia.)

*D.* I read the other day, mother, that the Birmans and Chinese have no coin, but that silver and lead in bullion are current amongst them. I do not know the meaning of bullion, will you explain it ?

*M.* It is either gold, or silver, or any other metal in the mass, that is, uncoined. Metals are said to be in bullion when melted from their native ores into bars or ingots.

*D.*— Mother, you call the pieces of engraved paper, in your pocket-book, money?

*M.* Yes ; they are bank notes, and are employed for convenience instead of gold and silver, which are more bulky, and inconvenient to carry about in large sums. Bank notes are engagements to pay the bearer on demand at the bank whence they are issued, the sum stipulated on the note. With these notes any article can be purchased as readily as with gold and silver.

*D.* I have heard of notes of hand ; are they not bank notes ?

*M.* No, quite different. A note of hand is given from one man to another, promising that he will pay the sum therein stipulated, in a certain time, which is determined and agreed upon by the parties concerned. These notes cannot pass from one person to another like bank notes, because a bank note promises to pay its value on demand ; therefore, if you wish for gold or silver for your bank note, you have only to ask the cashier at the bank to exchange, and it will be done.

*D.* Did the bank make father a present of

those notes he had yesterday? I should like to go there too, and get some for myself.

*M.* Your father transacted some business for the Directors, and they paid him in the notes you saw. But they would not give you notes of money only for your asking for them, unless you were in distress, and they were inclined to relieve your sufferings. You know you must have shoes, and clothes, and books, and a great many other things, which cannot be obtained without money. Now I shall give some of the notes, which are in my pocket-book, to the shopkeepers in pay for your clothes, and they will pay them away to others, and thus the notes will circulate through the country.

*D.* What is a bank, mother, and what are bank directors?

*M.* Bank in commerce signifies a common repository, where many persons agree to deposit their money for safe keeping. The persons who so deposit their money, meet together once a year, and choose nine Directors to superintend the institution, and to lend out the money on interest, to such persons as wish to borrow, and whom they consider trustworthy. These Directors choose a President and a Cashier, who attend at the Banking house every day. Now instead of lending silver and gold, which I before told you were heavy to carry about,

they issue such bank notes as we have been speaking of, and which at any time may be returned to the bank in exchange for the precious metals. People place their money in the bank either for safe keeping or to receive interest upon it by lending it to persons who pay them for the use of it.

The first institution of banks was in Italy, where the Lombard Jews kept benches in the market-places, for exchange of money and bills, and *banco* being the Italian word to signify bench, banks took their name from this circumstance. We have many banks in the United States; the principal is the United States Bank, located at Philadelphia, and its various branches in the principal cities of the Union. There are also state and company banks in all parts of our country.

*D.* All you have told me is very entertaining; I shall learn to cypher with much more pleasure now I know something about money. Can you tell me who invented cyphering, mother? I am quite impatient to learn.

*M.* The use of numbers is very ancient, though different nations employed different methods for computing. The Romans employed the letters of the alphabet to express figures. Our numerical figures 1 2 3 4 5 6 7 8 9 0, are borrowed from the Arabians,

and it is by the different combination of the ten simple or cardinal figures that we compute sums either of great or small value.)

Cyphering is of great advantage to every one, but especially so to children, for by it they not only acquire what they would be obliged to learn in more advanced age, but their understandings are improved, and their memories strengthened, while at the same time they are taught to study, and fix their minds upon one object. I would therefore, by all means, have you give great attention to your Arithmetic, as its advantages are so many and important. }

*D.* (Who made the Multiplication table, mother?

*M.* It is supposed to have been the invention of Pythagoras, a Grecian philosopher and teacher, more than five hundred years before the birth of Christ.)

*D.* I am sure we should be much obliged to him for it. I find it very convenient when I cypher, and am glad I have learned it perfectly, though I thought it would be of little use when my teacher desired me to commit it to memory.

*M.* You must ever keep in mind that whatever your teacher in school, or your parents at home, think proper for you to learn, should be attended to at once, without hesitation, as they are much better qual-

ified to judge what studies are proper for you to pursue, than you can be for yourself these many years to come.

*D.* I will for the future think of this, and try to feel interested in all my lessons.

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### PRACTICAL QUESTIONS.

What money was first in use ?

What was the Lacedemonian money ?

Do all nations coin money in a circular form ?

What were some of the stamps impressed upon ancient coins ?

What money is coined in America ?

Does the coin of other nations circulate here ?

What is bullion ?

What is a bank ?

What is a bank note ?

What is a note of hand ?

Who invented the multiplication table ?

## CONVERSATION VIII.

—◆—  
DAUGHTER.

NOW, mother, my lessons are all learnt for school. You promised me when the collier brought our coal, that you would tell me how it was made ; but I wish to know if it is the same kind of coal I have been studying of in my lesson to-day ? my lesson was concerning the State of Pennsylvania, and the geography informs me coal is very abundant in and round Pittsburgh.

*M.* It gives me much pleasure, my good little girl, to find you so studious and observing ; and it will always afford me pleasure to give you all the useful information you ask. The coal brought from Pittsburgh is dug from mines in the earth, and is called mineral, or, in the opinion of modern geologists, more properly vegetable coal. That which I bought to-day is charcoal.

*D.* Is mineral or vegetable coal found in any other country but the United States ?

*M.* Yes, England yields immense quantities of it annually. The best English coal is brought from Newcastle, a town in the

northeastern part of England, on the river Tyne ; that next in estimation comes from the vicinity of Liverpool, a fine commercial city on the river Mersey, and from Whitehaven. The mines at this latter place are the deepest that have hitherto been wrought. The salt mines in Hungary and those of silver in South America, though called the deepest, yet being situated in mountainous regions, are not so far below the ordinary surface of the earth as the coal mines of Whitehaven.

Almost all the States of America yield coal in greater or less quantities ; but the best is brought from Pennsylvania, and is called the Schuylkill and Lehigh coal. Mineral coal has recently been discovered in Worcester, a pleasant flourishing town in Massachusetts. It is not very valuable.

In Europe, mineral coal is very generally burnt instead of wood, particularly by the inhabitants of Great Britain. The inhabitants of the United States of late years seem to follow their example, though wood is so easily obtained that it is burnt almost wholly in villages and inland towns.

*D.* What, mother, is Charcoal ?

*M.* Charcoal is burnt wood, and contains a large proportion of carbon ; it is made in the following manner. A piece of ground, ten or twelve yards in circumference, is cleared and excavated about twelve inches



below the surface ; into this space are thrown fagots and dry billets of wood ; these are piled on till they form a little mound, or hill, over which are laid sods of grass and earth, so as to cover the wood entirely, leaving only two or three small openings to admit the air. Fire is put into these apertures, and the wood kindles : and as it cannot blaze, being closely covered, it is converted into coal. When the wood is completely on fire, the holes are closed with earth, and the fire, without air to feed it, is extinguished. After this the earth is removed, and the charcoal is loaded in carts and carried to market. Charcoal is very useful to kindle fires, as it is dry, and burns quickly. .

*D.* I suppose charcoal is only used for fires ?

*M.* You are mistaken ; it is a chief ingredient in the manufacture of gunpowder.

*D.* Is it possible, mother ! do tell me how Gunpowder is made, and also who first invented it.

*M.* Swartz, a German monk, of the city of Cologne, about 1340, is said to have invented gunpowder. Having made a mixture of nitre, sulphur, and charcoal, a spark accidentally fell upon the ingredients and a violent explosion took place. Astonished at this result he prosecuted his experiments, and thus ascertained the composition and

nature of gunpowder. It is composed of equal parts of charcoal and sulphur, with more than double the quantity of nitre or saltpetre. In the first place these ingredients are separately reduced to a fine powder, then mixed, and ground or beaten together in a wooden mortar, a quantity of water being first added to prevent explosion. It is then made into fine grains, by passing the mixture through a sieve, when it is carefully dried and is then fit for use. Gunpowder is of great utility in blasting rocks in mines, and other places. Its effects are dreadful as an agent in destructive warfare.

*D.* Mother, there were wars before gunpowder was invented; with what weapons did soldiers fight? they could use neither cannon nor guns without powder?

*M.* Swords, sharp scythes and daggers were used by some, others were armed with slings, bows and arrows, pikes and clubs.

*D.* Have you now told me all the uses of charcoal?

*M.* No; reduced to a fine powder it is applied to the teeth as a dentrifice, and is certainly a very cleansing and proper application for them. Charcoal is also an excellent preservative of unsalted meats; keeping them fresh and sweet. It has the quality of rendering putrid substances sweet. Meat that is a little tainted becomes fit for

use when rubbed with finely pulverized charcoal. Putrid water may be purified by passing it through this substance when freshly prepared. We are told, that in Herculæum, a city which was destroyed more than 1700 years ago, by an eruption of Vesuvius, beams of wood converted into charcoal are found entire : a proof that this substance is affected neither by moisture nor air. I have read, that in the British museum is charcoal, which was made of corn in the the days of Julius Cæsar, and which is still in so perfect a state that the grains of wheat may be distinguished from those of rye.

*D.* This is indeed very wonderful ; can you tell me any thing more, that will be as entertaining ?

*M.* Not now, my daughter ; I am engaged the remainder of this evening. You may read any of the books you find on the study table, till it is time for bed, which will be very soon ; if little girls are up late at night, there is danger that they will waste the pleasant hours of morning in sleep. You know the lines I gave you the other day, to commit to memory ?

*D.* Yes, mother, I have learnt them ; do let me repeat them before you go.

*M.* I will hear you with pleasure.

“ How foolish they, who lengthen night,  
And slumber in the morning light ! ”

How sweet at early dawn to rise -  
 To view the glories of the skies,  
 And mark with curious eye the Sun  
 Begin his radiant course to run!  
 Her fairest robe then nature wears,  
 And clad in brightest green appears.  
 The sprightly birds, with artless lay,  
 Proclaim the entrance of the day.  
 How sweet to breathe the gale's perfume,  
 And feast the eye with nature's bloom!  
 Along the dewy lawn to rove,  
 And hear the music of the grove.  
 Nor you, ye delicate and fair,  
 Neglect to taste the morning air;  
 This will your nerves with vigour brace,  
 Improve and heighten every grace;  
 Add to your breath a rich perfume,  
 And to your cheek a fairer bloom;  
 With lustre teach your eyes to glow,  
 And health and cheerfulness bestow."

*M.* Very well repeated, my daughter. I must now go.

*D.* Good night, mother.



### PRACTICAL QUESTIONS.

\*What countries afford the best mineral coal?

What is charcoal? How made?

What are its uses?

When was gunpowder invented, and by whom?

What weapons were in use before gunpowder was invented?

## CONVERSATION IX.

—  
DAUGHTER.

DEAR mother, it is quite early ; I hope we shall have a long time this evening to converse. Father has promised to take me to the glass-works at South Boston very soon ; will you be so good as to tell me when the making of Glass was invented ? I should like to know before I go.

*M.* It is a matter of doubt and dispute among different writers when glass was first made ; probably however many centuries ago. It is generally allowed, that the Tyrians first possessed this art. Glass windows were unknown in Great Britain before 1180, and for many years after that time were so expensive that they were considered suitable only for palaces and churches.

*D.* But of what were windows made ? before people had glass, the houses must have been very dark.

*M.* It is probable that shutters, made to throw open in pleasant weather, were the first attempts to introduce day-light into dwelling-houses ; and to this day they are

common in the south of Europe. In some countries the next advance was oiled paper ; this would in a very short time be destroyed by inclement weather. Horn, which is more durable than paper, was introduced soon after ; neither of these substances are transparent, yet they will admit light, although external objects are excluded.

*D.* And before people had even these last named substitutes, how could they, in cold countries, see to work during the storms of winter and the long summer rains ?

*M.* They burnt oil, and torches of dry wood. You will find occasion, my daughter, as you become acquainted with the limited conveniences and comforts which the ancients possessed, to be thankful to that Good Being who has created you in a more refined age, and multiplied around you every thing that can contribute to your happiness and improvement.

*D.* I am thankful, I hope, dear mother. You have so often told me my duty, that I should be very ungrateful and wicked to forget it. You say, the Tyrians were probably the first glass makers ; what nation acquired this art next after them ?

*M.* The Italians and French ; and from France it was introduced into England. Germany and Holland probably became possessed of this art very early. The first glass

works established in England seem to have been about the year 1557, at Crutched Friars. They are now frequent in Europe and America. There are five in and near Boston. Glass is one of the most elastic bodies in nature ; if suddenly cooled, it becomes very brittle. Glass may be variously coloured ; green by the oxid of copper ; violet by the oxid of manganese ; red by a mixture of the oxid of copper and iron ; purple by the purple oxid of gold ; white by the oxid of arsenic and zinc ; yellow by the oxid of silver and some combustible bodies. Plate glass is cast upon a large table, on which it is poured when very hot ; the excrescences or bubbles are immediately removed by a roller that is swiftly passed over it ; the plate is then annealed in the usual way by a gradual admission of cold. The Venetians long excelled all Europe in the manufacture of crystal looking-glasses. Glass plates for looking-glasses were not manufactured in England till 1673, when a manufactory was established at Lambeth by some Italian artists. The French soon after acquired the art, and were famous for the great size of their plates. Glass metal is, as you know, also made into various articles both useful and ornamental.

*D.* Yes ; we have decanters, tumblers, cruets, salt-cellars, dessert-plates, fruit-dishes, lamps, and chandeliers, besides a great

many other things. Then all our windows are glass. I am very glad I do not live in those countries where they have no glass windows. I remember, mother, the musical tones I heard produced from the Harmonica, when it was here : how wonderful, that musical notes should be produced from glass. Then cousin Elizabeth has a set of glasses upon which she plays a great many tunes : the glasses are partly filled with water while she is playing ; but I forget that you know all this, for you were with me at my aunt's the last time I heard her play.

*M.* The music produced from these glasses is certainly very soft and pleasing ; but do you know what burning glasses are ?

*D.* I believe not exactly, mother.

*M.* They are glasses made in a particular form, so that when held in the sun they concentrate or collect the rays into one point of the glass ; the point, where the rays meet and unite their heat, is called the focus. The heat thus produced is of sufficient power to light candles, cigars, and indeed every combustible substance. Historians inform us, that Archimedes, the celebrated geometer of Syracuse, made burning glasses of such power as to set fire to the enemy's ships, which were then lying in the harbour. You must remember that we should have neither telescopes, microscopes, nor magnifying glasses, without the aid of glass.



*D.* Nor spectacles, mother.

*M.* Aged people, and those who are near-sighted, or have weak eyes, are much indebted to the inventors of glass, and to Spina, the good monk of Pisa, for the convenience and advantage they derive from spectacles. He lived towards the close of the thirteenth century, but since his time this valuable invention has been much improved.

*D.* Mother, what are Telescopes and Microscopes ?

*M.* A Telescope consists of a number of glasses, differing in size, and fitted into a hollow tube ; by looking through which, objects, that are at a great distance, appear to be brought near, and may be distinctly viewed. Stars, which are invisible to our eyes, are, by the aid of this instrument made plainly visible. The largest and most powerful telescope ever made, belonged to the celebrated Dr. Herschel, who discovered the planet which has received his name.

A Microscope is an instrument calculated to show distinctly the minutest objects by magnifying their size. This instrument is composed of a mirror and several glasses properly arranged. Your father has one in the study, and some time when he is at leisure, will show you the effect it has in magnifying insects or whatever is viewed through it.

*D.* Thank you, mother ; do tell me who was so ingenious as to invent these curious instruments ?

*M.* Many have claimed the honour of their invention. It is generally allowed that a Neapolitan, by name Baptista Porta, made the first telescope. About fifty years after this, a spectacle maker of Magdeburgh improved it ; Galileo, an astronomer of Venice, made, and afterwards repeatedly improved the construction. Since which, this optical instrument has been perfected. The inventor of the first Microscope is unknown ; in truth, it may be more properly termed a discovery than an invention, as the first hint was probably accidental.

*D.* O mother, speaking of inventions and glass, reminds me of a vial Henry gave me last week, containing a little reel with silk wound upon it. Now I cannot imagine how the reel came in the vial, for the mouth is so small I can hardly get a quill into it, and the reel is much larger. Can you tell me how Henry contrived to put it in ? perhaps he carried it to a glass maker, and got him to form the vial over the reel ; and yet I do not see how that could be : for the heated glass would be very likely to burn up the reel, and silk too.

*M.* Yes, that would be a natural consequence, to be sure ; but here comes your

brother, and I dare say he will solve your doubts at once ; can you not, Henry ?

*Henry.* Yes, mother ; I thought Sarah might puzzle her active mind a little while ; but I will tell you now, sister. Look here, do you not see that the reel is composed of three pieces of mahogany ; I dropt them one by one into the mouth of the vial, and then with these little wire instruments joined them in the proper shape ; after this I put the silk in, and wound it on the reel by means of a small wire hook. It took me a long time to fasten the knot, but I did it at last, and you may keep the vial and its contents as a——

*D.* Specimen of your patience and ingenuity. I shall keep it, brother, though you were going to say something else. I will not detain you longer, for I see you only came for a book.

Mother, will you tell me of what use is the Thermometer, which hangs in the hall ?

*M.* It shows the variations of temperature in the air ; the increase or decrease of heat and cold. You have observed that the little glass tube attached to the case contains a white silvery substance ; this is quicksilver ; it rises in the tube as the weather moderates and becomes warm, and descends when it changes to cold : cold having the

effect of condensing that metal, as heat has of expanding it. ←

+ *D.* Will you tell me what is the Mariner's Compass? I heard my uncle Charles tell Henry, that without it seamen could not guide their vessels across the ocean from one country to another. They were called away just as I was going to ask an explanation of them, but I have kept it in mind ; for I should like very much to know.

*M.* It consists of a needle of iron, impregnated with the qualities of the loadstone ; and so influenced by it, that it always points very nearly north and south ; this needle is inclosed in a box marked with all the points of the compass, and a seaman, acquainted with these, may direct his ship with certainty and ease. You will better understand this by seeing a compass, and at the same time the globe ; I dare say, either your father or uncle will show you all you can wish to know about it. The mariner's compass was the invention of a Neapolitan, named Flavio, about the beginning of the fourteenth century.

*D.* That was before Columbus discovered America, mother ; I suppose he could not have sailed across the Atlantic ocean without one. I love to think of Columbus ; he was so persevering and patient. But will you tell me what the Loadstone is, which possesses such useful and surpris-

ing properties, as to direct the needle always one way?

*M.* It is an ore of iron, in weight and colour resembling that mineral, though somewhat harder. It is chiefly found in iron mines, and is usually called a Magnet, and the property which it possesses is called magnetism. It attracts all metals. There is a knife in my writing desk which has been magnetized; bring it to me; touch the point of this needle to the blade; you see the needle attaches itself to the knife at once; it will not fall unless you shake the knife, or agitate the needle violently.

*D.* This is indeed wonderful: I shall never forget the properties of the loadstone, nor the many useful things which you have told me this evening.

*M.* I hope you will not. Always remember those things that tend to strengthen and improve your understanding. You cannot learn without attention, neither retain those lessons that you have once learnt without frequently reflecting upon, and reviewing them in your mind; by this means things long past will remain impressed upon your memory. It will be of little use that I devote an hour every evening particularly to you, besides frequent instructions at other times; it will be of less use that your teacher at school appoints and teaches you daily

lessons unless you apply your mind steadily and earnestly to learn them both accurately and thoroughly. It is of no use to commit whole pages to memory, merely to recite them once without hesitation; you must think of the *meaning* more than the words, —of the *ideas* more than the language. I say this rather to encourage you to persevere in well-doing, than to reprove you for neglect. Your improvement has been as rapid and solid for the last year as I could desire; and so long as you continue amiable, studious, and diligent, you will continue to be the joy and happiness of your parents and friends.

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### PRACTICAL QUESTIONS.

When were glass windows introduced into England?

Who were the first glass makers?

What are burning glasses?

When were spectacles invented, and by whom?

What is a telescope?

What is a microscope?

What is the mariner's compass? by whom invented?

What are the properties of the loadstone?

## CONVERSATION X.

## DAUGHTER.

IT rains quite hard, mother, and the clouds are thick and heavy ; father is writing in the study, and Henry is busy with his books ; I think we shall not be interrupted this hour. Please to tell me now about Salt mines, and the making of Salt.

*M.* You seem so happy in the anticipation of enjoying this evening without interruption, that I cannot refuse you the subject you desire ; though I trust, should we be interrupted, you will exercise a proper degree of patience and good humour, even should it be when engaged in the most interesting part of our conversation.

*D.* I shall try, mother, to submit with propriety, though I hope I shall not be obliged to meet a trial of my temper.

*M.* I will begin then, by informing you that there are three kinds of common or culinary salt, and that salt exists both in a solid and fluid state. I shall speak first of solid or mineral salt, also called fossil salt. It occurs mostly below the surface of the

earth, but it sometimes rises into high hills and is also found overspreading tracts of considerable extent, as in the Arkansâs territory, about 1200 miles above the mouth of the river Arkansâs, where it lies on a plain to the depth of six or eight inches. This tract is called the salt prairie. In Missouri territory is a very extensive salt mountain, said to be many miles in length, from which abundance of rock salt is obtained in a pure state. There are salt hills in Spain; the highest is near Cordova. As for salt mines, they are found in many countries; the most celebrated are those of Gallicia, commonly called the salt mines of Cracow; those of Northwich in England, of Tyrol, of Prussia, Germany, Italy; of Castile in Spain; Iletzki in Russia; and Lahore in India. Salt is also found in the mountains of South America, and in the deserts of Lybia. In Caramania, travellers inform us, that it is so abundant and solid, that it is sometimes used in building. Its solidity there, is probably owing to the dryness of the air. The Hallein mine near Saltsburgh in Germany, is very extensive. The salt exhibits almost every colour of the rainbow; red, yellow, and blue, with all their shades. In order to purify this salt from earthy substances, it is dissolved in water and then exposed to the sun in large vats; the liquor is absorbed,



and crystals of salt deposited in the bottom of the vessels that contained the water.

*D.* Will you give me a particular description of the salt mines near Cracow? I am very curious to know more of them. There is some poetry in one of cousin Elizabeth's books, which describes them; I could not quite understand all the lines, so I copied them; see, here they are, I will read them if you please, and when you describe the mines I shall comprehend perhaps what Darwin means by "milk-white vales in ivory channels spread."

*M.* Read the passage, my dear.

*D.* "Thus cavern'd round in Cracow's mighty mines,  
 With crystal walls a gorgeous city shines;  
 Scoop'd in the briny rock long streets extend  
 Their hoary course, and glittering domes ascend;  
 Down the bright steeps, emerging into day,  
 Impetuous fountains burst their headlong way,  
 O'er milk-white vales in ivory channels spread,  
 And, wandering, seek their subterraneous bed.  
 —Far gleaming o'er the town, transparent fanes—  
 Rear their white towers, and wave their golden vanes,  
 Long lines of lustres pour their trembling rays,  
 And the bright vault returns the mingled blaze."

*M.* Very well read, my little daughter; you shall certainly have the description of the Wielicza or Cracow mines. They were discovered in 1251. The length of the mines from east to west is above six thousand feet; the breadth from north to south above two

thousand, and they are eight hundred feet in depth. When a stranger wishes to visit these mines, he is habited in a suit of miner's clothes, and let down by machinery a perpendicular descent of six hundred feet. The place is very dark, and the miner, who descends as a guide, strikes a light and conducts the stranger forward, through several gloomy winding passages, at the end of which they descend by ladders two hundred feet lower into a large cavern; through this cavern they enter upon an open plain, peopled by the miners and their families, together with their horses, dogs, and other domestic animals. Nothing can exceed the brilliancy of this place; illuminated by thousands of lamps, reflecting their light upon the beautiful and transparent surface of the the salt in every varied colour.

*D.* Ah, mother, we have now got to "caverns" and "crystal walls."

*M.* Yes, and I will immediately introduce you into the "gorgeous city." Those persons who have visited these mines inform us that they have every appearance of a little city: streets are regularly laid out and cut in the solid rocks of salt.

*D.* We have it now, mother; "Scoop'd in the briny rock long streets appear."

*M.* Pillars, altars, and temples are raised, and seem the work of magic. Little springs

of fresh water are found here and there, flowing over their crystal beds.

*D.* I understand "milk-white vales" and "ivory channels" now. They are formed of the pure white salt. But, mother, how do horses get up and down those deep mines?

*M.* They are let down by machinery, but when once there, are never taken out.

*D.* How do they get their food then?

*M.* It is conveyed to them from above ground. The miners could not do well without these horses, which are employed in carting the salt from one part of the mine to another. Some people, who have been born in these mines, have never seen the light of day : others go frequently upon the surface of the earth.

*D.* I should not like to live there, mother ; though I believe I should have courage to visit them : I should not be much afraid to go down those difficult passages if you were with me.

*M.* There is little prospect, my dear, that your courage will be put to the test. I doubt whether your travels will ever extend to the interior of Europe. You will have sufficient time to arm yourself with resolution when there is a prospect of its being called into exercise. But to resume our subject ; great quantities of salt are annually exported from England. The salt springs

in Cheshire are very strong, yielding a much greater proportion of salt than either the springs of France or Hungary. Bavaria has many valuable salt springs.

*D.* How is salt made from salt water, mother ?

*M.* The water is conveyed from the springs into large pans, made of wrought iron, and boiled till the salt forms in little crystals round the pans ; the salt is scraped off by means of a rake adapted for the purpose, and the pans are again filled with water : this process is constantly repeated and the salt thus obtained is a considerable article of commerce with the British. Salt springs abound in the United States : those from which the greatest quantities of salt are manufactured, are in Salina, a town in the interior of New York. In the neighbourhood of these springs more than three hundred thousand bushels of salt are manufactured yearly by boiling or by evaporation, and several millions of bushels might be made. In Illinois, near Shawnéetown, are very extensive and valuable salt works.

*D.* How is the third kind of salt obtained ? you have told me of rock salt, and of salt obtained by boiling.

