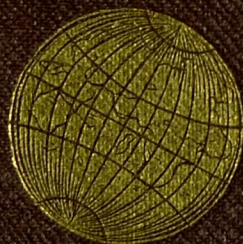
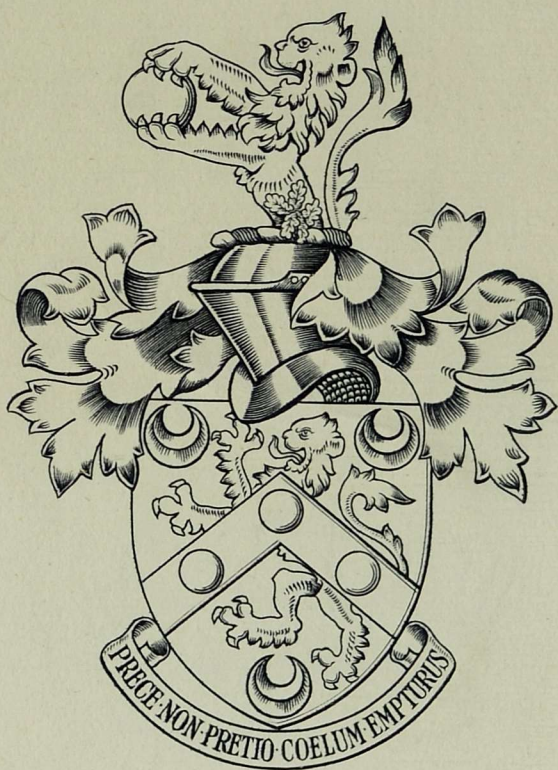


THE EARTH IS THE LORD'S



AND ALL THAT THEREIN IS.



CHAPMAN-PURCHAS

(R) By S.W. Newcombe

SAME FRONT.

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"I cordially concur with you in the prayer, that, by God's blessing, this undertaking may conduce to the common interests of the human race, by encouraging the arts of peace and industry, and strengthening the bonds of union among the nations of the earth."

—See Page 22.

J. H. Long. *April 1852.*

FIRESIDE FACTS

FROM

The Great Exhibition.

BY

THE EDITOR OF "PLEASANT PAGES."



S. W. Newcombe

The earth is the Lord's, and all that therein is.

BEING AN AMUSING SERIES OF

OBJECT LESSONS

ON THE

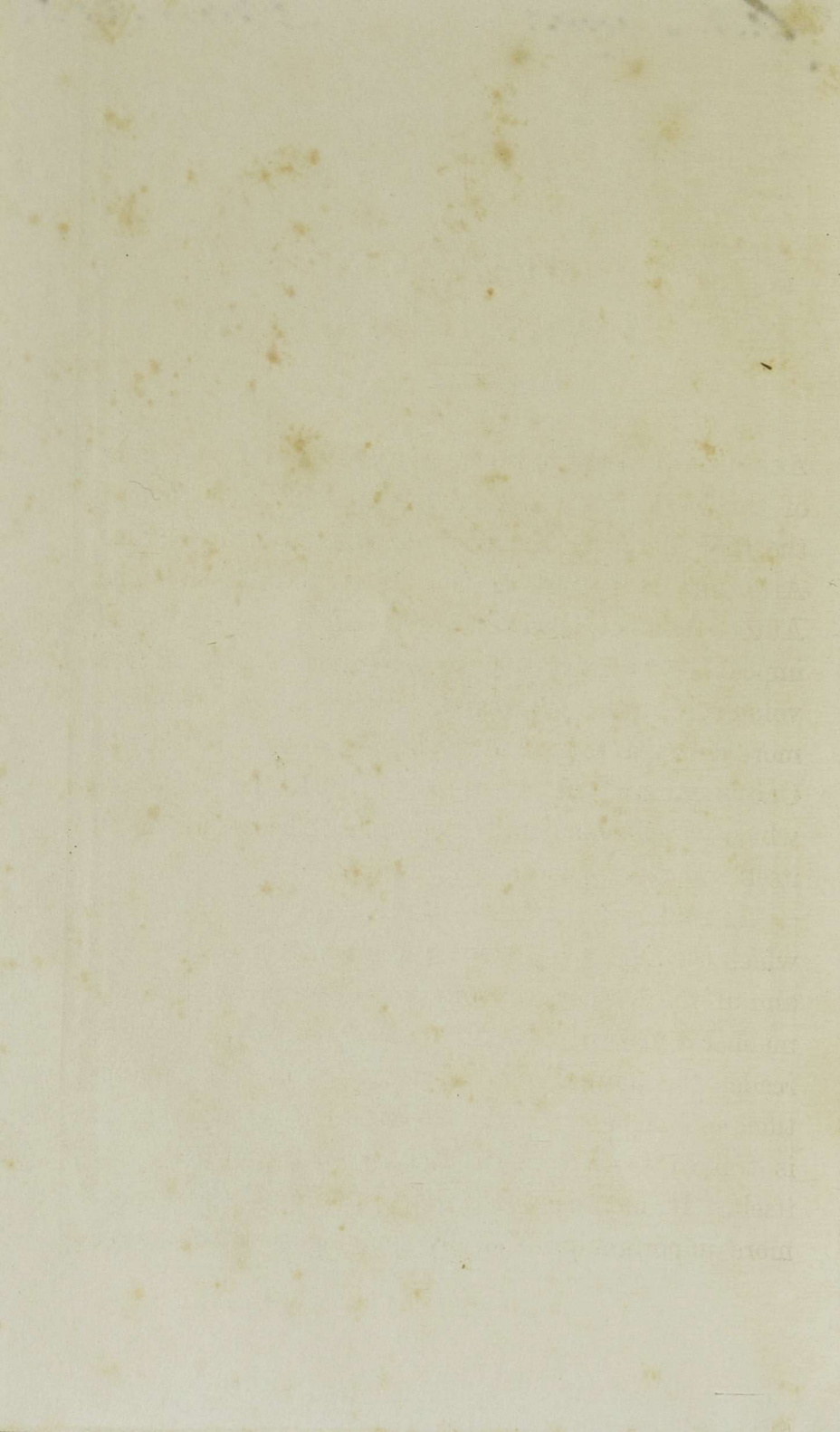
FOOD AND CLOTHING OF ALL NATIONS
IN THE YEAR 1851.

LONDON:

HOULSTON & STONEMAN, 65, PATERNOSTER ROW.

AND ALL BOOKSELLERS.

Price, 3s 6d.



PREFACE.

ACCORDING to the prospectus issued at the beginning of this work, it was designed to contain the history of the Raw Material; Machinery and Manufactures; Fine Arts, and Sculpture, of the Great Exhibition. The Author does not, however, regret that it has been found impossible to carry out so extensive a plan in one volume. In the progress of the work, he deemed it more desirable to give to the subject of THE FOOD AND CLOTHING OF ALL NATIONS IN 1851, the full space which its valuable details required. The subject is in itself sufficient to form a highly interesting volume.

In conformity with the principles of education on which the Object Lessons are written, it has been the aim of the Author, not only to convey in an amusing manner a mass of information, but to cultivate in the reader the powers of observation, comparison, induction, and memory, by the exercise of which the mind is trained to investigate and acquire knowledge for itself. It has also been attempted to observe a far more important principle by applying such knowledge

to the cultivation of faith in the providence of God; and for illustrating the motto of the title-page, "THE EARTH IS THE LORD'S, AND ALL THAT THEREIN IS." A history of the Great Exhibition has been added; and illustrations of some of the "lions," which will long be remembered by its numerous visitors.

The facts relating to the great event of 1851, and the facts in Natural History relating to the familiar objects around us, are eminently "Fireside Facts." They have been arranged in one volume, in order to render it a book of *permanent interest*, not only as a record of the Exhibition, but as a book of reference for useful knowledge.

The introductory history of the Exhibition is the same as that in "Little Henry's Holiday," as the Author did not deem it necessary to rewrite the same particulars in a different style for this volume.

The Priory House, Clapton,
December, 1851.

S. W. Newcomb

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THE MASS OF CRYSTALIZED ALUM.



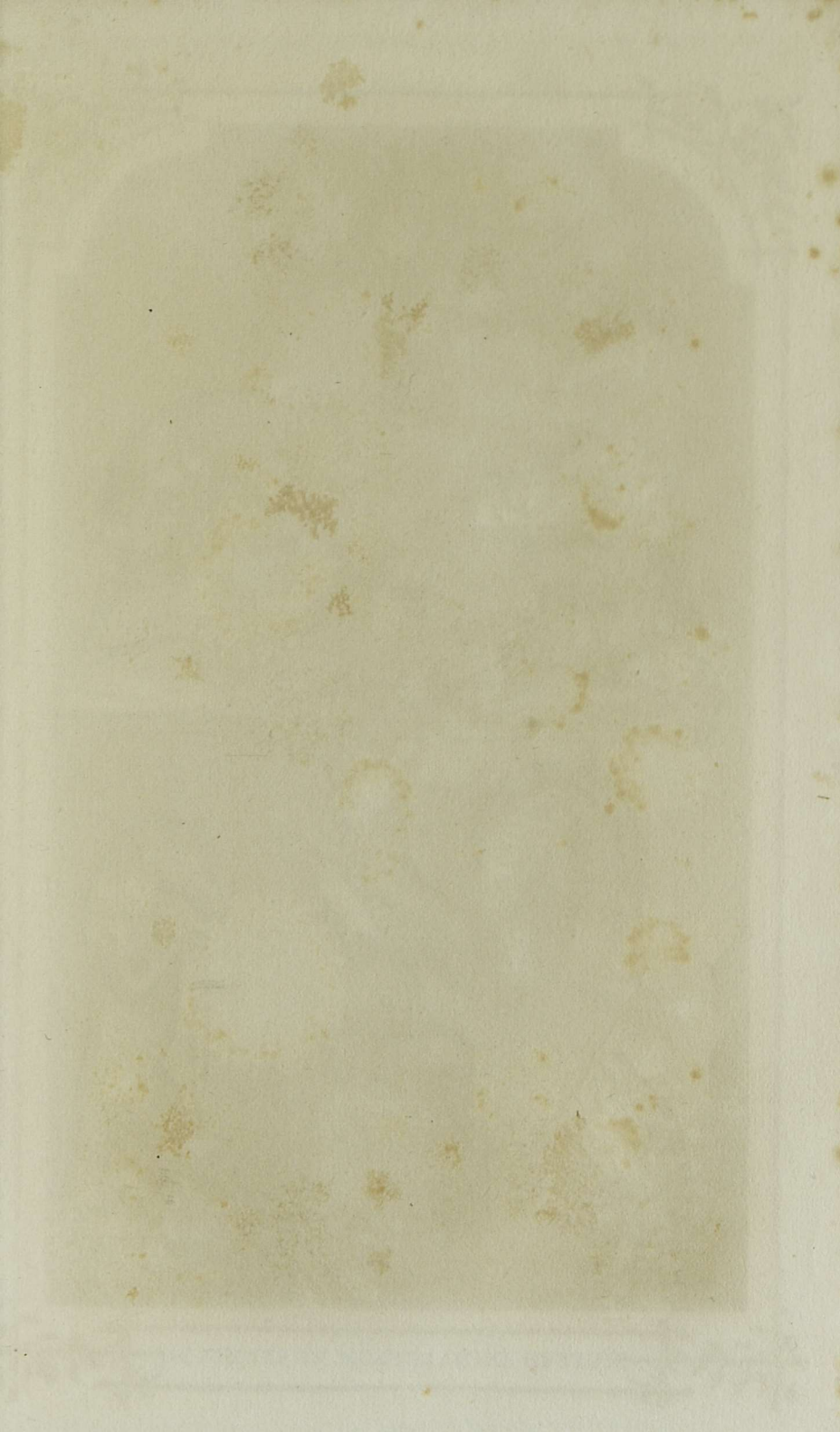
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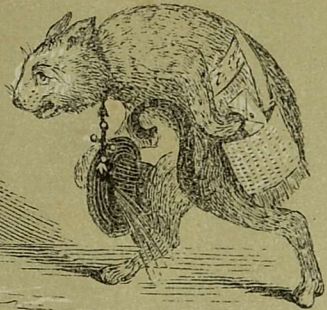
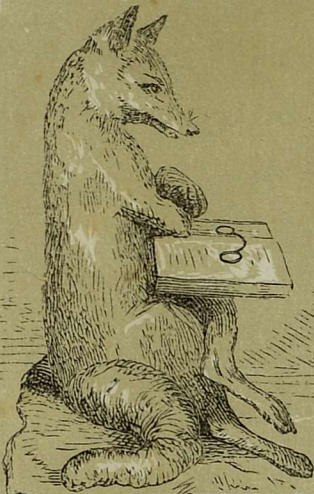
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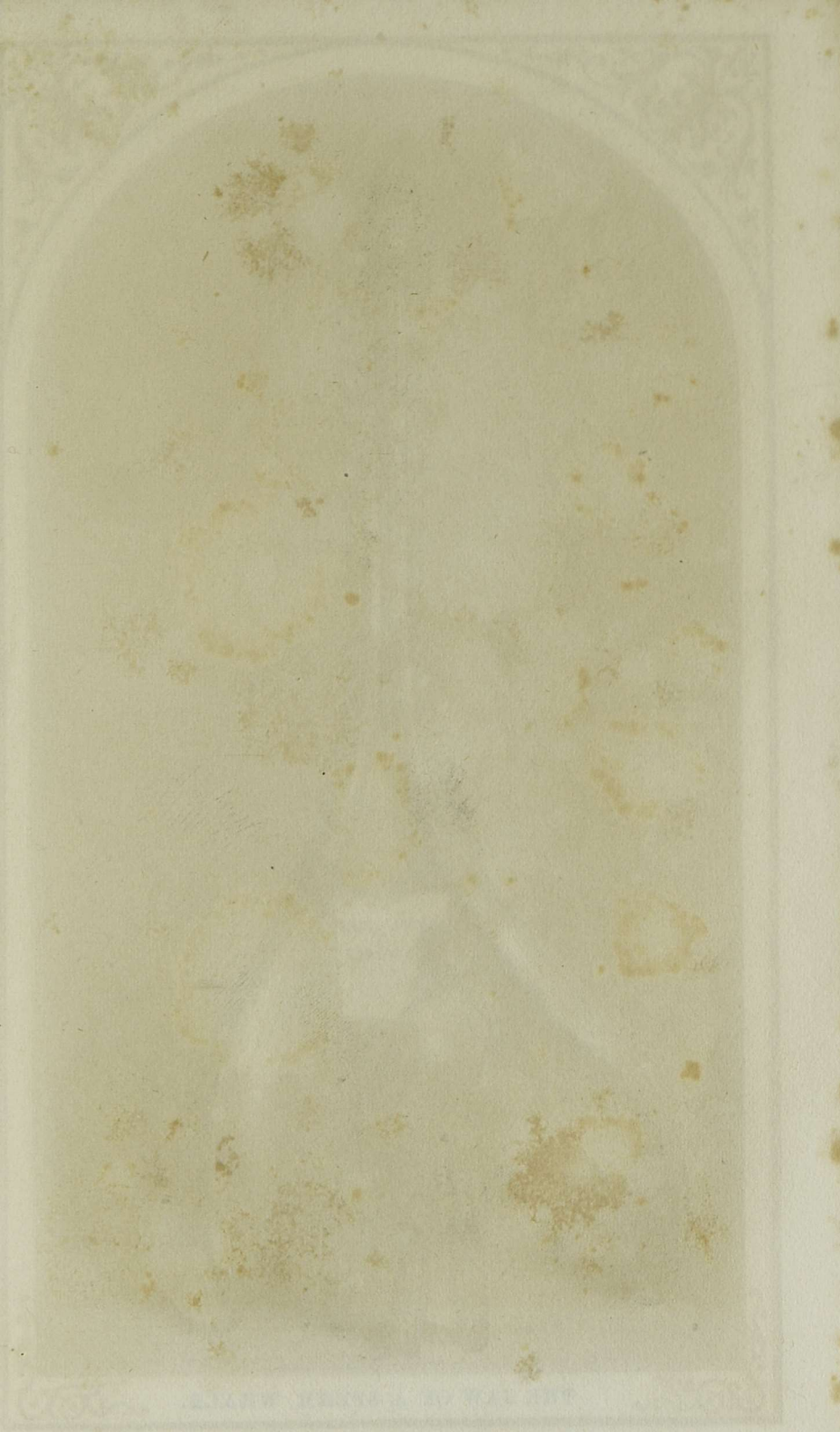


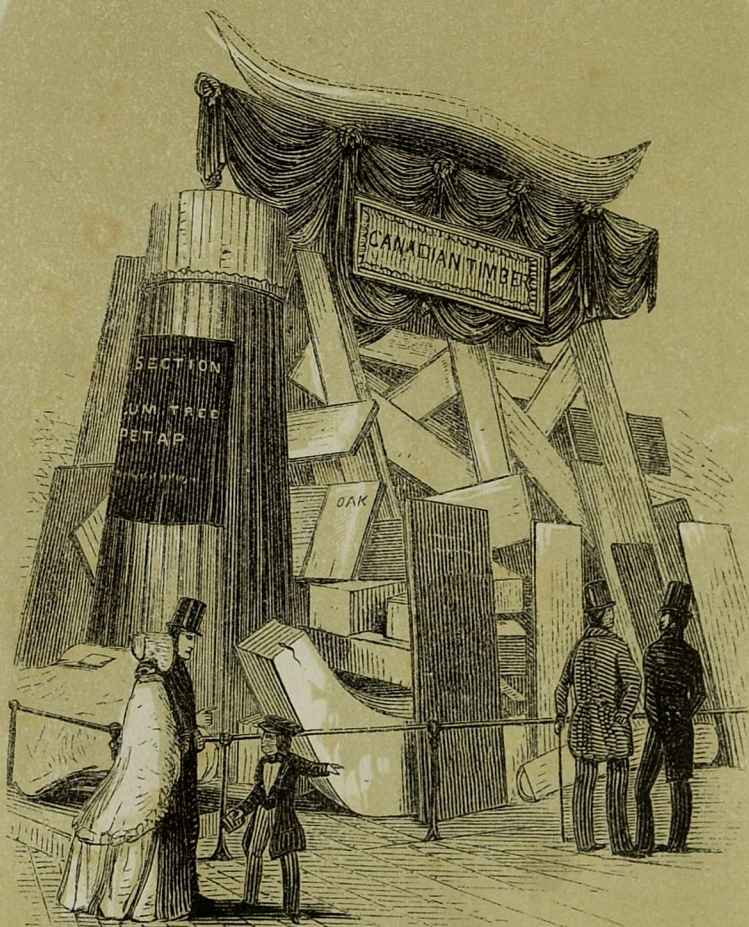
COLEBROOK-DALE IRON DOME.





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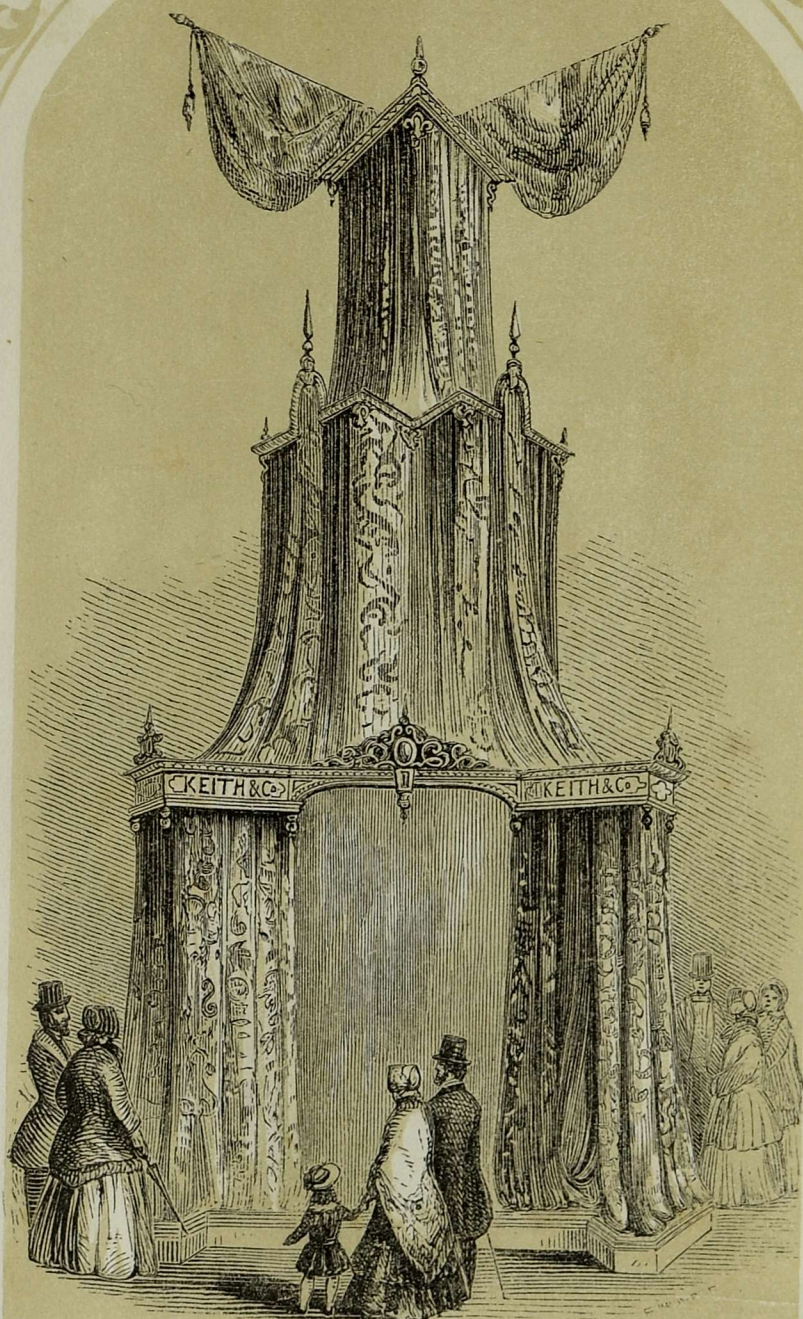
CANADIAN TIMBER TROPHY.





FRENCH ARTIFICIAL FLOWERS.





THE SILK TROPHY.



THE AMAZON.



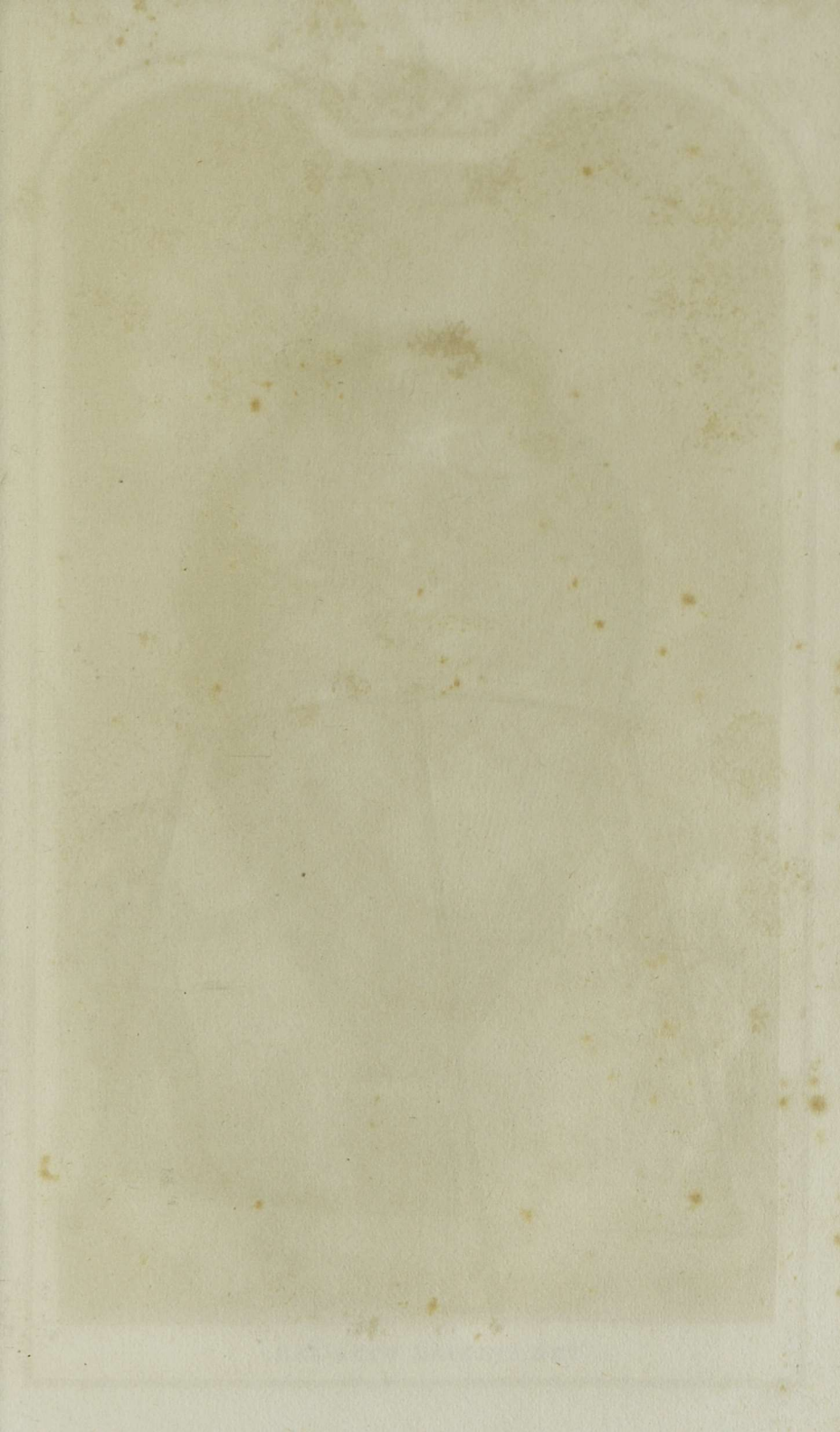


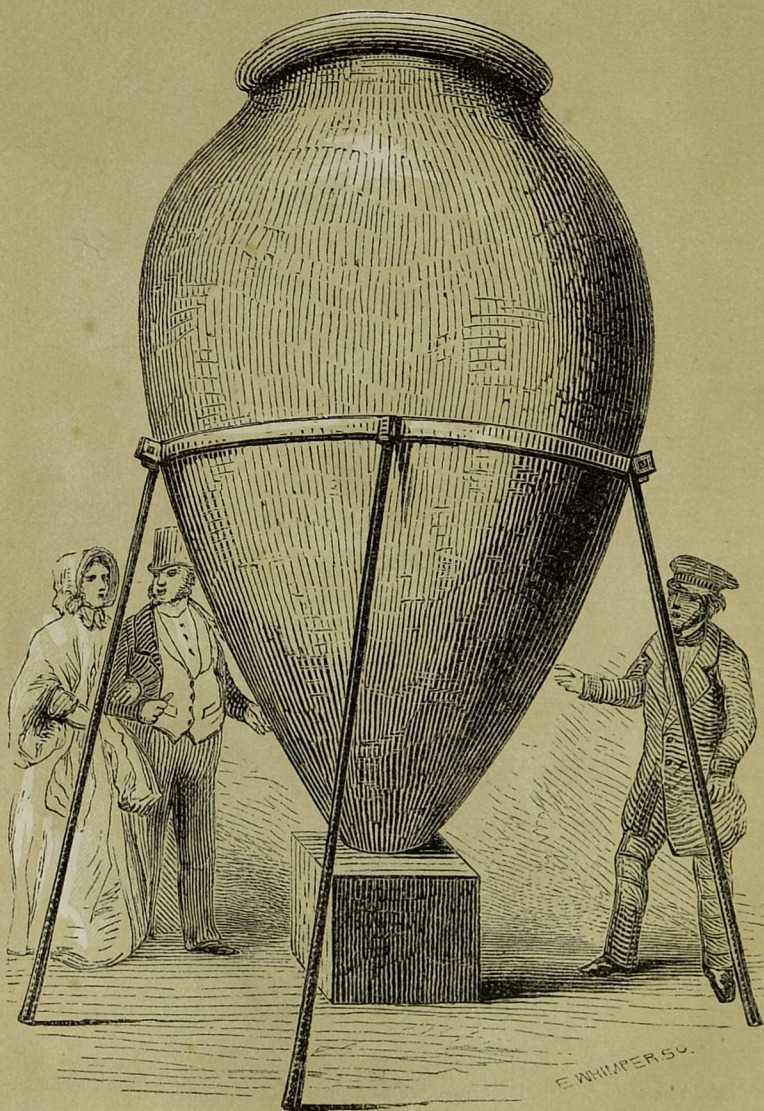
ST. MICHAEL AND THE DRAGON.



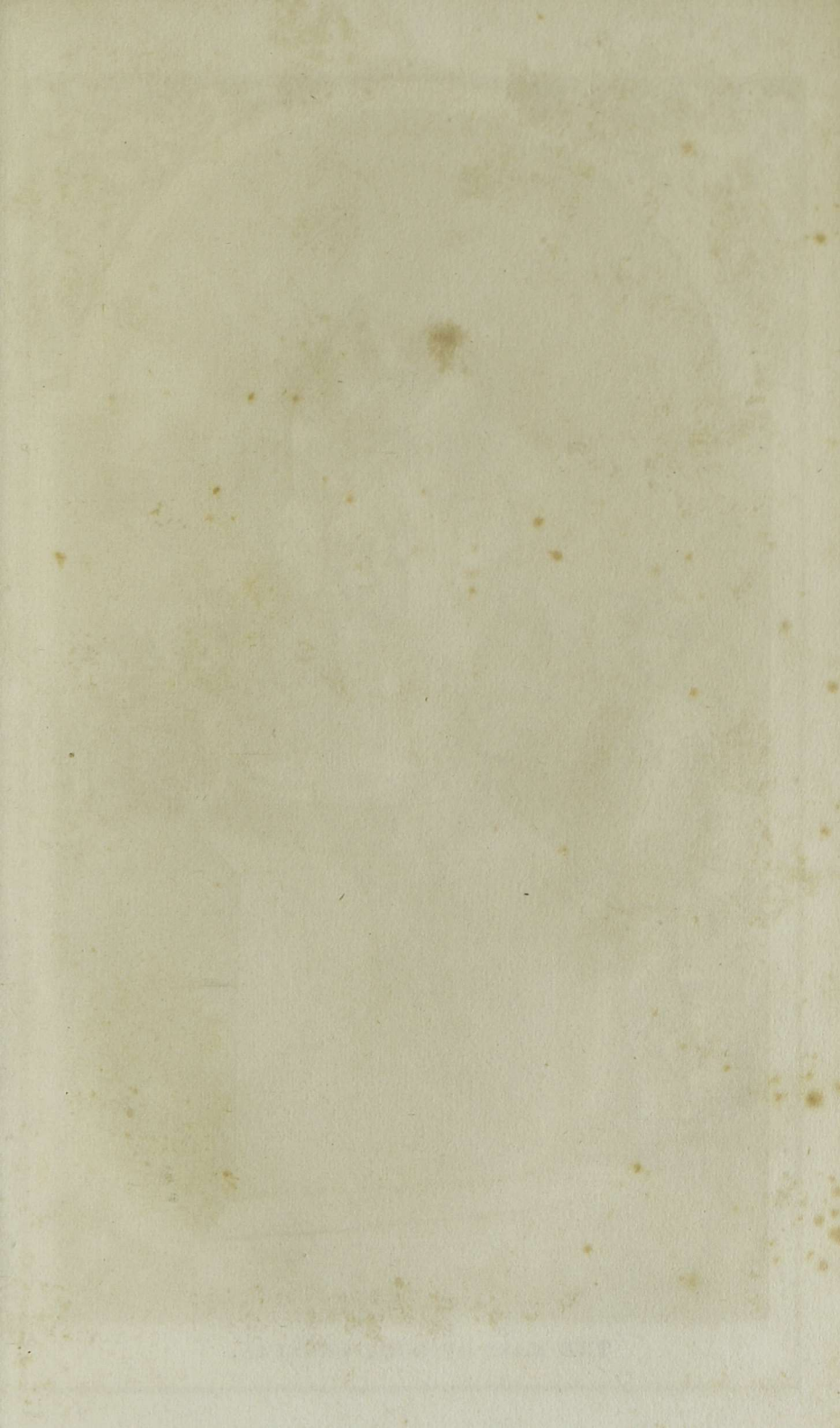


GODFREY DE BOUILLON.





THE SPANISH WINE JAR.



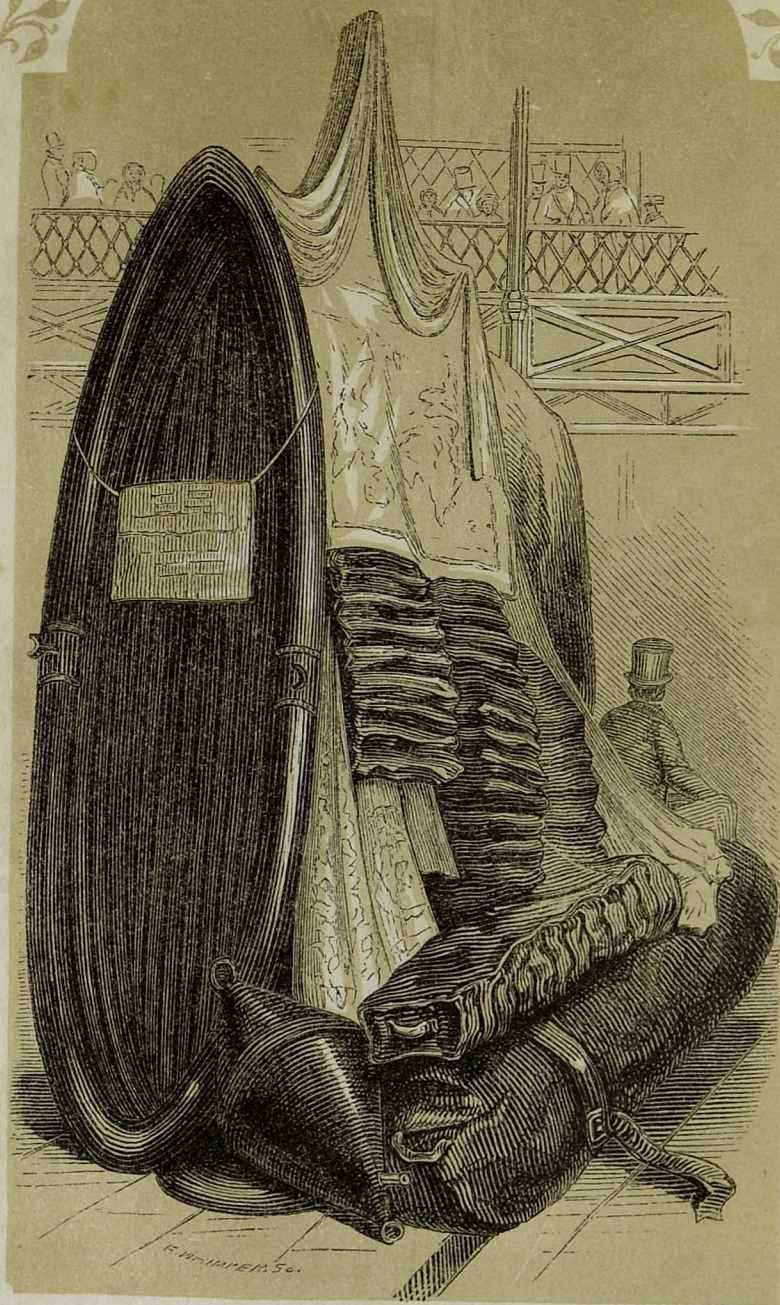


E. WHIMPER, SC.

THE MASS OF ROCK CRYSTAL.



THE KOH-I-NOOR.



THE INDIAN RUBBER TROPHY.



THE CORN TROPHY.
RUSSIAN DEPARTMENT,

OBJECT LESSONS

FROM THE

Exhibition of the Industry of all Nations.

INTRODUCTION.

W. Now, papa, we are ready for the "Object Lessons on the Exhibition." Are you going to begin?

P. No,—I am not, for several reasons. In the first place, I am very tired. I have been to that Exhibition ten times, and—don't you *see* how tired I am? You will understand me better when you have been there, and know what an enormous place it is.

Besides, we must not begin such a course without a proper introduction.

L. No; we should like to have the history of the Exhibition—to know how it began, and many more things.

P. Then, as I have been writing a book on the Exhibition, we will read the first chapter, which is suitable as an introduction to our course. The book contains a full account of a visit which little Henry and his sister Rose paid to the Exhibition.

Now listen to my story of the Exhibition. The tale will be divided into several chapters.

CHAPTER FIRST—HOW THE IDEA AROSE.

Henry. What does that mean?

Rose. Why, I can understand that.

H. It means—that the idea—*got up!*

P. Yes, that is the meaning. Let us see how the idea of the Exhibition got up, or grew. An idea sometimes grows like a flower; it lies hid in some dark corner of the mind just as the flower lies under the earth until it is strong and breaks through to the light. Then it grows until it is very large, and in the course of the year, you see a great sunflower. So the idea of the Exhibition came to the light—before the public.

H. And grew in the Newspapers.

P. And then in Hyde Park, until it brought forth—

Rose. Ah! a great *Crystal Palace*.

P. Or, rather, *the Exhibition* in the Palace: but some ideas grow more quickly—they spring up instantly, like the mushrooms. We shall see soon.

The idea of the Great Exhibition has been growing ever since the year 1756.

H. (*whispering*.) Then it has been growing like an oak, Rose.

In the year 1756, a "Society" in London, called THE SOCIETY OF ARTS, thought of something. The men of that Society had

once been to school, perhaps, and they remembered that their master had said to the boys, "I want to teach you to write and draw much better. So, if each boy will try and make a better drawing than he has ever made before, the drawings shall all be shown to me, and he who has made the best shall have a prize?" The boys at school would therefore strive more to make good drawings; and, when they were all shown to the master that he might give the prize, they formed quite an Exhibition—this was the first Exhibition! Do you know what we call the act of striving with one another?

H. Yes, I have heard the word; it is called "competition." The boys were having a competition.

Rose. And it was a good thing even for those who did not get prizes, because they learned to make better drawings.

P. True. And that was the secret of the sly old master,—he wanted to improve the boys—to do them good. Now, the LONDON SOCIETY OF ARTS thought, that after boys had left school, and had become men, and had learned to make other things besides drawings, they might improve more quickly by competition and by "Exhibition." Therefore, in the year 1756, they said that they would give prizes to those who could make the best carpets, or those who could make the best porcelain, or tapestry; and some people did get prizes. Soon after, a Royal Academy was also formed for exhibiting pictures.

In the course of time, the people found that it was a good thing to make Exhibitions. So, in the year 1798 the French made one; and have continued to make Exhibitions every now and then, from that time until this, while there have been similar Exhibitions in other countries—in Belgium, and even in Spain. The English people have also had small Exhibitions in the different large towns. In 1849, the year before last, a much larger Exhibition than any of the others was held at Birmingham.

H. Then I suppose that that made Prince Albert think of having one in London.

P. It was not that exactly. I told you that there is in England a Society called the *Society of Arts*, and his Royal Highness the Prince Albert is the President. This Society began a series of Exhibitions of Manufactures, and the first was held in the year 1847. Everybody liked that Exhibition. So in the year 1848 the Society had another. This was liked even better than the first; so in the year 1849 they held an Exhibition which was the best of all. The manufactures were principally ornaments in gold and silver, and other metals; and some of them were graciously sent by the QUEEN herself!

And now THE IDEA, which had been growing for some time, arose. The Prince and other members of the Society began to see that if it was a good thing for the manufacturers in England to make a competition

with one another, it would be a good thing for the manufacturers of *all the world* to do so!

Rose. But what a number of prizes they would have to give, papa! Perhaps they didn't think of that.

P. Yes, they did. The Society knew that there must be a great number of manufacturers if they came from all parts of the world, and that a great many of them would deserve prizes. But it was worth while to pay a very great sum of money to do good to the manufactures of all the world! So the Society determined to give away prizes worth **TWENTY THOUSAND POUNDS.** And, when they thought of all the manufacturers who would try to get prizes, and of the wonderful things they would send, they began to see that such things would make a truly **GREAT EXHIBITION.** *Thus the idea arose—gradually.*

H. Well, I think that they were going to give away a great deal of money. But were the Society really going to give all that money of themselves? Where did they get it from? Please tell me.

P. That question brings me to another chapter. They were going to give £20,000, but they had not £20,000 to give. So, you shall hear, secondly, *How the money was raised.*

CHAPTER SECOND—HOW THE MONEY WAS RAISED.

"WE are to give away £20,000," thought the Society, "but we have not got it;" and although they had the Sovereign

Prince at their head, they found great difficulties.

Rose. Why couldn't they ask the Queen? If I had been Prince Albert that is what I should have done.

P. Ah, you do not know anything about it. The Queen has not so much money to spare as you think; the proper parties to ask were the *government*,—that is, the gentlemen who govern the nation. But then, the money which the government has belongs to the people, and the government would have no right to spend it in any way they pleased.

H. Then, how *did* they get the money, papa? I do want to know very much.

P. You shall know if you have patience, for it is a rather long story. They asked the government that some gentlemen from the Society and others might be formed into "A Royal Commission." They would then have the *Authority of the Queen* to promise the manufacturers prizes worth £20,000, which they would collect by Public Subscription.

Rose. I know what that is. I have seen "Lists of Subscribers" in the *Times*. The people *give away* their money.

P. But, the Society could not obtain their request. No one would advise the Queen to form a "Royal Commission,"—it was said that the money ought to be collected *first*.

H. Of course.

P. And then there might easily be a Royal Commission to give it away. They were now much puzzled. Every one saw

that the answer from the government was a just one. "We must not," they thought, "have a 'Royal Commission' to give away money that is up in the clouds! and, it would not be right to have a Royal Commission merely to collect subscriptions. And, unless we have a Royal Commission no one will give us any subscription. Yet we shall want £20,000 for prizes, and £30,000 or £40,000 for the building, and a great many more thousands for the great expenses in letting the world know all about it. What shall we do?"

H. That is just what I want to know. When are you going to tell us, papa?

P. Now, England is a very rich country. It is full of rich merchants, and manufacturers, and builders. I'll tell you of several soon. Two very rich builders, whose names were Munday, heard what the PRINCE and the Society wanted to do,—and, they thought, "We'll *help* them!" So, they found a gentleman of the Society named Fuller, and they said to him, "We think that your plan of making an Exhibition from all nations is a very good one; and, if you can carry it out, thousands of people will pay to come and see it, so you will be *sure* to succeed and get plenty of money. And this is what we will do. *We will lend you* £20,000, and besides that, we will spend £50,000 to make a fine building for you, and lend you a great many more thousands for the expenses—altogether about one hundred thousand pounds!

H. Well done, Mister Munday! They were—

P. They were noble men, certainly; but listen! Then Mr. Fuller made haste at once to take the good news to the Prince. He hastened to his Highness's country seat at Balmoral, in Scotland, and on the 3rd September, 1850, at the very moment when the Prince was going out to hunt the stag, His Highness was informed of this noble offer.

H. Well, that shows how the money was raised.

P. Not quite. It would not have been right for the Society to have let Messrs. Munday spend all this money for them, before they knew whether they would be able to pay it back—besides, they found that they would want nearly *Two* hundred thousand pounds. The "Royal Commission" was now granted, and the Prince and gentlemen who formed THE ROYAL COMMISSION FOR THE PROMOTION OF THE INDUSTRY OF ALL NATIONS, began to collect subscriptions.

Rose. There, Henry! Then *that* is how the money was raised.

P. No, indeed it is not. The people would not subscribe properly. "The appeal to the public was almost a failure." Fine speeches about this Exhibition were made in London and other parts of the country; but the people had never heard of such a thing before, and some, who wanted to show how wise they were, laughed at the thought, and the money "dribbled in slowly." Thus the Prince,

nobles, and gentlemen of the Royal Commission, who were going to collect the money, began to think, "We shall not be able to do it," when another gentleman, Mr. Samuel Peto, came to their help. He said, "I will be *security* for £50,000;" the Prince said he would be security for more money; and other wealthy men followed, until security was raised for TWO HUNDRED THOUSAND POUNDS. And thus *the money was raised*—laboriously.

H. Thank you, papa. What is next?

P. You have heard, 1st, How the idea of the Exhibition arose; and 2ndly, How the means arose. You shall hear, 3rdly, How the idea of the *Palace* arose.*

CHAPTER THIRD—HOW THE IDEA OF THE PALACE AROSE.