*M.* The third kind is obtained from sea water by evaporation, and is with us commonly called Bay salt : it is coarse, and generally of a dingy white hue. Sea water is ex-

posed in the open air in large wooden vats to the action of the sun. It gradually crystallizes ; and large quantities are thus formed on the shores of Cape Cod, and at Quincy and Dorchester in Massachusetts, besides in many other places. It now only remains for me to tell you the uses and properties of salt. As it will not corrupt, it is proper for preserving meats from tainting. It becomes purer by exposure to fire, and melts at a very high degree of heat. It is said to fertilize some lands. The principal uses of common salt are, for seasoning food, and preserving meat, fish, &c.

I have told you all you need know at present about salt ; and, as you wished, we have not been interrupted. Now, my daughter, go to your lessons ; I see you wish to prolong our conversation this evening, but I fear you are not quite prepared for school to-morrow ; you must remember never to indulge in any recreation to the neglect of your books. Amusements are proper, especially for children, if indulged in at proper times : they may be moderately enjoyed without interfering with stated employments. But do not forget, that time, passed solely in the pursuit of pleasure, leaves no solid enjoyment for the future ; but, from the hours you spend in reading and studying useful books, you will gather a golden harvest in future years. Pleasures take

to themselves wings and fly away ; true knowledge remains for ever.

*D.* I am much obliged to you, dear mother, for all you have taught me ; I will study the lessons appointed for to-morrow's recitations. I know them almost perfectly, but I do not wish to get low in my class by negligence, nor displease my teacher by going with an imperfect knowledge of what she has given me to learn.

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### PRACTICAL QUESTIONS.

How many kinds of salt are there ?

From what countries is abundance of rock salt obtained ?

What use is made of it in Caramania ?

Where are the most celebrated salt mines ?

How is salt obtained from sea water ?

What is the process by which it is obtained from salt springs ?

Where are the most extensive salt works of America ?

Where those of England ?

9\*

## CONVERSATION XI.

—  
DAUGHTER.

**YOU** promised me, when you purchased your Porcelain vases, that you would tell me of what they were made, and how ; will you this evening, dear mother ?

*M.* Porcelain may be regarded as the finest kind of pottery ; it is a substance of a middle nature between pottery and glass, and is made of a composition of kaolin or feldspar, a whitish laminated feldspar in the state of earth or clay, and of petunse, a sort of clay quite white and soft to the touch, and sulphate of barytes. These are calcined, that is, burnt in a furnace, and then powdered so fine as to sift through the finest silk. To this powder a proper quantity of water is added, and the mixture is twice strained through a silk sieve, after which it is boiled till it becomes about the thickness of cream, and then gradually evaporated till it becomes a tough paste. It is in this state ready for working ; pieces are placed on a turning wheel and moulded into various shapes with wonderful accuracy. All china of a circular form is thus shaped ; as cups, bowls, &c. Dishes, and other arti-

cles are made in moulds. After being formed, each piece is put in a separate clay case. A furnace built closely up, like the brick kilns I showed you the other day, is filled with these, and subjected to a red heat for sixty hours. The furnace is then allowed to cool gradually, when the porcelain is withdrawn, and in this state is called biscuit. The blue paint, which is cobalt, is next put on, and the china is ready to receive the glazing, which is made of lead and glass ground to a fine powder, and mingled with some other ingredients, which are known only to those who make the preparation. The biscuit is dipped into this glazing, and again baked for forty hours, when it is ready to receive the other colours and the gilding. It is again baked ten hours or longer, according to the colours employed in ornamenting it. The gilding is now burnished with agate or blood stone, and the china is ready for the ware room. Porcelain passes through seventeen different processes before it is completed. You will probably now understand the animated poetical description of the manufacture of china. Here is the book you may read the passage.

- D. "Hence ductile clays, in wide expansion spread,  
Soft as the cygnet's down, their snow-white bed,  
With yielding flakes successive forms reveal,  
And change obedient to the whirling wheel.



First China's sons, with early art elate,  
 Formed the gay teapot, and the pictured plate ;  
 Saw with illumin'd brow and dazzled eyes  
 In the red stove vitrescent colours rise ;  
 Speck'd her tall beakers with enamelled stars,  
 Her monster josses, and gigantic jars ;  
 Smear'd her huge dragons with metallic hues,  
 With golden purples, and cobaltic blues ;  
 Bade on wide hills her porcelain castles glare,  
 And glazed pagodas tremble in the air."

I do not know the meaning of porcelain towers, mother ; I suppose the writer cannot mean large towers made of china.

*M.* But he does, my dear. The Chinese are celebrated for their fondness for towers and pagodas, or temples. The famous porcelain tower at Nankin is nine stories high, and completely encrusted with tiles of the most beautiful China, which has resisted the ravages of time, and stood for more than four hundred years.

*D.* I should like to see this tower, mother ; but as I cannot, I will think of something else. 7

*M.* The most considerable porcelain manufactories in England are those of Worcester, Colebrookdale and Swansea. Dresden in Prussia has long been famous for the beauty of its porcelain. We have several recent establishments in the United States ; that at Philadelphia is the most valuable. Shall I tell you how china is printed ?

*D.* Do, if you please.

*M.* On a copper plate, properly engraved, the colour is laid, heated and well rubbed in ; a sheet of fine paper, first prepared with a secret composition, is printed from this plate. The paper is cut to fit whatever is to be printed, and pressed closely upon it ; the biscuit is then washed in cold water ; the paper peels off, but the pattern remains perfectly impressed.

*D.* This must be a very ingenious process ; but, mother, can you tell me what japanning is ? I saw an advertisement in the paper this morning, offering japanned ware for sale.

*M.* It is the art of varnishing, painting, and drawing figures on wood, metals, leather or pasteboard. All substances that are either stiff or hard will admit of being japanned. When leather is japanned, it is stretched in frames, in order to keep it quite smooth and free from folds, as it would otherwise contract and crack the varnish. Paper is prepared in the same way. Metals and wood require no other preparation than that they be made quite clean. Waiters, coolers, stands, dressing-cases and boxes, together with a great variety of other articles, are japanned. The name is taken from the island of Japan, where the art was invented and brought to perfection.

*D.* What is varnish, mother ?

*M.* It is a transparent glutinous liquid, used by painters, gilders, cabinet-makers, and other artificers, to give a gloss and finish to their works. It is made of various kinds of gum, united with oil of turpentine. But what have you there, my dear ?

*D.* A cork, mother ; I was examining it this morning in order to ascertain of what it is made ; it does not appear to be wood, and I do not know what it can be.

*M.* Some have supposed Cork to be the bark of the cork tree ; on the contrary, it is an excrescence, formed by exudation, on the cuticle or outer bark of the tree. The trees are stripped for the first time before they are twenty years old, and generally once in eight or ten years after. It would appear that this contributes to their health and vigour, for if left unstripped, they gradually decay, and in fifty or sixty years a whole plantation will die ; whereas, the trees which are repeatedly peeled, live and thrive upwards of two hundred years. When the cork is removed from the trees, an exudation takes place, which acquires consistency by the action of the air, and thus the succeeding layer of cork is formed. The oldest trees afford the firmest cork, every successive peeling improving the quality. ✎

*D.* This is quite new to me. Will you tell me, mother, in what countries the cork-tree flourishes ?

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*M.* It is a native of Asia ; but grows in France, Spain, and Portugal. Our best cork is brought from the province of Guienne, in the south of France. The tree is a species of the oak, and resembles it both in the shape of its leaves, its acorns and its size.

*D.* Do we use cork just as it is taken from the trees ?

*M.* No, it is piled in pits or ditches filled with water, and pressed flat by weights ; when sufficiently soaked, it is taken out of the water, dried, and packed in bales for exportation.

*D.* Is India-Rubber made of leather, mother ? I can think of nothing else which it resembles.

*M.* No, my dear, it is a juice or gum issuing from a tree called Caoutchouc, which grows in South America : it is known by different names, as jatropha or gum elastic ; caoutchouc from the tree which yields it ; and by us commonly called india-rubber. It issues from the bark of these trees, by incision, in the state of a white milky liquid, which hardens in the air : but it undergoes some preparation by the Indians, before it is fit for use. We usually receive the rubber in the form of bottles : these are made by forming the gum over clay moulds ; when the gum is hardened, it is exposed for

several weeks to the action of smoke, after which the clay is broken out, and the rubber is ready for use. The Indians make boots of it, which effectually exclude the water ; and also sails for their boats, which are very durable. In Cayenne, the natives use it, made in the form of cylinders, for torches ; it burns with a bright flame, yielding a dense smoke, which affords good lamp-black. † ✕

*D.* I suppose they can make it into any shape they please ?

*M.* Yes, easily. We use india-rubber for little else but to erase the marks of lead pencils and crayons, and as an ingredient in some kinds of varnish. Of late we wear shoes made of it. There is a kind of mineral caoutchouc, but it is very rare, having only been found in lead mines in England, and that in very small quantities. \

*D.* I really thought india-rubber was made of leather, and should never have suspected it to be a gum. Will you tell me, mother, something about Leather ? I know it is the skin of various animals prepared for use. †

*M.* Yes, and tanning is the art of converting raw skins into that very useful article called leather. Skins are the general term for the hides of cows, calves, goats, does, seals, &c. The methods of preparing them are very various ; some being dressed with

the hair and fur remaining on them, as buffalo skins, which you have often seen: and seal skins, which are in great request with trunk-makers, and many other artists. Deer, sheep, lamb, and goat skins are commonly dressed in oil, and the kind of oil preferred for this use is cod's liver oil. They are also dressed in sea salt and alum, and likewise tanned. Tanned skins are converted into leather by being first steeped in lime water, which dissolves the gelatinous part of the skin and facilitates the removal of the hair; they are next steeped in an infusion of tannin, an astringent substance contained in many vegetables. This is obtained chiefly from chesnut and oak bark, gall-nuts, grape seeds and the wood of catechu, an Indian tree. By skins dressed in oil, I mean such as are converted into leather chiefly by the aid of oil. Tawed skins are such as are made into leather with alum, salt, meal, and some other ingredients. ~~A~~

Skins are known by different names according to the manner of dressing, or the animal from which they are taken. Kid is a delicate leather, manufactured into shoes and gloves, and is the skin of young goats. Shammy is a kind of leather much esteemed for its softness, and was formerly prepared only from the skin of a kind of wild goat, called Chamois; common in the northern

mountains of Spain, in the south of France, in the Sardinian states, and Germany; now the art of tanning is better known, the same kind of leather is manufactured from deer, goat and sheep skins. Morocco, or morroquin, is the skin of a goat, and is much used. It derives its name from the kingdom of Morocco, where it is supposed the method of preparing these skins was first known. Great quantities of morocco leather are brought from the Levant, from Barbary, Spain, Flanders, and France. It is variously coloured, as you well know. Of parchment and vellum I have already spoken; you will want no farther information respecting them. Skins are of very ancient use, and were worn for clothing by many nations. Leather and skins are held in request by tanners, curriers, harness-makers, coach-makers, saddlers, chair-makers, book-binders, glovers, and other manufacturers.

*D.* I had no idea that leather was in such extensive use. Can you tell me from what countries the greatest quantities of skins are brought?

*M.* From many parts of South America, particularly Peru; from St. Domingo, Barbary, the Cape Verd isles, the eastern coast of Africa, Russia, Canada, and from the north-west coast of North America. Seal skins are

obtained in great quantities from New South Shetland.

The bell has rung nine, my daughter, some time since. I fear if you do not now bid good night, you will rise late in the morning.

D. Which I should be sorry to do, dear mother, for I should lose my pleasant walk with Henry. ~~✱ ✱ ✱~~

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### PRACTICAL QUESTIONS.

What is the process for making salt ?

How is china printed ?

What is jappanning ?

What is varnish ?

What is cork ?

From what countries obtained ?

Describe the tree ?

What is india-rubber ?

How obtained ?

To what uses is it applied ?

What is leather ?

How is it prepared for use ?

What is morocco ?

What is parchment ?



## CONVERSATION XII.



DAUGHTER.

**MOTHER**, what is the meaning of Esculent Vegetables? I heard my father say, no country afforded them in greater abundance and variety than our own.

**M.** Esculent means eatable; and esculent plants and vegetables are all such as are fit for food.

**D.** Will you describe them to me? I suppose corn is among the number?

**M.** Yes, all grains are of this class, and we will make them the subject of this evening's conversation. The grains which are made into bread, &c. for food, are Wheat, Rye, Barley, Indian Corn, Buck-wheat, Rice, and Oats.

**D.** Do these grains require much cultivation, mother?

**M.** Man must bestow long and patient labour before he can, with the blessing of Heaven on his efforts, bring to perfection the fruits of the earth. Some, it is true, require much less labour than others in their cultivation, but none grow spontaneously in any great quantities.

*D.* People have always had bread to eat, I suppose ?

*M.* No, you are mistaken ; men at first subsisted on milk, and on fruits that grew without cultivation. Corn, like all other productions, was found scattered over the earth ; people tasted it, and learnt that it was nourishing and fit for food ; from this they proceeded to cultivate it in fields, and in process of time, they discovered how it might be made into bread.

*D.* The cultivation of corn must be ancient, mother, for you told me the other day, that in the time of a famine in Italy, Gelon, king of Syracuse, sent vessels loaded with it to the suffering people.

*M.* You are right, and, history informs us, that the Egyptians understood the cultivation of it many hundred years before the birth of Christ. The grains are all cultivated in the United States. Flour is wheat, ground in a mill ; and when mingled with yeast, and water or milk, and baked in an oven, is called bread. Wheat is with us the most abundant grain, and is chiefly cultivated in the middle states, in Maryland and in Virginia ; the best grows in the western part of the state of New-York. From wheat and barley is distilled gin : the liquor is flavoured with juniper berries.

*D.* Which are the middle states, mother ?  
10\*

I do not recollect with certainty, though I have learnt them once. ~~X~~

*M.* Then you had better refer to your geography, for by searching yourself for them you will be more likely to retain their names than if I tell you. Here is the book.

*D.* I have found them, mother; they are, New-York, New-Jersey, Pennsylvania, and Delaware; I do not think I shall forget them again.

*M.* I hope you will not; but do not shut your book; you must look for our western states; they produce the greatest quantities of maize, or Indian corn.

*D.* They are Tennessee, Kentucky, Ohio, Indiana, Illinois, and Missouri.

*M.* Very well. Buck-wheat, Rye, Barley, and Oats are cultivated in all the states which you have mentioned, as well as in New-England. Barley is also very extensively cultivated in Great Britain, and is chiefly made into malt, from which, with an infusion of hops, is made porter, ale, and beer. From rye is distilled an intoxicating liquor called whiskey. Thus does man pervert the blessings of benignant Heaven, and from a wholesome grain extract a destructive liquid. In America oats are employed for little else than food for cattle; but the lower classes of people in Great Britain and Ireland have no better bread than cakes made of oat-meal.

*D.* I am impatient to learn something of Rice, mother?

*M.* Rice is a native of China, and the south of Asia; it is cultivated in most of the East Indian islands; and is the chief food of the Hindoos and Chinese. It is always cultivated in wet swampy lands, or in such places as can be flooded with water. Our southern states produce this grain abundantly, particularly Georgia and the Carolinas. It was first brought to America, by the captain of a vessel from the island of Madagascar, in the year 1695. It is very nutritious, and is said to increase and strengthen the blood more than any other grain.

*D.* Have you told me all the substances from which bread is made, mother?

*M.* No; Millet, a sort of grain, cultivated in the Barbary states, in Spain, and in Turkey, is eaten. The Dalecarlians who inhabit the northern parts of Sweden make bread of the bark of the pine and birch. The inhabitants of Kamtschatka\* in the place of bread, eat the stems of the acanthus. The Indians, inhabiting many islands of the Eastern Archipelago, subsist almost wholly upon the fruit of the Rima, or Bread-fruit tree.

*D.* Pray describe it, mother.

*M.* The celebrated navigator, Capt. Cook, says, it is a tree growing about twenty feet

\* The Russians pronounce this word Kam-shat-ka.

high; its leaves are of an oval form, frequently half a yard long, and deeply indented; they resemble the fig leaf in colour, and when broken, emit a milky juice; the fruit is nearly the size of a child's head; the surface is composed of a sort of net work, covered with a thin skin: in the centre is a core, between which and the skin is an eatable substance which has something of the taste and consistence of new bread. The fruit can be gathered fresh eight months in the year. The wood of this tree is soft, yellowish, and light; and is much used by the natives in constructing their huts and canoes.

I must not forget, while speaking of the substances which in some countries supply the place of bread, to describe the Sago, or Landan tree, which grows in the Molucca islands; look on your map and see where the Moluccas are situated.

*D.* I have found them, mother; they lie south east of Asia, near the isles of Sunda, in the Indian ocean. Is Sago the fruit of the Landan tree?

*M.* No; it is the pith or inner part of the trunk. When the tree is felled, the natives cleave it in two, and obtain the pith which is even eatable when fresh from the tree; but in order to make it more palatable, the pith is dried, and reduced to a fine powder; this they carefully separate from the pieces of

of wood which remain in it, and make into a sort of paste, which they either bake in cakes, or granulate, by passing it through a coarse sieve.

Ropes and cloth are manufactured from the bark and leaves of the Landan tree ; and a pleasant drink is made from the sap extracted from the trunk.

You must know too, that very good bread is made of yams and potatoes.

*D.* What are Yams, mother ?

*M.* The roots of a small plant which grows in the southern states, and in the West Indies ; they very much resemble in taste our potatoes, but are about four or five times larger. Yams, when boiled, make very nice puddings ; and are considered both wholesome and nutritious.

Potatoes you eat every day, and need not be told what they are. They grow naturally in Peru, and in many other parts of South America ; from thence they were brought to North America, and are considered quite indispensable at our dinners. These roots were introduced into Ireland about 1565, where for fifty years they were considered as rarities. The wreck of a ship-load on the coast of Lancashire, about that time, is the first notice we have of them in England.

*D.* What are the esculent vegetables which are cultivated in New-England, mother ?

*M.* The most common are Potatoes; besides which we have Peas, Beans, Carrots, Parsnips, Beets, Turnips, Squashes, Cucumbers, Onions, &c.

*D.* I suppose these are also common in Great Britain?

*M.* Most of them are now, but history informs us that in the reign of Henry VIII. there did not grow in England any vegetable or eatable root, and that Queen Catherine, his first wife, could not have a salad for her table, till a gardener was procured from the Netherlands.

*D.* I am very glad I did not live there then, mother, for I love vegetables very much.

*M.* You will gradually learn, my daughter, that you live in an uncommonly happy age and country, and will, I hope, be thankful to your Maker, who has given you the comforts and luxuries of food, and above all a happy and quiet home.

*D.* How was corn ground before mills were invented, mother?

*M.* Sometimes it was pulverized between two stones; afterwards it was ground in small hand-mills: this was a slow and laborious process; to hand-mills succeeded mills turned by horses; wind-mills were the next invention; and lastly, water-mills: these last grind immense quantities of grain in a short

time. In Ohio, floating-mills are common, and are very convenient, as they may be moved from place to place at pleasure.

*D.* Is corn ready for the mill as soon as it is brought from the field, mother?

*M.* No: Indian corn must be shelled from the cob; wheat, rye, and other grains are beaten or threshed from the stalks or straw, by means of an instrument called a flail; this consists of two round sticks made of very tough wood, united end to end by a leather thong: with this the grain is beaten till it separates from the straw; it is next winnowed, in order to separate the chaff and dust, and is then ready for the mill.

The Hottentots have a singular method of threshing their corn. Round a smooth circular floor is built a fence about three feet high; the sheaves, to the number of a thousand, are placed upon the floor; then all the young horses on their farms are turned into the enclosure, and made to run round the area for a number of hours, till the whole is completely broken from the husks. A person stands in the middle of the circle with a long whip, to regulate their course, while a few others are employed in turning the sheaves with forked sticks, that the whole may be broken from the straw.

*D.* I should like the bread made from our own corn better, I think, mother; I should



not much relish it after the corn had been trampled under horses' feet.

*M.* The Hottentots, to be sure, are not in all respects, remarkable for neatness.

*D.* Have you nothing more to tell me of grain and bread, mother ?

*M.* I have no more leisure, my dear, this evening ; besides, it is your bed time, so good night, and do not forget what I have told you.

*D.* O no, mother, I will not ; to-morrow I shall tell brother Henry, what you have taught me this evening ; I do not think he knows about the Ohio floating-mills, and the way that the Hottentots thresh their corn.

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### PRACTICAL QUESTIONS.

What is the meaning of esculent vegetables?  
In what States is wheat extensively cultivated ?

What States produce the most Indian corn ?

Where is rice cultivated ?

Who brought it to America ?

From what is sago obtained ?

What are yams ?

When were potatoes first carried to Ireland ?

How is grain pulverized ?

How do the Hottentots thresh their grain ?

## CONVERSATION XIII.

—◆—  
DAUGHTER.

**MOTHER**, does Coffee grow upon trees ?

**M.** What we call coffee, is the fruit of a shrub, growing to the height of eight or ten feet. It is propagated by seeds, and is a native of Arabia. The best coffee is brought from Mocha, a seaport on the Red sea : that next in esteem is raised in the East-Indian islands, and that of the lowest value in the West Indies. The berries or fruit are of somewhat an oval shape, and of a dark colour ; when ripe, they are separated from the outer red pulp, and the seed dried and packed for use. Coffee is an article of late introduction into England ; the earliest information which we have of its use there, is in 1652. At Paris this article was nearly unknown till 1669 ; and it was not in very general use in America, till the middle of the eighteenth century.

**D.** Will you now, dear mother, tell me something of the production of Tea ?

**M.** Your attention to my instructions induces me to gratify you. Tea, like coffee,

grows upon a shrub, which rarely attains to a greater height than six feet. The leaves, when full grown, are about an inch or an inch and a half in length, tapering, and of a dark glossy green colour; the flowers are not much unlike those of a wild rose. The black and green teas are not all produced from the same shrub. The leaves are plucked at different seasons, and there are various methods of curing them. There are four kinds of black tea, and three of green, imported from China. Tea is chiefly brought from China, Japan, and Siam; it is cultivated with some success in the West Indies, and attempts have been made in Louisiana and Florida to raise plantations, and they seem likely to succeed; but at present it is not an article of commerce from either of the last mentioned places. How long tea has been in use among the Chinese, we are entirely ignorant; but we are informed that an infusion of the leaves in water is a common drink among them: the use of it may first have arisen from the badness of the water in that country. The inhabitants of Japan reduce the leaves to a powder, which they dilute with water till it acquires nearly the consistence of soup. Tea was introduced into England by a Dutch merchant in 1610; its use did not become general till 1666. It was imported into our country in the eighteenth century.

**D.** I will remember what you have told me ; but do inform me of what the Chocolate is made, which I drink in the morning for my breakfast ?

**M.** Chocolate is made from the cocoa, or cacao-nut, which grows on a tree nearly resembling a cherry tree ; it has abundance of leaves, similar to those of the orange tree. The blossoms are small, regular, and similar to the rose, but scentless ; they are saffron-coloured, and very beautiful. Each fruit contains from fifteen to twenty-five small nuts or almonds, and each is inclosed in a thin yellow skin. These trees grow in South America, Jamaica, and in some other countries. It flourishes throughout the year, but especially near the summer and winter solstices. The Spaniards first introduced the use of chocolate into Europe. The natives of some parts of South America use the cacao nut for their common food. The nuts when pressed yield an oil, mild to the taste, which is used in the manufacture of pomatum, &c. Spanish chocolate is often perfumed with the fragrant seeds of the vanilla, a climbing American plant. The shells of the chocolate nut, boiled in water, afford a pleasant beverage.

**D.** We must have Sugar, dear mother, to sweeten our tea and coffee ; I should like to know from what it is made ?

*M.* Sugar is chiefly made from the sugarcane, a tall, slender plant or reed, which is cultivated to great extent in the West Indies, where it was introduced from China, or some other part of southern Asia, about three centuries ago. When the canes are cut, the leaves are thrown aside as useless, and the stems or canes are divided into pieces of about a yard in length. They are then tied in bundles and carried to mills, where they are bruised between wooden rollers covered with iron. The juice, which flows from them into a receiver, is conveyed into boilers; where, after the process of clarifying, boiling, and separating the scum or impure part of the liquid, the thickened sirup granulates, and is drained; and becomes what is called muscovado, or raw sugar. The molasses, or treacle, drained from the sugar is applied to many uses in cookery, and a spirituous liquor, called rum, is distilled from it.

Sugar is not refined at the mills, but is prepared for use by sugar bakers, either in the United States, or in Europe. This is done by first dissolving the sugar in water, boiling the solution in lime water, and clarifying it, either with bullock's blood, calcined bones, or the white of eggs, and then straining it through woollen bags. After the liquid is evaporated sufficiently by boiling, it is poured into conical moulds of unglazed earthen ware. Here it concretes into a

white mass, leaving that part of the sirup which will not crystallize, to pass off through a hole in the apex of the cone: the liquid thus drained off is called sugar-baker's molasses. Next, the broad end of the cone is covered with moist clay, the water from which penetrates into the sugar and carries off all the impurities which would otherwise discolour it. It is then carefully dried, and receives the name of loaf or lump sugar. When sugar was first introduced into Europe, it was employed only as a medicine.

*D.* Is sugar manufactured from any other substances besides the sugar cane ?

*M.* Yes; some vegetables yield it in considerable quantities. It may be extracted from some of our garden vegetables, as the parsnip and beet. Sugar is also made from the sap of a tree, called Rock-maple, which flourishes in many parts of the United States, especially in New-England.

*D.* Will you describe the tree, and the process of making sugar from its sap, mother ?

*M.* The maple tree grows usually to the height of from forty to fifty feet. It blossoms in the spring before it puts forth its leaves. No tree can be more beautiful than the maple when it is covered with foliage. Its leaves are of the most brilliant green, and very thick set. The branches are so

sweet that they afford sustenance for cattle. The wood makes a hot and bright fire. In March usually, or, if the season be very cold, the first of April, the sugar-maker taps his trees; this he does by boring, with an auger, into the heart of the trunks, about two feet from the ground: he then inserts pieces of grooved wood or little ducts, by which the sap that flows from the wounds in the trees is conveyed into troughs or buckets placed to receive it. These the sugar-makers carefully watch, that the sap may not overflow and run to waste, and when full, empty them into large boilers; after this the process is nearly the same as in evaporating the juice of the sugar-cane. The molasses drained from maple-sugar is very rich, and many prefer it to honey. The sap when fermented yields a spirituous liquor, and also affords excellent vinegar.

*D.* I am much obliged to you, mother, for this interesting information; and if you please, will read the anecdote you told me you had reserved for my amusement.

*M.* It is not applicable to our conversation this evening; but you may read it, and will, I trust, derive from it a useful lesson. Here is the book.

*D.* "A lady whose education had been very much neglected in her youth, obtained a situation at the court of Brunswick as lady

of honour to the Duchess. She had not been long there, before she perceived that the conversation frequently turned on subjects of which she was entirely ignorant, and that those ladies had most of the duchess's attention and favour who were best acquainted with books. She regretted for the first time in her life, the neglect of her own education, and although she had hitherto considered that kind of knowledge which is derived from reading, as unbecoming and unnecessary for a woman of rank, she now saw that learning was valued at court, and resolved to study, that she might be thought worthy of some consideration.

“ She accordingly mentioned this resolution to the duchess, desiring at the same time that she would lend her a book to begin with. The duchess applauded her design, and sent her a dictionary as one of the most useful of books. Some days after, her highness inquired how she relished it. Infinitely, replied the studious lady, it is the most delightful book I ever saw. The sentences are all short, and easily understood, and the letters charmingly arranged in ranks, like soldiers on the parade; whereas, in some books which I have seen, they are mingled together in a confused manner, like a mere mob, so that it is no pleasure to look at them, and very difficult to know what they mean. I



am no longer surprised (added she) at the satisfaction your royal highness takes in study."

Ah, mother, how very ignorant that lady was, and how much to be pitied; I am sure I shall study now; for what society shall I be fit for, when I am older, if I do not know more about books than she did? neither you, nor my father, nor Henry, will love me at all, nor will any body else be happy with me.

I shall not forget this anecdote, and should like to read it to every one who does not love to study.

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### PRACTICAL QUESTIONS.

Describe the growth of coffee.

When was it first introduced into America?

From what countries do we receive our tea?

How many kinds are there?

What is chocolate?

What are shells?

From what is sugar chiefly obtained?

How is it manufactured?

How is it refined?

Do any vegetables yield sugar?

Describe the process of sugar-making from maple sap?

## CONVERSATION XIV.

## DAUGHTER.

I THOUGHT to-day, dear mother, that I would not forget to ask you from what trees and countries Spices are obtained ; if you please, I should like to hear this evening.

*M.* I have no objection to making them the topic of this evening's conversation ; and will begin with the Nutmeg, as being the richest of all spices. The nutmeg tree grows as large as a pear tree ; its leaves resemble those of the peach tree ; the blossoms have a pleasant odour, and resemble the rose. The fruit is about the size of a walnut, and has two barks ; the first is thick, the second, which is very thin, and of a reddish yellow, is called Mace, and is a rich and fragrant spice. Nutmegs grow plentifully in the Asiatic island of Banda, which belongs to the Dutch. . The tree produces three crops annually ; the harvests are gathered in the months of April, August, and December.

Cloves, which rank next, abound in the Molucca or Spice islands ; when pulled from the trees, the only care they require is to

dry and preserve them from the air. When first gathered they are of a reddish colour, but become brown by drying; when fresh, they yield by pressure a fragrant oil which is highly esteemed. The Dutch monopolize this trade.

Allspice or Pimento is a native of Jamaica, and grows upon a low shrub. It is not much valued.

*D.* Do not forget Cinnamon, mother.

*M.* The cinnamon tree grows to the height of twenty or thirty feet; the leaves are oval; the flower small and fragrant, and succeeded by a fruit resembling the olive.

There are nine or ten species of the cinnamon tree; the spice is, you know, the bark of the young and tender branches. The bark of the cassia tree so much resembles cinnamon, that it is often substituted for it. The outer bark is stripped from the tree, and then the inner, which is the spice we use. From this bark a valuable oil is extracted, and the roots of the tree yield gum camphor, though this is not the only species of tree which produces that drug. We are told that the oil or tallow, extracted from the fruit of the cinnamon tree, is manufactured into candles in the island of Ceylon. This tree is now successfully cultivated in Jamaica, and several neighbouring islands.

*D.* Now I suppose I am acquainted with

all the spices ? O no, there is Ginger ; I have never thought of that.

*M.* Ginger is an aromatic root of considerable use, both as a spice and medicine. The plant grows two or three feet high ; its leaves are long, large, and of a dark green ; the flowers, which form a kind of spike, are fragrant and beautifully coloured. The ginger plant grows wild in several parts of Asia, and is cultivated to considerable extent in some of the East and West India islands. The root does not grow deep in the earth, but spreads just below the surface, and is prepared for use in two ways. When intended for what is called ginger, it is picked, scraped, washed, and dried in the sun. Black ginger is prepared by cleansing the roots and immersing them in boiling water. This last process is much more expeditious and less expensive than the other. The black colour of the last arises from its losing some portion of its essential oil. When the roots are intended for sweetmeats, they are dug when quite young and tender ; and make a fine preserve, of a hot, pungent taste, which is much esteemed.

*D.* Speaking of the hot taste of ginger reminds me of Pepper ; will you tell me how it grows ?

*M.* Pepper is the fruit of a climbing plant, and grows in clusters of from twenty to thirty

grains each. The berries are green when young, but when ripe of a bright red colour. They are considered fit for gathering as soon as they begin to turn red ; and are spread on mats in the sun to dry ; which renders them black and shrivelled. When ground in this state, the fruit or berry receives the name of black pepper. To make white pepper, the best and soundest grains are selected and steeped in salt water for the space of a week, at the end of which time the skins burst, and the grains are taken from the water and spread to dry ; the skins are then easily rubbed off, after which the pepper is reduced to powder, and packed for sale. The black pepper is more pungent than this, much of the strength being in the skins. Another method of taking off the black skins, is, by covering the kernels with lime, which causes them to fall off. The last process is followed in Borneo. Pepper is imported both from the East and West Indies. It is used as a spice in cooking, and as a medicine.

While we are speaking of these things, it may be well to tell you, that Capers are the buds of a shrub of the same name, growing plentifully in France and the Indies. They are gathered while quite green and spread in a dark place to wither, and then steeped in vinegar with the addition of a little salt. The bark of the caper shrub is medicinal.

*D.* What is curry, mother ?

*M.* Curry or Currie is a composition of ginger, pepper, and tumeric ; it is eaten boiled with rice, or made into sauce for meats, &c.

*D.* I made a list the other day of several questions I wished to ask you, mother ; we shall have time this evening, I think ; will you tell me all I wish to know,—all I ask you, mother ?

*M.* As for time, I suppose we shall have enough between now and your hour for bed, to prolong our conversation ; but I shall not promise to answer all your questions till I know what they are : propose them, and I shall then be better able to decide.

*D.* The first is about Tobacco. I was reminded of that by seeing the gardener burn the leaves over some plants in the garden to destroy the insects which were devouring them.

*M.* A reasonable question to begin with, certainly, and one I cannot object to answering. Tobacco is an Indian plant, much cultivated in Virginia, and other of the southern states. It produces large leaves, which at a proper time are cut, spread on the ground, or hung up to dry ; after which the leaves are prepared for chewing, or else made into cigars for smoking, or into snuff ; which latter preparation is made by reducing the fibres to a fine powder, by means of

mills, and adding some sort of perfume. Tobacco was first used in England about the year 1586, where it was carried by the celebrated Sir Walter Raleigh. We are told by some English writer, that one day, while Sir Walter was smoking his pipe, his servant came into the room with a pitcher of water, and seeing his master enveloped in a cloud of smoke, in much alarm threw the water over him.

*D.* I think Sir Walter could not have been much obliged to his domestic for giving him such a bath.

*M.* Probably not for the bath, but certainly for the convincing proof of his servant's zeal in affording such prompt assistance, when he supposed it so much needed. But I wish to tell you that in Turkey, many, instead of chewing tobacco, make free use of Opium.

*D.* What is that, mother ?

*M.* The juice which exudes from the seed vessels and bulbous roots of poppies after the plant has done flowering. The opium or poppy juice is at first of a milky colour, but, after exposure to the air a short time, it changes to a dark brown or black, and gradually hardens into a kind of gum. With us, it is chiefly used medicinally, and is prepared in various ways ; made into a liquid it is called Laudanum, and if taken in too large doses is a certain and deadly poison.

Great quantities of opium are imported from the East Indies and Turkey.

*D.* Are there any other plants which have similar properties to the poppy?

*M.* Yes, many; our common garden lettuce is among the number; but it is much less powerful than opium: the milky juice contained in the leaves is in taste not unlike that drug. Hops too possess the same narcotic qualities. The farina or dust that may be shaken from ripe hop blossoms, when taken in small quantities, causes sleep, and is of considerable efficacy in coughs, and other slight diseases.

*D.* Are not Hops used in making beer?

*M.* Yes; they give it a lively and pleasant bitter taste. Hops are extensively cultivated in England, and in some of our northern states. The English have been long famous for the excellency of their porter and ale.

*D.* Next on my list is Starch, mother; I thought it might be a preparation of flour, for I know that paste is made of it for various uses.

*M.* Starch or fecula is not a preparation of flour; but may be obtained from wheat before it is ground. The grain is usually a little broken, and soaked in water for several hours: the liquid is then strained and separated from the coarser parts of the wheat:



this liquid, after standing for some hours, deposits a sediment in the bottom of the vessel, which is starch. The water is poured off, and pure water added continually, till the starch is quite white : it is then collected and dried in the sun. Starch may be obtained from other vegetables, particularly from arrow-root and potatoes, which last roots yield it abundantly.

*D.* How is potato starch made ?

*M.* The roots when quite ripe are washed clean and pared ; then reduced to a pulp, and passed through the same process as I have described for making it of wheat. There is a large manufactory of potato starch at Wilton, New-Hampshire ; where it is made of as good quality as that obtained from the best wheat.

I will now tell you, while we are speaking of starch, that Hair Powder is chiefly made from it ; and that the more delicate and nicer kind is perfumed with Orris root, which is chiefly imported from Leghorn. The orris plant grows low, has long pointed leaves of a beautiful green, and is adorned with white fragrant blossoms. The root is employed both as a perfume and medicine.

Now that I have answered your proposed questions, I bid you good night, my daughter ; wishing you quiet and refreshing slumbers.

*D.* And you the same, dear mother.

PRACTICAL QUESTIONS.

- Where are cloves chiefly found ?
- Describe the cinnamon tree ?
- The nutmeg tree ?
- What is ginger ?
- How is pepper prepared for use ?
- What are preserved capers ?
- What is tobacco ?
- What is opium ?
- Do any plants possess similar qualities ?
- What is starch ?
- How made ?
- From what is hair powder made ?

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## CONVERSATION XV.

—  
DAUGHTER.

**MOTHER**, will you tell me now from what Oil is procured ?

**M.** Yes, willingly. You must first be informed that oils may be divided into three classes ; animal, vegetable, and mineral oil.

**D.** What animals yield oil ?

**M.** Several species of fish ; but we are chiefly indebted to the whale for the oil that lights our parlours, and enlivens our streets.

**D.** What are Vegetable Oils ?

**M.** All those, which are extracted from fruits and the seeds of plants. That which is obtained from the olive is much esteemed ; immense quantities of this oil are exported annually from Italy and France, and some also from Spain. The land of Canaan yielded olive oil very abundantly, and from thence much of it was conveyed into Egypt as a tribute to the Egyptian kings.

A valuable oil is extracted from the almond nut ; the tree which yields this fruit flourishes in the south of Europe. Walnuts and butternuts afford abundance of oil. The

**Date-bearing Palm-tree**, which Dr. Clarke asserts is the most valuable tree on earth, flourishes in the western and central parts of Africa, and in some other places. The inhabitants of a considerable part of Egypt, Persia and Arabia, subsist almost entirely on its fruit. They boast too of its medicinal qualities. Camels feed upon the date-stone; from the leaves of the tree are made couches, baskets, bags, mats, and brushes; from the branches, fences for gardens, and cages for poultry; from the fibres of the boughs are made thread, ropes, and rigging; from the sap is prepared a rich sirup, which may be converted into a spirituous liquor; the body of the tree furnishes fuel, and lastly, a valuable oil is extracted from the fruit, which is used for many purposes, and among others, very extensively in the manufacture of soap.

*D.* Mother, pray describe the growth and appearance of this valuable tree.

*M.* It rises to a great height, and is remarkably straight. The trunk of the tree is not solid like most large trees, but its centre is filled with pith, round which is a tough bark, full of strong fibres; when young, these are very pliable, but as the tree becomes old, they harden, and are more stringy. The leaves are closely joined to the bark, and when the tree is full grown, they are six or eight feet long; and very broad when spread

open. They are used for covering the tops of houses, &c. The fruit grows beneath these leaves and is of a sweet, agreeable taste. The tree is in its greatest vigour thirty years after it is planted, and continues in full bearing seventy years longer, yielding all the while, three or four hundred pounds weight of dates, yearly. Some of these trees have lately been brought from Africa to Florida, where the mildness of the climate gives encouragement to attempt their cultivation.

*D.* I shall always remember the date-bearing palm-tree ; but can you tell me what seeds afford oil ?

*M.* Very many plants produce seeds containing valuable oils, among which are the Rape-seed, Flax-seed, &c. That which is extracted from this last is much used by painters for its drying qualities. The method for purifying this oil, or indeed that obtained from any seeds, is this : to 236 gallons of oil, is added 6 pounds oil of vitriol, which mixture is well stirred three hours. After this, 6 pounds fuller's earth, mixed with 14 pounds best lime, is added ; the whole is kept in agitation three hours longer. The mixture is then introduced into a boiler containing a quantity of water equal to that of the oil, and the whole gently stirred and boiled three hours. After this the oil is gradually cooled,

and is found quite pure. Sun-flower seeds yield oil ; a bushel will afford a gallon ; this is used like olive oil on salads, as well as medicinally, and in the mixture of paints, varnishes, &c. I must also, while speaking of the seeds, inform you of the very many useful purposes to which this plant is applied. The sprouts are eaten with oil and salt. In Portugal bread is made of the seeds, as is also gruel, and, besides yielding oil, they fatten fowls ; the leaves are excellent food for cows and sheep ; the stems may be used for bean and hop poles, or any other climbing plants ; they likewise serve, when dry, for fagots to kindle fires.

*D.* I had no idea, mother, that this plant was of any use, except for the seeds, which it yields, and which I give to my little birds.

*M.* Now you are informed of its many uses, my dear, you must remember them ; but we must not forget the Castor in our enumeration of plants which afford oil. This plant grows to the height of five or six feet ; it blossoms in clusters, and from the seeds or beans is extracted the castor oil, of so much use in medicine. The plant flourishes in the south of Europe, in the United States, and other countries. There are many other plants which afford oil, but I have enumerated the most important of them.

*D.* What are Mineral Oils, mother ?

*M.* There are two kinds of mineral oils, Naptha and Petroleum; they are distinguished by the name of bitumens, and are always inflammable, or easy to take fire. I shall also describe to you mineral Tar, mineral Pitch, and Asphaltum, which are allied to them in substance. The two first named substances are similar in quality, though not in colour. Mineral tar is found abundantly in the island of Trinidad; it is mixed with common pitch, and used to cover the bottoms of ships; and effectually excludes the water from penetrating the timber. Mineral Pitch, of which there are three kinds, is applied to the same uses; it is lighter coloured and harder than mineral tar. Asphaltum is of a black, or brownish-black colour, and is found floating abundantly on the lake of Asphaltum, otherwise called the Dead Sea. Its principal use is in the composition of varnishes, especially that kind used by copper-plate engravers.

*D.* What is Naptha, mother? I have learned from my geography that it is found near Badku, in the province of Shirvan.

*M.* You are right; and I need not tell you that these places are near the west end of the——

*D.* —Caspian sea, mother; but I should not have known that, if Henry had not told me, and pointed them out on my map.

*M.* I am glad you give your kind brother credit for his assistance; you know it would have been taking undeserved merit to yourself had you left me to suppose your information was acquired altogether by your own research. But to resume our subject; naphtha is found also in Japan, and Italy; it is of a light brown colour, perfectly fluid and transparent, and is burnt in lamps by the Persians, the Japanese, and the Italians.

Along the Tigris, springs of naphtha and bitumen are found in great numbers: the black bitumen serves instead of oil; the white is used as a drug. Their light boats are made of wicker-work, and pitched over with this substance, which floats in the river in such abundance that the boatmen often set fire to it, and the river presents the magnificent spectacle of a floating sheet of fire.

*D.* And Petroleum—what is that?

*M.* Petroleum is neither so transparent as naphtha, nor so pure; its colour is various, being in some places found brown, in others red, and again in others green. This oil is found in different parts of England, particularly in Shropshire and Coalbrook: it is met with in Hungary; in the south of Asia, and it is also found in the Birman empire. The Birmans obtain petroleum, by digging wells in those places where, from the nature of the soil, they are pretty sure of finding it. They



are usually obliged to dig many feet deep for it ; when they come to the oil, which flows from the rocks, and through beds of mineral coal, as water into a well, they proceed to lade it into buckets, which are drawn to the surface by machinery. The oil thus obtained, is of a dingy green colour, and fragrant odour ; the natives apply it to many uses ; it is too thick to burn in lamps, and hardens by long exposure to the air. In the Duchy of Modena, in Italy, are springs of fragrant mineral oil, similar to petroleum. There is a spring of water in the same duchy, upon which swims such quantities of oil, that ten or fifteen pounds may be collected from its surface weekly. And what is still more wonderful, oil is frequently found to rise upon the surface of the water, near the coast of Naples ; this, we are told, is carefully collected by the boatmen, and sold at Naples to considerable profit.

*D.* Are there no springs in America which yield oil, mother ?

*M.* Yes, many have been found in different parts of the United States, but little is now known of their properties. There is one in the northern part of Pennsylvania, upon which constantly floats oil resembling petroleum : which being considered efficacious in rheumatic complaints, is collected for druggists ; little other use is made of it.

*D.* What more have you to tell me of oils, mother?

*M.* Nothing to-night, my daughter. Go to bed, and in your prayers to your heavenly Father, forget not to thank him for the invaluable treasure with which he has endowed you—a thinking and improvable mind.

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### PRACTICAL QUESTIONS.

How many kinds of oil are there?

What are vegetable oils?

From what animals is oil obtained?

What are mineral oils?

Describe the palm tree.

What are the uses of the sun-flower plant?

What is naphtha?

What is petroleum?

Where is it found?

## CONVERSATION XVI.

—  
DAUGHTER.

**MOTHER**, I was thinking when I went with you to the silk-merchant's, from what those beautiful goods were manufactured, and whether, like linen, they are obtained from plants ?

*M.* I am pleased to hear you inquire the nature of those things in common use, with which you are not fully acquainted ; I will willingly gratify your curiosity. Silk is an animal production, not a vegetable. You appear surprised, and will be more so when I tell you it is the work of an insignificant little worm, which the ingenuity of manufacturers has wrought into such beautiful fabrics.

*D.* Before you speak of silks, please to tell me something of this singular little creature.

*M.* The Silkworm is a species of caterpillar, with twelve very minute feet ; it produces a butterfly of the moth kind, which deposits the eggs from which the young worms are hatched. The eggs are about the size of a pin's head. While in a caterpillar state it

eats mulberry leaves ; when changed into a moth it eats nothing, but dies immediately after depositing its eggs.

*D.* How do they make silk ? I am quite puzzled to imagine by what means they accomplish their task.

*M.* They feed several weeks upon the leaves of the mulberry-tree, and then begin their labour, spinning cones about the size of a large nutmeg ; these are either white or yellowish. The worm spins itself into these cones, as if performing for itself the office of burial, and then changes into what is called an aurelia, which in a fortnight or three weeks, becomes a moth, and bursts through the cone or cocoon as it is called. But as the eating a hole through the cocoon would spoil it for use ; those who rear worms bake the cocoons in warm ovens, which process kills the aurelia. These cocoons are formed of one continued and exceedingly fine thread, which is unwound and reeled ; several of these twisted together form the thread from which silk is woven.

*D.* Where are silkworms raised, mother ? I should like very much to have some.

*M.* They were originally brought from China ; but they are natives of all the temperate climates of Asia. They were introduced into Sicily and Calabria from Asia Minor, about the beginning of the twelfth century, by Roger, king of Sicily, and the

weaving of silk is now one of the most lucrative manufactures in the southern kingdoms of Europe. This article was carried to Rome about the third century, where it sold for its weight in gold. We are told in history, that the Emperor Aurelian, when his Empress requested of him a dress of silk, replied that he could not afford it. Very beautiful silks are imported from India, France, and Italy. Pamphila, a native of the island of Cos, is said to have been the first person who contrived to weave silk into drapery.

*D.* This is all very interesting. I should like to study history, mother; and when you permit me to add this to my other studies, I will try to remember all I read. Please inform me how oiled silk is prepared?

*M.* The cloth or silk must be fastened in a frame and immersed in a mixture composed of one pound linseed oil, 1 ounce and half of white lead, 1 ounce umber, and a clove of garlic. These ingredients must first be boiled, however, 12 hours over a small fire, when the composition will be fit for use. The silk after having been immersed may be hung to dry, after which it must be rubbed with pumice stone, to render it smooth. It is then coated with another thick fluid, composed of 1 pound linseed oil, 1 ounce vitrious oxid of lead, 4 drachms sulphate of zinc, and 4 ounces white lead, calcined till it turns

yellow. These must previously be boiled in an iron vessel, until they are reduced to the consistence of paste. The materials thus prepared will be found water-proof when thoroughly dried. Oiled silks are made into hat cases, umbrella coverings, over-coats, aprons, &c. Silks are wrought into a variety of beautiful fabrics.

*D.* Will you have the kindness to inform me from what Cambric and Muslin are made?

*M.* From cotton, which is the product of a plant, that grows to the height of about six or eight feet. The leaves are suspended by small stalks, adorned with a nap, or hairy substance. The flowers are large and numerous, shaped like a bell, and of a yellow colour, mixed with red or purple; these are succeeded by the fruit, about the size of a large walnut, which when ripe, opens and discloses three partitions, containing the cotton, which is of a snowy whiteness. Heat swells each flake to the size of an apple. Cotton grows in Syria, Cyprus, and Candia, also in the East and West Indies. It is cultivated in the southern states of North America, and is from them a staple article of commerce. Cotton is spun like wool, and manufactured into a great variety of cloths, some of exquisite fineness.

*D.* Have we many manufactories of cotton in this country?

*M.* Yes, in all our northern and middle states they are numerous: but we are indebted to foreign countries for our delicate cambrics and muslins. No country equals India in the manufacture of the last mentioned article.

*D.* Now, mother, for Wool; I know broadcloths and flannels are made of wool.

*M.* Wool is the hair or fleece of sheep, and is the most valuable part of that animal. It is manufactured into a great variety of articles, both useful and beautiful; among which, besides those you have named, are blankets, coverlets, hats, and yarn for hose, carpets, rugs, and many other articles of domestic comfort. Flannels and blankets are often injured by moths; this may be prevented by strewing slips of sweet flagroot between them, when laid in trunks or drawers.

*D.* What countries produce the best Sheep, and how many kinds are there, mother?

*M.* According to Linnæus, the naturalist, there are three distinct species of sheep. The first includes the common sheep, such as you have seen in the country; these are raised also in England. The Spanish sheep are remarkable for the fineness of their wool, and are raised in several places in the north of Europe and Asia. The African sheep have short hair like the goat, and the broad-tailed sheep are common in Syria, Barbary,

and the interior of Africa. Sheep are also found in the kingdom of Thibet, whose fleeces equal those of the Cashmerian goat in fineness, beauty, and length. They are wrought into elegant shawls and other fabrics, and imported from the East Indies. The Angora sheep has beautiful erect horns, twisting like a screw. These are common in Hungary, in the rocky mountains of Pontus ; and large numbers are found on Mount Ida, in the centre of the island of Crete. Woolly sheep are found only in the temperate latitudes ; in the torrid and frigid zones, they lose their fleece, which is supplied by a rough hairy coat. Of the species I have named, there are found many varieties.

*D.* I suppose the sheep is otherwise useful than for its fleece ?

*M.* Yes, its flesh is a delicate and wholesome food. When the flesh of this animal is young, it is called lamb, when old, mutton. The skin is applied to many uses. It is manufactured into shoes, gloves, parchment, covers for books, &c. The entrails when properly prepared are used as strings for musical instruments and clocks. The bones when calcined or burnt, are used by the sugar-refiner. Sheep are very hardy, and discover great sagacity in selecting their food : they appear by instinct to foresee the approach of a storm.

*D.* Your description of the silkworm and



of wool from the sheep, reminds me of a little hymn I learnt in the book you gave me ; may I repeat it, mother ?

*M.* Certainly. I am happy to see you apply what you learn to good purposes.

*D.* " How proud we are, how fond to show  
Our clothes, and call them rich and new ;  
While the poor sheep and silkworm wore  
That very clothing long before.

The tulip and the butterfly,  
Are dressed in gayer coats than I ;  
Let me be clad fine as I will,  
Flies, worms, and flowers exceed me still."

I did not think of these verses, when I asked of what silk was made, or I should have known at once. It is strange I should not have remembered.

*M.* Well, then, you must try in future to be less forgetful. I will now tell you something of the various processes through which wool passes before it is made into cloth.

*D.* I will be attentive.