When any one struggles through difficulties it does him good! He feels himself strong, and greater; and has greater ideas. So the ideas of the "Royal Commission" began to enlarge. There came grand thoughts of teaching other things to men by means of the Great Exhibition; and there also came the thought, "We will have a splendid house for our friends, when they come

over to see us." So, architects were wanted now,—men to draw plans of the building; and the architects came. 245 Plans were made: 188 were made in Britain; 27 came from France, and a few came from Belgium, Holland, and other parts; and with them there came new difficulties for the Royal Commission.

The plans were all examined, and none of them suited. So the Commissioners sent for other architects and engineers, to make a new plan for the purpose. But when the people saw the idea of a great brick and mortar building which was to cost £200,000, they asked, "Where are you going to put it?" They were told that it was to be placed in Hyde Park, but thousands of people said, "No!" And the newspapers made a noise; and angry men made speeches; and many said 'twas a shame their park should be spoiled by a large brick and mortar building. And the Commissioners—

H. I should think they were puzzled.

P. Perhaps they were; but somebody was always sent to help them. Mr. PAXTON came this time.

Rose. What was the gentleman's name, Henry?

H. Mr. PAXTON. Let us hear about him.

P. Mr. Paxton thought about the building. This gentleman is a landscape gardener, and he is very clever in writing books,—and in making houses, it seems. He made a beautiful garden for the Duke of Devon-

* It may be as well to acknowledge, that the materials for parts of this account are taken from the ILLUSTRATED LONDON NEWS, and the OFFICIAL ILLUSTRATED CATALOGUE. The Editor has, in fact, made free with every source of information that he could obtain.

shire; and, as the Duke had a new and enormous water-lily, Mr. Paxton made an immense conservatory of iron and glass for it to grow in. And, when he heard that the building of the Exhibition did not please the public, he thought to himself, perhaps, "Why shouldn't a glass house be as good for an Exhibition as for a house of plants? If I were to make them one, like that of the Duke of Devonshire, I'm sure they would like it. They could have a house higher than the trees, and the large trees could grow inside it." So, on the 18th January, 1850, when Mr. Paxton was engaged on a Railway Committee, he hastily sketched his idea of the building on a sheet of blotting-paper, which happened to be near him. He then went home, and from his sketch he formed a finished drawing, working all that night, and working on still at all the plans and particulars for ten days, when he set out for London by train to see the Commissioners. He thought that his plan had been made too late to be of any use, but he happened to meet in the railway-carriage a gentleman named Stephenson, an engineer, who was one of the "Royal Commissioners."

This gentleman looked at the drawings very closely, and at last he said, "Wonderful!" but he thought it was a pity they had not been prepared before. However, he said he would show them to the Commissioners.

You know, I daresay, whether

the Commissioners used Mr. Paxton's plans or not. At first it was said they were too late, and then, that it was not usual to build with iron and glass. Some of the architects who had made the plans for the Commissioners said it was impossible for such a building to answer,—that it would be blown down by the wind,—that hail-stones would break the glass,—that the glass would get loose, and fall in, and the people of "all nations" would be bruised or killed. Others said it would be too hot inside, and the unhappy visitors would be grilled. The public, however, soon heard of it, and began to speak for themselves. They saw the plans, and read about them in the *Illustrated London News*. They read, and talked, and were pleased. The mighty "million" shouted out their opinions again: "It will be a famous place! a transparent palace like crystal. Let us have A CRYSTAL PALACE!"

The Royal Commissioners said so too. They said, "We can put it up in Hyde Park, and, what is more, we can take it down again,—and that will be a very good thing." Then it was all agreed to. Thus, *the idea of the Crystal Palace arose—suddenly.*

H. Well done, Mr. Paxton, this time!

P. True, Henry, the idea was "well done." But let us go on; we have nothing raised yet but ideas. We have harder work before us now, for we have to speak of the raising of the *Palace.*

CHAPTER FOURTH—HOW THE
CRYSTAL PALACE AROSE.

How did it arise? I wish I were a poet, Henry, that I might make some fine comparison to show you how it was done.

It rose swiftly and silently, almost like some fairy scene; and yet, with *labour*, as all the rest had been done. "Industry" has made many a fairy scene, and her secret is,—Work! work! work!

L. And the building rose *suddenly*, papa.

P. Yes, with strange suddenness. As the dry bones that were shaken by the wind came together, "bone to his bone," so came the columns of this Crystal Palace! They came from afar: an exceeding great army of iron and wooden bones. By waggon loads they came,—girders and trusses, columns and ribs, of iron and wood. Then, they fitted one to another, forming a framework fairy-like and fine for the transparent glass. No unsightly heaps of brick! no smoking heaps of lime! no click of noisy trowel! no great unsightly scaffolding! All the parts were ready prepared; and, though they came from distant places, they quickly joined together, like brethren who knew each other. Then, ranging in square companies, and in long rows, they helped and supported one another until they were tall and strong. Thus were they able to bear up their curved-shaped friends, the giant

ribs, who gratefully formed a roof over their heads, and covered them in from the rain.

H. Well done, Mr. ———! But who did it?

P. Well done, Messrs. Fox and HENDERSON, you may say now.

Rose. Then tell us, please, papa, who were Messrs. Fox and Henderson. I want to hear some more "particulars." Will you describe to us, a little bit?

P. Very well, I am not at all tired: but before telling you how the building was made, you shall hear what there was to make.

Messrs. Fox and Henderson are two of the great builders (or contractors) who, as I told you, abound in our wealthy country; you shall now see what gigantic undertakings two Englishmen can carry on. At the time when Messrs. Fox and Henderson began the great palace, they had other extensive works in hand, in all parts of the British Empire. These I will mention directly. Let us first speak of their work in Hyde Park.

DESCRIPTION OF THE PALACE.

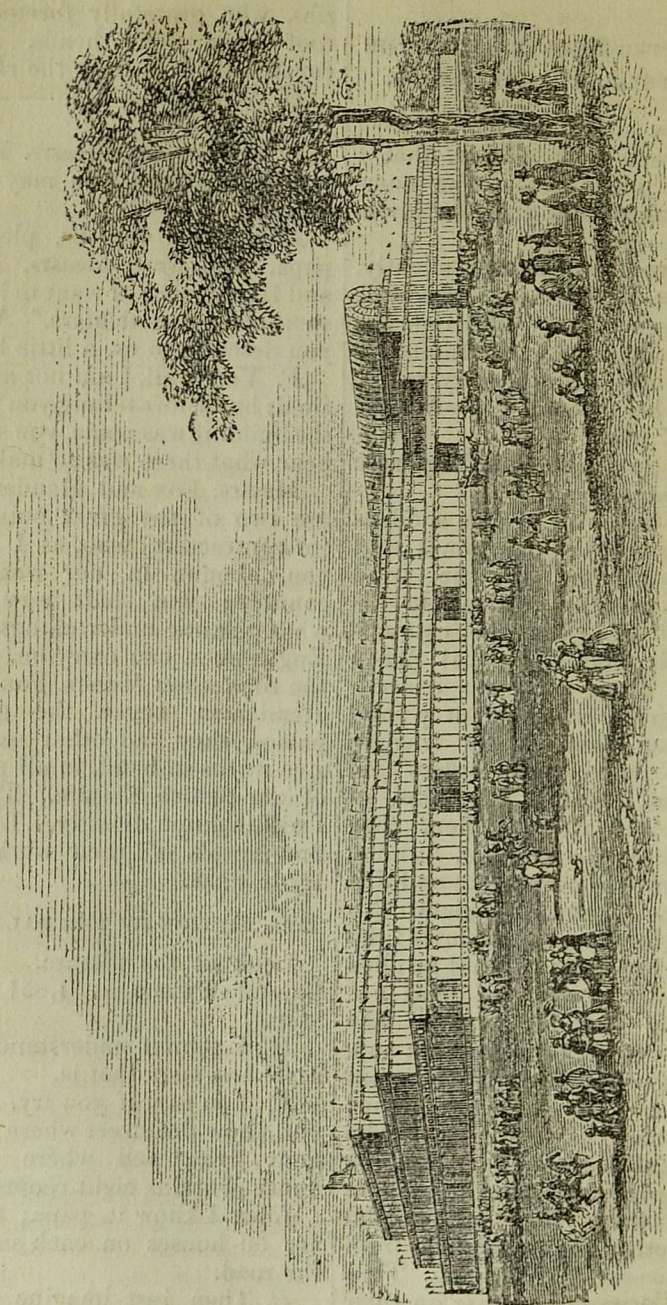
Look at the picture. This Crystal Palace is 1,851 feet long.

H. I cannot understand exactly *how much* that is.

P. You can, if you try. Do you know the street where your aunt lives, and where each house contains eight rooms?

Rose. I know it, papa; there are 50 houses on each side of the road.

P. Then just imagine that, instead of 50, there were 116



THE SOUTH-WEST VIEW OF THE EXTERIOR.

houses—then you get an idea of the length of the Crystal Palace. It is as long as 116 eight-roomed houses placed in a row!

H. Then how broad is it?

P. About as broad as a street of 28 such houses,—that is, 456 feet; and in the arched part, called “the transept,” which crosses the building, it is 68 feet high. There! put it away in your memory, Rose. “*The Crystal Palace is 1,851 feet long, 564 feet broad, and 68 feet high.*”

H. But how high is it in the large part, papa?

P. In the “long part,” which is called “the nave,” its height is 65 feet. The whole building covers almost *eighteen acres* of ground—a space about six times as large as that of St. Paul’s. You know what a square foot is?

H. Yes. A square piece of board, which measured a foot on each side, would be the size of a square foot. I will cut out a piece of the proper size when we are at home.

P. And if you wished to cut out enough pieces to cover the whole space of the Exhibition, you would have to make NINE HUNDRED AND EIGHTY-NINE THOUSAND, EIGHT HUNDRED AND EIGHTY-FOUR of them, for that is the number of square feet in the Exhibition. The floors of the galleries measure 217,100 square feet, and the ground floor measures 777,284 square feet. Let us add them together :—

Galleries . 217,100 squareft.
Ground Floor 777,284 „

That would be 994,384 square feet altogether.

Would you like to know what *space* is contained in the building?

Rose. Yes, please, papa.

P. Then suppose that you made a solid block thus; and

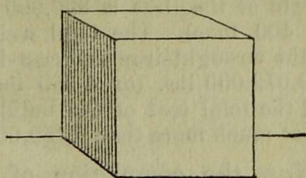


Fig. 1.

that each of the six sides was a perfect square foot, such a block is called a *cubic foot*.

Rose. And, how many cubic feet could we put in the space of the Exhibition?—a thousand?

P. More.

H. Not a *hundred* thousand?

P. Yes; three hundred and thirty times as much. The space of the Exhibition is no less than three hundred and thirty hundred thousand cubic feet, or 33,000,000, as we say. The surface of the *glass* measures 896,000 square feet. The quantity of the *wood* is 600,000 cubic feet, and the quantity of the *glass* is 896,000 lbs. The weight of all the *iron* is 9,072,000 lbs. and the cost of the building about £150,000. These, then, are the “totals.” You must write them down on a piece of paper.

H. I will, papa.

The CRYSTAL PALACE, which Messrs. Fox and Henderson built, is six times as large as St. Paul’s. Its length is 1,851 feet (the number of the year in which it is built), it is 456 feet broad, 64 feet high in

the nave, and 68 feet high in the transept. The total surface of the flooring measures 994,384 square feet; and the total space of the building is 333,000,000 cubic feet. The total surface of the glass measures 896,000 square feet. The total quantity of the wood is 600,000 cubic feet. The total weight of the glass is 896,000 lbs. (or 400 tons). The total weight of the wrought-iron and cast-iron is 9,072,000 lbs. (or 4,050 tons), and the total cost of the building is not much more than £150,000.

Now, the completion of all this work was undertaken by *two men*. They began at the end of July, 1850, and it was ready for receiving the goods to be exhibited by about the end of January, 1851. In how many months did they do it?

H. I have been counting,—in only six months, papa.

P. This, you will say, then, is a great undertaking for two men: but, as I told you, they had at the same time extensive works in all parts of the kingdom. They were making a whole railway in Ireland; an immense wrought-iron bridge over the river Shannon; another over the Medway, at Rochester; a truly immense station for passengers at the end of the Great Western Railway; a large station at Liverpool for another railway; a railway station at Bletchley; another at Oxford, of iron and glass, like the Palace itself; and several other large works which I cannot at present remember. Think of that, dear Henry. Think what two men *can* perform, and when you have plenty of work to do, never sit down and say, "I can't!"

H. Well, I won't again. But now, will you let us hear how it was all done?

P. Yes; let us leave the totals, and attend to the *parts*. We will imagine that we are sitting on the ground, in Hyde Park, and then we shall see the parts coming.

First came the men with theodolites. Surveyors, they were called, for they took a "survey" of the ground. Then came the *hoarding*.

Rose. What is that?

H. I will tell you; the great boards which they stick up, all round the place.

P. Here is a picture of the

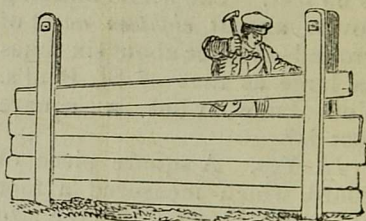


Fig. 2.

hoarding. It pleases me very much; for those who built this work of art wisely copied the Works of Nature, where nothing is *wasted*. The boards of the hoarding were all used afterwards for the floor of the building itself. You may see by the picture that it was not necessary to nail them together. The two upright posts were fixed in the ground and the boards were slipped in between them. The posts were then tied together at the top, so that the boards were held tight, and could not fall out.

Rose. But, I suppose that there was some waste. What

was the use of all those great posts afterwards?

P. They formed *joists*,—the thick pieces of wood which are laid on the earth to nail the floor upon.

H. To be sure. Don't you see, Rose, that they couldn't nail the boards to the ground? it would be too soft.

Rose. Ah!

P. When the hoarding had been fixed, and the ground was enclosed, the surveyors once more came with their theodolites, and measured the places for the iron-columns; and then came the columns themselves.

The columns were followed by all manner of parts—by “girders,” “trusses,” “braces,” “Paxton gutters,” “sash-bars,”

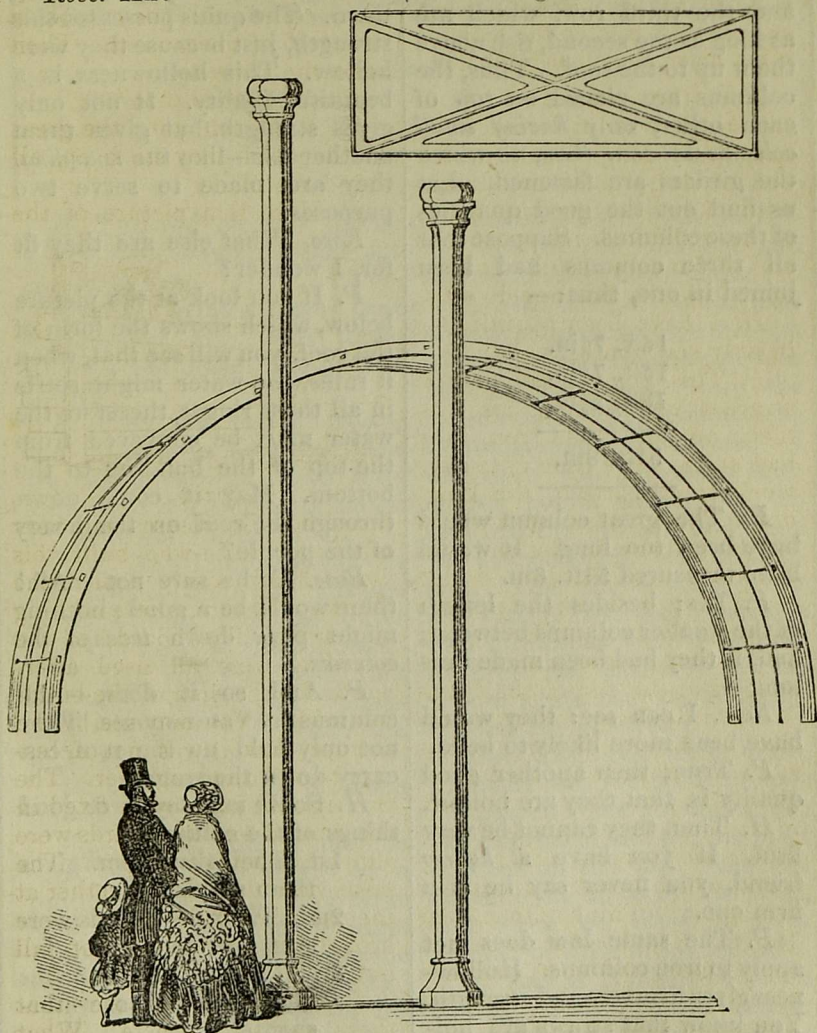


Fig. 3.

"ventilating bars," and a great many more things. I have drawn some of these *parts* for you.

Let us examine them.

The beautiful COLUMNS are interesting objects. There are three rows,—the columns from the floor to the gallery, which are 18 feet $5\frac{1}{2}$ inches high; the second row rise from the gallery, they are 16 feet $7\frac{1}{4}$ inches long; and the third row, which are as long as the second, rise above them up to the roof. Thus, the columns are placed on top of each other, only *having small columns between them*, to which the girders are fastened. Let us find out the good qualities of these columns. Suppose that all three columns had been joined in one, thus:—

16ft. $7\frac{1}{4}$ in.

16ft. $7\frac{1}{4}$ in.

18ft. $5\frac{1}{2}$ in.

51ft. 8in.

H. The great column would have been too long. It would have measured 51ft. 8in.

P. Yes; besides the length of the smaller columns between; and, if they had been made thus long—

Rose. I can see: they would have been more likely to bend.

P. True; then another good quality is, that they are hollow.

H. Then they cannot be very firm. If you have a *hollow* friend, you never say he is a firm one.

P. The same law does not apply to iron columns. Hollow-ness gives firmness and strength. You know that straws are hol-

low; so also are quills. Professor Cowper was talking in a lecture about the beauties of these columns, and wanted to show their strength,—so he cut two quills of equal length, and placed them upright. On these small quills he managed to place 100 lbs. weight, and then another 100 lbs., but they did not break until 224 lbs. were placed upon them. The quills possessed this strength, just because they were hollow. This hollowness is a beautiful quality. It not only gives strength, but gives them another use—like the *hoarding*, they are made to serve two purposes.

Rose. What else are they fit for, I wonder?

P. If you look at the picture below, which shows the form of the roof, you will see that, when it rains, the water might settle in all those ridges, therefore the water must be conveyed from the top of the building to the bottom. May it come down through the roof on the heads of the people?

Rose. To be sure not. Ah! there would be a good plan,—it might pour down *through the columns*.

P. And so it does,—the columns are water-spouts. They not only hold up the roof, but carry down the water.

H. So we may say three good things of the columns:

1st, Their short *length* gives them strength;

2nd, Their *hollowness* gives strength; and

3rd, Their *hollowness* makes them useful as water-spouts.

P. While you may add—
4th, Their *hollowness* also
gives lightness.

The columns are kept apart
by the cross-pieces called *girders*,
which are drawn on the same
page with the columns—but, let
us ascend at once to the im-

mense girders which extend
across from the columns on one
side of the nave to the columns
on the other side, a distance of
72 feet. These immense girders
are called *TRUSSES*, and as
you may observe, contain nine
girders.

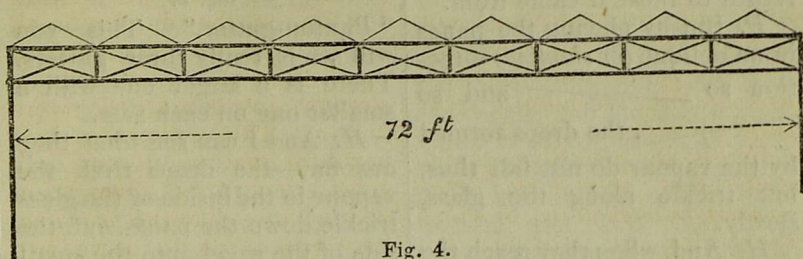


Fig. 4.

H. Yes, and on each girder
a little roof is raised—they are
like little hills.

Rose. Or Arab's tents; that
is the way you draw tents,
Henry—you make lines up and
down!

P. They are called *ridges*,
and the valleys between them
are called *furrows*; thus they
form what the architects called
a "ridge and furrow" roof.

Rose. And I suppose that in
the furrows there are gutters,
or something, that the water
may run away to the columns.

H. But you see, *Rose*, that
the water would run "long-
ways," it could not reach the
poles on each side.

P. Ah! How can it reach
the columns?

Rose. Well, that would be
very easy; there might be a
gutter on the top of each large
truss. The gutters in the ridges
would lead to the gutters in the
trusses. (See Fig. 6, page 14.)

H. Yes, the gutters on the
trusses are placed crossways,—

of course. Then, they lead to
the tops of the columns, and
the water flows down them.

P. That is right; at the base
of each column is a pipe through
which the water is conveyed, as
Mr. Dickens says, "into the
jurisdiction of their honours the
Commissioners of Sewers." I
will show you two more inter-
esting points concerning the
roof and the gutters, and then
we will conclude our descrip-
tion. You know that, when
any vapour rises and reaches a
cold surface, as there is no heat
to keep the particles of the
vapour apart, they unite again,
or *condense*, as we say.

Rose. Yes, and form *drops*.
I noticed that yesterday; mam-
ma poured some hot water into
the slop-basin and put the plate
of toast on the top; then the
steam arose up to the flat plate,
and when we lifted it up a
number of little drops fell off.

P. And so it might be in the
Crystal Palace; the vapour
which we call "breath," arises

from the crowds of people below—and if the glass roof were flat, thus ———, or like the bottom of the plate, then?

H. Then the vapour from the people's breath would form drops, and make a shower-bath on the people's faces. It would return to those it came from.

P. But by placing the panes in an oblique (or *slanting*) direction so ——— and so ———, the drops formed

by the vapour do not fall thus, but trickle along the glass, slowly.

H. And, when they reach the end of the glass, don't they fall off?

P. No: there is a gutter to receive them, a very ingenious affair, which was invented by Mr. Paxton, and is called the

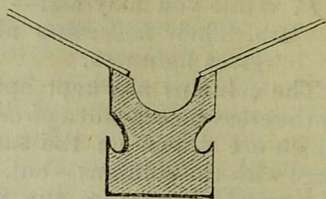


Fig. 5.

“Paxton-gutter.” This you will see is really three gutters. There is a larger one with a smaller one on each side.