*M.* The sheep are first washed. In New-England this is done either on the last of May, or the first of June. When the wool is dried, the shearer cuts off the fleece, to which operation the animal can oppose no resistance. The fleeces are then sorted according to their degrees of fineness, and scoured thoroughly in hot water, in order to cleanse the wool from the oily matter with which it is filled. The wool is then picked

and beaten with stiff rods, to clear it from all dirt and bits of sticks and grass. Next it is oiled, and either carded by hand with small cards, or sent to a carding mill. When carded, it is spun into yarn, reeled, and made into skeins, and is then ready for the weaver; who begins the cloth by putting the warp, or the threads which run the long way of the piece into the loom. The cloth is formed by throwing the filling, which is the thread that runs across, with a shuttle, between the threads of the warp. When the piece is woven, it is carried to the fuller to be scoured, cleansed, and made ready for dyeing. The wool for mixed cloths is dyed before it is spun.

*D.* Who first thought of making wool into clothing?

*M.* I cannot inform you. The manufacture is of great antiquity. It was introduced into England from the Netherlands in the fourteenth century. During the reign of Elizabeth, the manufacture was much increased, and the English now make it one of their chief national commodities of traffic.

*D.* Is your Cashmere shawl made of wool, mother?

*M.* It is manufactured not from the wool of our sheep, but from the hair of the Cashmerian goat of Thibet. The hair of this animal is the finest of any of its species. That of the Angora goat, is next in value.

From it are manufactured our finest camblets, also a kind of sewing silk called mohair. Hose, of a very delicate and durable fabric, are likewise manufactured from it. The fleece or hair of the Angora goat is distinguished for its glossy whiteness, and for being both long and thick.

*D.* Please to describe the manufacture of linen.

*M.* Not to-night, my daughter ; if nothing unlooked-for prevents, I will gratify you to-morrow evening. Good night.

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### PRACTICAL QUESTIONS:-

- Is silk an animal production ?
- How is it produced ?
- From what countries chiefly brought ?
- What is cotton ?
- Describe its growth ?
- What is wool ?
- What are its uses ?
- How many species of sheep are there ?
- Describe the process of manufacturing wool into cloth ?
- What countries yield the finest wool ?

## CONVERSATION XVII.

—  
DAUGHTER.

WELL, mother, here we are comfortably seated, and if you are not too much engaged, I must claim the fulfilment of your promise, to tell me something of the manufacture of Linen.

*M.* Linen is, you know, made of flax, which is a plant with a long slender fibrous stem, usually growing three feet high, covered with leaves, and bearing on the top of the stalk a small blue flower, which produces the seed called lin or flax seed. These seeds yield a very useful oil, and when that is expressed, they serve as food for cattle.

The flax plant ripens towards the end of August, and is pulled as soon as the seed vessels turn brown, and bend their heads. After the flax is pulled, the seeds are threshed out, and the stalks soaked in water or spread upon damp ground in order to disengage the outer bark or skin. It is then swingled, that is, beaten with a machine, till it becomes silky, and is freed from all the brittle parts of the stalk. The flax is next hackled,

which is done by drawing it repeatedly through a machine, filled with long steel spikes ; this operation disengages all the coarser and broken fibres, and leaves it smooth and even. The coarser part, which is called tow, is manufactured into strong cloth ; but tow requires carding, which flax does not. After the flax is dressed, as I have told you, it is wound upon a distaff, which is nothing more than several strong twigs, tied at each end and spreading in the middle. It is now ready for spinning ; and you may judge of the extreme fineness of the threads of flax, by this cambric which I am making into ruffles. The most beautiful linen cambrics come from Cambray in Flanders. Holland has long been celebrated for its fine cambrics and linens. In Ireland these manufactories are very extensive, and we have also fine linens from Scotland, France, and England. In America, but especially in New-England, flax is raised on almost every farm. The Egyptians also raise great quantities of flax ; their country is peculiarly favourable to the growth of this plant, which there often rises to the height of four and five feet.

*D.* Is it always white, mother ?

*M.* No ; in its natural state, it is a dark brown ; after it is spun and woven into cloth, it is bleached ; at the manufactories this pro-

ness is varied, but that which is called "home made" is boiled, soaked in ley, and laid on the grass, exposed to the sun; the cloth becomes white in a few days. You remember the nice linen I had made last year in New-Hampshire; it is quite equal to the Irish linens, except in the dressing.

*D.* Is cloth ever made from Hemp? I know ropes, sailcloth, and cables, for ships, are made from it.

*M.* Yes, our best sheetings are made of Russia hemp. The plant is somewhat similar to flax, though taller in its growth, and the fibres much stronger. The process for dressing hemp is much more laborious than that of flax; the stems being tougher and larger.

*D.* I now know all the materials from which cloths are manufactured; why do you smile, mother, am I mistaken?

*M.* You are not quite so learned as you think yourself: but that you may not plead ignorance as an apology for again making a similar assertion, I will inform you that cloth is made from many other substances besides those which I have described to you.

*D.* I will be mindful of what you say, and in future be more careful not to boast of my fancied knowledge.

*M.* You resolve wisely. I suppose you will be a little surprised when you are in-

formed that a kind of linen is manufactured from stone.

*D.* From stone, is it possible, mother ! had any one but yourself told me so, I should have supposed they were trying to impose on my credulity.

*M.* This stone-flax is a mineral substance, called flexible Asbestos, or Amianth ; it is of various colours, being sometimes found of a silvery white, and again of pale and leek green, yellow, and faint red ; its texture is somewhat woolly, and it possesses a pearly lustre. It consists of small fibres, endued with the wonderful property of resisting fire, and remaining unconsumed in the most intense heat. Asbestos was known to the ancients, and was much esteemed by them ; they considered it equal in value to precious stones. The wicks of lamps, burned in their temples, were usually made of amianth. They wrought it into cloth, with which they wrapped the bodies of their dead.

*D.* Where is it found, mother ?

*M.* It is obtained from every quarter of the globe. Sweden, Saxony, Anglesea, and Portsoy in Scotland, yield asbestos. Greenland especially affords this substance ; and it is so abundant in Corsica, that it is used instead of tow for the purpose of packing minerals, &c. I have in my cabinet some specimens from Canada and Vermont, which you

may examine, also some from Cornwall, remarkable for the silkiness and length of the fibres.

You must further know, that the natives of the Sandwich, and other of the Pacific islands, manufacture cloth from the bark of a tree, called the paper mulberry. The process is very simple, the cloth not being woven, but beaten together and smeared with glue.

In the East, a species of grass is manufactured into very durable fabrics. Some trees in South America also afford materials for cloth.

*D.* Thank you, mother. Will you tell me whether my father's hat is made of wool? In enumerating the different articles manufactured from it, I remember hats were of the number.

*M.* Hats of the commonest kind are made mostly of wool, but your father's is made of Beaver's fur. This animal, which is also distinguished by the name of Castor, is remarkable for its social and industrious habits.

*D.* Will you describe it, mother?

*M.* It is an amphibious animal about two feet long, and twelve or fifteen inches broad. It has a broad flat tail of an oval form, which is covered with scales, and serves alike the purpose of shovel and trowel.

*D.* Will you stop one moment, and tell me what is the meaning of amphibious animal?



*M.* One that can live both on the land and in water ; such are the crocodile, the hippopotamos, the sea-elephant, the seal, and many others. The mouth of the beaver is pretty long ; the ears short, round, and hairy ; the teeth very strong and long, the under ones are crooked, project, and are very sharp ; with them they fell trees of the largest size. The legs are short, and the paws are shaped something like a human hand ; with these they dig, soften, and work clay. Beavers vary in colour ; the most valuable skins are black ; the general colour is chesnut-brown ; some have been found quite white, but they are very rare. The finest beavers inhabit the Canadas and New-Britain. They are also found in the northern parts of Europe and Asia.

*D.* But, mother, do tell me what these singular animals can want of clay and trees ?

*M.* With these materials they construct themselves houses, my dear.

*D.* O, the wonderful creatures. They are more ingenious than any animal I ever before heard of.

*M.* Do not birds build themselves nests ?

*D.* Oh yes, mother, with little bits of straw, sticks and wool ; they do not cut down trees and knead clay ; and yet I remember they are very ingenious in forming their little habitations. You know I learnt

some pretty lines the day Henry brought me home a bird's nest which he had found on the ground in the mall when he was returning from school. I will repeat them if you please.

*M.* I should like to hear them.

*D.* " Much it wins my admiration  
To view the structure of that little work,  
A bird's nest. Mark it well within, without ;  
No tool had he that wrought ; no knife to cut ;  
No instrument to fix ; no bodkin to insert ;  
No glue to join ; his little bill was all ; —  
And yet how neatly finished ! What nice hand,  
With every implement and means of art,  
And twenty years' apprenticeship to boot,  
Could make me such another ?"

But yet I do think the beavers are very, very wonderful animals, mother.

*M.* Well, we will allow them the merit of being ingenious ; but suppose I tell you how they build their houses ?

*D.* I should like very much to hear.

*M.* When they intend building, they assemble in companies of two or three hundred, selecting a place where there is plenty of green wood, near a running stream or pond of water. They always build in the water ; but as a current would impede their progress they drag trees and drift wood across the stream, and thus form a dam, filling up the interstices with stones, clay, and

mud, which they carry between their fore feet and throat. The dam is of a convex shape, of great strength, being eight or ten feet at the base, and tapering gradually upward. They build their houses on the causeway or dam, and if the force of the water injures them, they immediately repair the damage. Their habitations consist of two stories, raised one above another. Each beaver has his own cell assigned him, the floor of which is covered with leaves, or the branches of trees, to make it clean and comfortable. Besides their houses, they excavate holes in the banks of the river, which serve as places of retreat, when assailed in their abodes. Their works are completed about the last of August, and they then proceed to lay in their store of winter provisions, which consist of tender wood steeped in water, and a root which they seek on the sides and in the bottom of the rivers. During the summer they live upon fruits and vegetables. The hunters destroy these animals for their skins and bags of castor. Their flesh is esteemed by the natives in the winter, when it is fat. It is from the downy part of their fur that hats are made.

*D.* Poor creatures, how can men be so cruel as to kill them ?

*M.* The desire of gain, my daughter, will harden and destroy many of the kind and

tender feelings naturally impressed on the heart of man.

*D.* I do not like to think of the poor beavers, mother. Will you describe the manufacture of hats? They are made in Boston, I believe.

*M.* Yes, and in most other places. When the skins are taken to the hatter's, the first business is, to clear them of the fur, which is then carded; wool and other furs are sometimes mixed with it. A proper quantity is taken for a hat and put upon a little square table, which has chinks cut through it lengthwise. The workmen, with an instrument called a bow, work the fur till it mixes well together, the dust passing through the chinks. In this manner they form two pieces or bats, as they are called, into an oval shape, ending with a sharp corner at top. These are hardened by pressing them between two pieces of leather; they are then laid in a vessel over a fire and sprinkled with water; a sort of mould is used to shape the stuff, which, by the action of the water, pressing, and the heat of the fire, becomes thickened into a sort of felt; they then turn up the edges of one, lay it aside, and take the other bat, with which they proceed in a similar manner. The next thing is to join the two, so as to form a high-crowned hat. It is next dipped into a copper kettle filled with

hot water, where they roll and unroll it repeatedly with their hands or a little wooden roller; this they continue to do several hours. The crown is formed by laying it on a wooden block of a proper size, and tying it close with pack-thread. When the hat is dry, they singe it and rub it with pumice to take off the coarse nap; it is afterwards rubbed with a seal skin, and lastly carded with a fine card. It is now put into a large kettle, and boiled in a dye made of logwood, verdigris, copperas, and alder bark; after being boiled an hour, it is taken out and cooled; this process is repeated several times. When the dyeing is finished, it is dried thoroughly and stiffened with sizing; it is now steamed, again dried, put upon the block, brushed, and ironed; nothing now remains to be done but to trim and line the hat. This process is sometimes varied, in different manufactories.

*D.* I will ask father to take me to a hat-manufactory, if you please. I shall be much interested to see these various operations performed.

Good night now, dear mother; I shall not soon forget of what hats are made; nor the ingenious animal which is killed to ornament with its fine fur the hats of gentlemen.

*M.* And of little girls too; you forget that you sometimes wear a beaver hat in winter.

PRACTICAL QUESTIONS.

What is linen ?

How prepared for use ?

For what is flax-seed useful ?

In what countries are made the finest lin-  
ens ?

What are some of the uses of hemp ?

What is stone flax ?

Of what are hats made ?

Describe the beaver.

How are their habitations constructed ?

Can you tell me the process of hat making ?

## CONVERSATION XVIII.

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DAUGHTER.

O, MOTHER, see these beautiful white coloured flowers, which cousin Elizabeth has given me ; they are made of rice paper, and she says if I am not very careful, they will break, the paper is so brittle.

*M.* The flowers are certainly very beautiful, my daughter ; but white is not a colour, as you suppose. There are but seven primary colours, red, orange, yellow, green, blue, indigo, and violet ; it is from different combinations of these colours that all others are formed. White is composed of all the primary colours united.

*D.* I do not understand how it can be so.

*M.* I will show you by means of a Prism, which is a piece of glass having three sides, each perfectly smooth. This, held in the light, will decompose or separate the rays of light, and you will see all the primary colours distinctly and regularly placed in the prism.

*D.* This is indeed wonderful ; but is not black a colour ?

*M.* No : it is a privation of all colour. Go into the drawing-room, and although the sun shines here, you will see no ray of light or<sup>d</sup> colour there while the shutters remain closed. The carpets, the pictures, the furniture, are all alike black; but admit the light, and you restore their colour. Hear what the poet says —

“ Colours are but the phantoms of the day ;  
 With that they're born, with that they fade away ;  
 Like beauty's charms, they but amuse the sight,  
 Dark in themselves, till by reflection bright ;  
 With the Sun's aid, to rival him they boast ;  
 But light withdrawn, in their own shades they're lost.”

The science of light and colours properly belong to studies at present above your comprehension ; at some future time I will explain the properties of light more fully.

*D.* Thank you, mother ; but will you tell me of what colours Green is composed ?

*M.* Of yellow and blue ; red and yellow make orange ; mixtures of blue and red, in different proportions, form violet, purple, and lilac ; red, blue, and yellow produce olive.

*D.* I suppose that Black cloth will receive no other colour ?

*M.* No, it can receive no light shades.

*D.* What cloths are most easily dyed ?

*M.* Woollen fabrics take colouring the most readily, silk the next, cotton the next, and linen the least of all.



*D.* Will you be so kind as to tell me what are some of the substances used in dyeing Blue ?

*M.* Woad and indigo are the commonest substances. Woad is a plant much cultivated in Europe, though it grows wild in many places. When the leaves are ripe, they are gathered, and after laying some time, are ground in a mill. The substance thus produced is then spread to dry. After remaining in heaps two or three days, it is reduced to powder, and sprinkled with water. Being thus alternately dried and wet for the space of a week, it is ready for use. It affords a very deep, bright blue ; the ancient Britons used to paint their bodies with it. Indigo is a plant about two feet high ; it grows naturally in the Carolinas, and is much cultivated in the East and West Indies. Its leaves are round, and green, except towards the edges, where they incline to brown ; underneath they are silver coloured. The flowers are of a reddish colour, resembling pea blossoms, and from them proceed long crooked pods, enclosing a seed of an olive colour. The indigo plant grows very rapidly, and in six weeks or two months after the seeds have been sowed, it is ready for cutting.

*D.* How is Indigo prepared for use ?

*M.* The plants are laid in a large vat or

cistern, and covered with water. In this state they are left to ferment, and the fluid or pulp which first appears green, by exposure to the air changes to blue. It is now drawn off into another vat, and constantly agitated or beaten, until the colouring matter unites in one body; and lastly, the water is drawn off, and the pulp or indigo is cast in small moulds, and prepared for sale. Another method of preparing it is this. The plants being thoroughly dried, are put into large jars of heated water, and rapidly stirred round till the colouring matter is combined with the water. The liquid is then carefully strained or filtered through the porous bark of trees into another vessel, where it remains eight or nine days. The indigo subsides into a thick sediment, which is transferred to wooden troughs containing a quantity of dried sand; the sand absorbs the moisture, while the indigo remains in solid cakes, and may be packed for exportation. The best indigo is of a dark shining blue.

*D.* What produces a Yellow colour, mother?

*M.* The principal colouring matters for yellow, are weld, fustic, tumeric, sumac, and quercitron bark.

Weld, or dyer's weed, is a plant much cultivated in England. Fustic is the wood

of a large tree that grows in the West Indies. Tumeric in its growth resembles ginger; the root is very hard, and yellow within and without; Madagascar, and the East and West Indies yield it; glovers use it to colour their gloves; and brass founders to colour their brass; Indians also eat it with rice and other food; the root is difficult to break, heavy, and resinous.

Sumac is a tree growing plentifully in many parts of North America. Its height is from ten to fifteen feet; the wood affords a brilliant yellow dye; the berries, which grow in large clusters, are of a bright crimson colour, and, united with some other ingredients, dye a permanent black. They should be gathered the last of July, and carefully dried, without exposure either to the sun, rain, or dew. The rays of the sun after gathering, will extract the colour, and dampness destroy its colouring property. Sumac is also used in tanning leather.

Quercitron is the inside bark of the red oak tree, which grows naturally in North America.

*D.* What are the colouring matters for Red?

*M.* Kermes, cochineal, madder, carthamus, and Brazil-wood.

Kermes, like the nut-gall, is an excrescence growing on a species of the oak; it is formed by an insect, which is red, and

exceedingly small. The kermes berry is very bitter, and filled with these little insects : and to prevent their loss, the berries, when fresh gathered, are steeped in vinegar. Kermes are used in medicine as well as in dyeing. Red ink is also made of them.

*D.* From what countries are the kermes procured, mother ?

*M.* From Spain, Languedoc, Sicily, and some other hot countries.

*D.* What is Cochineal ?

*M.* Cochineal is an insect living on a plant which grows to about the height of six feet. Whole plantations of this are raised in Mexico for the sake of cochineal, which the Indians take the greatest care to preserve and cultivate. In order to collect the insects, the plant on which they are feeding is shaken gently, and they fall upon cloths purposely spread to catch them. They are then dried and packed for sale.

Brazil-wood grows in America, and the West Indies ; it does not yield so fine a red as either kermes or cochineal.

Madder is the root of a common plant, and yields a rich red colour. Though not confined to Spain, this plant is extensively cultivated in the Spanish provinces. Smyrna and the island of Cyprus export the best madder. Cattle are very fond of this plant.

Carthamus is the flower of a plant cul-

tivated in Spain and the Levant. It contains two colouring matters, the one red, and the other yellow. The first is chiefly used.

*D.* What are used in dyeing Black ?

*M.* There are very many substances which afford good blacks, with the addition of copperas ; among them is logwood, which communicates a lustre to whatever it colours. The wood of this tree is common in the West India islands and the country which surrounds the bay of Honduras.

The bark of the Butternut tree which flourishes in North America, yields at some seasons of the year a black, at others a brown dye.

*D.* I suppose, in order to dye green, blue and yellow colours are mixed ; as you say green is formed of these colours ?

*M.* No. Woollen, silk, and linen goods are usually first dyed blue, and afterwards dipped into a yellow dye, which makes them green.

You must now, as I am engaged the remainder of the evening, amuse yourself with my microscope ; you will find with it a box containing a variety of curious insects ; bring the microscope to me and I will show you how it is to be used.

*D.* Here it is, mother, and the box too. Pray what are these beautiful insects which are wrapped in the blue paper ?

*M.* They are Cantharides, and are used sometimes when people are sick, to raise blisters.

*D.* Please to stop one moment, and tell me where they are found?

*M.* They are, as you see, a little larger than the common fly, and of a beautiful green and gold colour. These flies are collected in Spain, Italy, and in the southern countries of Europe generally, also in South America. But those which are considered most valuable for their blistering qualities are brought from Catania and Mount Etna in Sicily.

*D.* Thank you, mother; I will not detain you any longer, though I do wish very much to ask something about this creature with long horns and bright wings.

*M.* It is the golden beetle; but I cannot tell you any thing of its natural history now. Good evening.

*D.* Good evening, mother.

**PRACTICAL QUESTIONS.**

**Is white a colour ?**

**What are the primary colours ?**

**What cloths are most readily dyed ?**

**What substances are used in dyeing blue ?**

**Describe them.**

**What substances afford a yellow dye ?**

**What are the colouring matters for red ?**

**What is cochineal ?**

**From what country obtained ?**

**Where are cantharides chiefly found ?**

**What are their uses ?**

## CONVERSATION XIX.

## DAUGHTER.

I READ in a little book this morning that the Italians excel all other nations in the art of sculpture ; what is the meaning of Sculpture, mother ?

*M.* It is the art of carving figures in stone, or wood. The first statues were probably formed of clay, and served as models for works of greater skill and ingenuity. But even now a sculptor always forms a pattern with clay, before he begins to fashion his marble. Sculpture is supposed to be more ancient than painting ; and it is generally allowed that the ancients excelled the moderns in this art.

*D.* You told me some evenings since, mother, that marble is used a great deal in the building of houses in Italy, because it is very abundant there. Are mines of it found in any other countries ?

*M.* It is not correct to say mines of marble, my dear ; we say mines of metals and minerals, but quarries of marble, slate, and stone. But to answer your question : mar-



ble is found in many countries besides Italy. The island of Paros has always been famous for its marble, as have also several countries in Turkey. There are quarries of beautiful marble in many other parts of Europe, and it is abundant in North America, and in Asia.

*D.* Is Porphyry a kind of marble? father has a box made of it, you know.

*M.* Yes, it is a very fine kind of marble; the best was anciently brought from Egypt, and for hardness excelled that of all other places. Porphyry is usually of a brownish red colour, sometimes interspersed with white veins.

*D.* Our Alabaster vases, are they likewise marble?

*M.* Alabaster differs from marble in being finer, softer, and in a degree transparent. There are three kinds; the yellow, which abounds in Germany, and is also found in Greece, France, and the western part of England; the snow-white, which is brought from the Taurus mountains of Asia Minor; and the variegated yellow and-red, found in various places. But to return to our subject. Statuary is a branch of sculpture; and I hardly need tell you that a statue is a piece of sculpture resembling the human figure.

*D.* Statues were not always made of clay and marble, mother, for I remember you told me they were cast from metal; there

was the famous Colossus of brass, that was erected at the entrance of the harbour, on the island of Rhodes.

*M.* You are right ; statues formed with the chisel are either of wood, stone or marble ; but you do well to remember that they are not always made of these substances. They are cast not only from brass, but various other metals, particularly from gold, silver, bronze, and lead.

*D.* Painting comes next to statuary, mother ; who were the first painters ?

*M.* It is not certainly known ; but painting is supposed to have had its rise among the Egyptians ; the Greeks learnt it of them, and carried it to a high degree of perfection. The Italians learnt it of the Grecians, and from Italy the knowledge has been diffused among other nations. Painting may be distinguished into several kinds, according to the materials employed in it ; as painting in oils, painting in water colours, in fresco, or on glass. Artists paint on paper and ivory with black lead, chalk, crayons, India ink, and with water colours : but they paint on board and canvass with oil colours. The art of painting in oils, that is, with the paints mixed and ground with oil, was discovered by a Flemish painter, about the year 1415.

*D.* Mother, what is painting in Fresco ?

*M.* It is a kind of painting in water colours upon fresh mortar, or on plaster, ceilings, and walls, before they are quite dry. This sort of painting is very durable. It has been known much longer than other methods, and was early practised among savage nations.

*D.* What is Engraving, mother? I heard you tell my cousin, when she was looking at your prints the other day, that some were wood, and others were copper engravings.

*M.* Engraving is the art of excavating or cutting metals, precious stones, &c. so as to yield correct impressions of any designs. There are many kinds of engraving, such as Line engraving, Mezzotinto,\* Etching, Stippling, Aquatinta, &c.

*D.* Will you describe some of these methods, mother?

*M.* Willingly, but first of engraving in general; it is necessary that the artist be furnished with a graver, which is a small steel instrument, square for broad lines, and lozenge-shaped for fine ones; this must be very carefully tempered, and inserted in a handle of hard wood, resembling a pear with a small piece cut from one side: the scraper is a triangular steel, tapering from the handle to the point, which is used for scraping off rough edges and erasing erroneous lines: the burnisher is a third instru-

\* Pronounced Met-zo-tin-to.

ment of steel, hard, round, and highly polished ; it is used for rubbing out scratches upon copper ; a fine needle is used for etching ; an oil stone is necessary for polishing these instruments, as is finely pulverized charcoal.

*D.* Next, the engraver must have a copper-plate, I suppose, mother ?

*M.* Yes ; the plates must be of the best copper, quite free from flaws, well hammered, and finely polished. The table intended for engraving should be perfectly even, and be supplied with sand bags upon which to rest the plate. Great care is necessary in engraving ; as erroneous lines would cost much additional labour. It is customary to engrave beneath the shade of silk paper, as a glare of light on the plate dazzles the eyes.

*D.* How are the designs traced, mother ?

*M.* The plate is usually heated sufficiently warm to melt white wax, with which it must be thinly and equally covered. The drawing is copied with a black-lead pencil on white paper, and laid with the pencilled side upon the wax, and the back gently rubbed with the burnisher, which process transfers the lead to the wax. Next, the paper being removed, the design is traced with an etching needle through the wax, upon the copper, after which the wax is rubbed off,

and the outline is distinctly seen on the copper-plate and is ready for the graver.

*D.* I should like much to see this process, it must be very curious. Will you tell me in what Mezzotinto differs from line engraving?

*M.* Mezzotinto, which is said to have been discovered by Prince Rupert, differs from the above method in producing prints which very much resemble drawings in India-ink. The necessary tools are the grounding tool, the scraper, and burnisher; the copper-plate should be prepared as for the graver, and laid on a table covered with flannel. The grounding-tool is then placed perpendicularly and equally pressed till the teeth have marked the copper from side to side, care being taken not to place the teeth twice in the same place; the operation is repeated from end to end, and from corner to corner across; by this means the surface is quite crossed with intersections which, if covered with ink, would present a perfectly black impression upon paper. To transfer the design, the rough side of the plate is smoked or covered with black chalk; and the design itself covered with red chalk and flake white: particles of red are thus conveyed into the interstices upon the plate; after this the process is finished with the scraper, by smoothing those parts of the

plate intended to represent light ; the burnisher is used to polish the extreme edges of the drapery ; the deepest shades are corroded by aqua-fortis. Many proofs are required to determine whether the process is quite finished, and the deficient parts are often retouched.

*D.* Designs are sometimes engraved on steel, I suppose ; for in father's study I have seen several small engraved steel plates.

*M.* Steel engraving is chiefly confined to small articles, such as punches, dies, seals, coins, medals, &c. Latterly it is much used instead of copper for fine engravings, particularly where large numbers of copies are wanted ; steel plates will serve for a greater number of impressions than copperplates.

*D.* How are precious stones engraved ?

*M.* Chiefly by means of the diamond, or emery ; the tools used are many, and the process rather difficult.

*D.* Etching I think comes next, mother.

*M.* Yes ; etching is performed by means of aqua-fortis upon copper-plates ; this process is more difficult than any of the preceding, the slightest inattention would ruin the whole process. I cannot describe at length the various methods at present of applying aqua-fortis upon the plates, but just add that Stipling is engraving the plates with fine dots more or less deep ; Aquatinta is another pro-

cess by which the designs resemble delicate drawings in India-ink.

*D.* Now for Wood Engraving ?

*M.* Engravings on wood have been brought to great perfection within the last fifty years. They are not, like copper, executed by cutting into the substance, but by raising the figures upon the surface like the letters of printing types. Box-wood is used for these purposes on account of its solidity, and compactness of texture. The surface is to be made quite smooth, and the design traced with a lead pencil.

*D.* When was engraving first introduced, mother ?

*M.* The printing of engraved plates was discovered between the years 1470 and 1525 ; since that period the art has advanced rapidly towards perfection ; wood engraving has been known for some centuries, but not, as now, beautifully executed. We must not forget Lithography in our view of prints.

*D.* Pray what is that, dear mother ?

*M.* Lithography is the art of painting on stone, and is one of the most important of modern inventions. The Germans were the first inventors of it.

*D.* How long have they known it, mother ?

*M.* Since the beginning of the nineteenth century only. Lithography has been intro-

duced with great success into France and England, where it has been much improved. Next to that done in Paris, however, Boston in New-England may rank high in the art of printing from stone.

*D.* Will you tell me how the stones are engraved, and the impressions taken ?

*M.* I will attempt it, my dear. A slab of fine stone, about an inch in thickness, is prepared, being first made perfectly level, and polished with fine sand or emery for receiving delicate subjects, and with coarser substances when the work is to be a rough sketch. Upon the slab may now be drawn, with a pen and black liquid, the landscape, profile, or other subject. After this, the stone is washed with diluted nitric acid, which slightly corrodes the part not drawn upon with the pen ; the stone is then saturated with water, and common printing ink passed over it, as in type printing ; the ink adheres to those parts of the stone only, which have been drawn ; the other parts being corroded with acid, and saturated with moisture, repel the ink ; the impression is then taken by passing the stone through a press, by means of a plane and cylinder.

*D.* India-ink, I know, is black, and solid like the little cakes of gamboge and lake ; will you now tell me of what it is made ?

*M.* India or Chinese ink is made from



smoke-black or soot of different kinds. We are informed that the smoke obtained from the fat of pork burnt in a lamp, is the best. Oil is rubbed with it to make it fine, and reduce it to a paste ; perfumes are also added to destroy the offensive smell of the fat. This paste is then dried in small cakes, and ornamented with gilding in different figures, such as birds, flowers, Chinese characters, &c. The cakes are then packed for exportation.

*D.* What is Smoke-Black, and how is it obtained ?

*M.* Hold this sheet of paper over the flame of the lamp ; a little higher to prevent its burning : you will soon see that it will be covered with a thick smoke ; this is called smoke-black. It may be obtained from different substances in various ways. Lamp-black is obtained from the sooty fumes of rosin, prepared by purifying the rosin in iron vessels placed on a fire, in a chimney lined either with skins or thick cloth, to receive the smoke which is quite black. In Norway and Sweden it is often made in the pine woods, by heaping the roots of pine trees, which contain a quantity of this rosin, in a sort of tent, and then burning them slowly. Spanish black, which is chiefly brought from Spain, is burnt cork. What is called ivory black, is made either from the

shavings of ivory burnt quite black in a crucible, or the shavings of bleached bone. German black is made from ivory shavings and peach-stones burnt to blackness, and mixed with the burnt dregs of wine.

Lake or lacca is usually made of the extract obtained from Brazil-wood, boiled in ley made from the ashes of vine branches, a little cochineal, the bones of a kind of fish finely pulverized, and a small quantity of powdered alum ; to these, when they are all well mixed, a little citron juice is added. But there is a kind of lake, obtained from a gum which is brought from the East Indies, which is much used in making Sealing-Wax. When it is collected from the twigs and branches of the trees where it has been deposited by small insects resembling flying ants, and melted, it is called shell-lac. It is said this gum is much used in dyeing the beautiful Coromandel cottons. Most of it comes from Bengal and the kingdom of Pegu ; but I see you are ready to ask me what are the other ingredients in the composition of sealing-wax. To be made red, a sufficient quantity of shell-lac is mixed with a less proportion of rosin and cinnabar, which is a heavy red mineral, found chiefly in quicksilver mines. Red lead is often employed for the coarser kinds in the place of

cinnabar. Red lead is, I believe you know, a preparation obtained from common lead.

*D.* And Emery, which you have several times named, mother, what is that ?

*M.* It is a stone allied to ruby. There are three kinds, Spanish, red, and common emery. The first sort is found in the gold mines of Peru ; the second is met with in copper mines, and comes chiefly from Sweden and Denmark. Common emery is taken from iron mines. The English, it is said, alone possess the art of reducing it to powder. The consumption of emery is very great among armorers, cutlers, locksmiths, lapidaries, masons, and other mechanics, some of whom use it in polishing metals, glass, marble, and precious stones.

*D.* I have learnt from brother Henry, that Gamboge is a gum used by painters, and that the best sort is of a deep yellow or orange colour.

*M.* You must further know, my dear, that it is used in medicine, and that stone cutters employ it to stain both stone and marble, upon which it leaves a beautiful and permanent colour. It is brought to us from the Birman empire, chiefly from that part called the province of Cambodia, and is obtained by making incisions in the young shoots. It has little taste, and no smell, and is chiefly made up into cakes or rolls.

*D.* The river Meinam is not far from Cambodia, mother ; and do you know that on its banks are swarms of beautiful fire-flies that quite illuminate the country by emitting a bright light ? Father told me last summer when I so much admired those little fire-flies in our garden, that their light was not so brilliant as that of the insects of Birmah, and others of the same species in some parts of South America, and that they fly only in the night. I think they are wise to do so, for when the sun shines brightly they could not display their little lamps, you know.

*M.* And do you know, my dear, that in South America is a little bird, which is said to illuminate its nest by collecting these brilliant insects, and fastening them with moistened clay or gum to its habitation ? We must not forget the inoffensive little glow-worm, which one of our poets calls very aptly

“ The lantern-bearer of the night,  
Gemming the fields with starry light.”

Glow-worms appear in the month of June, and betray their presence in the evening by their luminous appearance. Cannot you repeat to me those lines from Cowper, which you learnt last summer, when your brother brought you the little glow-worm he found in the garden ?

*D.* Yes, mother, I think I remember them.

" A nightingale, that all day long  
 Had cheered the village with his song,  
 Nor yet at eve his note suspended,  
 Nor yet when eventide was ended,  
 Began to feel, as well he might,  
 The keen demands of appetite ;  
 When looking eagerly around,  
 He spied far off upon the ground,  
 A something shining in the dark,  
 And knew the glow-worm by his spark.  
 So, stooping down from hawthorn top,  
 He thought to put him in his crop.  
 The worm, aware of his intent,  
 Harangued him thus quite eloquent :  
 Did you admire my lamp, quoth he,  
 As much as I your mistress's,  
 You would abhor to do me wrong,  
 As much as I to spoil your song ;  
 For 'twas the self-same power divine,  
 Taught you to sing, and me to shine ;  
 That you with music, I with light,  
 Might beautify and cheer the night.  
 The songster heard his short oration,  
 And warbling out his approbation,  
 Releas'd him, as my story tells,  
 And found a supper somewhere else.

Hence jarring sectaries may learn  
 Their real interest to discern ;  
 That brother should not war with brother,  
 Nor worry and devour each other !"

**M.** Very well, my daughter ; we have  
 had a long conversation. You must not  
 sleep the later for it to-morrow. Good night.

## PRACTICAL QUESTIONS.

What is sculpture ?

What is statuary ?

What countries afford the finest marble ?

What is porphyry ?

What is alabaster, and where found ?

What nation excels in the art of statuary ?

Where is painting supposed to have had its rise ?

How many kinds are there ?

What is painting in fresco ?

What is engraving ?

What is mezzotinto ?

How are the various blacks, as smoke-black, Spanish black, &c. obtained ?

What is gamboge, and from what countries obtained ?

What is the composition of sealing-wax ?

What is emery, and its uses ?

## CONVERSATION XX.

## DAUGHTER.

MOTHER, I am much obliged to you for this pretty ivory box. . Can you tell me whether Ivory is a natural or artificial substance, and from what country it comes ?

*M.* It is a natural production, being the teeth and tusks of the elephant. The best ivory is brought from the Birman empire, and from the western coasts of Africa. The ivory brought from the island of Ceylon never turns yellow. There is in ivory, naturally, an oil ; to take this out and fit it for receiving the paint, it is rubbed with garlic juice. I have seen bone bleached so as very nearly to resemble ivory. The bones of oxen make the best imitation of ivory.

*D.* What are some of the uses of ivory ?

*M.* Miniatures are painted upon little plates or leaves of it. It is applied to a great many other purposes, such as making boxes, combs, handles for knives, &c. Bone and ivory may be dyed various colours. The most common are red, green, and black.

*D.* I should like to know something of the natural history of the Elephant, mother.

*M.* You shall be gratified. The height of the elephant is from 12 to 15 feet ; his ears are large, and he often uses them as a fan to cool himself, or defend his eyes from dust and insects. The most striking feature of the elephant, is his trunk or proboscis. It is the organ both of feeling and of motion. In the largest animals, the trunk is 8 feet long ; it is flexible, and moves in every direction. The nostrils are situated at the extremity, through which it draws water, either for the purpose of quenching its thirst, or cooling itself. The elephant, according to naturalists, is the most sagacious as well as the largest of all land animals. Notwithstanding its unwieldy bulk, it is very rapid in its movements, and can swim the deepest rivers. In its temper it is mild and peaceable, though it will not bear injury or submit to unkind treatment. It subsists upon vegetables, fruits, and tender wood ; is very fond of perfumes and flowers, and has a most delicate sense of tasting and smelling.

His hearing is very acute, and he is very fond of music ; no animal is so obedient and courageous when tamed. It will kneel to receive its rider, carry heavy burdens, and suffer many persons to mount its back at once.



In Asia it is indispensable in the armies and equipage of princes, and has been tamed and employed from very early ages. Since the invention of fire arms they have been of less use in deciding warlike contests. Many anecdotes, equally interesting and wonderful, are related of their sagacity. You have seen pictures of the elephant which will give you a better idea of the animal than I can by description. It lives to the age of from one hundred to one hundred and twenty years, always sleeps standing, and cannot live far from the water. Elephants are mostly of a dark grey colour, approaching to black. They are found white, though rarely; these last are very highly valued, and sell for immense sums. The texture of the skin is uneven, wrinkled, and often deeply furrowed. The elephants of Siam are remarkable for their size and beauty.

*D.* Some are brought to this country, I believe?

*M.* Only as curiosities, my dear; not more than five or six have been brought to the United States. Elephants were anciently brought from Asia into Greece, and from thence to Italy, by Pyrrhus, king of Epirus, when he attempted to defend the Samnites from the Romans, and we are informed that in consequence of the terror these animals

excited, Pyrrhus gained the first battle, in which he encountered the Roman army.

*D.* Will you allow me to relate an anecdote I read the other day, exemplifying the instinct of the elephant?

*M.* Certainly, every proof you give of retaining what you read, affords me pleasure.

*D.* An elephant at Adsmeer was daily driven through the market-place, and was accustomed to receive a handful of greens from a woman who kept a stall. It was one day made angry, broke its fetters, and ran towards the market. Every one fled for safety, and among the number the green-grocer, who from terror forgot her child, which she left on the stall. The animal took its course directly towards the seat, overturning every thing in its way; but no sooner did he see the frightened child had fallen to the ground, than he raised it with the utmost tenderness, and placed it in a safe condition.

*M.* Very well related; to reward you I must, in my turn relate one

One of these creatures having received a wound in its trunk or proboscis, from its cruel keeper, was entirely disabled from feeding itself, and was dependent on others for its subsistence. In this pitiable situation, one of its own species sympathizing in its distress,

constantly prepared for it bunches of fresh grass, leaves, and fruit, which it put into the mouth of its wounded companion.

*D.* How I should have loved that elephant, mother, for its instinct and benevolence.

*M.* Yes, you could not but feel attached to so kind and amiable a creature. What a lesson does this anecdote teach us rational beings, to be generous and humane to the suffering of our own species; to befriend the friendless, to soothe the afflicted: to contribute of our abundance to the relief of those who are not equally blessed with the comforts and necessaries of life with ourselves.

*D.* Mother, did you not read me something of the elephant the other day from Thomson's Seasons?

*M.* Yes, my dear.

*D.* If you will allow me to get the book, I should like to hear the passage again, now I know more of this sagacious creature.

*M.* You will find it in the usual place; bring it to me, and I will read the lines again with pleasure.

*D.* Here it is, mother; I now see why it is so convenient to have "a place for every thing, and every thing in its place," as you have so often told me, when my work and books have been mislaid, and I have

been obliged to seek for them just at the moment I have wanted them. But I interrupt you.

*M.* "Lo ! where the Ganges rolls its sacred wave,  
Amid the central depth of black'ning woods,  
High raised in solemn theatre around,  
Leans the huge Elephant ; wisest of brutes !  
Oh truly wise ! with gentle might endowed,  
Though powerful, not destructive ! Here he sees  
Revolving ages sweep the changing earth,  
And empires rise and fall ; regardless he  
Of what the never-resting race of men  
Project : thrice happy ! could he 'scape their guile,  
Who mine, from cruel avarice, his steps ;  
Or with his tow'ry grandeur swell their state,  
The pride of kings ! or else his strength pervert,  
And bid him rage amid the mortal fray,  
Astonished at the madness of mankind !"

*D.* Thank you, mother ; will you now have the kindness to tell me what are the most valuable Gems ? speaking of ivory, has reminded me of them.

*M.* The Diamond is considered far more precious than any other gem. The richest diamonds are brought from Golconda, and are dug from mines, but they are found in other places, particularly in Brazil. Amethysts, topazes, agates, sapphires rubies, and garnets, together with other gems, are found abundantly in the isles of Japan, on the continent of Asia, in South America, and

some countries of Europe. Bohemia particularly is famous for its garnets, which are found chiefly in the mountains of Stiefelberg.

I have told you that the diamond holds the first rank among precious stones ; it was called by the ancients, Adamant. The most perfect diamonds are white ; there are others of inferior value, differently shaded. Red rubies are called oriental rubies. Precious stones may be more readily distinguished from each other by their different degrees of hardness, than by their colour, for we have green diamonds, sapphires, rubies, emeralds, and agates. Most of our beautiful emeralds come from Peru, though they are found in other parts of the globe.

Besides the gems I have named to you, there are varieties of stones wrought into jewelry, such as the Beryl, Turkuois, Cornelian and many others. Pearls are found in the shell of the pearl-oyster : you are acquainted with the manner in which they are procured, but if you wish for further information, I refer you to " Conversations on Natural History," and Mrs. Wakefield's " Mental Improvement." Pearl oysters are taken in the seas of the East Indies, in those of America, and in some parts of Europe. The most remarkable pearl fisheries are on the coasts of the island of Ceylon at Manaar,

and in the Persian gulf. Pearls have been found in Loch Lomond, Loch Leven, and other lakes in Scotland ; in the larger rivers of Lapland, and also in several small rivers in Bohemia and Moravia. The pearls found in these rivers are known by the name of Bohemian pearls. Glass beads are made to imitate pearls by filling them with a substance derived from the scales of a particular species of fish. Mother-of-pearl, which is obtained from the shell of the pearl oyster, is imitated by rice.

*D.* Is not Jet ranked among the precious stones ?

*M.* No, although it is used for ornamental purposes, particularly for mourning ornaments.

*D.* What then is it ?

*M.* It is a bituminous substance, and allied to mineral coal, both in colour and nature ; but as you do not know what a bituminous substance is, I must explain it to you.

Bitumens are vegetables decomposed, and are always of an oily and inflammable nature. Of this class are not only jet, but mineral coal, yellow amber, and naphtha.

*D.* Where is jet found, mother ?

*M.* In many countries. It is found in England ; Spain affords it in considerable quantities ; and it is found abundantly in the Prussian amber mines.

*D.* What is Amber ?

*M.* Naturalists are not decided whether it is a vegetable or mineral substance ; it contains a great quantity of carbon, and burns with an aromatic smell ; it is found both on the surface of the earth, in mines, and also floating on the sea. It is electric, and emits sparks when rubbed briskly in the dark. All animals are extremely fond of amber. The river Giarretta, formerly Sime-tus, in Sicily, throws up great quantities near its mouth. This the peasants collect and carry to Catania, where it is made into beads, crosses, and other ornaments, which sell for a high price. Amber is often found in clay-pits. It is collected on the coasts of Eng-land ; it abounds in Silesia and Bohemia ; is found on the shores of the Baltic, and in Germany, Sweden, and Denmark. But most of all, Prussia affords it in the greatest quan-tities.

*D.* I have heard of Ambergris, mother ; is it a substance similar to amber ?

*M.* In some respects it resembles it. The characteristics of ambergris, or grey amber, are, that it is pure, solid, oily, and fragrant. It is of an ash or grey colour, and is supposed to be derived from the whale ; it being often found in that animal, as well as floating on the sea. It is common in the Atlantic ocean, on the coasts of Brazil and

on the shores of Madagascar, Japan, New Holland, New Providence, and the Molucca isles.

*D.* What are its uses ?

*M.* In some parts of Asia and Africa it is used as a spice in cooking : with us, it is used as a perfume only, though some have recommended it as a medicine.

*D.* Speaking of perfumes, reminds me of Musk ; I read the other day that it was an animal substance.

*M.* You are right ; it is found in an animal of the same name in the kingdoms of Thibet, Tonquin, Cochin China, and near the rivers Jenisea, and Argun, from latitude 45° to 60°. Musk is used both as a perfume and medicine, but less so now than formerly.

*D.* I had nearly forgotten to ask you concerning Coral, mother. My uncle, when he returned from Sicily, brought me some very beautiful specimens ; and said I must ask you to give me some information about them. You know he was here so short a time, that he had no leisure to inform me himself.

*M.* There are three kinds of coral ; red, white, and black. White coral is the most abundant, red is used mostly in medicine, and black is the most esteemed, because it is the rarest. These various substances are formed by the coral insects ; they abound



on the shores of Asia, in the Persian gulf, Red sea, on the coasts of Africa, and in the Mediterranean. Coral lies in banks, at the bottom of the sea, and near the shores. An interesting traveller in Sicily has described to us the method practised at Trapani, to obtain coral. The coral fishers make a great cross of wood, to the centre of which they fix a heavy stone, or any other weighty substance. Nets are tied to the arms of the cross, which are balanced by a rope to keep the whole steady. This machine is let down into the water till they feel it touch the bottom. The rope is then made fast to the boat, and the fishers row about over the coral beds. The stone breaks off the coral from the rocks, and it gets entangled in the nets. When a sufficient quantity is taken, they raise the machine and disengage the coral.

*D.* Is Sponge, like coral, a marine substance ?

*M.* Yes. It is formed by a sea insect, or worm, upon rocks in the sea : it is fished by sailors, and is quite useful as you well know. There are several varieties of sponge formed by different insects. You inquired the other day with what the case of my microscope was covered : I was not at leisure to inform you then, but will tell you now that it is Shagreen, which is made of the skins eith-

er of goats or fishes, prepared by being covered for several days with mustard seed, and then exposed to the air for some time ; after which they are tanned. Shagreen is very close and solid, and covered with roundish grains. The best is brought from Constantinople, and is of a brown colour ; it may be dyed however, either red, green, black, or yellow. It is very hard, but may be softened by steeping it in water. Shagreen is used for the coverings to instrument-cases, book covers, and other things.

*D.* Mother, I will trouble you with but one more question to-night : will you tell me from what the Ising-glass is manufactured, of which you make your blanc-mange ?

*M.* It is a preparation made from the skins and intestines of fish, and is much used in making jellies and other confections ; it is also given as a medicine. The fishes that afford this substance are found abundantly in the rivers Wolga and Don, and in the Caspian sea. Ising-glass is manufactured in New-England in small quantities.

*D.* I have learnt a great deal this evening, mother. Good night ; I shall tell Henry to-morrow about the elephant that fed his sick companion.

## PRACTICAL QUESTIONS.

From what countries is the best ivory obtained ?

What is ivory ?

What are some of its uses ?

What country yields the most valuable diamonds ?

From what are pearls obtained, and what countries afford them ?

What are bitumens ?

What is amber, and where found ?

What are the characteristics of ambergris ?

How many kinds of coral are there, and from what places is it chiefly obtained ?

What is sponge ?

What is shagreen ?

What is ising-glass ?

## CONVERSATION XXI.

## DAUGHTER.

MOTHER, where did these fine Tamarinds grow, and how are they preserved ?

M. The tree which produces the tamarind is a native of the East and West Indies. It grows to the height of twenty or thirty feet ; and its blossoms resemble those of the orange flower. The fruit, you see, is inclosed in pods two or three inches in length, these naturally contain a sharp acid pulp, which surrounds the stones ; they are, as you observe, about the size of a large bean, though they differ in shape. Previous to exportation, the fruit is freed from its outward pod or shell, and packed in jars, a rich sirup is made, and, while yet boiling, is poured over the tamarinds. A few clusters of preserved tamarinds in a tumbler of water make a very pleasant and wholesome beverage, especially in the summer season. Tamarind trees are found in different parts of Asia and America. Guava or Psidium is the fruit of a tree or shrub of the same name, growing in the West Indies. This delicious fruit is made into jellies and exported to other countries.

*D.* I have been wishing, ever since you gave me those Oranges, to ask you how and where they grow. Can you inform me now, mother?

*M.* The finest oranges are imported from South America, those next in estimation, come from Spain; we have them also from France, Italy, Sicily, Syria, and Turkey; they likewise flourish in the East and West Indies. The orange tree has many branches, bearing a few thorns, and adorned with beautiful green leaves, somewhat resembling the laurel. The flowers are of a delicate white, very fragrant, and are succeeded by the fruit, with which you are too well acquainted to require a particular description. This fruit, besides being eaten in its natural state, is used in making marmalade, sweet-biscuits, jellies, puddings, and tarts. The perfume of an orange grove will scent the air for miles around. A very fragrant oil is extracted from the rind of oranges. The shaddocks, which you saw on the fruit-stall as you passed the market, are a species of the orange, and, as you observed, three or four times as large. Their flavour is agreeable, their juice pleasantly acid, and they are esteemed wholesome on account of their cooling qualities. They are common in many islands both of the East and West

Indies. The name is derived from a Captain Shaddock, by whom the fruit was first brought to America.

*D.* I wish we had orange trees here ; why do not people cultivate them ?

*M.* The climate is too unequal ; our warm seasons are too short, and the frosts and snows of winter would quite destroy the young trees.

*D.* Citron is the preserved rind of lemons and oranges, I suppose, mother ?

*M.* No ; the fruit of the citron tree is not eatable, like oranges, but the rind, when preserved, is an ingredient in cakes, pies, and also puddings, which you love so well.

*D.* Pray, mother, describe the tree and its fruit.

*M.* The citron tree is of a moderate height ; the trunk is slender, the wood white and hard, and the bark of a pale green colour ; the boughs are numerous, slender, and tough, the larger ones are armed with prickles ; the leaves are of a brownish red cast, and the tree is clothed with them both winter and summer : the flowers grow on the ends of the branches. The fruit is shaped like the lemon, but is four or five times larger : the outer skin is tough and wrinkled. Both flowers and fruit may be seen on the tree at the same time. The outer bark of

the citron tree yields a fragrant oil, and the leaves exhale a pleasant odour.

*D.* In what countries does the citron tree grow, mother ?

*M.* It is generally supposed that it was introduced from Assyria and Media into Greece, and thence into the southern parts of Europe, where it is now cultivated to considerable extent. It grows also in the West Indies.

The East India Mango tree deserves our notice. Its fruit, when ripe, has a thin oblong shape, about the size of a large lemon. Its coat is not thick, and when peeled, the fruit has a fleshy substance, and is very delicious. The flavour is somewhat like that of a melon ; but the mangotanges or mangosteen is esteemed the most delicious fruit that the Indies produce. It is very fragrant and juicy. When stripped of its outward rind, it appears like a little apple of a snowy white, composed of six or seven lobes, each containing a black stone. The Chinese use the rind of the mangosteen for dyeing black.

*D.* If you are not fatigued, will you now tell me how Lemons grow ? as I have never seen them in our gardens, I suppose that, like oranges and citrons, they are found only in hot climates.

*M.* Your conjecture is right. The lemon tree flourishes only in warm countries,

and although it is cultivated here in hot houses, the fruit never arrives at great perfection. The tree is a native of Asia, from whence, like the citron, it was brought into Greece, and afterwards transplanted into Italy. It forms an important article of commerce from Sicily, and other of the Mediterranean islands.

*D.* I should like to see the trees and fruit growing upon them. How beautifully they must look !