H. And I can see what they are for,—the drops from the vapour in the inside of the glass trickle down the panes, and the side of the wood, into the small gutters, and the rain outside the glass pours into the large gutter.

P. Just so; and again, the gutter is a good firm solid rafter, and is therefore useful

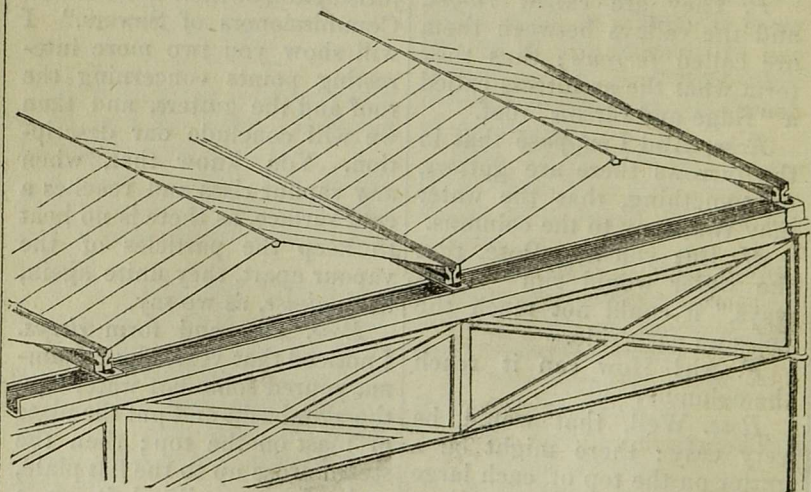


Fig. 6.

as part of the frame-work for the glass. Here is a piece of the outside of the roof,—you may see the ridge and furrow,

—the Paxton-gutters,—and the “crossway” gutters on the tops of the trusses.

H. Well, then, they are very

good gutters. They do three things:

- 1st, They support the glass;
- 2nd, They receive the rain outside the glass;
- 3rd, They receive the breath inside the glass.

Rose. They are almost as good as their relations the columns. One is a *column* and a *spout*,—the other is a *rafter* and a *gutter*.

P. And now if we jump down from the roof to the floor, we shall find that it also serves three purposes. When we reach the Exhibition, we shall find that the boards which were once a hoarding, are now used as a floor, a dust trap, and a ventilator. But we have had too long an account. Let us add up "the quantities," and proceed.

H. As you say them, papa, I will write them on the same piece of paper with the totals, if you will please speak slowly.

P. Very well, then write down—

Of the columns there are 3,300. There are 3,300 *girders* made of cast-iron, and 358 of the long *trusses* made of wrought-iron. The *Paxton-gutters* would measure altogether no less than 20 miles—the panes of glass are joined to thin slips of wood which are called "sash bars"—the total length of these is not less than TWO HUNDRED MILES!

There! what do you say to that?

H. Now, papa, please to tell us how it was all put together, if you are not tired.

P. Oh, I am not tired. When the hoarding was fixed, and the

foundations were prepared, the columns began to arrive.

It was some time before the different parts came, for they had all to be cast at places near Birmingham, which are a long way off. A month and twenty days had passed away; the 20th of September had arrived, and only 77 columns had been fixed out of 3,300. But, during all this time *everything had been made ready*, and hundreds after hundreds of columns had been cast. Everybody had learned his duties, and was prepared to proceed, and then came the columns in abundance. Ah, it was a truly busy scene! if you had only been outside that hoarding you would have liked to watch the waggons! Every day you would have cried out, "Here they come!" and, as they unloaded, you would have seen columns, girders, trusses, and other pieces in abundance.

From the immense and mighty furnaces of the casting works were brought, in one week, 316 girders; and also, every week, at least 200 columns. Each casting, as soon as it was delivered, was very carefully weighed and examined. It was made to bear very heavy weights, to see if it were of the proper strength; it was next painted, and was then carried off to its proper place to be fixed. All this was done with the greatest dexterity. "Each heavy article could be lifted from the waggon, weighed, placed in the 'proving machine,' lifted out again, and taken to its place, in less than four minutes."

The scene became more busy

every week. As more columns were brought in, more men were hired to work, and in the course of a month (by the end of October) hundreds of columns were rising, and nearly 1,500 men were at work.

H. But, papa, if the columns were three or four times as tall as the men, how *could* the men lift them?

P. Very easily, by means of "shear-legs."

Rose. What are "shear-legs?" not their own legs, I suppose. Are they stilts?

P. No, nor wooden legs, although they are made of wood. They are two wooden poles, which are placed together so:

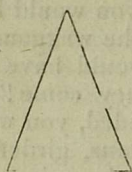


Fig. 7.

What shape do they form, with the line of the ground?

Rose. A triangle, papa.

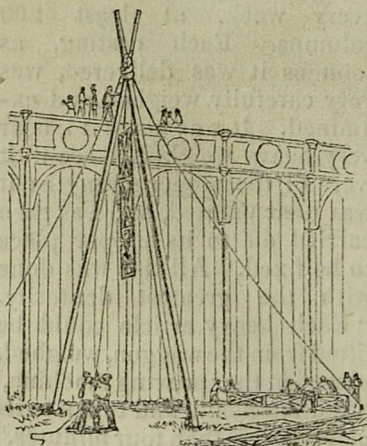


Fig. 8.

P. Here is a picture of a column being hoisted by means of the shear-legs. You may notice that there is a long rope on each side to keep them steady. At the *apex* of the triangle (you have learned what that means in PLEASANT PAGES), there are pulleys with ropes passing over them,—thus you see how the men pulled them up.

With 1,500 men at work, not only were great numbers of the columns and girders soon raised, but the smaller parts of the framework for the glass. During all this time the glass-blowers had not been idle. They had plenty to do; they had to make large and thick panes of glass almost a yard and a half long and ten inches broad. They soon found that as they had to make so many thousand panes, they had really *too much* to do. ENGLAND could not supply workmen enough to make such an immense quantity in so short a time; it was necessary, therefore, to bring workmen from foreign countries to help. Each pane was made in a manner different from the old system, which you will understand better when you have an "Object Lesson" on glass.

A few weeks, and the scene in Hyde Park was more exciting still. The increasing numbers of men had worked on through November to the beginning of December, when the bustle was at its height. The columns, girders, and heavy castings were still being brought; with an enormous number of smaller castings, which were

erected with amazing rapidity. Other pieces of framework, and sash-bars, for the glass were next prepared—then came the glass; and with it came more men still, to fix it.

H. Yes, *Glaziers*, I suppose.

P. The most trying undertaking of all was next begun, namely, the hoisting of the great curved ribs for the roof of the transept; these ribs we shall be able to see when we reach the Palace. I cannot give you an idea of the great “crabs,” and tall “shear-legs” which were used. This most dangerous work was completed in one week; sixteen great ribs were erected, and fortunately without any accident. Then the glaziers were mounted high up to their work, and soon they were dotted over the roof, looking in the distance something like the flies on the ceiling. When these glaziers worked on the “ridge and furrow” roof, they were conveyed in new and ingenious machines with wheels, which travelled in the Paxton gutters. The men soon learned to work quickly, and 80 of them, in one week, put in 18,000 panes of glass. One man, in one *day*, inserted 108 panes, which covered 367 feet of the roof.

Thus, all kinds of labour were being executed at the same time, and all varieties of people were seen. There were not only the glaziers attending to the glass, but carmen unloading the wag-gons, and workmen raising the roof,—workmen raising the columns, painters painting them, carpenters attending to the works of wood, carmen unpack-

ing the glass,—crowds of porters performing odd jobs, while the scene was made gayer still by the numerous red coats of the Sappers and Miners, which sparkled here and there amidst the crowd. “Useful men these,” you might have said,—“they have done all the surveying and planning.” Besides these were the higher orders of workmen, His Royal Highness the Prince, Mr. Wyatt, Mr. Fuller, the architect Mr. Paxton, the contractors, the decorator Owen Jones, numbers of draughtsmen and clerks, with a great sprinkling of visitors, whose principal labour was, in trying to understand how all was done so quickly.

But even with so large a supply of men, there were not enough hands to complete the great work; and a new power had been added—a great *steam-engine*, with the power of six horses, might have been seen—setting in motion several machines, and causing them all to help.

Let us talk of these machines: the steam was turned on, and this was the signal for them to *work*. They were obliged to obey—evidently they knew this, and had been accustomed to steam, for immediately they began punching, and drilling, and cutting bars of iron into their proper lengths. Another machine had been preparing the “Paxton gutters;” another cut the wood into sashes for the glass, preparing them by *mile-lengths*; another actually *painted* them; while another—a still more knowing machine—received

logs of wood, and sent them out again in the shape of long spouts for drainage, with even the holes for the nails bored through them. Ah! those machines, how well they obeyed the steam, and how the steam kept them at work! No machine took the slightest interest in the work of his neighbour, or even offered to assist him. The spout-machine kept entirely to his spouts, and not a single gutter or sash-bar did he make. Indeed he had no time to try; he was so intent on his work, that he scarcely seemed conscious of having a neighbour at all.

Rose. Perhaps he hadn't any "consciousness."

P. He was none the worse for that. Certainly, every machine kept to his *own* business, and so did each workman, and that is one reason why the building was finished in time.

The conscious workmen, indeed, seemed as active as the machines; all worked on steadily, and the great giant—the dumb, unconscious Palace—rose silently over their heads. "Wonderful!" they thought, as they saw what they were doing—all wondered at the work of their own hands! still guided by greater minds than their own, their hands worked on, while the building seemed to look down from its height, and wonder how large it was going to be.

H. Perhaps he wondered what he was being made *for*!

Rose. And he would wonder what those impertinent steam-engines had to do with it, and why their wheels went round

and round without seeming to mind him at all.

P. True. And as through all December the machines and the crowds of men worked on (for now there were nearly TWENTY-FIVE HUNDRED MEN), the great giant of iron and glass must have stared more still. Yes, indeed! for his masters were working all through the night, and had lit him up by *torchlight*! He must have felt it to be awful and grand when the bright lights danced through the dim shades, and the men and machines moved on. What did the *machines* care for the night? why should they go to sleep? They "never tired nor stopped to rest." No! each machine still *worked* and "pursued the even tenor of his way."

H. Poor Crystal Palace! I dare say he felt that he *must* be built, and must grow up as large as they chose to make him; he couldn't help himself.

P. Yes; and as time rolled on, strange things rolled in. While the Palace had been thus preparing, beautiful goods to exhibit had been prepared by thousands of men in all parts of the world. Gentlemen from England had been sent all over Europe; and messages had been delivered to "all nations," saying that this Palace was built for them to exhibit in. Like the school-boys whom we talked of, they were invited to a "competition" for prizes. Soon they began to try who could make the finest and best of goods; and, when they had done their best, they sent their works over the land and the seas, to Hyde

Park. If you had had the proper ears, you might have gone to the top of the Palace one windy night, and have heard that they were coming. Great wheels were buffeting the ocean waves, and bearing ships from the east—great sails were driven along by the wind from the countries of the west, north, and south; and the whistling wind, which had crossed the ocean for thousands of miles, and had reached the Palace before them, whispered in its corners, "They come!" Great packages were soon made ready; and by railway from the cities of Europe; by canal and rail from the counties of England, they were sent off, directed to the Great Exhibition. After that, *they came*,—and with them came a scene of bustle and business, which I could not reasonably attempt to describe. There were workmen from Austria and France; men from the Zollverein and Bavaria; from all parts of Germany, from Russia, from Switzerland and Italy, from Spain, Belgium, and Holland. From the far-west came Americans; and from the East the men of Egypt, all attending to their goods; amidst the confusion of tongues, a work mightier than Babel's still went on; and by its appointed day, the 1st of May the Crystal Palace was finished.

On the 30th April, the night before the Palace was born, I stood outside and asked him, "How came *you* here?" Soon I imagined that the answer came back in these words: "WE, the

Crystal Palace, are so bewildered at ourselves, that we scarcely know how we came here. We know where we came *from*. We came from the bottom of the sea, and from the tops of mountains, from dark caves, and from mines in the bowels of the earth. There we were called by different names, such as 'sand,' 'soda,' 'galena,' 'ironstone,' and 'pine.' But some of us were melted in hot furnaces, and were *cast*, and are now called 'iron,' and 'glass;' and some have been hammered, cut, sawn, and drilled. But it has been done so quickly that all we can tell you is, we are now called 'THE CRYSTAL PALACE.'" Thus, *the Crystal Palace arose*,—rapidly.

CHAPTER FIFTH.

HOW THE IDEA WAS REALIZED.

P. I suppose you remember the 1st May, Henry?

H. Yes, very well, papa.

P. On the 1st May, 1851, the people rose up early; at five o'clock on the 1st of May the people were getting up; at four o'clock on the 1st of May, there were people getting up. At three o'clock in the morning there were people getting up. A few people rose at two, and many were rising all night long, for some never slept at all. When the morning came, there were clouds over-head, but beneath there was light-hearted joy. Tens of thousands of men and women hurried down the streets. Cabs and carriages

filled the road, and all moved onward to the west. From north, and south, and east, and west; by steamers and rail, by omnibus and cab, by carriage or gig, came the myriads of people, and stood round the GREAT EXHIBITION.

Rose. Yes, we heard about that, papa; the Exhibition was ready to be opened.

P. But I think you do not know of all that gave the people joy. As I was waiting with the crowd, I saw an old man with an eager face, and a very glad sparkling eye. His head was bald, and his beard was grey. "What is it," I said, "that makes you glad? Is it that you see the Crystal Palace sparkling in the light of the sun?" "Not only that," he said. "Is it that you expect to see the Queen, and intend to say 'God bless her?'" "Not only that," he said. "Is it that you see men of all climates, and of all colours, meeting together with friendly looks?" "Not only that. It is all these together that make me glad. Don't you notice," he whispered, "that all these men have one feeling toward that building? Don't you hear the Frenchmen say to their enemies, 'the perfidious English,' 'Brothers! we helped to make it!' Listen how they say, 'We all have an interest there!'"

Rose. I should like to have seen that old man; he had some kind thoughts.

P. Yes, you shall hear more about him soon. On that day there was a brotherly feeling beaming from the faces of all,

and I'll tell you why. This Exhibition was showing them the marvellous good works of each others' hands, which they had never seen before, but now it was beginning to teach them *more*. This Exhibition had brought them together, and was showing them marvellous goodwill in each others' hearts, *which they had never seen before*. For the first time since the world was made, men of all nations were *working* together in one great act of peace.

Now hear what the old man related to me. "Not forty years ago," he said, "I saw the fathers of these men meet on the battle-field. I saw their forefathers meet, hundred of years ago. The Franks and the Goths, the Celts and the Moors, met only to show their *hate* to each other. Do you know why?" he said.

"No," I replied.

"Then I'll tell you—it was because they did not know each other. Ah!" he cried, "I have seen *all history*! I've seen it all myself. I remember the first great gathering of Christian nations, seven hundred years ago."

Rose. What an *old* man, papa! How could he have lived for seven hundred years?

P. You will hear. He has lived six *thousand* years. But listen to his story.

"That mighty gathering of the nations! Like the people around us now, they were brought together by an *idea*. How that idea arose and grew! The 'Industry of All Nations' was aroused, and was making

swords and spears. They met and heard the idea from the sacred lips of their priests. 'Go dip your swords in blood! Go wage fierce war! Go kill, for the sake of Christ, the Prince of Peace! Hundreds of thousands are to follow hundreds of thousands; and meet around Jerusalem, the former city of God, to destroy their fellow-men.' Europe answered with the cry, 'It's the will of God!'^{*} Then, as they promised to go, and to *fight* round the Holy City, the blessing of the Almighty was asked by the Archbishop of ROME, on the first and fearful gathering of the nations.

But the high days of *chivalry* are now passed away, and those of the sword and spear are passing away too. Come, come with me," said the old man suddenly. "Come to the Crystal Palace! ye shall see a very different gathering of the people of the earth. Come!" he cried, as he moved along faster (for he had been moving on all the while), I never stop! and, with his hour-glass in his hand, he bore me on his wings over the people in the midst of the Great Exhibition.

H. (Whispering.) Rose, the old man had wings! Who was he?

P. I know not how it all happened, but when we reached the palace, the people outside had seen the sight. The splendid carriages, and the pomp and show had gone away, and I found inside, the Queen and

the Prince of the greatest nation of the earth. There were other princes, nobles and mighty lords, the old warrior of the world, with his sword put up for ever—and the great men of all degrees who had come from thousands of miles. As I gazed through the bright and beautiful building, and saw the long lines of faces, the many strangers in character and in dress, it seemed that men from all countries of the earth had met. Had met—not with fierce rage, or flaming swords—not diseased and dying with hunger and fatigue—not expiring under a burning sun outside the gates of the city—but near where the cool crystal fountain played, and murmured a sweet soothing sound; near the quiet shade of a noble tree; under the high arch of the transparent transept. There, surrounded by the brilliant trophies of the arts of peace, more beautiful and pleasing than the trappings of war, there the second gathering of the nations began.

The sound of a thousand voices had just ceased to breathe their melody through the air, to the hymn of "God save the Queen," when the President of the Society of Arts, HIS ROYAL HIGHNESS THE PRINCE ALBERT, whose first difficulties you may well remember, arose and read a long address to Her Majesty. It would take too long for me to tell you all of it, but I will read to you the last and most striking parts:—

"Having thus briefly laid before Your Majesty the results of our labours, it now only remains for

^{*} "Deus id vult, Deus id vult."

us to convey to Your Majesty our dutiful and loyal acknowledgments of the support and encouragement which we have derived throughout this extensive and laborious task, from the gracious favour and countenance of Your Majesty. It is our heartfelt prayer that *this undertaking, which has for its end the promotion of all branches of human industry, and the strengthening of the bonds of peace and friendship among all nations of the earth*, may, by the blessing of Divine Providence, conduce to the welfare of Your Majesty's people, and be long remembered among the brightest circumstances of Your Majesty's peaceful and happy reign."

Her Majesty then arose and replied. Here are some of Her Majesty's cheering words:—

"I cordially concur with you in the prayer, that by God's blessing this undertaking may conduce to the welfare of my people and to the common interests of the human race, by encouraging the arts of peace and industry, strengthening the bonds of union among the nations of the earth, and promoting a friendly and honourable rivalry in the useful exercise of those faculties which have been conferred by a beneficent Providence for the good and the happiness of mankind."

There, dear Henry! Does not your heart feel glad? The cry which rose in Christendom more than 700 years ago might well have been uttered again for the cause of Peace—"It is the will of God"—"It is the will of God."

H. Peace is God's will always.

P. True; and so said the

Archbishop of Canterbury, for the highest part of the service had yet to come. None forgot that GOD was there! and after the reply of Her Majesty, there stood up—not the Archbishop of Rome, but the Archbishop of England. He arose to ask the Divine blessing on this noble work. He asked that it might be blessed to teach all nations more of love, brotherhood, and peace. Hear some of his words:—

Prayer.

"AND now, O Lord, we beseech Thee to bless Thy works which Thou hast enabled us to begin, and to regard with Thy favour OUR PURPOSE of *knitting together in the bonds of peace and concord the different nations of the earth; for with Thee, O Lord, is the preparation of the heart in man.* Of Thee it cometh that violence is not heard in our land, wasting nor destruction within its borders. It is of Thee, O Lord, that nations do not lift up the sword against each other, nor learn war any more; it is of Thee, that peace is within our walls, and plenteousness within our palaces. Therefore, O Lord, not unto us, not unto us, but unto Thy name be all the praise.

Both riches and honour come of Thee, and thou reignest over all. In thine hand it is to make great and to give strength unto all. Now, therefore, O God, we thank Thee; we praise Thee, and entreat Thee so to overrule this assembly of many nations, that it may tend to the advancement of Thy glory, to the diffusion of Thy holy word, to the increase of general prosperity, by promoting peace and

good-will among the different races of mankind.”*

Then, once more came the sound of the organ. The thousand voices again were

* This is only a part of the prayer, which is too beautiful to be forgotten. It is so simple that a child may understand it, and it is therefore printed entire, that the children may read it often, and long remember it.

ALMIGHTY and everlasting God, who dost govern all things both in heaven and in earth, without whom nothing is strong, nothing is holy, accept, we beseech Thee, the sacrifice of praise and thanksgiving, and receive these our prayers, which we offer up unto Thee this day, on behalf of the kingdom and people of this land. We acknowledge, O Lord, that thou hast multiplied on us blessings which thou mightest most justly have withheld. We acknowledge that it is not because of works of righteousness which we have done, but of Thy great mercy that we are permitted to come before Thee with the voice of thanksgiving, and that instead of humbling us for our offences, Thou hast given us cause to thank Thee for Thine abundant goodness. And now, O Lord, we beseech Thee to bless thy work which Thou hast enabled us to begin, and to regard with Thy favour our purpose of knitting together in the bonds of peace and concord the different nations of the earth; for with Thee, O Lord, is the preparation of the heart in man. Of Thee it cometh that violence is not heard in our land, wasting nor destruction within its borders. It is of Thee, O Lord, that nations do not lift up the sword against each other, nor learn war any more; it is of Thee that peace is within our walls, and plenteousness within our palaces; it is of Thee that knowledge is increased throughout the world, for the spirit of man is from Thee, and the inspiration of the Almighty giveth him understanding. Therefore, O Lord, not unto us, not unto us, but unto Thy name be all the praise. While we survey the works of art and indus-

heard, and the song of “Hallelujah” rang through the building, while the Queen and nobles walked through the aisles of the palace, from one end to the other, until they again reached the transept, from whence they started. The Queen then declared

THE EXHIBITION OPENED.

P. Just at that moment, I missed my friend TIME, who had brought me thither on his wings, and, rubbing my eyes, I found myself in the place where I had first met him in the Park; but how I returned I cannot tell.

try which surround us, let not our hearts be lifted up that we forget the Lord our God, as if our own power and the might of our hands had gotten in this wealth. Teach us ever to remember that all this store which we have prepared cometh of Thine hand, and is all Thine own. Both riches and honour come of Thee, and Thou reignest over all. In Thine hand it is to make great and to give strength unto all. Now, therefore, O God, we thank Thee; we praise Thee, and entreat Thee so to overrule this assembly of many nations, that it may tend to the advancement of Thy glory, to the diffusion of Thy holy word, to the increase of general prosperity, by promoting peace and good-will among the different races of mankind. Let the many mercies which we receive from Thee dispose our hearts to serve Thee more faithfully, who art the author and giver of them all. And, finally, O Lord, teach us so to use those earthly blessings which Thou givest us richly to enjoy, that they may not withdraw our affections from those heavenly things which Thou hast prepared for those that love and serve Thee, through the merits and mediation of Thy Son Jesus Christ our Lord, to whom, with Thee and the Holy Ghost, be all honour and glory.