*M.* Yes ; but we have many fine shrubs and trees in our own country, which do not flourish where the lemon and citron trees grow. We must be grateful for all the sources of enjoyment within our possession, and be contented in those places where our heavenly Father has appointed our abode.

*D.* I will strive to profit from your precepts, mother ; I know we enjoy a great many comforts and luxuries, which many other nations have not. In our enumeration of foreign and domestic fruits, we have named neither the Almond, which make such confections, nor Apples and Pears.

*M.* The almond tree, which is common in France, Spain, some parts of Germany, and in the Barbary States, is a slender tree, somewhat resembling the peach tree. The fruit resembles the peach in shape, though it is of smaller size, and not eatable. The stone within contains a kernel, which is what



we call the almond. There are two kinds of this fruit, the bitter and the sweet.

*D.* I love the sweet almonds sugared, as I get them at the confectioner's.

*M.* They are very good ; but it is not wholesome to eat many of them. Of Apples there are many varieties ; the fruit is very wholesome, whether eaten in the natural state, or preserved. The juice of apples yields the common liquor called cider. The apple tree is a native of this country. Pears are easily cultivated in great variety and perfection. The liquor called perry, is obtained from pears.

*D.* Will you describe the growth of Figs, mother ?

*M.* Figs are the product of a tree of the same name, growing in great abundance in the islands of the Eastern Archipelago, and in Italy, Spain, and the south of France : they are very abundant in Asiatic Turkey ; indeed they were originally brought from Asia. The tree is large, shady, furnished with leaves resembling those of the mulberry, and divided into many branches. The fruit is produced upon the trunk and large boughs. The principal fig harvest is in autumn, but the trees produce three crops annually. The fruit when gathered is spread on a rack, or hurdle, to dry in the sun. Figs are very nourishing, and much more palat-

able when dried than when gathered fresh from the trees.

*D.* What are Prunes ?

*M.* Plums baked or dried in an oven or in the sun. They are chiefly imported from France. I suppose you would inquire about Raisins and Currants ?

*D.* Yes, mother.

*M.* Raisins are grapes prepared either by drying in ovens, or dipping the clusters into ley made from the ashes of rosemary and vine branches, with a small quantity of slacked lime, and then dried by exposure to the sun, to preserve them from decay. There are various kinds of this fruit. Those brought from Damascus are remarkable for their size. Raisins of the sun and jar raisins are dried in the sun without any preparation, and are considered the best of that kind of fruit. Sultana raisins are very small, without seeds, and are chiefly brought from Turkey : all the southern states of Europe produce raisins.

Vines flourish best upon rather elevated land, which has a southern and western aspect. The reaping of grapes is commonly performed in three gatherings. They first select the ripest and finest clusters, carefully separating the grapes which appear decayed. They next select the thick clusters which are less ripe than the first gathering, and thirdly those which are inferior to either

er of the preceding. Wine is, you know, made from the juice of grapes. The clusters are thrown into large presses, and the expressed juice flows into vessels placed for the purpose. It there undergoes fermentation, which converts it into wine. The ancients obtained the juice by treading the grapes: hence you may better understand that affecting scriptural allusion, "He hath trodden the wine press alone, and there was none to help him." The ancients likewise frequently kept their wine in skins, or leather sacks carefully secured. The wood of the vine, when reduced to charcoal, is used by painters, and from the seeds or stones, is extracted an oil, not unlike that obtained from olives. It is said the stones, when roasted and ground, form a tolerable substitute for chocolate. A fine flavour may be given to wine, by plucking the flowers of the vine when they are fully opened. These must be dried in the shade, powdered, tied in a piece of fine linen and suspended in the casks containing the new wine. Brandy is obtained from wine by distillation.

*D.* Are not Currants small grapes?

*M.* No. Raisins of Corinth, or currants, are of various colours, and before they are dried, are usually the size of a gooseberry, and very delicious when fresh gathered. The plant which bears them is low, and

abundantly furnished with leaves. The fruit ripens in August, and is then gathered and spread on a floor to dry. When it is properly cured, it is carried to large magazines, and stowed so closely, that iron instruments are necessary to separate the mass, when a quantity is wanted for exportation; according as they are in demand, they are put into casks or bales, by men, who tread them with their feet which are previously bathed in oil. Cephalonia and Zante have long been famous for currants.

*D.* The other day, when we were walking, Henry purchased for me at a fruit shop several Pomegranates. There were pine-apples there also. When we returned, I intended to have asked you how, and in what countries they grew; but you were engaged with company, and I could not interrupt you; I shall be much obliged to you if you will inform me now.

*M.* Willingly; not only because your desire to learn is laudable, but for being considerate in your behaviour, when I was engaged in entertaining my friends. It would have been treating them very rudely, and me disrespectfully to have proposed your questions at that time. The pomegranate tree grows low, and is very common in Palestine and some other eastern countries. Its branches are thick, bushy, and armed with

sharp thorns ; the leaves are long and narrow, and the flowers of an elegant red colour. The tree is chiefly valued for its fruit, which is, you know, the size of an apple. Like other summer fruits it allays heat, and quenches thirst. From the seeds or kernels are made conserves and sirups, which are used medicinally.

The Pine-Apple is justly esteemed for the richness of its flavour, which surpasses that of all known fruits. It is supposed to have derived its name from the cones of the common pine tree ; the fruit very much resembling them in figure. They grow plentifully in Africa, and the adjacent islands, without cultivation, and are probably natives of those places. Pine-apples have long been abundantly cultivated in the West Indies. The Anana plant is a species of the pine-apple ; it grows upon an upright round stalk, about a foot and a half high, and is much esteemed for its delicious flavour. It grows spontaneously in both the Indies. It makes an excellent sweetmeat, and from its juice is extracted a wine almost equal to Malmsey.

*D.* Thank you, dear mother ; I will ask you but one question more this evening ; I wish to know something of the Cocoa-nut tree.

*M.* It is a most useful and beautiful tree, growing in some parts of Asia. It rises in a column to the height of from thirty to fifty

feet, and is crowned with branches covered with long green leaves, under which cluster the blossoms and fruit, which may be seen on the trees at the same time. The nuts are three or four times larger than an orange, and covered with strong, compact fibres; the shell is thick and encloses the kernel, which is very white, and contains a quantity of sweet milky fluid. This nut affords abundance of oil, and the remains, after the oil is expressed, are good food for cattle and poultry. This tree is applied to many uses; the trunk is made into boards and rafters; the leaves are used to cover the tops of houses, as well as to make brooms, umbrellas, mats, &c. From the fibres, which coat the nutshell, are manufactured ropes, cordage, &c. Vinegar, wine, and sugar, may be made from the sap of the cocoa tree.

*D.* This tree seems to be as valuable as the date-bearing palm-tree. I should like very much to see them both growing.

*M.* As you cannot, in our northern climate, you must be contented with the description.

*D.* I shall certainly remember its various uses. Will you tell me in what countries the cocoa flourishes?

*M.* It is found in South America, and some of the adjacent islands; on some parts of Africa, and in most of those islands which

lie east and south-east of Asia, in the Pacific ocean. Look for them on your atlas, and then you must bid good night.

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### PRACTICAL QUESTIONS.

From what countries are tamarinds obtained ?

How are these countries situated ?

What countries yield the finest oranges ?

What is citron ?

In what countries does the lemon tree flourish ?

What are prunes ?

What are raisins, and from what countries obtained ?

Describe the growth of the pomegranate tree.

Of what countries is the pine-apple a native ?

Where do figs grow in the greatest abundance ?

Can you tell me of the East India mango-tree ?

What kind of fruit is the almond, and where does it flourish ?

Tell me concerning vines and their cultivation.

Describe some of the qualities of the cocoa-nut tree.

## CONVERSATION XXII.

—  
DAUGHTER.

I SUPPOSE, mother, this Liquorice which you have given me for my cough is a gum ?

*M.* No ; it is the juice obtained from the root of a plant which grows wild in the south of Europe, particularly in Spain. In England it is cultivated in extensive fields. The liquorice-plant has round, green, shining leaves ; the flowers are purple, from which arise a round ball or pod, which contains the seeds.

This plant grows to the height of four or five feet. The roots are numerous and long ; brown externally, and yellow within. They contain much saccharine matter, joined with some portion of mucilage. Liquorice is one of the few sweet substances which tend to allay thirst. When boiled, the roots give out all their sweetness, and the decoction when evaporated produces by different processes, what is called Spanish juice, liquorice cakes, liquorice lozenges, and Pontefract cakes ; the former is used to a great extent in the brewing of porter. The roots are



sometimes used as stopples for beer and wine bottles, and are found more durable than cork.

*D.* Is liquorice cultivated in the United States?

*M.* Very little; we sometimes see it in gardens.

*D.* What is Manna? I have seen the name, but do not know whether it is a gum or vegetable.

*M.* It is a sweet juice oozing from the branches and leaves of a tree resembling the oak. Manna is of great use in medicine. The best comes from Calabria and Arabia. It is gathered during the summer heats: and whitens and hardens on exposure to the air. That is most esteemed which exudes in drops, and is called, "manna in tears." The people of Sicily, about the beginning of August, make incisions into the bark of the tree which yields it, taking care to wound only one side of the tree; this is repeated daily for some time, and the manna is collected as fast as it exudes. The following year the opposite side of the tree is wounded.

*D.* Is this the kind of manna that we read of in the Bible, and that the children of Israel subsisted on in the wilderness?

*M.* Probably not. We are informed that they gathered that manna every morning on

the ground, and it was white and round like coriander seed.

*D.* What is Coriander seed ?

*M.* A fragrant seed, which grows like the carraway, on a plant about two feet high ; they are both used as a spice in biscuits, cakes, and other confections. You wished the other day to be informed of the growth and nature of the roots and gums which were sent here from the druggists. I am now at leisure to tell you.

Spikenard is the root of a plant growing plentifully in North America, and other countries. The plant grows from two to three feet high, bears a pretty flower and small berries. In Asia it grows differently, being covered near the roots with long reddish fibres.

Ginseng is a native of both Asia and America. Its root is medicinal, and much used by the Indians. In New England the plant grows to about the height of three feet.

Of Rhubarb there are two kinds ; that growing in our gardens, and another which is used only as a medicine. The common rhubarb is cultivated for the foot-stalks of the leaves. In the spring, before we have fruit, these stalks are made into pies and tarts much resembling gooseberries in flavour and appearance. The other is chiefly imported from Turkey, but it is also brought from

Russia, China, and the East Indies ; it is often found growing wild on the mountains of Tartary. The stem grows erect to the height of six feet ; the leaves rise immediately from the root, and are round, large, and woolly. The flowers are of a bright carnation, and shaped like stars. The root when newly taken from the earth is of a blackish colour on the outside, and within of a variegated red. When the roots are dug up, they are cleansed, scraped, strung on cords, and hung to dry in the sun.

Senna, a valuable medicinal plant, grows in Egypt without cultivation. It is found in some of the Asiatic countries.

Gum Benzoin is obtained from a tree that attains a large size in the East Indies. This gum is valued as a perfume and is used in medicine.

Gum Guaiacum is extracted from a tree called *lignum vitæ* ; the trunk, limbs, leaves, roots, and gum, are all medicinal. The tree is a native of Jamaica, and is found in most of the West Indies, and in all the warm countries of America. The gum is obtained by wounding the bark of the tree, from which it flows copiously ; it is efficacious in rheumatic complaints.

Tragacanth, or gum dragon, oozes from the larger branches of a shrub, growing in Asia, and the south of Europe. Its purple flowers grow in clusters and make a splendid

appearance. It abounds on Mount Ida, in Candia, and on the Mountains of Libanus; the gum flows spontaneously, about the middle or last of June. It is valued as a medicine, is also used as a paste or glue, and enters into the composition of some varnishes.

*D.* What is Frankincense? it was burnt in the catholic church the day I was there; I suppose it is a kind of gum?

*M.* It is an odoriferous substance, consisting of equal quantities of gummy and resinous particles; it is collected in a very impure state, and refined after importation. We have the gum from Mount Lebanon and Arabia, also in great quantities from the western coast of Africa. It was formerly burnt in all temples of worship, and many christians were put to death by the idolatrous Jews and Romans, for refusing to burn it before idols. The best frankincense is of a yellowish white colour, brittle, and easily pulverized. The Russians import and use much of it in preparing leather.

*D.* Ah, mother, the odour I perceive every time I go into the library, is then frankincense: many of the books you know are bound in Russia leather. Will you now tell me something of Myrrh?

*M.* It is a precious kind of gum flowing from the trunk and larger branches of a tree which grows in Arabia, Egypt, and Abyssinia. Its taste is very disagreeable, though

the smell is rather fragrant. It is gathered by means of leather thongs attached to poles which are thrown over the branches of those trees which afford myrrh ; in withdrawing the thong, the gum is detached, and thus collected in considerable quantities.

*D.* Peruvian bark ; I should like to know what that is ?

*M.* Peruvian, or Jesuit's bark, is the rind of a tree growing in South America, and in the West Indies ; it is very valuable as a medicine.

*D.* How was it discovered to be medicinal ?

*M.* It is not certainly known ; accident probably first taught men the use of vegetables both for food and medicine. The Indians, however, have a tradition, that a lake near a town in Peru was surrounded with these trees ; that they were torn up by an earthquake, and falling into the water rendered it extremely bitter. An Indian, who was sick and very thirsty, drank plentifully of the water and soon recovered ; he related the fact to some of his countrymen who were sick : they drank of it, and were also cured. On examination it was discovered that the efficacy of the water was owing to the trees which had fallen into it. In 1640, a Spanish soldier was sick at the house of an Indian ; the bark was administered and the soldier recovered ; he carried some of it to his friends ;

its valuable properties soon became known, and it was imported into other countries.

*D.* I have often drank cream-of-tartar mingled in water ; I do not know what it is, but suppose it is obtained, like alum, from the earth, and now I recollect I intended to ask you particularly about Alum and its uses.

*M.* Will you first tell me how you know alum is obtained from the earth ?

*D.* I found a large book on Henry's table, in which all the mineral productions of the United States were named ; alum was of the number, and I learnt that it chiefly abounds in the state of New-York.

*M.* Very well. The uses of alum are various. It is not however always dug from the earth, but is frequently prepared artificially. Dyers use it as a mordant in fixing the colours in cloth ; tallow chandlers use it in the manufacture of candles, to give them hardness ; it is of use to the tanner in tanning leather ; vintners or wine-merchants use it to refine wine ; and fishermen use it with salt in curing their fish, particularly cod. Wood, soaked in water impregnated with alum, will not easily take fire.

*D.* I wonder who invented the manufacture of alum ?

*M.* Artificial alum was first made in England, about the beginning of the seventeenth century.

**D.** Is mineral alum found in any other countries besides the United States ?

**M.** Yes, Great Britain, and several other countries of Europe afford it in considerable quantities. But you were mistaken in supposing Tartar a mineral substance. It is a kind of salt, which adheres to the sides of wine casks and vats. It is either white or red, according to the colour of the wine which produces it. That which is white is considered the best ; it must always be refined before it is fit for use.

**D.** Well, mother, I think I am not mistaken in calling Saltpetre and Copperas mineral substances ?

**M.** You are quite right ; saltpetre often occurs incrusting in limestone caves, though never to any considerable depth ; Kentucky yields it in great quantities. It may, like alum, be prepared artificially.

Of Copperas or Vitriol there are several kinds ; green, blue, and white. Green vitriol, is a sulphate of iron, it is of much use to hat manufacturers, dyers, and calico-printers. Blue vitriol, or sulphate of copper, is artificially prepared from copper : this is done by heating copper plates red hot in a furnace, by which means they become encrusted with a coat of oxid, which separates from the plates as they cool ; the oxid is then boiled in sulphuric acid, and cooled in leaden vessels. Sulphate of copper, or blue vitriol, is

often found in the streams of water which run through copper mines. Vitriolic acid, when condensed, makes aqua fortis. White vitriol, or sulphate of zinc, occurs in some mineral waters : it is found in Germany and other countries. It is used medicinally and otherwise. You must for the present content yourself with an imperfect knowledge of these things ; when you are old enough to study chemistry, you will understand the meaning of the words *sulphate* and *oxid*, and many others, which it would now be difficult for me to explain so that you would properly understand them.

*D.* You have said saltpetre is sometimes artificially prepared ; will you explain the process by which it is manufactured ? I am quite at a loss to imagine what it can be.

*M.* The earth from old and decayed buildings is always found to contain a portion of this substance. Beds are made by digging ditches, which must be sheltered from the rain, and yet so situated as to admit the air. These beds are filled with the earth I mentioned, together with bits of horn, skins, &c. which are mixed in a heap and frequently turned with a spade. In the course of a few months the nitre forms, and is obtained by passing water through the mass, draining and boiling it once or twice ; and exposing it to the air several clear nights, after which it is fit for use. During our revolutionary



war, great quantities were obtained in this way for the manufacture of gunpowder.

*D.* What was the revolutionary war ?

*M.* In a short time you must be made acquainted with the history of your country ; you will then acquire all the information necessary for your satisfaction and improvement ; at present I have not time to speak upon this interesting subject ; and can only tell you that the consequence of that war was the Liberty and Independence of the United States, in their separation from the British government.

Good night, my child.



### PRACTICAL QUESTIONS.

What is liquorice ?

What is manna, and from what countries obtained ?

How many kinds of rhubarb are there, and from what countries is it obtained ?

What is gum tragacanth, and where found ?

What are frankincense and myrrh ? and how is the latter obtained ?

What is cream-of-tartar ?

## CONVERSATION XXIII.

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MOTHER.

AS I am not engaged just now, I will fulfil the promise which I made you when we were at the furniture warehouse, and give you some account of the various woods which we there saw manufactured into furniture.

*D.* Thank you, mother ;—do begin with Mahogany.

*M.* It is the wood of a tree which is a native of the warm climates of America, but is found growing chiefly about the shores of Honduras, and in the island of St. Domingo. This island, you will remember, was the first land discovered by Columbus after his long and tedious voyage across the Atlantic. But to return to mahogany ; it is a tall, straight, and beautiful tree, bearing red flowers, and oval, lemon-sized fruit. When this tree grows in a barren soil, the grain of the wood is fine and beautifully variegated and mottled ; upon rich ground, it is pale, porous, and of little value. The Machineal tree also grows in the West Indies ; it is in-

terspersed with beautiful green and yellow veins like marble ; but the dust of this wood is of so acrid and poisonous a nature, that those who work it are obliged to wear masks over their faces to exclude the dust, and protect them from its injurious effects.

*D.* I should not think people would make this wood into furniture, if it is so poisonous.

*M.* If we had only those things which are procured with ease, and freedom from danger, we should find the comforts and luxuries, if not many of the necessaries of life considerably diminished ; though it must be allowed there is no necessity for having our furniture made of the machineal wood.

*D.* We saw Ebony work-boxes, mother.

*M.* Yes, and the wood is brought from the Indies ; it is both very heavy and hard ; and on that account receives a good polish ; it is much used to inlay boxes, and in mosaic.

*D.* What is Mosaic ?

*M.* Mosaic work is an assemblage of marble, shells, ivory, pearl, stones, and glass of various colours, cut square or in fanciful figures and cemented or inlaid together. The dressing table of black ebony and ivory in my room is mosaic ; and my work-box and card-case are also mosaic ; look at them ; you see they are tortoise-shell and mother-of-pearl.

*D.* Please to tell me of Tortoise shell.

*M.* You forget that I have not yet described the ebony tree ; at some other time you shall be informed how tortoise shell is obtained. There are various kinds of ebony ; black, red, and green. The ebony flourishes chiefly in the islands of Madagascar, Mauritius, and the West Indies. The tree grows very large and high ; its leaves resemble those of the myrtle, and are of a deep, dusky green colour. We are informed that the islanders, after felling the black ebony, bury it for a time that the wood may become still blacker. This wood when burnt yields an agreeable perfume ; the bark is medicinal. The natives make their statues, and the little images of their gods, and also the sceptres of their princes, of ebony wood. Green ebony yields a fine green tincture, which is sometimes used in dyeing cloth. Of red ebony I can tell you but little ; it is rarely found. Cabinet-makers imitate it, by staining pear and cherry wood with a decoction of galls. Cherry wood receives a good polish, and makes very pretty furniture. Box wood is celebrated for its durability ; it is extremely hard and smooth, and is often manufactured into buttons, and button-moulds, knife-handles, combs (except those which are worn for ornament, and to confine the hair,) and many other useful and

valuable articles. Mathematical and musical instruments are often made of box wood, and from its hardness and solidity it is frequently substituted for ebony. A medicinal oil is distilled from the wood and leaves.

Indian wood grows plentifully in Jamaica, and on the shores of Campeachy. The heart of the tree is naturally red, but becomes black after it is felled and has been exposed to the air for some time. The wood affords beautiful red and orange dyes ; it is very heavy, and when burned, gives a clear and brilliant flame. The inhabitants of those places where it grows make their common furniture of it.

Lignum-vitæ, or Brazil wood, also grows in the West Indies, and is valuable alike for its gum and timber. The tree rises to about the height of thirty feet ; the bark is variegated green and white, and is very smooth ; the flowers are pale blue ; the wood is of a blackish yellow colour, and extremely hard and difficult to cut ; it is wrought into boxes, bowls, and a great variety of domestic utensils.

Next comes the Cedar tree, which is a large and beautiful evergreen. It grows very high, has numerous branches, and affords a delightful shade. The wood is a reddish brown colour, of an aromatic smell, and very durable ; its durability is in part owing to its bitter taste, which the insects

and worms dislike, and therefore will not injure; it is also filled with a gum which preserves it against the injuries of the weather. In the Scriptures we often read of the cedars of Lebanon, and are informed that the Jewish temple was chiefly built of this wood, as was also Solomon's palace. The common red cedar which grows in North America is a species of the Juniper. Cabinet-makers use this wood much less since the introduction of mahogany. The holly tree is a beautiful evergreen, and is the whitest of all the hard woods; it takes a fine polish and is much used. In enumerating cabinet woods our beautiful American curled maple must not be forgotten; it grows high, and has spreading branches, and leaves of a grass green colour; it is one of the most elegant and useful of our forest trees. The wood receives a fine polish, and of late years has been in great request with us.

*D.* Mother, what is the Sittah tree, of which we read in the Bible?

*M.* It is not certainly known, but is supposed to be the acacia tree of Arabia. The wood is hard, tough, smooth, and extremely beautiful. The spreading branches are armed with thorns, which grow three together; the leaves are long, the flowers which are generally yellow, though sometimes white, are very fragrant. The fruit resembles a

lupin, and is contained in pods. The bark of this tree is quite rough. The acacia tree is found in all the deserts, from Arabia to southern Ethiopia ; its leaves are the principal food of camels travelling in those countries. The trunk, on incision, yields a gum, which is what we know by the name of Gum-Arabic ; it is, you know, an ingredient in the composition of writing ink, and is very useful for many other purposes.

*D.* What is Gopher-wood, of which we read the ark was built ?

*M.* I shall be able to give you but little certain information of it ; writers are not agreed on this point, and there is now no tree in the eastern countries bearing that name. The Mahomedans generally suppose it to be the Indian plane-tree ; while others think it must have been the cypress.

*D.* Will you describe the Cypress tree ?

*M.* It is a large evergreen, generally rising in a pyramidal form ; the wood is very fragrant, heavy, and durable ; it takes a fine polish, and is not liable to the attacks of insects. It is a native of those countries which border on the Levant, but has been transplanted and found to flourish in other regions. The name is derived from the island of Cyprus in the Mediterranean. Its gloomy hue caused the ancients to consecrate it to funerals, and branches of the tree were placed in and around those houses where a per-

son lay dead. We read that the ancient Egyptians made the chests in which they deposited their embalmed dead, or mummies, of the wood of the cypress tree.

The Teek tree of Burmah is an evergreen, and valuable for its property of resisting the mischief of insects and worms. It is used in ship building, and the natives build and repair their temples with no other wood.

*D.* I wish, mother, you would describe some of the most useful timber trees, as you have spoken of those which are less common with us.

*M.* Your wish to know more of forest trees, is quite natural, and I readily yield to your request. I shall begin with the Oak, of which there are many varieties; which is one of the largest, most durable, and most useful trees, which grows either in North America or Europe; it is found in some parts of Asia. England has always been celebrated for its oaks; indeed the ancient Britons considered this tree as sacred. It will endure all weathers, and the timber is used in the building of ships and houses, and for machinery. The bark is very useful to the tanner and dyer, and the ashes are highly valued by soap manufacturers.

The Ash ranks next to the oak in usefulness. It serves in their various occupations, the ship-builder, carpenter, cooper, turner, and the wheelwright.



The Elm is one of the most beautiful trees growing in our northern states. It is large, full of branches, and affords a most delightful shade. The clearness of the grain renders it fit for all kinds of carved work and architectural ornaments. It is valuable for pumps, aqueducts, pales, and ship-planks below water line. Wheelwrights make great use of it for axletrees, wheel-spokes, &c.

The Beech is a fine large tree with very beautiful foliage. It is found both in Europe and America.

The Birch is also common in the same countries; of this tree there are many species. The wood is applied to various uses.

There are many useful varieties of Poplar; the wood is tough and white, and is made into bowls, pails, &c. Poor people in the south of Europe, who cannot afford leather, make their shoes of this wood.

The Chesnut is a large tree valued both as ornamental in avenues, and for the good quality of its wood, which is particularly excellent for making casks, as it neither shrinks, nor changes the taste nor colour of liquids. This tree also produces nuts, which are very good when fresh gathered, but better and more wholesome when roasted or boiled. These nuts are enclosed in a prickly bur, which the frost opens; the nuts consequently fall to the ground, and are easily gathered.

There is another tree, called the Horse, or

Spanish Chesnut, which is very beautiful, and ornaments our gardens and pleasure-grounds. In the spring it puts forth bright green leaves, and is in a short time after adorned with large clusters of fragrant flowers, delicately variegated with pink and white. The fruit is said to be good food for cattle.

The Walnut is a fine large tree, flourishing in France, where it is of almost universal use. The Hickory, or North American Walnut, called also white walnut, to distinguish it from others of the same species, is common here, and produces very fine nuts, such as you have often eaten. These nuts yield abundance of oil. The English walnut is a beautiful tree, yielding fruit different from the American walnut; having a thinner shell, and being more than twice the size: the flavour of the nut is pleasant, and considerable quantities of oil are expressed from it. Spruce, Hemlock, and Larch trees are common.

The White Pine is the last tree of which I shall speak this evening. It is, like the spruce and hemlock, an evergreen, and grows to a great height. The wood is much used in building, and masts for ships are made of the high straight trunks of this towering tree. Shingles are very commonly made of pine wood. Pitch, tar, rosin, and turpentine are all obtained from the sap of pitch-pine trees. Norway and Sweden have

long been famous for pine trees. I shall take some future opportunity to give you further information upon forest trees.

*D.* Thank you, mother, for all you have told me this evening. Will you allow me to repeat a few lines I learnt the other day, descriptive of trees. I heard my father read them to you, and when he had laid the book aside, I took it and learnt a few of the lines; but had not time to get as many as I wished, for tea was waiting, and since then I have had no opportunity to learn the remainder.

*M.* Let me hear those you know.

*D.* "Round me trees unnumbered rise,  
Beautiful in various dyes;  
The gloomy *pine*; the *poplar* too;  
The yellow *beech*; the sable *yew*;  
The slender *fir* that taper grows;  
And sturdy *oak* with broad-spread boughs."

I shall soon learn the rest, mother.

*M.* Very well. Good night, my dear.

#### PRACTICAL QUESTIONS.

- What are the uses of mahogany?  
From what countries is it obtained?  
How many kinds of ebony wood have been found, and what are its uses?  
What is mosaic work?  
What are the uses of box-wood?  
For what is the cedar tree valued?  
What is the sitah tree supposed to be?  
For what is the oak useful?  
To what uses are the elm, beech, and birch woods applied?

## CONVERSATION XXIV.

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MOTHER.

WELL, what have you to propose for this evening's entertainment?

*D.* I have made a list of questions, which I wish to ask you, and hope you will be so indulgent as to answer all of them. I will read my list to you; here is first, baskets and canes, porcupine quills, and turtle shell; you promised the other evening to tell me about turtle shell, and——

*M.* Stop—stop, little girl—not so many things at once; why, what a length of paper you have filled there; you must spend but little time in reading, if you would have me tell you half you wish to know this evening.

*D.* Begin, then, with baskets, if you please, mother.

*M.* Baskets are made of various materials; of the straw of wheat, of cornstalks, of flags, and osiers; of beech, birch, and willow twigs, bamboo, rushes, ornamented paper, and many other materials.

*D.* What are Bamboos, mother?

*M.* They are a species of cane, which grows in the East Indies, China, Japan, Bir-mah, and Hindostan ; they have been successfully cultivated in the West Indies ; indeed the plant will grow in all tropical countries, and has been raised even in the cold climate of England. It grows naturally sixty or eighty feet high. It is at first green, but afterwards of a pale yellow colour ; the second year it does not increase in height, but acquires both hardness and elasticity.

*D.* Are bamboo canes very useful ?

*M.* Yes ; there is no plant of the kind so much so, especially to the inhabitants of those countries where they grow naturally. We are told that the lower class of people build their houses and garden fences principally of them. Bridges, masts for boats, fishing rods, boxes, baskets, mats, chairs, and drinking cups are made of bamboo canes. The canes that grow in Guayaquil, South America, are remarkable for their length, thickness, and the water contained in their tubes, which is said to be an excellent remedy for bruises. These canes are applied to many uses, and among others for preserving vessels, which are loaded with cacao, from the injurious effects which would otherwise arise from the heat of that fruit.

*D.* Mother, are Rattans canes ?

*M.* They are a species of bamboo, but

tougher and grow neither so large nor so high. The Chinese and Japanese make cordage of them for their vessels, as they are very elastic, and less liable to decay than hemp.

*D.* Porcupine quills come next on my list ; they, I suppose, are the quills of an animal ; but I should like to know something more of the creature.

*M.* The porcupine is a native of Africa, and the hottest parts of India ; yet it is found both in Palestine, Italy, Spain, and America. It is about two feet long and twelve or fifteen inches high. The head, back, and sides are covered with quills : the other parts of the body with fine soft hair. The quills are about the thickness of a goose-quill, generally from five to ten and fifteen inches in length, and tapering towards each end. The Italian porcupines have shorter quills than those of Asia and Africa. The animal when attacked raises its quills and shakes them with great violence, at the same time striking at the object of its resentment.

*D.* Upon what does the porcupine subsist ? I suppose, as it is so well armed, it can kill small animals for food.

*M.* It is quite inoffensive in its disposition, and never attacks any animal, unless first provoked ; it then makes an obstinate

defence. Its chief food is grass, roots, and vegetables.

*D.* Is there any other animal that resembles the porcupine, in being armed with quills ?

*M.* Yes, there are several ; among the number is the hedgehog or urchin, an animal in many respects like the porcupine, but smaller. When harassed it collects itself into the form of a ball, and presents a surface covered with sharp points. Dogs will rarely venture to attack it, being constantly wounded from its prickles. It feeds on fruits, worms, and insects, and during winter remains in a torpid state. It is found in New-England and other countries. I saw one killed a short time since when I was in Vermont ; you will find some of its quills in my cabinet.

*D.* Are the quills of any use, mother ?

*M.* The Indians ornament their belts and mocassins with them, and by weaving the most delicate quills into the thin bark of trees, they make very pretty baskets and boxes. They also eat its flesh.

*D.* They are smaller than those of the porcupine ?

*M.* Yes, and lighter coloured.

*D.* I think they look a little like turtle shell : you will tell me of turtle shell now, mother ?

*M.* There are land and sea turtles, or tortoises as they are sometimes called. Their size is various: the land turtle rarely exceeding a foot in length, while the sea turtle is often seen four or five feet long, and is otherwise large in proportion. The Mediterranean turtles are the largest of this species, being sometimes from seven to eight feet in length, and weighing from seven to nine hundred pounds. These are entirely unfit for food. Turtles live to a great age, and are amphibious. You know what amphibious means?

*D.* Yes, mother; living both on the land and in water. You told me that, when you described the beaver.

*M.* I am glad that you have remembered it. Sailors distinguish sea turtles chiefly into four kinds; the green, loggerhead, trunk, and hawksbill turtles.

*D.* Do tell me about them all.

*M.* The green turtle is the largest of its species, and is so called from the colour of its shell; this kind is common in the Caribbean sea, and along the northern shores of South America, and is the only sort fit for food. The loggerhead is so named from the great size of its head, which is very large in proportion to the rest of its body. The trunk turtle is of a rounder shape than the others. The hawksbill is smaller than those



I have distinguished, and is valuable for its beautiful shell, which is wrought into combs and other articles. The shells of the other turtles are generally thin and porous, but that of the hawksbill will receive a beautiful polish, and is, as you well know, manufactured into a great variety of trinkets and ornaments, the most common of which are combs. The shells from the Indian ocean are generally darker coloured than those found in the Atlantic, and less liable to break.

*D.* Are turtles easily caught ?

*M.* Not always ; they are very strong, and will sometimes overpower two or three men. They deposit their eggs in the sand on the sea shore, and are most easily taken when thus employed ; they are also taken in nets, and by harpoons.

*D.* I think they take as little care of their eggs, if they bury them in the sand, as the ancients supposed the ostrich to take of hers.

*M.* The turtle takes great care to conceal her eggs by covering them, but she, in fact, leaves them to be brought forth by the warmth of the sun's rays. As you have named the ostrich, to which we are indebted for our beautiful feathers, can you tell me something of its nature ?

*D.* I will try ; brother Henry was reading the natural history of the ostrich to my father the other day, and I tried to re-

member it. He first read that it was a native of that part of Africa, which is included in the torrid zone ; it is also found in some of the neighbouring islands and in the western parts of Arabia. It has a very long neck, and is the largest of all known birds, except the condor of South America ; it measures seven feet from the top of its head to the ground, and is six feet long. Its feathers are a mixture of black and white, except on the wings, where they are either white or grey. It will eat every thing it can find, even stones and iron. The eggs are large, and weigh from ten to twelve pounds, and sometimes more. The ostrich runs so fast that the fleetest horse can hardly overtake it ; but it is a cowardly bird, for when tired with running, instead of making any resistance, it buries its head in the sand, and thinks the rest of its body is concealed too. This is all I recollect, mother.

*M.* You have related what your brother read very well ; and now, while we are in Africa, to reward your attention, I will tell you something of the crocodile, though perhaps you had rather continue your list.

*D.* O no, mother ; that will do for another evening ; I wish to hear about the Crocodile.

*M.* There are two species of this animal ; the crocodile and the alligator. The body of

the former is more slender, and the snout more tapering than that of the latter ; the colour of the crocodile is ash, that of the alligator black. They are from fifteen to thirty feet long, and their jaws are armed with a great number of sharp teeth ; they are very strong ; have four legs, and can run and swim with astonishing rapidity. They seldom leave the water except to deposit their eggs in the sand. Crocodiles are common in all the rivers of Africa north of the tropic of Capricorn ; they also infest the rivers of southern Asia.

Alligators grow to an enormous size in the marshes and swamps of Brazil, and are found in all the tropical rivers of South America. In the water, they subsist chiefly upon fishes and other aquatic animals ; but they will devour men, tigers, and cattle, whenever they come within their reach.

*D.* Which, if they were wise, would not be very often, I should think.

*M.* It is not likely any creature would voluntarily yield itself a prey to this voracious animal ; but it often has the art of concealing itself, till its defenceless victims are within its power. For instance, it will float on the water like a log of wood, but watching its opportunity, will devour every thing that comes in its way, even the young of its own species ; and yet these creatures are tamed

in some countries, and kept by the inhabitants in their gardens and houses for the amusement of their children.

*D.* I hope, mother, you will not provide me with such a playfellow. I don't think I should ever go into my garden again, even to gather my beautiful flowers, if it had such an occupant.

*M.* Do not be uneasy ; I shall not certainly be disposed to harbour one ; but do you not remember Mr. and Mrs. B\*\*\*\*\*g, the lady and gentleman from Carolina, who visited me last summer ? they had tamed two young alligators, and suffered their children to play with them, as freely as if the animals were naturally inoffensive.

The bell has rung nine, my daughter. Prepare for bed, but first repeat your evening hymn.

*D.* " Another day its course has run,  
And still, O God, thy child is blest :  
For thou hast been, by day, my sun ;  
And thou wilt be, by night, my rest.

Sweet sleep descends, my eyes to close :  
And now, while all the world is still,  
I give my body to repose,  
My spirit to my Father's will."

**PRACTICAL QUESTIONS.**

**Of what are baskets made ?**

**What are bamboos and their uses ?**

**What are rattans ?**

**Describe the porcupine.**

**Are there any animals which resemble it  
in being armed with quills ?**

**How many species of turtle are there ?**

**Describe them.**

**What is said of the ostrich ?**

**What distinguishes the crocodile from the  
alligator ?**

**Where are these animals found ?**

## CONVERSATION XXV.

◆

DAUGHTER.

Look, mother, I have found some descriptive verses in one of Henry's books : I will read them to you, and will thank you to explain the meaning of the last verse but one ; I understand the others, but should like to know something of the camel, hyeṇa, and locust.

*M.* First read your verses.

*D.* " O'er Arabia's desert sands  
The patient Camel walks :  
'Mid lonely caves and rocky lands  
The fell Hyena stalks.

On her cool and shady hills,  
Coffee shrubs, and tam'rinds grow ;  
Headlong fall the welcome rills  
Down the fruitful dells below.

The fragrant myrrh and healing balm  
Perfume the passing gale :  
Thick hung with dates the spreading palm  
O'ertowers the peopled vale.

Locusts, oft a living cloud,  
Hover in the darken'd air ;  
Like a torrent dashing loud,  
Bringing famine and despair.

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And often o'er the level waste,  
 The stifling hot winds fly ;  
 Down falls the swain with trembling haste,  
 The gasping cattle die.

Shepherd people on the plain  
 Pitch their tents and wander free ;  
 Wealthy cities they disdain ;  
 Poor — yet blest with liberty."

*M.* The verse of which you wish an explanation refers to a poisonous wind, which blows in Arabia at some seasons, called Samiel; if breathed, it produces immediate death.

*D.* People cannot see wind, mother; how can they avoid breathing it?

*M.* Camels seem, by instinct, to know when it is approaching, and plunge their noses into the sand till it has passed, which is commonly in a few minutes; now the Arabs never travel in the deserts without camels, and, warned by them of the approaching danger, and also by a yellow or brassy appearance in the air, they avoid it, as says the verse, by falling to the earth and covering their faces closely. Death would be the consequence of neglecting this precaution.

*D.* And does this wind blow in all parts of Arabia? I should not like to live there at all.

*M.* No, it blows only in the sand deserts, which are mostly uninhabited. Merchants must cross them with their camels and merchandize, in their progress from one part of the country to another, and it is to them it sometimes proves so fatal.

*D.* Is the camel, mother, remarkable for any very useful qualities ?

*M.* I will describe it, and leave you to decide that. The camel is an animal, supplying to its owners the place both of horses, cows, and sheep. Its milk is the chief food of the roving Arabs. Its patience and strength are very great ; it kneels to receive its load, and will carry several hundred weight on its back. The camel will live several days without either food or water : nature has provided it with a reservoir, in which part of the water which the animal drinks, remains fresh and pure ; this he forces into his throat and stomach by contracting the muscles of the bag which contains it.

The camel is about six feet high, and of a heavy, clumsy form, but will travel with great speed when not heavily loaded ; when he is burthened with a large load, he goes but thirty or thirty-five miles a day. But what renders the appearance of this animal singular and deformed, is a hump upon its back ; in this only it differs from the drome-



dary which has two. The camel is confined to Arabia, the Barbary states, Persia, and the countries bordering on the Levant ; but the dromedary is found not only in these countries, but in the south of Africa, Tartary, and many parts of India. It is not quite so large as the camel, but is swifter and equally useful in other respects. The camel arrives at the age of forty or fifty years. Though a native of warm climates, it dreads those which are excessively hot.

*D.* What is the colour of the camel, mother ?

*M.* A sort of dusky red ; its hair is several inches in length, and much longer on some parts of the body than others. It falls entirely off in the spring, and is succeeded by a new coat or fleece.

*D.* Is not the hair of camels manufactured into shawls ?

*M.* Yes, the finest is put to that use ; but the coarser is manufactured into stuffs which are used for various purposes by the eastern nations ; we read that John the Baptist was clothed in raiment of camel's hair when he was preaching in the wilderness of Judæa. Painters use pencils made of camel's hair to lay on their paints.

*D.* Well, mother, I think the camel is a remarkable animal.

*M.* Can you tell me in what respects ?

**D.** For its docility, its strength, and its usefulness. Let me see : it carries burdens like the horse and mule ; it affords milk like the cow and goat ; its hair, like the wool of sheep, is made into cloth ; and it can live longer without food than either of them. But is there any other animal so useful in all respects to any nation, as the camel is to the Arabian ?

**M.** Why yes, I think we may find one ; try if you cannot recollect.

**D.** The horse is not, mother, nor the elephant, nor any animal that I can now remember.

**M.** Did you never read of the Lapland Reindeer ?

**D.** Oh I do not know how I could forget that ; the reindeer is very useful to its master ; but is it as useful as the camel ?

**M.** In the first place, the reindeer travels with great swiftness, and it is said to go fifty miles without resting, and, if urged, nearly one hundred in a day, though such labour disables him from future service. His skin affords the Laplander clothing, and beds for himself and family ; his flesh and milk supply him with food ; his tendons and sinews are converted into bow-strings, nets, and thread for sewing : his horns are sold for making glue ; and he gives his master no trouble to prepare him food ; for he subsists upon a

sort of white moss which in winter he seeks under the snow. In fine, the Laplander is absolutely dependent upon his reindeer for nearly every comfort.

“ His reindeer-form his riches. These his tents,  
His robes, his beds, and all his homely wealth  
Supply, his wholesome fare and cheerful cups.  
Obsequious at his call, the docile tribe  
Yield to the sledge their necks, and whirl them swift  
O'er hill and dale, heap'd into one expanse  
Of marble snow, as far as eye can sweep,  
With a blue crest of ice unbounded glazed.”

The reindeer is wild in North America, where it is called caribou. It is found in Spitsbergen and Greenland, and is seen in the northern parts of Asia, as far as Kam-schatka.

*D.* I acknowledge that the reindeer is, if possible, even more useful to the Laplander than is the camel to the Arab.

*M.* What, my dear, is your next inquiry ?

*D.* I wish to know what sort of animal is the Hyena ?

*M.* It is the fiercest and most disgusting of all animals ; the most savage and the most untameable ; it is constantly growling, except when receiving its food. There are two species of this animal, the striped and the spotted ; the former is about three feet and a half in length, and its hair of a dirty

grey colour ; its eyes constantly glisten, and the bristles of its back stand upright, giving it somewhat the appearance of a hog ; its howl is loud and most terrific. Though little above the size of a large dog, it will defend itself against the lion, and fearlessly attack every other animal.

*D.* I hope we have none of them in this country ?

*M.* No, they are natives of Asiatic Turkey, Syria, Persia, and Barbary. These animals inhabit the wildest and most desolate places, infesting the caverns of mountains, and holes and dens which it digs in the earth. The spotted hyena is a native of the Cape of Good Hope, and is there called the tyger wolf. Its colour is a reddish brown ; its howl is said to be very loud, and dreadful beyond description. In short, the hyena is the most useless and offensive of all animals.

The persevering traveller Belzoni saw one of these terrific beasts in Egypt, near the famous lake Mœoris, and apprehended an attack from him ; but the noise made by the boatmen probably frightened the creature, for he fled, after giving a hideous roar.

*D.* I shall be contented with seeing the picture of this animal, without any desire of beholding it in reality ; one can neither love it for any good qualities, nor admire it for

beauty ; I do not even like to think of it, mother ; so pray tell me of the

‘ Locusts which darken the air like a cloud.’

*M.* The common brown locust is about three inches in length, and resembles the grasshopper both in form and appearance. After a mild winter, swarms of these insects, produced in the deserts of Arabia, overspread Syria ; every species of vegetation disappears before them. The hope of the inhabitants then lies in a bird called pamanmar, which devours them, and the south-east wind which drives them into the waters of the Mediterranean.

Swarms of locusts infest many parts of Africa, particularly Barbary ; they migrate to other countries, and wherever they go, mark their path with desolation ; not a leaf nor blade of grass escapes them. Famine is sometimes the consequence of their ravages. In the north of Africa, they generally make their appearance the last of March or the beginning of April, and often in such swarms as to obscure the light of the sun. Some nations eat these insects, cooked in various ways, though by us they would not be considered very palatable food. There are many species of locust.

*D.* I suppose those you have described were the kind sent upon Egypt in the time

of Moses; no wonder Pharaoh promised to let the children of Israel go, after his land and people had suffered so much from their ravages. I read the chapter which relates to these facts yesterday morning, and shall remember it the longer from what you have told me this evening of the locust.

*M.* It was indeed these destructive insects that laid waste "every herb and green thing" in the land of Egypt.—I can converse with you no longer this evening; so you may amuse yourself with joining your dissected maps.

*D.* Thank you, mother; I will put them together, and find the Barbary states.

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### PRACTICAL QUESTIONS.

What is the samiel, and the consequences of breathing it?

How may it be avoided?

Describe the camel and its uses.

In what countries is it found?

Describe the reindeer and its uses.

What is said of the hyena, and where is it found?

What is said of the locust?

## CONVERSATION XXVI.

—  
DAUGHTER.

HONEY, mother; I have been going to ask you twenty times about honey?

*M.* I suppose, my dear, you wish to know what countries yield it, and the method of procuring it? /

*D.* Yes, mother.

*M.* Honey is the produce of bees, which thrive in almost every hot and temperate climate, and in some cold ones. But the greatest abundance of honey is produced in Palestine, and in the southern countries of Europe. The bees are sometimes swarmed or collected in hives, but they are usually what is called wild, making their honey in the clefts of rocks and the hollows of trees. This the inhabitants collect without much trouble, and all they do not use themselves, they separate from the wax, and export to those countries where it is less plenty. Mead, a pleasant kind of wine is made from honey. The beverage called metheglin is also obtained from it.

*D.* I know the bees collect honey from flowers, but I cannot imagine how they get wax to form their neat little cells.

*M.* It was for a long time supposed that they made their wax from the powder or pollen of flowers ; this supposed fact has been disproved by many naturalists, and it is now satisfactorily ascertained that it is emitted from the body of this little creature. Wax is in some countries a staple article of commerce.

*D.* What are its uses ?

*M.* It has many ; great quantities are consumed in the making of candles ; it is also made into various figures imitating persons, fruits, flowers, animals, &c.

*D.* Wax is yellow ; I never saw yellow candles, therefore I suppose we do not burn wax candles here ?

*M.* You are mistaken ; wax candles are burnt in our drawing rooms, but the wax is bleached previous to its use.

*D.* How is that done, mother ?

*M.* I must inform you that when the bees first construct their cells the wax is white, but after remaining so a short time turns yellow ; to remove this colour and fit it for making candles, &c. it is cut into small pieces and melted in a copper cauldron, with the addition of sufficient water to keep the wax from burning. This cauldron is so disposed that the wax as it melts, flows through a pipe at the bottom, into a large vat, nearly filled with pure water. The vat is closely covered in order to prevent the heat from escap-



ing before the wax is disengaged from the water. From this vat it is conveyed into a vessel, the bottom of which is filled with small holes about the size of a grain of barley ; through these it falls in streams upon a cylinder or roller which constantly turns half immersed in water ; this process gradually cools the wax and disengages it from the cylinder. From the last mentioned vessel it is taken and spread upon large cloths, exposed some days to the air and sun. It is then heaped in a solid mass and allowed to remain five or six weeks ; when it is again melted, and passes through the same process I have already described. The third time the wax is melted, it is cast in moulds to form cakes, and again exposed to the sun and air to dry and harden, and is then considered fit for use. Wax burns with a very pure white light, and with less smoke than tallow. Great quantities of yellow wax are imported from the Baltic countries, the Levant, and the Barbary states.

*D.* How is wax made to imitate fruit, mother ?

*M.* The fruit to be imitated is first half buried in clay ; the edges of the clay, and the remaining part of the fruit which is exposed, must be oiled ; a paste, composed either of pulverized alabaster, or plaster of Paris, must be covered over it ; this dries

very quickly, and forms a half mould ; the other half is made in the same way ; the two are joined with the exception of a little hole into which the melted wax is poured, and shaken rapidly round ; the mould is separated as soon as the wax cools, and the fruit is made perfect in its resemblance, by being painted with the proper colours.

*D.* This must be a very pretty amusement ; I should like to make wax-fruit.

*M.* I shall not object, when you are old enough to manage the whole process yourself, and will furnish you with the materials when that time arrives.

*D.* Thank you, mother. Is wax produced in any other way than by bees ?

*M.* Yes, several trees and plants yield wax ; so you see it may be considered both as a vegetable and animal substance. It is found very abundantly in some parts of South America covering the trunk of the wax palm, a tree which grows to the great height of 180 feet, and has leaves 20 feet long. The trunk of this tree is covered with a substance composed of two thirds resin to one of wax. The wax shrub of Louisiana yields very pure wax, which is found encrusting the seeds. The bayberry shrub or plant grows about a foot high ; from its berries is obtained a greenish coloured wax, which is applied to many uses. This shrub

grows in New-England, and in many other parts of North America.

*D.* Will you tell me the materials of which candles are made, besides wax ?

*M.* A candle is a cotton or linen wick loosely twisted, and covered either with spermaceti, wax, or tallow. You already know from what spermaceti and wax are derived. Tallow is the fat of animals ; but there are some trees which yield a substance resembling animal tallow, and which, with the addition of a little oil, answers the same purpose very well. Tallow candles should be made in the proportion of half sheep and half bullock's tallow ; the lard of hogs is too soft for this purpose, being liable to swale ; and giving a thick black smoke, attended with an ill smell. Tallow candles are of two kinds, dipped and moulded ; the first are in more common use than the latter. There are several kinds of wax candles ; some are called tapers, and used in catholic countries to illuminate churches, to burn in processions, at funeral ceremonies, &c. The Romans at first made their candles by dipping little strings in pitch, or by surrounding them with wax ; afterwards the wicks were made of papyrus, covered likewise with wax ; sometimes also the pith of little rushes was used to supply the place of wicks. Candles kept in flour or bran, it is said, increase in hardness.

**D.** You spoke, mother, of trees which yield tallow ; where do they grow ?

**M.** The most valuable tree of the kind grows in China. It is called the tallow tree, and from the substance which it affords, the inhabitants make the greatest proportion of their candles. This tree grows to about the height of fifteen or twenty feet ; it has small leaves, and a very smooth bark. The fruit is enclosed in a kind of pod, and consists of three white grains, each of which encloses a little stone. These grains are collected and melted with the addition of a little oil to soften them, and then made into candles ; they yield, however, a smoky flame.

**D.** Are there any other substitutes for candles besides lamps ?

**M.** Yes, several ; the poor people of Great Britain strip the skin from rushes, except on one side, and dip the pith into melted tallow. In Norway, Sweden, and many parts of North America, the poor people burn slips of pine wood, or the knots and roots of pine trees, which contain a great quantity of fat resin ; these roots yield a strong bright flame, though the smoke is dense. They call them very properly, candle-wood. The French inhabitants of the island of Tortuga, use slips of sandal wood, which are very fragrant, and give a strong, clear flame, of a greenish colour.

The natives of Otaheite use for candles the kernels of an oily nut placed one above another, on a round stick or skewer. The nuts supply the place of tallow, and the skewer of a wick. You see, my dear, in these instances, as well as in many others, an exemplification of the old adage, "Necessity is the mother of invention."

Good night, my child.



### PRACTICAL QUESTIONS.

What is honey ?

What countries afford it in the greatest abundance ?