H. I think that you had been dreaming, papa.

P. Very likely; however, I remembered all that my spirit had seen, and I also looked back on the past. I thought how the idea of the Exhibition arose, and how the idea of the palace arose, and now I had seen it made real. It was, as we say, "realized." "Why," I asked, "was it magnificent?" Not because of the glitter and gold, but because God was there!—the God of heaven, where angels sing of peace on earth and of good-will towards men, deigned to smile on that day. He is the source of high magnificence.

So, when we look back on the *Exhibition of the Industry of all Nations*, we may truly think, *how the idea was realized*,—magnificently!

Just then, I thought I heard a flapping of wings, and I imagined that my friend "Time" was flying over head. I could not see him, but I heard him singing contentedly to himself: "I have seen a grand day to-day." Yes, I cried to him—you have seen one of the grandest days since the beginning of the world; it tells us that there are even better days to come yet.

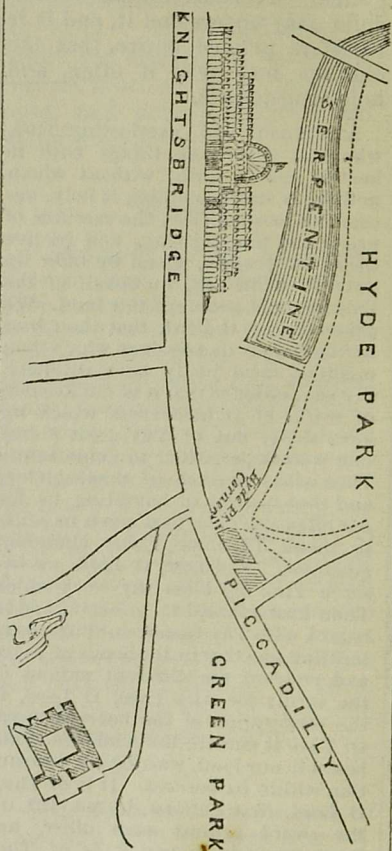
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H. Papa. Here is a park! and I can see a pond. I think that we must be near the Exhibition now. Shall I pull the string, and ask the cabman?

P. No, you need not do this—this place is called *Piccadilly*.

Rose. And what, papa, is that building in the distance across the park?

P. That is *Buckingham Palace*, where HER MAJESTY THE QUEEN lives. This park is called the "Green Park;" we shall soon reach Hyde Park. Here is a little drawing for you, by which you may see where we are, and what is the exact position of the building.



H. Yes, we have to pass Hyde Park Corner; and go up the road to Knightsbridge. Have you finished your story, papa?

P. Not quite. Listen—

CHAPTER SIXTH.

HOW IT BROUGHT FORTH FRUIT.

P. Some plants bring forth finer fruit than others. Just as a sun-flower is like a *golden* flower, there are fruits called "golden fruits."

Rose. Yes; I have often read about golden fruits.

P. And such are some of the fruits of the Exhibition. It has begun by bringing forth golden fruit in a remarkable degree. Round medals of gold, called sovereigns, have rolled in every day, in amazing numbers, gathered from the great crowds of people who have come to see it.

During the month of May, the money received at the doors amounted to no less than FIFTY-EIGHT THOUSAND AND FORTY-FOUR POUNDS, THREE SHILLINGS; while the amount paid for "season tickets," up to June 7th, was SIXTY-FIVE THOUSAND, NINE HUNDRED AND SEVENTY-SIX POUNDS, THIRTEEN SHILLINGS.

Besides all this money, the subscriptions, which, you may remember, were collected by the Royal Commission, amounted to £64,344. The Commissioners also received £3,200 from Messrs. Spicer and Clowes, for the privilege of printing and selling the Catalogues; also, for the privilege of supplying the refreshments, £5,500 was paid. Suppose we add these accounts to the larger one.

£124,011	16	0
64,344	0	0
3,200	0	0
5,500	0	0
£197,055	16	0

H. What, papa, are the "season tickets," for which so much money was paid?

P. A "season ticket" is a ticket which will admit the owner to see the Exhibition on any day during the season in which it is open. They cost £3 3s. each; I may as well tell you, also, that only those people who possess "season tickets," were admitted on the 1st of May. All who went there on the 2nd and 3rd May, paid £1; and all who went during the next three weeks, paid 5s. each for admission. On what day of the month would the three weeks after the 3rd of May end?

H. Twenty-one days after, —that would be the 24th May.

P. True; and, since the 24th May, the rule has been that all who go to the Exhibition on a Monday, Tuesday, Wednesday, or Thursday, shall pay 1s. each; those who go on a Friday, are to pay 2s. 6d., and those who go on a Saturday, must pay 5s. each.

But this golden fruit is not the best fruit of the Exhibition. Do you remember what old TIME said of the first gathering of the nations—of the Crusades?

Rose. I do, papa.

P. Now, when men write the History of Europe, and speak of the Crusades, they show that out of evil came good, that nations gained new ideas, and that they learned much of each other, and much *from* each other. Thus, they became more "civilized."—"Civilization!" that is a long word.

H. Yes, it is, rather.

P. But suppose that you find out its meaning. You will then understand what, in future days, men will say, when they write the History of Civilization. If from the gathering of men for war, there came forth new ideas, how many new and bright thoughts must be gained from this gathering for Peace! They are its best fruits, and are now being gathered to be scattered amongst "all nations." Ah! these fruits will last longer than the "golden fruit." They will reach the very corners of the earth, and will make refreshing gladness for weary spirits. So the bright gold coins, and still brighter thoughts from the Great

Exhibition, will show *how it brought forth fruit*—abundantly.

H. Papa, I think we are near the Palace. Look at the number of empty cabs; here they come two—four—seven—ten; I think I could count a hundred in five minutes, and they are all coming *from* the Exhibition?

Rose. And the omnibuses which are coming from there. Look! they are all empty. And how slowly we are moving now! the horse cannot go on because of another cab in front.

H. Yes, I heard a policeman tell the driver to *keep in the line*.

P. Then we had better walk the rest of the way. You may pull the "check string" now, Henry, and we will get out.

PART THE SECOND.

CHAPTER SEVENTH.

ON THE FOUR CLASSES OF OBJECTS.

P. Now that you have heard the history of the great Palace, and of the Exhibition itself, let us proceed to the history of the articles inside.

L. Are you going to talk of *all* of them, papa?

P. If I tried to do that, I should make such a long talk that it would reach to the end of next year! Indeed, to examine the ten-thousands of objects in that Palace, and to *understand* them, would cost many years.

Ion. Then, what are you going to do, papa?

P. To speak of them in *classes*. You have heard before of the advantage you may gain by arranging things in classes.

W. Yes. When you put a number of objects which are alike in classes, if you describe one, the same description will answer for all the rest.

P. So, we find that the objects of the Exhibition *have* been arranged into classes. On examining the goods you will observe four different sorts.

To understand properly what human industry has done in making so many fine goods, we must know, first, *what the goods have been made of*. They have been made of many different materials; and some of each

sort have been sent to the Exhibition,—such as cotton, wool, bone, and ivory; the different woods, stones, and metals. As these materials have been sent just in the raw state in which you find them in nature, without having been changed in any way by man, we call them **RAW MATERIALS**.

Ion. Then, the “raw materials” form *the first class*.

P. Yes. Upon thinking, we find, secondly, that man could not change the rough-looking raw material into such fine and beautiful objects with his own hands. Suppose that you gave a man a lump of gold and said to him, “Make me a gold watch”—

Ion. He could not do it with his fingers—he would want *tools* to make it with.

P. He would want tools, and *machinery* perhaps, which is not always used by the hand as tools are. After the raw materials, these machines and tools are the next important class, for *they give shape to the raw material*.

Ion. So we will say that the “machinery” forms *the second class*.

P. That is correct.—Now, if men take the objects of the *first class* and work upon them with the articles of the *second class*—a third class must thus arise.

L. Yes, papa. You mean the *articles which are thus made*; such as watches, jewellery, silks, velvets, linen, calico, cloth, leather, &c.;—we sometimes say that they are *manufactured*.

P. And they are then called **MANUFACTURES**. Thus you see that the first class may be formed by the second class into a *third class*.

Ion. Then, I will repeat. The “manufactures” form *the third class*.

P. The fourth class are a higher kind of manufactures. To form the objects of the fourth class, we want not only raw materials—and tools—and the hand to guide the tools—and the mind to guide the hand, but something else—

L. What is that, papa?

P. Great *taste* is required, and *imagination*; for the fourth class consist of such articles as statues, pictures, vases, designs for all kinds of ornaments, patterns for cotton dresses, and fancy silks. To make such objects a man must not only have deep thought, but what are called “refined feelings.” These objects, therefore, are not spoken of as *manufactures*, but they are said to be the objects of the **FINE ARTS**—“Works of Art,” we often call them. They form the last class.

Ion. Then, I will repeat, fourthly. The “Works of Art” form the fourth class; so that in the Great Exhibition there are four classes of good:

1. THE RAW MATERIALS.
2. THE MACHINERY.
3. THE MANUFACTURES.
4. THE WORKS OF ART.

We will begin with the first class; and we will examine the *raw materials* in the Exhibition.

PART THE THIRD.

CHAPTER EIGHTH.

ON THE RAW MATERIALS IN
THE GREAT EXHIBITION.

P. You know that there are three great kingdoms in Nature—the Mineral, Vegetable, and Animal kingdoms. Whatever you see on this earth, and whatever articles you have in use, they are derived from one of these kingdoms. This you have heard before. If you sit down, and examine only the *dress* you have on, you will most likely find yourself wearing mineral, vegetable, and animal substances.

From these three kingdoms we get not only *clothes* to wear, but—

W. Food, papa, to eat.

P. And, what else?

Ion. Why all the *furniture* in the house—the “clothing” of the house, I call it. And the house itself, too;—*that* is made up of the vegetable, wood; the mineral, nails, the minerals, brick and stone; and the animal substance—

W. The *oil* in the paint may be an animal substance, and the glue which fastens the wooden parts together.

Thus, in the Raw material we find

1. SUBSTANCES USED AS FOOD.
2. SUBSTANCES USED FOR CLOTHING.
3. SUBSTANCES USED FOR DWELLINGS AND FURNITURE.

P. We might exist without the *third* substances, or even

without the *second*, but the *first* we could never dispense with. They are the most important,—therefore our first series of Object Lessons shall be on—the *substances used as food*.

CHAPTER NINTH.

ON THE SUBSTANCES USED AS
FOOD.

You will not find many minerals in this series. The minerals are the food of the *vegetables*; the only mineral often used thus by man is *salt*, which is eaten as a “condiment” with our food.

Ion. I remember our old lesson on salt, papa. You said that it did not form food—it was only useful to help in digesting our food.

P. That is the case. Therefore, we shall find our food in the substances derived from the animal and vegetable kingdoms. Let us consider for a minute the variety of these articles. We have in this Exhibition articles of food which grew under the burning sun, in Africa, and Asia,—they have been sent from the Spice Islands, China, India, Persia, Egypt, Tunis, Malta, the West Indies, &c. In most of these hot places round the Equator (which you know are called “tropical countries”) the articles of food are *vegetable* productions. In hot climates, vegetable food is far more suitable than the flesh of animals, and we find, too, that under the influence of the sun,

the trees and plants in those countries grow to an enormous size, and yield most luscious and beautiful fruits.

But, if we were to travel suddenly from the tropics to the cold countries around the poles, there we should find that the case is very different. There, in the very coldest part, where the sun hardly shows his face for weeks, scarcely any vegetables grow—only a little Iceland moss, with sea-weed, and different kinds of fungus. But, vegetables are not so much required there as in the warm tropics;—the people are compelled to eat more animal food.

If, again, we return to the countries situated between the Tropics and the Poles—those which are neither very hot nor very cold—we find a different kind of produce, and accordingly different food.

Now, we shall be able to find in the Exhibition, the articles of food from “all nations.” Therefore, in this course of lessons, and perhaps in the other courses, we will speak, first, of the substances sent from the tropical countries; secondly, of the substances from the frozen countries; and thirdly, of the substances from the temperate countries. Let us make a new chapter, with a new heading.

CHAPTER TENTH.

RAW MATERIALS—SUBSTANCES USED AS FOOD.

(Tropical Countries.)

Suppose that you enter the GREAT EXHIBITION at the door

of the South Transept. Before going any further, take out your map, and look for the tropical countries in the Eastern Hemisphere.

If we were to begin our course at the most easterly part of the hemisphere, the first countries we should observe would be the islands of the Indian Ocean. But, on the same map is a far more important place—the great Eastern British possession, the famous country, INDIA. As India is of very high importance, we find it situated in the very centre of the Palace. Let us, therefore, go there, and see what specimens of their food the folks from India have sent us!

L. How are we to reach India when we are at the Palace?

P. Proceed in a straight line from the beautiful iron gates of the *South Transept* to the crystal fountain, and you will notice on your way that the western side of the transept is occupied with India. On reaching the *crystal fountain*, turn round with your face looking down the *western nave*, and you will find that the Indian department is on your right hand and on your left. It occupies, in fact, not only the western side of the *south* transept, but the western side of the *north* transept also.

Now, if you really want to enter India, and study the articles of food, I would advise you not to wait long, or to look very far down the nave. Mind that you don't look at the *silk trophy*! keep off your eyes from the *horse and the dragon*, or the *timber trophy* behind it! Don't

look up or down! Don't begin to look at the people! Don't look at *anything*, until you have made haste into the INDIAN DEPARTMENT.

W. Why, papa?

P. Because you are likely to forget what you have come for; and, at the end of half an hour, you may find that you have unconsciously wandered a very long way from India, to quite another part of the building. It will perhaps cost you another half hour before you find your way back again.

Last week I was going to see Mr. Lawson's *vegetable productions of Scotland*, in the south gallery, when I was just tempted to run down to *Russia* for a few minutes, to show a lady the malachite doors, and the beautiful vases. We stopped at a great many places before we reached Russia; we stopped a very long time in Russia itself, and we stopped at several places on our way back. The consequence was that we did not reach the vegetable productions until we had been in the Exhibition for *two hours and a quarter!* Such is the way in which you may be tempted in the Exhibition. Oh, it is a sad place for attending to *business!* But, let us proceed to India forthwith.

Even, when you are safe inside the department, if you are not careful, you will take a long time before you reach the *articles of food*. You will either stop to look at the wonderful collection of jewels, containing the great diamond, "the *Durra-i-noor*, or sea of light," or the room furnished in the style of

an Indian palace, or the rich shawls, carpeting, and matting; or, perhaps, you will be led away by the curious models which have been made to show the Indian manners and customs; there you will see so many strange things that you will be sure to stop. You will see the model of a native court of justice—but I am afraid that I too shall be led away from our subject. We are going to talk of the *articles of food* in India.

You will find in the Indian department good specimens of sugars from the sugar-cane and from dates. You will find arrow-root, pearlsago, and tapioca, nutmegs, pepper, cinnamon, and all kinds of spices; teas and coffees, different kinds of wheat, with oats, millet, maize, or Indian corn, and *rice*. The last mentioned is the most important article of food in India; it forms the daily bread of the millions of people in that and the neighbouring country, China.

Ion. Then, papa, may we begin our lesson by having an Object lesson on *Rice*?

P. Yes, we will do so. Indeed, we shall only have time for the *principal* articles of food in each country.

1. RICE.

P. Let us now sit down and examine some rice. Here is some.

L. Is this really rice, papa? I should have taken it to be oats.

W. So should I. Look at its beard (or *awns*, as they are called sometimes); there is one long awn fastened to the end

of each grain. I never knew before that rice was bearded; but, what surprises me most is the colour—it is *yellow*, when rice is white.

P. That is only because the rice grains have the husk on them. It is not exactly right to call these ears which I am showing you, *rice*,—they are called *paddy*. But you see that I have here several perfect plants; what English plant do you think they resemble?

L. They look like corn or barley, papa; and, they also look something like the long grass which grows by the side of rivers, and in marshes.

P. Or like the long *reeds*, or short grass either; for the rice, and the corn, the barley, oats, Indian corn, reeds, sugar-canes, the great bamboos found in the tropics, and many others, all belong to one tribe, which we call the *grasses*. The seeds of many of these grasses form the principal vegetable food for man. In some, such as the common grass of the field, the seed is not large enough for our food, therefore the stalks are used, either as green food for horses, or to make dry hay.

Ion. You once told us of the sugar-cane, papa. We do not use its seed but its *stalk*, or rather the juice of its stalk.

P. True; but let us return to our rice, or rather, to the subject of the CORN-PLANTS. We will examine, together, the rice and all these other grasses which yield *grain*.

L. Look, Willie! Papa has brought several more plants, and each has grain at the end

of its stalks. Here is a long stalk of *oats*, here is some barley, and here is one much more like grass.

P. This is *rye*; and here is another resembling grass, which we call *millet*. This very large plant, with such a thick stalk, and such broad leaves, is *maize*, or Indian corn. Here are many more grasses with smaller seeds than the others, so that they are not honoured by the name of corn-plants. You may now examine these corn-plants, and tell me in what respect they are all alike. Count the different *parts* of each plant.

W. I will count them, papa. Each plant has a stalk, a root—No! I will begin at one *end* first. In each plant there is a root, a stalk. What are these little stoppages in the stalk, the hard places?

P. They are the knots or joints.

W. Well, then. The plant has a *root*, *stalk*, *joints*, *leaves*, *ears*—for look at this plant, it has several ears! There is a skin outside each little grain in the ear.

P. That is called the *husk*.

W. The *husk*, the *grain*; and some of the plants have an awn, or *beard*, at the end of each grain; so that the different parts of each corn-plant are the root, the stalk, the joints, the leaves, the husk, the grain, and the beard.

P. Now examine these parts, and see if there be anything else worth describing.

L. Yes, papa. The root of the one I have in my hand is not a bulb like the root of a

tulip or an onion, but it is a bundle of thin fibres,—so we say that it is a *fibrous root*. I wonder whether the other plants have fibrous roots.

W. Yes. I have been noticing them; they all have fibres. I will examine the *stalk*. The stalk is thin and hollow, and is divided into several parts by these joints. The joints make the stem stronger, because if it were not divided, and consisted only of one straight piece—it would be more likely to bend and break.

Ion. I will examine the *leaves*. 1st, Each leaf springs from one of these knots. 2ndly, The leaf grows round the stalk for some distance, and makes a sort of sheath to it, and then it branches out. 3rdly, The leaves are not the shape of the leaves on the trees, but they are very long and narrow, ending in a point.

P. If you examine them more minutely, you will observe that their *veins* are different from those of other leaves; they are all straight, and parallel with each other, and extend from the beginning of the leaf to the end, while other leaves have a mid-rib, and veins spreading out on each side, so as to form a sort of net-work all over the leaf.

L. I will notice the *ear*, papa. In some of the corn-plants the grains form a *close ear*, and in many the grains hang loosely. The ear of some is bearded, and in others the ear is not.

P. You may now write down "the distinctions" of a corn-plant, and this account will

then answer for all the other corn-plants we may describe.

Ion. I will write it, papa.

THE CORN-PLANTS

Are large grasses, distinguished by having

a *root*, which is fibrous;
a *stalk*, which is long, hollow, and jointed;

leaves, which are long and narrow, with straight parallel veins—(they grow from the joints, and form a sheath round the stem for some distance, thus making it stronger);

and *grain*, which is sometimes bearded, and sometimes not—and either hangs loosely, or is arranged in a close ear.

P. That will do. We will now describe the rice itself. Suppose that I begin with its history.

Rice originally grew either in India, or some other warm part of Asia, for there it is still found in a wild state—flourishing near the bank of some river, or in the marshes. The grain of the wild-rice, however, is much smaller than that which is cultivated.

The plant was not long confined to Asia. It was found to be so useful that it was carried by man to all parts of the world suitable for its growth, so that, now, it is said that no grain supports the life of so large a number of persons as rice. It was transported to the Western world about 150 years ago; and now, in the West Indies, and South America, enormous

quantities are grown—forming a very important article of food. It feeds, also, as I told you, the millions of people in China; and in the South of India immense numbers of the people get scarcely anything else to eat. They eat it with a powder, which consists of a few spices mixed together, and is called *curry powder*. The English people in India eat it with nearly every meal, and you have, I dare say, heard of the singular way in which the Chinese convey it to their mouths, by means of “chopsticks.”

If you carry your finger across the map, and touch each rice-growing country, you will find that it also forms the food for the Egyptians, the Arabs, and the people of other countries outside the tropics. Even in the south of Italy and Spain very fine crops are raised.

L. Is that because Italy and Spain have a warm climate?

P. Yes. And because the people have, from the beginning, carried out a good system of supplying the plant with water, great quantities of which are necessary to its growth.

Perhaps one reason for its being so largely cultivated is found in the fine *crops* it yields. One acre of land, it is said, will give two crops of from 30 to 60 bushels every year. Another reason for its cultivation is, perhaps, that the process of culture is not expensive. Very little, or nothing, is paid for *manure*. A gentleman who has been to India says that he never saw or heard of an Indian

farmer manuring his rice-fields, in the smallest degree. There are fields in India which have continued to yield a fine crop of rice every year, for perhaps thousands of years; and during all this time they have never been manured.

L. Will you tell us, papa, *how* the rice is cultivated?

P. Yes. Perhaps the method of cultivation will explain why manure is not wanted. The best places for rice-fields are the low open plains through which rivers pass, as the large quantity of water necessary is the great peculiarity of the rice growth. As soon as the small green shoots from the seeds are a few inches above the ground, the water from the rivers is let in upon the field, completely flooding it, and causing it to look something like a large pond. As the grain grows, it is flooded a second time, and shortly before the grain ripens, it is flooded a third time; the water being allowed to remain in the field until the grain is quite ripe, and ready for the harvest. This rule for flooding the rice is not always adhered to. The fields are, in fact, kept constantly wet, and are more or less flooded according to the kind of grain; for some descriptions of rice do not require nearly so much water as others. It is supposed that the fertilising substances left on the soil by these inundations, enable the farmers to dispense with manure.

In those parts of the country where water cannot be procured from the rivers, arti-

ficial reservoirs are made to supply water—other crops of rice depend only upon the help they get from the heavy rains, and the atmosphere.