What is wax ?

How is it prepared for use ?

How is wax made to imitate fruit ?

Do any plants yield wax ?

Of what are candles made ?

Describe the tallow tree.

What are substituted in the place of candles and lamps in some countries ?

## CONVERSATION XXVII.

—◆—  
DAUGHTER.

I HAVE been trying to think what air is, mother, and am glad you have come to put an end to my doubts. I at first thought it might be wind without motion, but as I could not tell what wind was, I was as much at a loss as ever.

*M.* I am glad to find your thoughts occupied upon such a subject ; and will try to define air to your satisfaction. To use the words of philosophers, “ air or the atmosphere is a thin invisible fluid, which every where surrounds the earth, and reaches to a considerable height above it ;” and without which neither animals nor vegetables can live. Deprived of air, you would in a few moments cease to breathe. Wind is the air agitated, and forced into action by heat, and other causes, which I do not think you are yet old enough to understand. In another year you will perhaps have made sufficient progress in your studies to read Natural Philosophy to advantage, and then I will aid you in your researches without hesitation ; but you must remember that you will not be able to learn

these things unless you apply steadily to the books now put into your hands. Every lesson learnt is a sure step forward in the path of wisdom and knowledge, but every lesson omitted carries you back, while at the same time the expansion of your understanding is doubly retarded. You cannot attain learning without pains and labour; we do not see the fruits and flowers in our garden arrive at perfection in a single day, on the contrary, they require much labour, and many warm days and sunny hours to ripen them, and perfect their growth. How many days you watched for the buds to blossom on your favourite rose tree; and how much joy you felt when you presented an opening flower to your father and me. It is with the same solicitude and hope that we watch the growth of your young mind; it will expand like your roses, gradually; but much depends on your own efforts to assist in the culture; you are a rational being, and endowed with both reason and reflection; your rose tree, having only vegetable life, cannot of itself put forth leaves and flower; but you are required to do both as respects the cultivation of your talents, and the improvement of your mind.

*D.* I will study indeed, dear mother; I will try to improve and become useful, if it be only to make you and my dear father happy, and fit myself to repay in part, (for I

know I never can wholly,) your care and solicitude for me while I was incapable of acting for myself. Will you tell me as much as I can now comprehend about the formation of clouds, mother ?

*M.* You are a good little girl, and while you so well profit by my instructions, I can refuse you no reasonable desire. Clouds are composed of water, absorbed by the sun's rays ; these at first form vapours, and at length clouds ; which, when condensed, and too heavy to remain supported in the atmosphere, fall either in the form of drops of rain, hail, or snow.

*D.* Are there any countries where it never rains ?

*M.* Yes. Rain rarely falls in the northern parts of Chili, and in some parts of that country never ; in Egypt rain is almost unknown.

*D.* How then is the earth watered ? nothing can grow in those places where there is not water to support vegetation.

*M.* Chili is not only well watered by rivers, but by frequent and heavy dews. Egypt owes its fertility to its only large river, the Nile, which rises in Abyssinia, and owing to the heavy rains which fall there, annually overflows its banks, like the Mississippi in our own country, and thus fertilizes and waters all Egypt. The Egyptians dig canals



also in various directions to convey water from the river to distant parts of the country ; and by means of aqueducts, raise it to the higher grounds, and thus rarely suffer from drought.

*D.* Snow must be frozen rain, I think ; for though rain falls in tropical climates, snow is never seen there, except on the summits of the highest mountains : Henry told me this the other day, when I asked him why snow did not destroy the fruit and leaves of fig trees in winter, as it does here the verdure of our trees.

*M.* You are right in supposing snow to be frozen or congealed rain. The formation of the flakes of snow is both curious and wonderful : when we see it descend from the heavens, let us think of the benevolent Creator of nature, who “ scattereth his snow like wool, and his hoar frost like the shining pearls.” The largest flakes of snow fall from the highest clouds ; for in their descent they meet, and several unite in one. The lower the clouds, the smaller are the flakes of snow. Hail is more solid than snow, and is supposed to be formed by drops of rain very suddenly frozen ; several of these frozen drops adhering in their fall form hailstones. Violent hail storms are very ruinous in their effects, destroying trees, vegetables, and whole fields of grain ; injuring

houses, and sometimes causing the death of cattle. Such terrific storms are not common in this country, and most thankful should we be that they are not. Hurricanes, or wind storms, are with us hardly known ; though in the West Indies, and some other places they are frequent. Earthquakes, which are caused by subterranean fires, are in some countries very frequent. Spain, Italy, Sicily, the northern parts of South America and the adjacent islands have suffered severely from them ; whole cities with their inhabitants have been almost instantaneously buried in the earth. Whirlwinds are caused by the meeting of winds blowing from different points of the compass. Some philosophers have attributed the formation of water-spouts to whirlwinds.

*D.* What are they, mother ?

*M.* A collection of clouds, rapidly condensed by the wind into a body of water, which descends either to the earth or upon the sea in the form of a pillar : this pillar, or immense body of water, is retained in its position by the pressure of the air upon its surface ; which pressure in a short time lessens, and the water-spout breaks with great force, sometimes deluging considerable tracts of country. At sea these are very dangerous to mariners, for if the spout bursts near a vessel, there is great danger that it will

sink under the violence and weight of the water thrown upon it.

*D.* Are waterspouts frequent?

*M.* No, they are rarely seen, and are classed under the head of Phenomena, or the wonderful and uncommon appearances of nature.

*D.* What causes the Rainbow, mother?

*M.* At present you must remain ignorant of the philosophical cause which produces the beautiful rainbow, for the same reason that you can at present understand very little of the nature of light, air, colours, and clouds. The most simple reason I can give you for its appearance, is the shining of the sun's rays upon the drops of falling rain. The rainbow always appears opposite to the sun, and is not seen unless your back is towards that luminary. I some time since spoke to you of colours and their creation, which you no doubt remember; you may read Thomson's description of the rainbow; here is the book and place.

*D.* " Meantime, refracted from yon eastern cloud,  
 Bestriding earth, the grand ethereal bow  
 Shoots up immense, and every hue unfolds;  
 In fair proportion running into red,  
 To where the violet fades into the sky."

Mother, the two last lines remind me of a passage I learned in one of Henry's books after you told me that black was not a colour,

and that white was composed of all the other colours blended or mixed. I was looking through a prism, and my brother gave me the book, because he said if I learnt the lines, I should remember the order in which the colours appeared when separated.

*M.* Well, let me hear them, my dear.

*D.* "Of parent colours, first the flaming *red* -  
 Sprung vivid forth ; the tawny *orange* next,  
 And next delicious *yellow* ; by whose side -  
 Fell the kind beams of all refreshing *green* ; -  
 Then the pure *blue*, that swells the autumnal skies, -  
 Ethereal played ; and then, of sadder hue, -  
 Emerged the deepened *indigo*, as when the -  
 Heavy-skirted evening droops with frost ; -  
 While the last gleamings of refracted light -  
 Died in the fainting *violet* away."

Died into white, mother ; for all looked white below violet. Are not the lines pretty ? I am much obliged to my brother for giving them to me.

*M.* I am glad you are sensible of Henry's kindness and attention to you ; he is always obliging and ready both to assist in your studies, and promote your pleasures ; not only because he is good tempered, but because he loves you, and sees you have a desire to improve your mind : and as he is older, and more sensible of the importance of acquiring knowledge than yourself, he wishes to encourage you by all the assist-

ance in his power. You can only repay his attention, by affectionate and kind manners towards him, and by rendering him every little service in your power.

Good night, my-child.

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### PRACTICAL QUESTIONS.

What is air ?

What are clouds ?

When condensed, what do clouds form ?

Are there any countries where rain is unknown ?

Where are they situated ?

What is snow ?

What is hail ?

By what are earthquakes caused, and in what countries are they most frequent ?

What are water-spouts ?

In what situation must you be placed in order to see the rainbow ?

## CONVERSATION XXVIII.

—  
DAUGHTER.

I SHOULD like, mother, to be more particularly acquainted with the government of the United States ; my geography informs me that it is Republican, and that its civil rulers are a President, Vice President, Senate, and House of Representatives ; but, last spring, I heard you ask father who would be our Governor, and I do not know so much about these things as I wish.

*M.* And what has excited in you this desire, my dear Sarah, to be informed upon a subject usually uninteresting to little girls ?

*D.* I heard a gentleman conversing with my father the other day, and he said every body should be well acquainted with the principles upon which our Government is founded ; and my father thought as he did ; it was their conversation which made me think I ought to know more than I can learn from my small geography.

*M.* Well, your reason is certainly substantial, and for the present I will suppose it necessary for you to become enough of a

politician to converse this evening upon government : you must remember however all I tell you, even if you do not find the subject so amusing as my description of the manufacture of glass and porcelain.

*D.* I will try, mother, and fix my attention ; for I already perceive the advantage of applying as you have taught me, not to those things only which are amusing, but to some that I do not like quite so well ; my arithmetic, for example, for which at first I had so little relish, is now my favourite study.

*M.* Attention to any subject will in a short time render it attractive, be it ever so disagreeable and tedious at first. I will now attempt to explain to you what a free republic is, and in what a republican form of government consists.

A Republic is where the supreme power is entrusted by the people to councils composed of members holding different degrees of office, and chosen for a limited time ; and where a number of independent states unite themselves under one general government.

A republican form of government may be divided into three grand branches ; the Executive, the Legislative, and the Judiciary. The executive power of the United States is vested in the hands of the President ; but in the individual states, it rests with the Governor. The Congress or Legislature of the United States, as well as that of the States

singly, consists of a Senate and House of Representatives ; and the Judiciary is vested in one Supreme Court, and in inferior courts, otherwise called circuit courts, or courts of common pleas. The magistrate who represents the executive power, sees that the laws are put in execution, but is not at liberty to act in affairs of state, without the advice and consent of his council.

*D.* Mother, forgive my interrupting you, but I wish to know what are laws ?

*M.* Laws are rules of action : for example, you have a law or rule in your school which prohibits you from speaking to your companions during school hours, except by permission of your teacher ; you have a law which obliges you to be at school precisely at nine in the morning, otherwise you forfeit your place in your class. We have state laws which prohibit men from robbing and from killing each other ; a transgression of the former is punishable by confinement in the State Prison for such a length of time as the Judge sentences, he being directed by the statute laws ; the latter crime is punished by death, which condemnation can only be remitted by the chief executive authority.

*D.* Thank you, mother ; I now understand for what the President and Governor are responsible ; they must see that the sentences passed by the Judge are executed.

*M.* Yes, that is part of their duty : but to



proceed. The Legislature, consisting of Senators and Representatives, assembles to make the necessary laws, either state or national, whether providing for the safety, or contributing to the prosperity and convenience of all. The Judicial department is vested in judges, who are appointed in the national courts by the President, and in the states, by the Governor and Council: their office is to explain the laws; hear and determine causes, and redress grievances.

*D.* How is the President chosen?

*M.* Each state appoints, as directed by the legislature, a number of persons, called Electors; equal in number to that of the Senators and Representatives such state is entitled to send to congress. Every state may send one representative for every thirty-five thousand inhabitants; but may send two Senators, without regard to population. No senator or representative can be chosen an elector. These Electors, when appointed, meet in their respective states at a given time and place; and when convened are called the Electoral College. The place in Massachusetts appointed for their convention is the State-house at Boston. The election of President and Vice-President takes place once in four years. The votes from every state are sealed up, and sent by a special messenger to the Congress at Washington, where they are counted, and the man

who has a majority of all the votes, is considered as chosen. The electors, at the same time, vote for a Vice-President. When the votes for two candidates are equal, the question is carried before the Legislature, whose votes decide the person.

The Senators of Congress are chosen by the state legislatures, and the Representatives by the citizens of the several states.

*D.* I should like to know what Congress has power to do ?

*M.* At present you cannot understand all, even if our time would now permit me to inform you, but I will tell you that which you will most easily comprehend. When you are older, you must read repeatedly our excellent constitution ; for though it is unnecessary for females to become politicians, they should possess sufficient knowledge of the government under which they live, to enable them to contrast it with those of foreign nations ; and estimate as they ought its great superiority over that of most others, I may say over every other. Congress has power to levy and collect taxes and duties ; to pay public debts, and provide for the common defence and welfare of the country ; to regulate commerce with foreign nations ; to coin money and designate the value of it ; to establish post-offices and post-roads ; to promote the progress of science and the useful arts ; to declare war ; to raise and support

armies ; to provide and maintain a navy ; to make all necessary and useful laws, &c. The laws to which the citizens of the United States are subject, are national and state laws ; however, besides these, every city and town has the liberty of enacting what are termed by-laws, as for instance, in Boston is a law obliging every householder in the winter season, to clear the snow and ice from the side-walk before his dwelling, and any one refusing to observe this regulation, is liable to be fined.

*D.* Are the Governors of our State chosen by electors, like the President and Vice-President ?

*M.* No ; they are chosen annually, by the citizens of the state : and may be re-chosen by a majority of the people several successive years. The President and Vice-President hold their office for the term of four years, and are sometimes re-elected.

*D.* Is the semi-annual assembling of the State Legislature, like that of the National Legislature, called Congress ?

*M.* I have informed you that our State Legislature, consists of a Senate and House of Representatives ; these, when convened here, are called the General Court ; in some of the other States, the General Assembly.

*D.* We are ruled by a Mayor in Boston, why are not the inhabitants of Dedham and Roxbury ?

*M.* These are towns, and are managed by Selectmen, chosen by the town's people to superintend their affairs. When a town is incorporated into a city, as Boston now is, instead of Selectmen, it is regulated by a Mayor, a Board of Aldermen, and a Common Council of 30 or 40 persons: whose duty it is to recommend and ordain all such measures as shall "tend to the improvement of the finances, the police, health, security, cleanliness, comfort, and ornament of the city." They are chosen annually, and are restricted in their power by the State laws.

*D.* Is Great Britain governed like the United States?

*M.* No, its government is monarchical. Time will not now permit me to enter into the particulars of British legislation; I can only tell you that it is a limited monarchy, and is governed by a king, house of lords, and house of commons, which, when convened, are called the Parliament.

The United States is a free republic; and

"Concenter'd here th' united wisdom shines,  
Of learned Judges and of sound Divines,  
Patriots, whose virtues searching time has tried;  
Heroes, who've fought where brother heroes died;  
Lawyers, who speak as Tully spoke before;  
Sages, deep read in philosophic lore;  
Merchants, whose ships are to no climes confined;  
Farmers, the noblest title 'mong mankind;

Yeomen and Tradesmen, pillars of the state ;  
On whose decisions hang Columbia's fate."

*D.* Why do you say Columbia's fate, mother ?

*M.* America is often poetically called Columbia, and in equity should always be so. Columbus discovered the new world : Americus only travelled over some parts of it, and wrote an interesting description of his adventures.

*D.* Will you tell me the true meaning of liberty ?

*M.* I cannot better define liberty than by saying it is the freedom every individual in society enjoys, of thinking, writing, and speaking as he pleases ; provided however, he does not encroach on the liberties and rights of others, or injure in any way the community at large.

America is often designated as the " land of Liberty." With one of our own poets we may say,

" Hail to the land whereon we tread,  
Our fondest boast ;  
The sepulchre of mighty dead,  
The truest hearts that ever bled,  
Who sleep on Glory's brightest bed,  
A fearless host :

————— Our unchained feet  
Walk freely as the waves that beat  
Our coast.

Our fathers crossed the ocean's wave  
To seek this shore ;  
They left behind the coward slave  
To welter in his living grave : —  
With hearts unbent and spirits brave,  
They sternly bore  
Such toils as meaner souls had quelled ;  
But souls like these, such toils impelled  
To soar.

There is no other land like thee,  
No dearer shore ;  
Thou art the shelter of the free ;  
The home, the port of Liberty,  
Thou hast been, and shalt ever be  
Till time is o'er.

Thou art the firm, unshaken rock,  
On which we rest ;  
All, who the wreath of Freedom twine,  
Beneath the shadow of thy vine,  
Are blest."

This land is our home ; our high, our inestimable privileges have been dearly purchased by the lives and blood of our ancestors ; we may not abuse them ; we must be both humble, and grateful in the enjoyment of them ; as we are the happier, and should be the better, for them.

**PRACTICAL QUESTIONS.**

**Under what form of government do we live ?**

**Into how many branches may it be divided ?**

**How are the individual states ruled ?**

**What are laws ?**

**Of what does the legislature consist ?**

**In what is the judiciary vested ?**

**How is the president chosen ?**

**How are the senators and representatives chosen ?**

**What are some of the things congress have power to do ?**

**How are the state governors chosen ?**

**Of what does the British government consist ?**

**From whom did America receive its name, and what should it have been called ?**

**What is liberty ?**

**What is a republic ?**

## CONVERSATION XXIX.

You have taught me, mother, in my morning and evening prayers, to thank my Heavenly Father for all he gives me, and to pray for his guidance and protection. You have told me there is but one God, and that he created the heavens and the earth, and every thing we see around us ; the Lord's prayer begins with "Our Father who art in Heaven," and the first lines of my morning hymn are

" O God, I thank thee, that the night  
In peace and rest hath passed away."

I have been thinking, as there is but one God, how the Romans could call the months after many gods, as you told me when you were explaining time ?

*M.* You have, my daughter, already learnt, that pure religion is the worship paid to one Supreme Being—the Creator and Ruler of the universe. In the earliest ages of the world, men worshipped God by offering prayers and sacrifices. We learn from sacred history, that after a time wickedness and irreligion prevailed throughout the world,



and that God caused a universal deluge, which destroyed every living thing upon the earth, except Noah and those who were with him in the ark. His descendants peopled the earth ; many of them became worshippers of false gods, and forsaking the worship of their Maker, adored the works he had made : they sinned even yet more, by substituting images and idols, for natural objects of worship, and from simply and devoutly worshipping the one true God, they adored images wrought by their own hands, and which they either believed, or pretended to believe, were endowed with power to hear and answer their petitions, to supply their wants, and relieve their necessities. In process of time they created in their imagination beings presiding over every part of the creation, whether elemental, animal, or vegetable. The ancient Egyptians worshipped the sun and moon, under the names of Isis and Osiris, and even deified animals and vegetables. The Persians adored the Sun, under the name of Iran, and fire was considered by them as sacred. The ancient inhabitants of France, Germany, and Britain, worshipped in consecrated groves, and their priests, who were known by the name of Druids, were distinguished alike for the simplicity of their lives and manners, and their bloody rites. They offered to their gods human victims,

usually their prisoners taken in war. You are too young to study the Grecian and Roman mythology at present; when you do, you will find that they consecrated numerous deities, such as a god of war, a god of peace, a god of the air, of the ocean, of the winds, of the fire, &c.

*D.* Was the worship of the true God preserved in its purity among any nation after the flood?

*M.* The Jews, though they repeatedly rebelled against God, and forsook his worship for that of idols, were destined to preserve it from total extinction.

*D.* Who were the Jews, mother?

*M.* The descendants of Shem, the eldest son of Noah. Abram, afterwards called Abraham, one of his lineage, is considered as the founder of the Jewish nation. After the Jews escaped from the bondage of the Egyptian kings, they settled in the land of Canaan, also called Palestine, or the Holy land, and now known by the general name of Syria. The Jews fell many times into idolatry, yet their religion, taught by Moses, never became wholly extinct.

*D.* Was not Jesus Christ born among the Jews?

*M.* Yes; the Jews were ever a people favoured of Heaven; the gospel was first sent to them, but they, with the exception of

a few disciples, rejected its precepts, and ignominiously crucified their Saviour. The apostles of Jesus preached his doctrines among the Gentile nations, particularly to the Greeks and Romans, and many flourishing churches were established among them.

*D.* How long after the death of Christ did the Romans continue to worship false gods?

*M.* Constantine, who reigned in the beginning of the *fourth* century, was the first christian emperor, and although he did not abolish paganism, he put an end to the cruel persecutions which had raged against the early Christians in his empire. At this time there were many Roman converts to Christianity, yet it did not become the established religion of the empire till the reign of Theodosius, A. D. 377 : he died A. D. 395.

The early christians were remarkable for the constancy with which they endured the severest tortures, and their unshaken faith in Jesus Christ ; thousands were put to death for refusing to acknowledge and worship the Heathen deities. Christianity was established in nearly all the ancient provinces of Germany and France about the close of the fifth century, during the reign of Clovis, king of the Franks, who was converted by his wife Clotilda. Missionaries, headed by the famous monk Augustine, were sent by the pope from Rome to Britain about the close of the sixth

century, and the Saxons, who had then conquered that country, in the course of a few years, generally embraced christianity.

*D.* O mother, I long to study history ; how entertaining it must be to learn about the Romans, and Britons, and all other nations. I hope you intend I shall study history very soon ?

*M.* The time depends something upon yourself, and the progress which you make in the studies in which you are at present engaged : I think you will not be disappointed in finding history both very entertaining and instructive ; be assured it is my wish to see you well informed in so important and valuable a branch of learning. At present I can give you but a very imperfect knowledge of the various modes of worship practised by the ancients ; when you are older, and can read, study, and reflect for yourself, your ideas upon these subjects will be clearer and more satisfactory. Let me conclude this evening's conversation by explaining some of those duties of our pure religion, which are enforced in the life and writings of Christ and his apostles.

*D.* I will listen to you with attention, mother.

*M.* You are by them taught to love and reverence God your creator, and to perform faithfully the duties which he has command-

ed ; and to imitate, as nearly as you can, the virtues which are exemplified in the life and character of our blessed Saviour. While you are yet a child, you can only know your religious duties as I teach them to you. At present they are chiefly these : obedience to your parents, and attention to the instructions of those who teach you ; kindness to your companions, and respect towards those who are your superiors in age and experience ; you must be ever good-tempered and obliging ; be sincere, and always speak the truth ; candidly confess your faults, even should you be certain of incurring reproof and correction ; for reproof you never will incur, unless it is merited ; always evince a readiness to receive instruction, and be patient in whatever you undertake ; you will thus win deserved approbation, and act as becomes one who is to lead a life of piety and usefulness. Be not proud or conceited if you excel your companions ; it may be that your opportunities for improvement are greater than theirs ; at any rate, the pleasure arising from a sense of doing every thing as well as you are able, will, in itself prove a sure and lasting reward. But above all, my dear child, be thankful to God for all he gives you to enjoy ; remember it is He who has created the pleasant light of day to cheer you ; has made the quiet night that you

may rest from employment, and slumber peacefully, be refreshed after labour and fatigue, and have strength to resume and pursue your daily tasks ; He has bestowed upon you an immortal mind, endowed with the capacity to be improved and cultivated ; He has given you health and activity, that you may be useful to your fellow beings, and happy in yourself ; He has also given you kind and affectionate parents who watch over, and educate you, and provide for all your necessities and comforts. God causes all your beautiful flowers to blossom, and the plants and fruits of your garden to flourish and come to maturity ; He has given too those melodious notes to the sweet singing birds that waken you every summer morning with their songs. If then, all these, and every other blessing, are the free gifts of your heavenly Father, how good and how grateful should you be to him for them ; learn, my dear child, to refer all you possess, and all you enjoy to his goodness and bounty ; pray daily to Him with a serious mind, that he may aid your feeble endeavours after holiness, and confirm in you all christian graces and virtues ; be good, and do good as far as you know how, nothing more will ever be required of you, and in so doing you will be a religious child.

*D.* I will try to be always good, dear mother.

*M.* You will then be always happy, not only in this world, but in a higher and holier state of existence,—and should you live here many years, and in the providence of God be called to encounter trials and disappointments, you will have that unfailing support within you, which attends the virtuous and pious who humbly rely on that great and good Being who careth for all his works; and the consciousness of that will ensure you a quiet mind. You will then be both fit and willing to die, whenever it pleases your Creator to take you from the world; and you will, my daughter, have laid up for yourself, treasures in heaven, which will never be taken from you.

*D.* You told me, the other day, that at church I must attend to our minister when he is preaching, and try to remember what he says; must I remember when he prays too?

*M.* When the minister prays, my child, you must pray also, and address your prayers to God in the words you there hear used; and though you do not speak them loud, you can pray silently, and thus take a personal and religious part in the services at church.

*D.* But, mother, I see a great many people looking about during the time of prayers at church.

*M.* You are taught your duty and must not do wrong because you see others, older and more capable than yourself, neglect to perform theirs. I am sorry any are so thoughtless as to neglect prayer, that pure and elevating service, which, while it chastens and subdues earthly passions, prepares us to receive benefit and instruction from the duties of the house of worship ; that place which is solemnly consecrated to holiness and heaven.

We should pray when alone in our closets, we should humbly and devoutly unite in the morning and evening family supplications, and with reverence and holy fear bow ourselves in the house of God.

Prayer enables us better to fulfil every duty of life ; by it our virtue is strengthened, our piety rendered more fervent, our affections purified, and our passions subdued. Our Saviour left us his example ; let us not sinfully disregard it.

*D.* What is the most religious part of the services at church ?

*M.* The prayers, certainly, for they are addressed to God, our Father in Heaven ; his praises are sung in psalms and hymns. Our minister, by preaching, teaches us how to perform our duties, enforces the precepts contained in the Bible, and explains those passages which are obscure, and difficult to



be understood ; he seeks to excite us to the faithful performance of our duties, and labours to make us wiser and better, and induce us to lead more virtuous and religious lives. We should love and respect our minister, remembering that he spends many long and weary hours in study, that he may enlighten and improve us. And now, my little girl, go to your chamber ; pray there to your heavenly Father that he will bless you and guide you through life, in death be your supporter and comforter, and receive you to that happy home which he has promised to all who in this world lead pious and useful lives. Good night, my child. You have ever the fervent prayers of your affectionate and happy mother.

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### PRACTICAL QUESTIONS.

- What is religion ?
- Did the ancients multiply objects of worship ?
- When did the Romans embrace christianity ?
- What does true religion teach ?
- To whom are you indebted for all you enjoy ?
- What is your duty at church ?
- Why are prayers the most sacred and religious part of our services at church ?

FINIS.