I do not think that you would like to be one of the poor people who work in the rice harvest. You can easily understand that the fields must be very muddy, and in South America and the West Indies, where, I believe, much more water is used than in the East Indies, the slaves have to work in mud which reaches to their knees. It is said that the time of rice-harvest is so unhealthy that the masters frequently leave the district during the time.

When the rice has been cut down by the men with their sickles, the straw is kept for fodder for the horses and cattle, during the hot weather. The ear is sometimes stacked. Sometimes the grain is trodden out by cattle, and sometimes it is beaten out in large stone mortars. Great quantities are not separated from the husk, in India, but are sent over in the ear, like that in the Great Exhibition. The rice thus sent in the ear is called *paddy*. Several new and ingenious machines have been invented for separating the grain from the husk.

There are many descriptions of rice; it is said that the varieties are innumerable—at least, from forty to fifty different kinds are known.

W. Yes; I know a great many,—I have seen their names on great tickets in the grocers' shops,—such as the BEST CARO-

LINA RICE—PATNA RICE—CEYLON RICE. I have heard, too, of EAST INDIA RICE, and MADAGASCAR RICE. There is rice marked at 1½d. per lb., 2d., 3d., 4d., and 5d. per lb. I have never noticed any at 6d.

P. I have bought cheaper rice than any you have mentioned. There is a rice called *cargo-rice*, which is sold for a penny per pound—often for less. It is so called, because it is brought over in ships as “ballast”—a substance used to make the ship heavier, when the cargo is so light that the ship is not deep enough in the water. This is brought from the East Indies, and is generally used for feeding poultry. In fact nearly all that is sold so cheaply is East India rice; it is not so *nutritious* as the best rice.

W. I have noticed, papa, that some of the cheap rice is very small and much broken.

P. Yes, rice is a very brittle grain. The rice for which you pay 5d. per pound is not so broken, because it has been screened (or sifted).

W. Just like the coals; I have heard of “the *best screened coals*”—the small coal is sifted away from them.

P. Before we make up our lesson, you may notice the *qualities* of the rice.

L. I notice first, papa, that it is very *white*, and that it seems to be a very *hard* grain.

W. And it is *pulverable*; it makes a very nice powder.

Ada. And when you boil rice it *swells* very much; why is that?

L. That is because it absorbs the water—it is *absorbent*.

W. And it nourishes us—it is *nutritious*.

Ion. And it is *wholesome*.

P. I will tell you a peculiarity which distinguishes it from other grain. You seldom see bread made of rice. This is because it consists almost entirely of *starch*, which will not form a dough tough enough to rise. It is, therefore, principally used for puddings, or cooked in some other way. We will talk more on this subject when you have the history of wheat. You may now write the lesson on Rice.

W. I have brought my slate, and have written "*Object Lessons from the Great Exhibition*" on the top; so you may begin as soon as you please!

Lesson 1. RICE.

1. (History.)—*Rice is the seed of a corn plant found in the EAST INDIES, CHINA, ARABIA, EGYPT, the WEST INDIES, and other tropical countries. It originally grew wild in the warm parts of Asia, but on account of its usefulness to man it was soon cultivated in every country where it was found that it would grow. Thus we find it growing in the south of Spain and Italy—countries which are outside the tropics.*

The method of cultivating rice is peculiar. The soil in which it grows is always kept in a state of moisture. When the green shoots from the seeds are still very young, the rice-field is flooded with water. This flooding has to be repeated two or three times, until the grain is ripe. We find,

therefore, that the most suitable place for its cultivation is in some low level plain near a river. Some species of rice can be grown without any greater moisture than that supplied by the rain. The rice-harvest is very unhealthy, as in some countries the reapers have to work in mud, which is often knee-deep. On the other hand, the matter left by the inundations is so fertile that no manure is ever necessary.

2. (Different sorts.)—*There are several different sorts of rice, differing very much in their quality and price, such as PATNA RICE, CAROLINA RICE, EAST INDIA and MADAGASCAR RICE. The common CARGO-RICE, sold at 1d. per pound as food for poultry; and the best SCREENED RICE.*

3. (Description and qualities.)—*Rice may be distinguished from other grasses and corn-plants, first by its ear, which is loose, while each grain has a long awn or beard. The grain is white, hard, opaque, pulverable, and very absorbent, containing more starch than any other corn-plant.*

4. (Uses.)—*On account of the latter quality rice is not much used for bread, as it does not rise or form a good tough dough. It is principally used for puddings, cakes, blancmange, &c. The hardness of rice when dry, also renders it useful for making chimney-ornaments, &c. In China, paper is made from rice; specimens of "rice-glass" have also been seen.*

L. Willie has made a rather long lesson for us. Are we to commit it to memory as we do the other lessons?

P. Certainly. It will be better to commit each lesson to memory as you proceed. Do

not begin a new lesson until you can say the preceding one "by heart;" otherwise your lessons will be almost useless.

P. If you leave the Indian department of the Exhibition and walk into the department belonging to the WEST INDIES—

W. Where is that, papa?

P. The West Indian department is beyond that of Canada, as you enter from the nave. This part of the world has no distinct department, for scarcely any productions have been sent from there. In the same room are the productions of New South Wales, and of the islands of the Indian sea; the productions of the Bermudas Isles, and of British Guiana—a colony of Great Britain, which you may look for on your map. It comprises three divisions—Demerara, Essequibo, and Berbice.

Now, as most of these places lie in or near the tropics, the productions sent by them are very similar. The next article of food we shall notice is—

2. MAIZE.

You will find a *box* of maize in the West Indian department, and I have brought you an ear to examine.

W. Why, papa, this is *Indian corn*! I have often seen Indian corn. How much larger it is than the corn of our country!

P. Yes; Indian corn is only another name for maize. Here is the whole plant for you to examine—tell me what you observe.

W. I observe that the stalk

is much thicker than that of wheat. The plant does not look as though it belonged to the grasses.

Ion. And I notice that the seeds have a different shape from the grains of wheat, they are almost round.

L. And I notice their different *colour*—some are yellow, others are white, and others are of a dark red.

P. And I have seen some which are a dark purple colour, almost black. We need hardly describe the plant after your former description of the corn plants. The only point I would wish you to notice is, the number of grains in each ear. In some of the largest ears there are as many as 800 grains, and each plant generally bears two full ears.

MAIZE is the most important corn-plant of the tropical countries after rice. Like rice, it will flourish in the *warmer* temperate countries. It may be grown even in England, but as the frost is sure to destroy the young plants directly they make their appearance above the ground, it has to be sown very late in the year; it therefore does not always ripen properly before the winter begins again. It is grown also in the United States, and other parts of America which are not tropical; there it is much used, and forms the only bread which the poor negro slaves eat.

L. Does maize make better bread than rice, papa?

P. Yes; but the bread is still not so good as that made from our wheat. It is better when

mixed with wheat; if not, it is dry and husky.

However, it is an article of food to an immense number of the people under the tropics; but it is not eaten so much in the shape of bread,—it is formed into a boiled mass, or soup, just as we boil peas to make pea-soup. Before they are ripe, the large ears of maize are also used as a green vegetable, being boiled, or stewed, or baked.

Ion. I have seen maize growing, papa. I knew a boy who planted a seed in his garden, and it grew up a fine plant. It did not require so much water as rice does.

P. No. Being so different a plant from rice, it is very differently cultivated. The seeds are sown by dibbling, and are dropt into the earth one or two at a time. As the stalks rise above the ground, the soil is hoed round them, so as to form a small hillock. Each plant is hoed separately, three times before it is ripe,—sometimes four times, if the expense of labour be not too great. Before the harvest time the maize is often thinned, and the stalks and leaves of the green plants then cut down, form famous fodder for cattle.

But the *seed* is not the only part of a plant used for food; men sometimes eat *pith*.

W. Then they must be very nasty fellows! I should not like to live in hot countries.

P. But, the pith is so nice that it is sent over to the people of the *temperate* countries in great quantities.

W. And do they *eat* it?

P. Yes, *you* do. Not long ago, I saw you enjoying some which had been boiled with milk.

W. You cannot mean Arrow-root, papa. That is the root of a plant.

P. No; in the same department of the Exhibition you will see several specimens, most of them sent from Borneo and the islands of the Indian Sea. Each specimen is called "Sago."

3. SAGO.

Sago is a Malay word, meaning *bread*. If you were to ask one of the natives of the Malay isles how he procured such "bread," he might take you up to a tall palm tree.

How you admire and wonder at that glorious palm! Its height would, perhaps, be twenty-five to thirty feet (or as great as that of five men). Its thick, massive trunk, is not tapering like that of some palms, but almost as thick at the top as near the root. From the top of the trunk branch out an enormous tuft of leaves, having the appearance of a huge shuttlecock. When they are covered with a whitish powder, the tree is fit for use, and it is cut down with a saw, or other instrument. This is the only proper time for cutting down the tree, for that white powder is a kind of starch prepared by the tree to nourish the flowers and fruit, and it only makes its appearance on the leaves, just when the flower-buds begin to appear. If the tree be left for the flowers to grow and the fruit to ripen, they will both derive their nourishment

from this starch, and from the pith inside; then if the tree be cut down, you will certainly have ripe fruit, but the trunk of the tree will not contain much pith, it will be little more than a hollow cylinder.

Ion. But how do the natives make the pith into sago?

P. Why, in the first place, down comes the tree! as I said. When the natives have laid the huge trunk low, they proceed to cut him across in five or six pieces. They then split each piece, and take out the pith. The pith is rather sticky and gummy, but it is washed in water, and the gum then rises to the top; this water is strained off, and the sago is washed a second or third time. When the water is finally poured away, the dried sago, which is really the *starch* of the pith, forms a powder.

It is seldom used in England in this state, but by a curious process in which it is half baked, it is brought into the shape of small grains, about the size of a pin's head. Sometimes it is prepared in grains of a larger size, and then it is called *pearl-sago*.

L. Do the natives get much sago from one tree, *papa*. I should think that by cutting down the trees in that manner, the sago would soon be all eaten up.

P. No, that is not the case. The tree grows in low marshy situations, and as the root remains, after the tree has been felled a new stem springs up, which grows until it is again fit for the axe. Besides, the

quantity of sago yielded by one tree is prodigious—it is not unusual for one palm to produce between 500 and 600 pounds.

I need not say anything about the uses of sago, except, “Don't you, Willie, ever again call people ‘nasty’ for eating *pith*.” I may just add that sago is so abundant, that, being a kind of starch, it is not *only* used for food; it is used in the manufacture of calico, as a dressing to give firmness and a fine surface to it.

L. Are there any more articles of food, *papa*, in that department?

P. Yes. In several places in the department, you will see specimens of food prepared from the *root* of a plant, the substance we call—

4. ARROW-ROOT.

ARROW-ROOT is grown not only in the East and West Indies, and the Spice Islands, but it is found in the Bermudas, two little islands, which, if you take your map, you will observe to be situated in the midst of the Atlantic Ocean, on the way to America. Like sago, it is really the *starch* of the plant, although it is procured from the root. Similar starch may be procured from a root grown in our country, and called the *potato*.

L. Why is the root of this plant called *arrow-root*, *papa*?

P. The Indians of South America were accustomed to use the juice of another plant of the same species, not for the

purpose of poisoning their arrows, as is generally supposed, but as an *antidote* to the poison in which the arrows of their enemies were dipped.

In preparing the arrow-root, the root, or *tuber*, of the plant is first carefully washed, to remove the particles of earth sticking to it. The root is then put in a wooden mortar, and is beaten into a state of pulp. The pulp is then mixed with a great quantity of pure water, by which means its fibres are easily separated from the starch. The mixture of pulp and water is strained through a hair sieve two or three times, each time a finer sieve being used. The water then has a milky appearance, which is caused by the particles of the starch. It is next exposed to the air and sun, and after some time it evaporates, or "dries up," as we say, leaving only the starch in a fine power.

A very large quantity of arrow-root is consumed in Britain every year, as it is very nutritious, and very easy to be digested. It is used for young children, and persons in delicate health.

Arrow-root is not the only food procured from the *root* of a plant which the natives of tropical countries use. You may also see in the grocers' shops, and I daresay have often eaten, a white substance, something like sago in its appearance, except that it is prepared in larger lumps or grains.

L. I think, papa, that you mean *Tapioca*.

P. Yes; in the same room

in the Exhibition are specimens of this food.

5. TAPIOCA.

This substance is prepared from the root of a plant called Cassava. There are two kinds of this plant, that with a sweet root, and that with a bitter. The sweet Cassava root is known by a long fibrous cord running through the centre, while the bitter has a highly poisonous juice. On account of the inconvenient "fibrous cord" in the former plant, the bitter cassava is preferred, and is largely cultivated.

Ion. But the *poison*, papa! Are the natives more fond of poison?

P. No, but that is easily removed by heat, so that after baking, the poison is "volatilized;" that is, its particles fly off in invisible vapour.

In manufacturing tapioca, the roots of the cassava are first peeled, and are then ground between millstones into a state of paste. This paste is pressed very tight indeed, so as to squeeze out as much of the juice as possible; it is then placed in a vessel over a fire, and stirred until the moisture has entirely evaporated; when it is thus dry it has a granular or lumpy appearance. It is cooled, and packed in barrels, and is then fit for use.

Tapioca is a very nutritious substance. It is said that half a pound of it per day is sufficient to support a strong man, but I almost question whether the tapioca *alone* would be sufficient.

W. Do the tropical people feed on any other roots, papa?

P. Yes. There is a large ugly-looking root, which looks something like an immense potato. Thousand of poor slaves get little else but this. It is called "Yam."

6. THE YAM.

If you like potatoes you would like *Yam*. It is hardly right to call a yam or a potato a *root*. They are not useful in sucking up the juices of the earth for the plant, they are themselves formed from such juices, just as the plants are; and on examining a yam or a potato, the fibrous roots will be found attached to them.

The plant itself is a twining plant, with a long trailing stalk, which sometimes extends along the ground, and sometimes twines round another plant. In some species of yams which trail along the ground, the stalk has knots or joints; and at each joint it strikes a root into the earth. At first, these roots are only very small fibres, but as they become stronger, and grow larger, they form a small tube, which in time grows into a large yam.

W. How large, papa?

P. That depends upon circumstances; perhaps as large as your head, Willie. There is a much greater variety in the size of yams, than in the size of potatoes. Some yams have been known to weigh 30 pounds, and I have even read of yams weighing 45 pounds. The common weight is about 2 or 3 pounds. The skin of a yam is thick and

rough, and of a violet colour, but it is often so dark as to appear quite black. Inside it is almost white, and when boiled it is firm and mealy like a potato. It is exceedingly nice, and forms very good food indeed for the natives. Sometimes, instead of boiling the yam, they cut it into slices, and expose it to the sun to dry.

Yams are cultivated almost in the same way as potatoes; the root is cut into pieces, and each piece forms a new plant; that is, provided each piece contains an *eye*.

Now, Willie, will you count up the principal substances of food which I have spoken of?

W. Yes. We have heard of rice, maize, sago, arrow-root, tapioca, and yam. I suppose that there are no other roots which afford food?

P. Yes; the tropics yield many more nutritive roots, but they are not all known in England. You have now heard of the principal ones.

Ion. I should like, papa, before you begin a new subject, to make *one lesson* of the subjects we have heard of since the lesson on rice.

Lesson 2. MAIZE, &c.

MAIZE, or *Indian corn*, is a large corn plant, affording bread to thousands of the natives of tropical countries. The plan of cultivation differs from that of rice, as it does not need so much water. It cannot be grown well in cold countries, because the frost nips the buds as soon as they begin to shoot. Maize alone

does not make such good bread as wheat.

SAGO is a part of the dried pith of a palm. It is the "starch" of the pith, being separated from it by repeated washings. A sago palm is a very large tree, and will yield as much as 500 pounds of sago.

ARROW-ROOT is the starch of a root or tuber. It is so called because one species of the plant from which it is procured contains a juice which is an antidote to the poison on the arrows of the Indians.

TAPIOCA is also the starch of a root or "tuber." It is procured from the CASSAVA plant. The bitter cassava contains a poisonous juice, but it is preferred to the sweet cassava, which has a fibrous cord passing through its centre.

YAM is a fine tuber, larger than the English potato, and very similar. It is the common food of the negroes in the West Indies, and other poor natives of the tropics.

Since you have written that lesson, Ion, I have remembered that there are in the Exhibition specimens of another food, which you have often seen and used.

Ion. I do not remember any other.

W. Nor do I.

P. Yet you have often seen it. I will mention its qualities. First, it is *hard*.

W. Yes.

P. Secondly, it is *tough*.

W. Yes.

P. Thirdly, it is not fleshy, like a tuber, but the hard substance consists of fibres. It is *fibrous*.

W. Well! I don't know what it is. Do you, Ion?

Ion. No; but let us hear some more "qualities" first.

P. It is sometimes a *dark brown*, outside,—sometimes it is *white*,—its general colour inside is a *yellowish white*.

Ion. I don't know it.

P. It is *dry*.

W. Yes, very—and very uninteresting, because we don't know what you are talking about.

P. It is *odorous*, it is *aromatic* in its smell. Now, have you got on the right scent?

W. I have never heard of such a root!

P. It is not used entirely as a food, but only *with* food, as a "condiment." It is sometimes used as medicine—so I may add it is *medicinal*.

W. Oh! Perhaps it is Rhubarb.

Ion. No. Rhubarb is not *white*, although it is *hard*, and *dry*, and *fibrous*, and *odorous*.

P. In its shape it is very irregular, a sort of jagged, *knotted* shape. In its taste it is very *pungent* and *hot*.

W. Now I know!

P. And when used, it is seldom bitten in large pieces; it is first rubbed on a nutmeg-grater into little shreds, or a powder.

L. Yes. It is called GINGER.

W. That is its name. Of course, there must be specimens of ginger in the Exhibition, I should think.

P. Yes, let us proceed with our lesson.

7. GINGER.

W. We will make a regular

"Object lesson" of this ginger, papa. Please let us discover its qualities ourselves.

Ion. I will run down stairs and will ask the cook to give me a piece out of the spice-box.

P. Stop, *Ion*! you may bring up the spice-box, as we shall find there many objects from tropical countries.

W. Well; you told us some qualities, papa. Ginger is hard, tough, fibrous, yellowish white, dry, odorous, aromatic, knotty, pungent, and hot.

L. And *medicinal*. Here comes *Ion* with the spice-box! Now that we have the ginger itself, I do not see many more qualities.

W. Then *feel* for some, *Lucy*. Please lend it to me. It is not at all heavy, so there's a quality—it is *light*!

Ion. I have thought of something, papa. You say it has an aromatic smell; and simply because it has a smell, you say it is *odorous*. What do you say of the ginger because it has a *taste*?

P. We say it is *sapid*; that is another quality.

L. And you may say that it is *rough*,—it has not a smooth skin like an apple.

W. And because it does not grow in England, but in foreign countries, we may call it *foreign*.

Ion. And because it grows in tropical countries, we may call it *tropical*.

L. And because it has no life, we may call it *inanimate*.

W. And because it may be ground into a powder, we may call it *pulverable*.

Ada. And because we cannot see through it, we call it *opaque*.

P. Yes; and you may call it by a great many more names, for every object has a surprising number of "qualities," if you try to find them all. But, instead of talking so much of the general qualities, let us choose those which belong to the ginger in particular—which *distinguish* it.

W. The only other "particular" quality in ginger, which I know of, is that it is useful sometimes to preserve other things—it is *conservative*.

P. And you may add that it is used to render food more pleasant to the palate, so as to excite the appetite, or stimulate it, as we say. We therefore call it *stimulating*.

W. I should like, papa, to write down its qualities once more; and to remember them better I should like to put its general qualities by themselves, and its particular qualities by themselves. We have done so before with other lessons.

GINGER is a

PARTICULAR QUALITIES.	GENERAL QUALITIES.
rough	opaque
fibrous	light
yellowish white	dry
jagged	pulverable
knotty	inanimate
hot	foreign
pungent	dull
aromatic	hard
conservative	tough
stimulating	and
and	solid
medicinal	
root. It is	
also	

Now, papa, may we learn the uses of ginger?

P. Yes. You shall learn its uses and its history together. It is not more proper to call ginger a root, than the yam. It is really a kind of underground stem—the real roots are only the fibres which grow from its surface underneath, and penetrate the soil.

The ginger plant is something like a reed or a flag, such as you see in the garden. Indeed, the root of the common garden flag grows almost exactly in the same way as the ginger; for the ginger “stem” (or *root*, as we generally call it) does not descend deep in the earth, but spreads out from each side. From the roots there rise, in the spring, the long narrow lance-shaped leaves of the plant, and separate stems bearing flowers, which are white and lilac in colour.

The plant is sometimes propagated by seed, and sometimes by cuttings from the root; these cuttings are planted out in the spring; and, in the course of three or four months, the shoots from the young underground stem have a flavour which is mild, compared with that of the ginger we use. The young root is called *green* ginger, and it is gathered to be preserved in sugar. It thus makes a beautiful preserve, or sweat-meat. The ginger which we have for use is not taken out of the earth until after the first twelvemonth, or even a longer time. Then, when the root stocks have been collected, they are prepared in two ways.

The common roots are merely scalded in boiling water, and are then dried in the sun. They thus have a very brown appearance, and are called *black* ginger. The better kind of ginger is peeled. The skin is simply taken off, and it is dried in the sun without being dipped in hot water. It is then called *white* ginger. The qualities *pungent* and *aromatic* are much stronger in white than in black ginger.

Ginger is one of a class of tropical productions used in this country with our food. This class are distinguished particularly by their *aromatic* flavour, and are called *spices*. See, Ion, if you can find any other spice in that box.

Ion. Yes; here is a spice called Nutmeg.

P. This also is found in the Exhibition. In the department containing so many tropical productions, there are thirty-six very pretty drawings, the work of a Malay artist. They have been sent by W. P. Hammond & Co., Merchants, London. Here you may see the different trees and plants on which the spices grow, and beneath each drawing is the spice, or the fruit, or the gum itself. From this contribution to the Exhibition may yet be drawn many more lessons.

8. NUTMEG.

P. Should you think that this also is a root?

L. No it appears more like a seed or a stone. Is it the stone of any fruit?

P. It is the *kernel* of a fruit

which hangs from one of the most splendid trees in the tropics. This tree is not at all like the palm-tree, but belongs to a family which is widely different. It is not unlike the cherry tree, but is larger. The fruit as it hangs from the tree is green and pulpy, about the size of a peach. Each fruit hangs on a long stalk. On examining one, you would find that the green part is only an outside coat, just like the outside green coat of a walnut. Like that of a walnut, also, it opens as soon as the fruit is ripe.

On taking off this outside covering, you find a large round nut, which is covered with a thin membrane, like network. This is of a bright scarlet colour, and is called *mace*. After carefully removing this, you find the nut underneath it to be of a dusky brown colour. On cracking the woody shell, you find inside a kernel which you call *nutmeg*. How many coverings has the nutmeg?

Ion. Three, papa. The woody shell, the scarlet membrane round the shell, and the large green pulpy husk, which is outside the scarlet membrane.

The best time of the year for gathering nutmegs is in April; they are also, I believe, gathered at two other seasons—in August and in December; but the April gatherings are the best. It is not well to open the woody shells directly they are picked, as the nutmeg is found to be rather soft and oily. Generally, after the mace has been removed, the shells are dried in the sun; and then, being placed

on a frame of bamboo canes, they are held over a slow fire. When, on taking up one of the nuts, it is found that the nutmeg rattles in the shell, they are then ready. The shells are broken open, and the nutmegs are taken;—many of the shells do not require cracking, but are found to be already cracked with the heat.

The collected nuts are then sorted, and are dipped in lime-water to preserve them from insects. Some, however, are not dipped in lime: this you may notice at the Exhibition, where you may find “limed” nutmegs, having a white appearance; and other nutmegs which have a brown appearance, because they have not been dipped in lime.

Nutmeg abounds with oil. Every pound of nutmeg yields an *ounce* of what is called “fixed” or “essential” oil; while it also contains a large quantity of “volatile” oil, which is lighter than water. Nutmegs are often distilled to extract the volatile oil, and are then passed off as fresh. They are, however, of very little use, as all the “goodness” has thus been taken out of them. The best way to try such nutmegs is to insert a hot needle in one; and if, on being taken out, the needle has *not* any oily coating, then you know that the nutmeg has been *spoilt*. You may also tell by feeling it, as such nutmegs are much lighter than others. I suppose that you know, pretty well, the qualities of nutmeg.

L. Yes, papa. Its “distinct-

tive" qualities are *aromatic*, *bitter*, and *pungent* in taste—rather *pleasant*, also, if a small piece be taken at a time. What other use has it besides that of flavouring our food?

P. It may, I believe, help in *digesting* our food, if a moderate quantity be taken. Or, if any one be suffering pains from wind or colic, the nutmeg is useful in removing them. But, if too much nutmeg be taken, it is found to affect the head, and produce sleepy diseases. It is, therefore, a bad thing, for I have even read that the constant use of too much nutmeg in the East Indies has been the cause of death!

Ion. Your speaking of the East Indies reminds me of something, papa. We have not heard of the "*place*" of nutmeg. In which tropical countries are nutmegs principally grown?

P. In *Ceylon*, an island at the south of India, and in the Spice Islands. Now it is also found in the *West Indies*.

Ceylon formerly belonged to the Dutch, but in the last great war, that island, and the colony of the Cape of Good Hope, were taken from the Dutch by the English. The Dutch still possess the Spice Islands, where the greater part of the nutmegs grow, but, when they also possessed Ceylon, the entire nutmeg trade was in their hands. They thus had what we call a *monopoly*, and they charged very high prices for the nutmegs; I forget now how much a-piece. Since then, however, it has been grown in the tropical parts of

America, and in the West Indies. We may add a few words about *mace*.

9. MACE.

Ion. We will say, first, that it is the thin scarlet membrane found outside the woody shell of the nutmeg.

P. You may say, secondly, that when taken off the shell and dried, it loses its brightness of colour, and changes to an orange coloured brown.

L. Well; I was thinking so, papa, for I was going to say that *I* had never seen any scarlet mace.

P. You may add, thirdly, that, like the nutmeg, it contains a strong "essential" oil, and that its taste is rather more bitter than that of the nutmeg.

Ion. Now, papa, shall we make up a lesson on Nutmeg and Mace.

W. And we have not made any lesson on *Ginger*.

P. You may make a lesson on these three spices, and then commit it to memory.

Lesson 3. GINGER, NUTMEG, &c.

(Qualities.) — GINGER and NUTMEG are two spices often seen together in England, and rubbed on the same grater. Ginger is a hot, pungent, aromatic, conservative, stimulating, and medicinal root, being yellowish, white, rough and knotty in shape.

L. Now let us see if we cannot say nearly the same of the nutmeg.

NUTMEG is a bitter, pungent, aromatic, conservative, stimu-

lating, and medicinal root, being brown, wrinkled, and oval in shape.

MACE has qualities similar to the nutmeg: it is rather more bitter, and is thin in shape, somewhat like a network.

(Uses.)—As the qualities of these substances are so nearly alike, their uses also must be similar.

W. Which is seen in their being so often found together in the nutmeg-grater.

(History and place.)—GINGER is grown principally in the East Indies. It is the underground stem of a plant resembling a reed or flag. There are three kinds—green ginger, black ginger, and white ginger.

NUTMEG is grown in Ceylon, the Spice Islands, and the West Indies. It is the kernel of a nut which grows inside a green-looking fruit, something like our walnuts.

MACE is the thin membrane found outside the woody shell of the nutmeg.

L. This lesson we will commit to memory. Are there any more spices in the Exhibition, papa?

P. Yes. I will mention one to you. It is of a spherical shape, sometimes black and sometimes white—sometimes rough and wrinkled, sometimes smooth. It is very pungent, very hot, and is pulverable. Unless it had the latter quality, it would not, I dare say, be so often brought to the dinner table, and used in connection with the salt.

Ion. Do you know what spice papa is talking about? It is pepper.

P. True.

10. PEPPER.

You may go to the West Indies, as well as the Spice Islands, to see the pepper growing.

L. Does it grow on a large tree, papa, like the nutmeg tree.

P. No; the pepper-plant is a creeper. It is not unlike a vine; sometimes it is called the pepper-vine. The outside of the leaves is of a deep green colour, the inside is of a more pale green. The berries, when ripe, become red, and then of a darker colour—almost black. A pepper-vine, when the berries are on it, is a pretty sight. As it is generally planted near a bush, it grows around it, or entwines itself between its branches, like ivy. Sometimes it is made to grow on a pole, like hops, while another kind of pepper trails along the ground.

There are two kinds of pepper. When the commoner sort is required, the cluster of berries are not allowed to ripen; they are picked when green, the seeds are not taken out of the berry, but are dried with the green berry on them, being exposed to the sun on mats, and thus dried quickly. By this process they turn black, and we call them *black pepper*.

W. Why, that is very much like the black ginger, that is dried with the skin on.

Ion. And to make *white gin-*

ger, the skin is taken off. I wonder whether it is so with the white pepper.

P. Yes, that is the case. To procure white pepper, the natives allow the berries to ripen. They are then picked; the bunches are rubbed as before, to separate the berries from their little stalks, and the red pulp is removed by washing. The seeds, which are white, are then taken out of the water and dried. Here are two pepper-corns—one is white and the other is black. Tell me what difference you observe between them!

W. The white, papa, is smaller than the black; the black is shrivelled and wrinkled, and the white pepper is smooth.

P. Yes; and there is a more important difference to be discovered by tasting. The dried outer skin on the black pepper gives it an unpleasant, fiery flavour, which you do not find in the white. Thus the white pepper is said to be better than the black.

Ion. Now will you tell us of the uses of pepper, papa? I have seen peppercorns in the pickle-bottle very often.

P. What should you think they are put there for?

Ion. To flavour the onions, perhaps, or else to help preserve them.

P. They are useful for *both* purposes; therefore what qualities would you say that the pepper *must* have?

Ion. To give a flavour it must be *sapid*, and to preserve the onions it must be conserva-

tive. Pepper is *sapid* and *conservative*.

P. It is also used for flavouring food, particularly in hot countries. It is said that 50,000,000 pounds of pepper are collected every year, and that of this large quantity only *one-third* is sent to the cities of Europe, and two-thirds are used by the Chinese. Like nutmeg, it helps in digesting food, and is very useful when taken with cucumbers, and other cold, raw vegetables which are hard to digest. But if too much pepper be taken, it is even more hurtful than nutmeg; it injures the liver. A very large dose of pepper is very likely to be fatal, by exciting inflammation in the stomach, and by injuring the nerves. Hogs are easily poisoned with black pepper.

P. In that same room of the Exhibition, I have seen many specimens of a spice, which at first appeared like long sticks. But on examination I found these sticks to consist of a number of thin pieces of bark rolled up together.

Here is a piece for you to examine; it is called Cinnamon.

11. CINNAMON.

W. I notice, first, that it is rather *thin* and *brittle*.

P. Mention only the qualities which render it different from the spices mentioned before.

Ion. It has a very nice sweet taste. I have a piece of the cinnamon in my mouth, and now I have got all the sweetness out

of it, and it leaves a sharp, hot taste.

L. And it differs from the others in *colour*. It has a very pretty light-brown colour.

P. There is a proper name for this colour—it is called "*cinnamon brown*."

The history of cinnamon has been long known. It is a spice which has been in use since the earliest times. The Greeks used it, and they procured it from the Phœnicians, a people whom I dare say you have heard of, as famous for travelling about in ships. They, it is thought, gave it the name *Kin-namomon*, from two Malay words which signify "sweet wood."

The tree from which the bark of the cinnamon is procured is a kind of laurel growing in the same countries as the former spices. When the plants are young they require a little shade; and, therefore, they are generally in some open space in the woods, where there are a few large forest trees to shade them.

The bark is seldom taken from the tree until it is about nine years old, and is becoming very strong. The natives begin the peeling in May, at the end of the rainy season; and continue it for five or six months. The operation is very simple; the bark is merely slit lengthways with a knife, the *outside* bark is then scraped off, and the inner bark is gradually loosened until it can be removed easily. It is then exposed to the sun, the heat of which causes it to curl up, just like the piece of cinnamon you see in my hand. Such

a piece is called a *quill* of cinnamon; and if we open this piece, we shall find that the smaller quills are rolled up inside the larger ones.

The same plan is not adopted in every place,—for instance, in some parts, the tree is peeled before the *outer* bark has been scraped away. The pieces which are taken off are tied in bundles for twenty-four hours, and during this time a sort of fermentation takes place. This enables the natives to separate the outer bark very easily, leaving only the pure cinnamon.

Ion. But, papa, I know a tree, the bark of which has been peeled off, and now it is *dead*!

P. That is because the bark has been peeled from the *trunk*, so that, as the winter comes on, the sap of the tree cannot descend; but the cinnamon is procured from the bark of the branches; such branches as are about three years old are the best; if they are too young, they have not sufficient flavour.

The inferior kind of bark is, I believe, used for the purpose of obtaining oil of cinnamon. The best cinnamon is wrapped in double cloths, made of hemp, and is packed in *bales*.

L. We know the common uses of cinnamon, papa. Can it be used as a medicine, like nutmeg or pepper?

P. Yes; being the bark of a tree, it contains an astringent property called *tannin*.

Ion. What do you really mean by "astringent," papa. I can tell an astringent taste, because anything with that taste seems to draw up my tongue.

P. And that is why we call it "astringent." The word is derived from the Latin *astrin-gere*, to draw together; and an astringent substance really *draws together* the particles of your tongue and of other substances. Tell me something that is *astringent*.

Ion. Alum is—very.

W. And so are sal-prunella balls—very, very!

L. Ginger, we said, is rather astringent; so are nutmeg, mace, and tea.

W. Have you ever tasted *nut-galls*, Lucy, which are used in making ink? They are astringent,—and so is the ink itself.

P. Nut-galls are procured from the oak; and the *bark* of the oak, as well as all other barks, has, as I said, an astringent property, called *tannin*. The tannin of the oak-bark is used to convert the skins of animals into leather, which it does by *drawing together* so closely the particles of the skin, that it becomes more tough and firm, and the wet cannot easily penetrate it.

Now, the tannin of the young bark, cinnamon, is not strong enough for this purpose, but it contains enough astringency to serve other purposes in the stomach; especially where the digestive powers are weak, and in case of bowel-complaint. It is also useful sometimes in cases of fever.

W. Yes; I have seen cinnamon-powder in Mr. Phial, the chemist's, shop. It is nearly of the same colour as this piece of cinnamon.

Ion. Now we will make a "memory lesson" on Pepper and Cinnamon, before papa teaches us anything more.

Lesson 4. PEPPER and CINNAMON.

PEPPER is the seed of a berry, produced by a climbing plant, called "*the Pepper Vine*." CINNAMON is the "*inner bark*" of the young branches of an evergreen, or laurel.

Pepper is used as a "*condiment*" with food, and is useful to assist digestion, particularly with raw vegetables, such as the cucumber.

Cinnamon is used to flavour puddings, &c. Being the bark of a tree, it has the astringent property "*tannin*," which renders it useful as a medicine also.

P. There are still more spices in the Exhibition. Would you like to hear of the rest?

W. Yes; I should like to hear of all of them, now that you have *begun* their history.

P. Then here is a spice which very much resembles one we have heard of before.

L. Ah, it looks like a pepper-corn.

P. It is not, however; it is called ALLSPICE.

12. ALLSPICE.

P. Look at it; tell me what you think it is. Is it a seed, a root, or a bark?

L. It looks more like a seed, papa; and yet it cannot be, because now that I am shaking it, I can hear something rattling inside. May I open it?

P. Yes.

Lucy. Come here, Ion and

Willie, and look! The Allspice has a partition which divides the berry into two cells, and there is a pretty little seed in each, so that the allspice is not itself a seed.

P. No; it is the dried berry, or seed-vessel. Its qualities and uses are like those of the *nutmeg*, *mace*, and *cinnamon*. Its flavour seems to unite the flavour of all other spices, and this is why it is called "Allspice,"—its real name being *Pimento*.

This berry grows principally in the West Indies, on a species of myrtle. In Jamaica especially, it is cultivated with great care, and is there called "Jamaica pepper." The myrtles abound on the hills, thriving in rocky lands, or rich soil which has *gravel* at the bottom. The trees are most beautiful objects, especially when they are in blossom, as they are then loaded with bunches of white flowers, which have a most fragrant smell.

Some of the old trees are thirty feet in height, but they begin to *bear* when they are three years old. They are not in perfection, however, until they have reached the age of seven years. They are generally arranged in regular walks. So nice is the flavour of the berries, when they are fully ripe, that they are a favourite food of the birds. They pick them and carry them away, but in doing so they often drop some of the seeds, so that they are said to be more industrious planters of these trees than the natives. To serve as a spice,

however, these berries must be picked *before* they ripen, as their taste, when ripe, is not so strong. The birds only like the *full-ripe* berries, because they have lost their aromatic and hot flavour. They are gathered by hand, and are dried by the sun almost in the same way as the black pepper. The berries are known to be dry enough when the rattling of the seeds inside can be heard.

Ion. Here, papa, is another spice which we have not yet heard of. What a curious *shape* it has! It is something like a short nail, such as the shoemakers use.

P. Yes; and it is supposed to have derived its name from that circumstance. The French word for nail is *clou*, and this spice is called a *CLOVE*; which name is generally believed to be only a "corruption" of that word.

13. CLOVES.

P. Examine this little clove, and tell me how many principal parts you see.

Ion. I see *two*, papa; the long straight part with the four points which project, and the little round knob which is fastened to the end of the straight part; but what to *call* either the straight part or the knob, I do not know.

P. Then I must tell you. This straight part is a part which is common to all flowers; it is the cup in which the flower is placed. "Flower-cup" is a very good name for it—but the

name given to it in general is the *calyx*.

Ion. And now that you have told me that, papa, I see that the little *knob* looks something like a little bud of a flower.

P. Yes; and if you will fetch a cup with some warm water, and put the clove in it, you will find that this bud can easily be opened.

The clove, like the other spices, grew originally in the Spice Islands; but it was afterwards transported to the New World, and is now flourishing in the West Indies as well as in the East.

The tree is a species of laurel. At a certain time of the year the tree brings forth very large and abundant clusters of flowers, and before the flowers have opened, when they are too small to hide the four points of the *calyx* which you noticed, *Ion*, they are picked. They are next smoked over a wood fire, and then are finished by exposure to the rays of the sun.

Each tree yields a large supply of cloves. Trees 12 years of age will yield from 5 to 20 pounds weight every year! It is rather difficult to imagine correctly how many cloves are required to make a *pound*. As the tree becomes older the produce increases, until they are known to yield as much as 60 pounds! After that the yearly quantity diminishes. A single tree, however, may live 150 years, and during that time it may supply 1,100 pounds of cloves.

Do you notice any peculiar quality in the clove?

L. Yes, papa; I have been biting one, and the taste is very strong and pungent indeed, stronger than that of pepper, or any other spice. The *smell*, too, is very strong.

P. That is because of the "essential oil" it contains. The quantity of this oil is so great, that it may be pressed out by the finger. Sometimes the oil is pressed out before the cloves are sold, but such a proceeding is a very unfair one, as they then have very little smell or taste.

L. It is as unfair as the practice of depriving the nutmegs of their oil. But what is the use of the oil of cloves?

P. The oil, being the *essence* of the cloves, may be diluted, and used for the same purpose as the clove itself; but being at the same time much stronger than the clove, it is used for curing the toothache.

Ion. I suppose that that is because it is so hot and stimulating. Have you finished the account of the Clove, papa?

P. Yes, I have nothing more to add.

Ion. Then I will sum it up, all of it, in one sentence. "THE CLOVE is the unopened bud and the calyx of a laurel; it is distinguished from the other spices by its very strong and pungent flavour, and is called Clove from the French word "*clou*," a nail, because it resembles a nail in shape.

P. You have now heard of the principal spices found in the Exhibition. I think it would be as well for you to make another short account of each, and ar-

range them together so as to form one lesson on the whole class.

W. We can easily do that, papa, and we will commit the whole account to memory.

Lesson 1. ARTICLES OF FOOD
(*Tropical Climates*).

THE SPICES.

The Spices are a class of vegetable productions, distinguished by a peculiar smell, called "aromatic," and a strong pungent taste.

In this class are included—

1. *A yellowish-white, rough and knotty root called GINGER.*

2. *A brown, wrinkled, oval-shaped kernel, called NUTMEG.*

3. *A thin, scarlet membrane, called MACE.*

4. *A small, wrinkled, spherical seed, with a very hot, pungent taste, called PEPPER. It is found inside the berry of a climbing plant called the Pepper Vine.*

5. *The inner bark of the three-year-old branches of a laurel; it is of a light brown colour, and is called CINNAMON.*

6. *The dried berry, or seed-vessel, of a myrtle, which, from its having a flavour like that of all other spices, is called ALLSPICE.*

7. *The calyx and unopened bud of a laurel, which contains a strong essential oil, and has a taste more aromatic, and even more hot and pungent, than pepper. From the resemblance of its shape to that of a nail, it is called CLOVE.*

P. There are in the tropics more foreign fruits worth men-

tioning, such as the Cocoa-nut, the Date, the Banana, Bread-fruit, &c. And there are other articles useful for food, although they are not sufficiently nutritious to support life. They are used particularly as drinks.

L. Such as TEA, papa.

P. Yes, that is one which you know comes from China, and is grown rather on the borders of the tropics than in the very hot countries.

W. COFFEE is another substance.

Ion. And COCOA.

Ada. SUGAR, too, comes from hot countries.

P. True; the three last were included in our course in PLEASANT PAGES. I may supply a few additional particulars on each, but the principal of these subjects will be TEA. Suppose that we take tea next.

14. TEA.

If you wish to find specimens of tea in the Great Exhibition, you will find several in the CHINESE DEPARTMENT; I must repeat, however, before beginning our lesson, that tea is not strictly a tropical plant. It will grow inside the tropics, but not in the very warm climates. It is cultivated by the Chinese, particularly in the tract of land round about the thirtieth degree of latitude.

Here are some specimens for you to examine. You may begin by discovering the *qualities*, and the *uses*. Then, if you have paid attention to your part of the lesson, I will pay attention

to my part, and see if I can give you an interesting *history*.

W. The first quality I observe in the tea is, that it is thoroughly *dry*.

Ion. It is also *brittle*—“*crisp*” would be a better word to use;—and it may be ground into a powder; it is *pulverable*.

L. It is *shrivelled*—that is a very good word to apply to it.

W. I do not see any more qualities. We have examined its appearance, and its substance: we cannot say anything of its shape, but we may add something of its colour, and something about its weight. It is *black*, and *green*, and in weight it is *light*.

Ion. We may add that it is a *vegetable substance*. It is really necessary to say that to describe it properly.

P. Why?

Ion. Because nobody would really think that it was a vegetable substance at first sight.

W. That is because it does not look natural. I suppose we must not call it a *natural substance*. We will say that it is artificial.

Ion. I don't think that that is correct. It is not made by man.

W. Well, I have heard that it is. Men dry and shrivel it up, in some way or other, to make it like this. Therefore I think that it is an artificial substance.

Ion. But at the same time, you see, men do not make it,—they only alter its *shape*.

L. And they alter its *state*—from a moist green state to a dry state.

P. You say that it loses some of its moisture. By thus losing its moisture, it loses one of its *qualities*.

W. Yes. One of its natural qualities, papa.

P. Then it is no longer in quite a natural state. It has been changed by the art of man, so it is in an artificial state.

Ion. And yet, papa, the tea-leaf is a natural *substance*, because men could not in any way make such a substance. When a substance is *compound* (that is, formed of two or three different substances—such as bread, which is made of flour, water, yeast, salt, &c.), then I call it an artificial substance. So, this is what I should say of tea—“It is a natural *substance* in an artificial *state*.” Will that do?

P. Perhaps that is the best way to express it. It certainly is not an artificial substance; and it is not in a natural state.

Ion. Then I will write down the qualities of the tea. “Tea is a *vegetable substance*, and is therefore *natural*; but it has been brought into an *artificial state*, for it is *dry*, *shrivelled*, *crisp*, *light*, and *pulverable*; sometimes it is *black*, and sometimes *green*.”

P. You have not made a complete list of the qualities. I think I have said before, there are many hidden qualities in a substance, which you cannot discover by observation.

L. You mean, papa, the qualities which we discover in using a substance. We call them its *effects*.

W. I know one effect of tea;

it causes people to talk, and be more lively. When people are dull, it serves to *stir them up*, just as coffee does. What is the Latin word for “stir-up”? I forget.

Ion. I remember it. *Stimulāre*, to stir up; and we call the coffee *stimulating*.

L. And, if you remember, we said that coffee is *refreshing*; and because it makes people glad, we call it *exhilarating*.

W. And, because it acts as a medicine, and keeps the students from going to sleep, we call it *medicinal*.

P. Yes. You said that the coffee, in its “effects,” is refreshing, stimulating, exhilarating, and medicinal: and these effects also belong to the *tea*.

W. It is very easy to know that tea has such effects, because we can feel them, and can notice them in other people, but I should like very much to know *how* the tea does so. Do you know, papa?

P. What do you want to know?

W. *How* the tea exhilarates people, and refreshes them. What it does *inside* them, to change them so.

P. Well, I cannot say that I know, exactly, but I will tell you all I have learned about it. There is, both in the leaves of tea, and the berries of coffee, a peculiar substance which produces these effects. Although this substance is found in both articles, we give it different names. When found in *tea*, we call it “Theine;” and when found in coffee, we call it “Caffeine.”

I have a little book on chemistry, written by a German gentleman named *Liebig*, and I will read you what he says of *Theine*. “When common tea leaves are placed in a watch-glass, loosely covered with paper, and gradually heated on a hot iron plate, until they are brown, *long white shining crystals* appear on the paper, and on the surface of the leaves. This is *theine*.” You can now easily understand that, if instead of heating the leaves on a watch-glass, they are heated in boiling water, the theine would not form dry crystals.

L. No, it would be dissolved in the water.

P. That is the case. So, the next time you are going to drink a cup of tea, you may look at it and remember that it is the theine dissolved in the water, which will refresh you.

W. Now I know something more, papa. But still you have not told us *how* the theine in the tea refreshes us.

P. I will tell you as much as I know of the subject. You have often heard how, when your food is being digested, it is dissolved by a fluid called the *gastric juice*. The food is afterwards acted upon by another fluid from the liver, which we call *bile*; but if we have not sufficient bile within us, what then?

L. Then our food will not be digested, I suppose.

P. And we shall feel unwell. Persons who do not take sufficient exercise, do not form sufficient bile; but the theine in tea will supply the substance

required for the purpose. This fact explains why men who sit much, and study, and females who do not often go out of doors, are so fond of tea.

W. Then, we may say—as the tea helps to form bile, the food is digested more quickly.

P. Yes; or the food is *assimilated*, as we say. By assimilation, we mean that the food becomes part of our body, by being changed into blood. The bile helps in this process; and thus, when the theine of the tea helps to form bile—?

W. The bile helps to form the food into blood.

Ion. And the blood begins to circulate more quickly, and we feel more lively—we are stimulated and refreshed. Most people feel lively after tea.

P. Thus, where food is difficult to digest, tea is often useful. Which kind of food have I told you is harder to digest—*Animal* or *Vegetable* food?

L. You said that vegetables were more hard to digest, and that grass-eating animals required salt to help their digestive organs.

W. Just as you said that we require pepper to help to digest cucumber, and other raw vegetables.

P. Thus we find that *tea*, also, is much used amongst nations which subsist principally on vegetables. The great chemist named *Liebig*, whom I mentioned just now, says in one of his books, “Tea and coffee were originally met with among nations whose diet is chiefly vegetable.”

Ion. But suppose, papa, that

a nation could not procure any tea! The English people had no tea at one time, I suppose. What did they do then?

P. Then, they used something else which answered the same purpose by helping digestion; or by stimulating and refreshing their bodies. Let me tell you something which is worth remembering. If people would only live on proper food, and eat it in proper quantities, and take proper exercise, they would seldom require such stimulants. But whenever people are poor and are poorly fed, they make up for the “sinking feeling” which such want occasions, by tea, coffee, tobacco, opium, and worse still, beer and spirits. It is said that in Germany, those who receive the lowest wages, while they are obliged to live on bread and potatoes, always reserve a portion of their wages for *coffee*.

Ion. I quite understand why they do that!

P. I should like you to understand it very clearly. I will say it to you once more: “Where there is good and nutritious food (containing *azote*, a word which I will explain to you some day), and with such nutritious food exercise is taken, the *azote* in the food forms sufficient bile; but, where the food is poor, or hard to digest, and sufficient exercise is not taken, then sufficient bile is not formed; and men use the *theine* in tea, or the *caffeine* in coffee, or some other stimulant, for the purpose.”

L. Then the lesson we may make about tea, is, that if we took great care to have proper

food and exercise, we might do without it, and other stimulants also.

P. Yes; but it is not very likely that this will ever be the case. Until *all* men give due attention to their food, there will be some people craving for stimulants, to make up for their carelessness. In another part of *M. Liebig's* book, there is a paragraph expressing this opinion. I will read it to you:—

“It is a question whether, if we had no tea, and no coffee, the popular instinct would not replace them. Every people of the globe has appropriated some such means of acting on the nervous life,—from the shores of the PACIFIC, where the Indian retires for *days*, to enjoy the bliss of intoxication with Koka, to the ARCTIC REGIONS, where the Kamschatdales prepare an intoxicating drink from a poisonous mushroom.”

Ion. Or he might add, when the student in the university, who wants to study all night, prepares a decoction containing either *theine* or *caffeine*.

P. Yes, whether the university be in England or Germany, or elsewhere; or whether it be in the cottage or mansion, such stimulants are still in use. In the same book it is said concerning Germany—

“In the Customs Union (*the Zollverein*), more than 60,000,000 pounds of coffee are consumed every year; while in Europe and America *Tea* forms part of the daily arrangements of the poorest labourer and the richest landowner—and the consumption of this article is more than 80,000,000 pounds per year.

L. And a pound of tea will last as long as two or three pounds of coffee.

W. What a long lesson we are having on the *uses* of tea! Now I will sum it all up. “*Tea and other stimulants are very useful things, because they have refreshing qualities which make up for the want of good food.*”

P. Oh, indeed! Is *that* the lesson you make? I make out a very different case. Listen! Tea and all other stimulants are (except in occasional cases) *bad* things, because they enable people to neglect their diet, and indulge in bad habits, without feeling the natural consequences. As long as men will use such stimulants to remove for a time the bad effects of their neglect, so they will not give the attention they ought to give, to their diet and exercise.

Ion. To be sure, Willie! Don't you see that? If the tea and other stimulants were taken away, then people would be obliged to take proper care of themselves.

P. Shall I show you another way in which tea and stimulants are bad?

W. Yes, papa, please.

P. Because they *wear out* the body. We do not observe this fact so much, because we take them in small quantities, and their action is gradual; but as soon as the stimulants are used in a little more than *moderate* quantity, their effect becomes evident. It is said of the frequent use of *TEA*, that it answers the purpose for a time, but the object is attained at “a

fearful price"—the destruction of health, and vigour of body and mind being the penalty. Tea is worse in this respect than coffee, as its effects are more permanent.

The property in tea which has such injurious effects is weakened by keeping the leaves for a long time. Fresh tea is so stimulating, that it is seldom used until it has been kept twelve months. The injurious property may also be weakened by *heat*, for green tea is more exciting than black, because, when being prepared, it is not "roasted" so often.

Tea is a very improper drink for young children; it produces too strong an excitement, and causes a diseased state of the brain and nerves. It has been said by a well-known physician, that "it ought by no means to be the common diet of boarding schools. If it be sometimes allowed to the children as a treat, they should be informed that it might, if used frequently, injure their strength and constitution."

Before we leave the subject of tea, I must not forget to mention that, although it may produce bad effects, the effects of stimulants which contain *alcohol*, instead of *theine* or *caffeine* (such as beer and spirits), are far worse. So dreadful are many of the evils which these stimulants bring, that a great society, called the NATIONAL TEMPERANCE SOCIETY, has been formed both in England and in Scotland, to induce the British nation to abstain totally from their use.

L. Have many people abstained from using them?

P. Yes, great numbers; especially drunkards, who had suffered from their bad effects; and when these societies do more to teach poor people how to spend their money in buying the best food, and how to regulate their diet and exercise, then these people will be able to give up stimulants more easily,—they will not *want* them. It has been found in the reports of large towns, that when wages have been high, or food has been plentiful, there has not been much drunkenness; but that when there has been scarcity and poverty, drunkenness has increased: for when the poor cannot obtain the *natural* refreshment for the body from wholesome food, they get *artificial* refreshment from stimulants.

There! we must not go any further into the question of stimulants in general. We have made too long a subject of it already. I should, however, like you, when we print this lesson, to read it over several times. Then, perhaps, you will see that it will be one of your *duties* so to attend to the diet and exercise of your body, as to enjoy life without the help of stimulants.

L. Now, papa, will you please to give us the history of tea?

P. Yes. But before we leave the *qualities* and *uses* of tea, I may as well add that in the composition of the tea-leaf are found two metals, viz., *iron* and *manganese*,—of course in very small quantities. Again, you

said that tea was astringent. This is because it contains the substance which I said was found in the bark of trees.

W. Do you mean *tannin*, papa?

P. Yes. I once heard a lecture from a chemist, in which he amused the company with a curious fact. You know that the *tannin* of the oak-bark is used in making leather. The lecturer showed us that when the tea with milk in it reaches our stomachs, the curds of the animal substance, milk, are often hardened by the *tannin* in the tea, so as to form a thin tough substance, like leather.

W. Then I won't take any more tea! I don't like the process of leather-making to be going on in my stomach!

P. The *tannin* in tea has, however, been rendered useful. There have been cases in which it has been used as an antidote to poison. Even *arsenic* has been decomposed by the astringent *tannin*.

The *natural history* of tea is the next point to engage our attention.

The Natural History of Tea.
—Tea is brought from CHINA, where it is grown principally on the hills, and in dry soils. It flourishes best with plenty of light, air, and a good sunny aspect. The plant is a species of *camellia*, and it is cultivated by means of seeds. The plan of culture is very simple. When a new plantation is required, the ground is carefully prepared, and a number of holes, about four or five inches deep,

are made. The holes are about five feet distant from each other to allow space for the young plants to grow. The seeds sown are always such as are quite fresh, as from their oiliness they do not preserve well. Five or six seeds are sometimes dropped into each hole, as their growth is very uncertain. Frequently all of the seeds will grow; and as the plants rise and grow together, they form a large bush. After they are sown, very little trouble is necessary, except that of clearing away the weeds. The trees are left to grow for three years, when the plantation yields its first crop.

If you were to ask a Chinaman which are the best kind of leaves, he would tell you that those which are from the young wood, and are grown in exposed situations, are the best. He might further inform you that the leaves are gathered three times in the year; those which are gathered in April being of a *bright* and delicate colour, and aromatic flavour, and without bitterness; the leaves which are gathered at Midsummer being of a *duller* colour, and less pleasant taste; "while," he would add, "the leaves of the third gathering are of a *dark* green colour, and very coarse and inferior." "As the trees become older," he would tell you, "the leaves are less valuable, and when they are seven years or ten years old they are cut down. Numerous young shoots then spring up, and give a good supply of young wood and leaves."

Thus you see how many different qualities of tea there may be. The quality of the leaves depends on the time of gathering, the age of the plant, the soil, and the situation in which the trees grow.

W. And I should think, therefore, that it is very easy to procure bad *tea*, when the good quality depends on so many points.

P. When the leaves are gathered, they are put in wide shallow baskets, and are exposed to the air or sun for some hours. The first dampness of the leaves is thus removed, and they are now ready for the drying-pan. The drying-pan is made of cast iron, and is of a flat shape. When the Chinaman is going to dry his leaves, he prepares a fire of charcoal, and places the pan over it; he then puts in not more than half or three quarters of a pound of leaves, and stirs them about quickly with a kind of brush. When they are ready, they are swept out of the pan into baskets; and, as soon as a basket is full it is handed over to another workman, to undergo the operation of *rolling*. This he performs by carefully rubbing them between his hands. The fourth operation is that of *drying the rolled leaves*—they are again placed in the pan, but in much larger quantities; and are heated just sufficiently to dry them without scorching.

The fifth operation is that of *picking and cleaning*; when all the leaves that are imperfect, or not dried properly, are removed.

The last operation is that of

packing it in chests, which are lined with tin-foil, and sent to England, and other countries. I might as well add that the Chinese preserve their own tea in porcelain jars, with narrow mouths, which they say give additional aromatic flavour to the tea.

W. You have told us, papa, of six operations; but I think you have left out the history of the tea *picking*, which is the first thing.

P. Yes. And that is a very important business, especially when the finer sorts are being picked. The collectors of fine tea are generally men experienced in their business, and trained to it from a very early age. They are compelled to clean themselves three weeks before they begin their work; and they are forbidden to eat fish, or any other kind of food which is reckoned unclean, lest by their breath they should contaminate the leaves. They are also made to bathe two or three times a-day; and when they gather the leaves they must not use their naked fingers, but must wear gloves.

W. There, papa! You have mentioned *seven* operations. The picking—drying in baskets—drying in a cast-iron pan—rolling—drying of the rolled leaves—picking and cleaning of the rolled leaves—and the packing of the leaves in tin-foil. So that we have learned the “qualities,” “uses,” and “description,” of tea. Now will you please tell us of the different sorts?

P. Yes.

The Different Sorts of Tea.—

There are *too* many sorts of tea! but they may be arranged in two divisions—the *good* sort, and the *bad* sort. Let us first name them according to their place. Beside the CHINESE TEA, there is a tea which, about twenty-five years ago, was discovered growing wild in a district of India called ASSAM. Assam is in the north-east corner of India, near Bengal and Burmah. The ASSAM TEA, when it first attracted public attention, became very celebrated, as it was grown in a colony belonging to England. On account of its novelty, it sold at very extravagant prices.

The tea-plant may also be grown in England, being very common in our conservatories. It may be seen growing in Kew Gardens, or in Messrs. Lodiges' gardens at Hackney.

The list of names of the Chinese teas is almost endless. It is said that in the catalogues of the Chinese merchants there are at least *one hundred and fifty* names. Many of these names, however, are only invented to impose upon foreigners, and obtain a high price.

The principal kinds of tea, however, are the BLACK TEA and the GREEN TEA.

The plants from which the green tea is picked are more hardy than the others, and will flourish when the snow is on the ground. The two teas are cultivated in different parts of the empire. The principal difference between the green and the black tea is, that the green

tea leaves are gathered without the stalks, and are not prepared like the black. It was supposed, at one time, that the green colour of the leaves was owing to their being dried on copper pans, but this I believe is not correct. It is true, however, that the Chinese can so change damaged black tea by the addition of colours, &c., that it cannot be distinguished from the green. The principal black teas are named *Bohea*, *Congou*, *Souchong*, and *Pekoe*; and the principal green teas are *Singlo*, *Hyson*, and *Gunpowder*.

There is a species of tea called *Tile-tea*, because it consists of leaves and leaf stalks, compressed in the shape of a flat cake or tile.

The *bad* kinds of teas are the coarse large-leaved teas, which are obtained in the third picking season—these are by no means good for common use, and are often used in *dyeing*. The poorer classes of Chinese also use them. But the worst kind of all are the *adulterated* teas. It is well known that the Chinese use many strange substances to mix with their tea. It is adulterated still more in England, where the leaves of the elm, ash, hawthorn, sloe, and apple, are mixed with the tea. Old tea-leaves are also dried, and chopped up with stalks of raisins. In Germany, green tea is adulterated with the very young leaves of the strawberry plant. It is singular that we cannot, in England, enjoy the very fine teas, in which the Chinese take so much pride,

for they are always spoilt by the sea voyage; the change of climate, and the dampness from the water, deprive them of their fine flavour.

Ion. Now, papa, that we have heard of the *different sorts*, will you give us the *history* of tea?

P. If we do not find the subject too long. I will try and make it as short as possible.

The History of Tea.—TEA has a separate history in the different countries in which it is used. The *Chinese History* of Tea begins (like many more Eastern histories) with a fable. It is said that in A. D. 516 a good Indian prince, of religious habits, came to China as a missionary, intending to set a good example to the natives, and to teach them their religious duties. However, he was once so overcome with his long fasting and want of rest, that he fell asleep; he was then so angry with himself, that he cut off both his eyebrows and threw them on the ground. Both of these eyebrows grew, and became tea-shrubs—the first ever known! The Indian prince soon discovered the virtues of the shrub, and recommended it to his disciples. They all declared, that it gave their minds fresh vigour, and its use became general.

The *English History* of Tea may begin with an act of parliament. In an act of parliament, of the year 1660 or 1661, it is ordered that 8d. per gallon duty be charged on all *tea*, coffee, or chocolate for sale. Thus you see that all three of our well-

known drinks were then in use. Tea had perhaps been introduced to England some time—it is most likely that it was procured from the Dutch East India Company, who first sold it in Europe. It is likely that its use was known about the same time as that of coffee, which, you may remember, was first sold in England in the year 1652.

Ion. Yes, I remember, papa, your telling us of the Greek servant who opened a coffee-house near Cornhill.

The continuation of the history of tea is connected with that of the EAST INDIA COMPANY. It appears that its use was not very general for some time; for in the year 1664, thy purchased, as a present to the king, *two pounds and two ounces of tea*. Five years later, in the year 1669, the directors ordered their servants in India to “send home by their ships *one hundred pounds of the best tea* they could get;” to be sent on speculation. In 1671, we read of their importing a package of 150 pounds—in 1678 they imported 4,713 pounds. It then became well worth the consideration of the company as an article of trade, for it still yielded the large price of 60s. per pound. The EAST INDIA COMPANY, therefore, obtained a “charter,” by which they were allowed to keep the whole tea trade of England in their own hands. Such a charter, which prohibits others from competition, is called a *monopoly*; its purpose is very unlike that of the Great Exhibition, and the Free Trade

of the present day. On the abolition of the Company's charter, in the year 1834, the tea trade immediately improved. The yearly sale was then above 31,000,000 pounds, but it has since increased to more than 40,000,000 pounds per annum, and yields an enormous sum of money to government as *duty*.

The history of tea in Scotland may begin with an anecdote. A pound of fine green tea was sent to a certain lady as a rare and valuable present. The lady took care to have it cooked! It was served up with melted butter and salted meat, but the cook found that the tea was not exactly "suitable." She complained to her mistress that "she had tried all manner of ways to cook them, and she didn't believe that all the cooking in the world would ever make those *foreign greens* tender!"

L. And now, papa, end the history of tea with an anecdote! will you?—for I am getting tired of it.

P. Very well. Even in the present century people will stick to the idea of *cooking* tea. I told you of the quantity of coffee used in Germany, but the Germans, especially the "Rhine-landers," who live around the river Rhine, drink plenty of wine, and therefore know little about tea. A gentleman whom I know, and who is an artist, was travelling in Germany about forty years ago, and had quite tired himself by sketching all day; so when he returned to his inn, he called for some *tea* to stimulate his weary frame.

Poor man! his mouth was hot and dry; how long and anxiously he waited for that tea!

At length it came!

Yes! In came the maid, triumphantly bearing the smoking tea in a *tureen*. "Very odd," he thought, "to bring me my tea in a *tureen*; but, never mind! here is a ladle; they wish me to drink it like soup." No sooner had the German damsel turned her back than the thirsty man lifted up the lid joyfully, and ——— Ah! —Wha-a-a-t? The German cook was no better than the cook of the Scotch lady! The *tureen* was full of tea-leaves, which formed a hard compact mass, for they had been carefully squeezed, so that *all the water had been drained off!* He was much surprised, but not half so much as the people of the inn, when he rang the bell violently, and insisted on them bringing him, instantly, *the water those greens were boiled in!* Fortunately, it had not been thrown away; and, to the still greater surprise of the whole household, he exchanged his *tureen* for the steaming saucepan; placed it before him on the floor; and, while they were gone for cup and saucer and milk and sugar, he ladled some of "the water those greens were boiled in" into his drinking-horn.

So you see that the quality of tea may not merely depend on the soil, or the climate and country in which it is cultivated; it may depend on the people who prepare it. There! we have talked long enough about *tea*.

W. We will not make a *lesson* on Tea, papa; but will wait, please, until we have heard about coffee, and cocoa, and sugar.

P. As you please.

15. COFFEE.*

You will find plenty of Coffee-samples in the *Great Exhibition*. In the department where the arrow-root and other tropical productions may be found, you may see many specimens of *West Indian* coffee.

As you have already learned of this and the two following subjects, they will not long occupy our attention.

In our lesson on coffee, what did you say of its *qualities*?

Ion. That, when it has been roasted, it has a rich brown colour, is crisp, aromatic, bitter, and pleasant to the taste.

W. And, when you spoke of its *uses*, you said that they were almost like those of tea.

P. Yes; and that it has *injurious effects* like those of tea. And I added in our lesson on tea, that its bad effects may be removed on ceasing to use coffee, but that the injuries produced by tea remain until the end of life. Since you had that lesson, I have discovered another use for coffee. A decoction of decayed coffee together with pure soda, will form a beautiful green colour. This green colour will not change, and cannot be acted upon by

acids, or by light, or by moisture.

What did I say in our *Natural History* of coffee?

L. You said, papa, that it is the berry of a shrub growing in the West Indies and Arabia. You spoke of the different modes of cultivation in each country. The principal coffee-growing countries are Brazil, Cuba, St. Domingo, Jamaica, Berbice, Porto Rico, Java, Sumatra, Borneo, and Mocha.

P. In speaking of the different sorts, I might as well tell you that I noticed in one of the galleries of the Exhibition specimens of coffee in which great care had been taken to supply the public with the pure seed. If you take a coffee-seed (or coffee-bean, as it is generally called), and break it open at the *groove* running through the centre, you will find that it contains a very thin woody fibre. In the specimen in the Exhibition, a coffee-dealer, who is named *Snowden*, has, by means of a patent process, entirely removed this fibre before the coffee is ground. There is another specimen of *dessicated* coffee, which unfortunately I had no time to examine.

I did not, in speaking of the different sorts of coffee, mention the bad, or adulterated, coffee. Coffee may be easily adulterated. For this purpose, burnt bread, burnt rye and wheat, and especially *chicory* is much used. The latter substance is the dried root of a plant which was formerly cultivated in Belgium and Ger-

* PLEASANT PAGES, vol. i. pp. 153, 170.

many. It is now largely cultivated in England. If about one-fifth part of chicory be mixed with our coffee, it improves the flavour; but we find that, as it is so much cheaper than the coffee, the grocers use too large a quantity, and thus the coffee is often spoiled.

Coffee requires as much or even more care in the preparation than *tea*. It should not be boiled, as the boiling destroys the aromatic flavour; and, to obtain the fine aromatic flavour to perfection, seeds a year old should be taken, and should be ground up and used on the same day on which they are roasted. The French are said to excel in coffee-making, but there is a difference of opinion on that point. Our next subject after coffee is

16. COCOA.*

In the *south gallery* of the Exhibition, in which the patent coffee I spoke of is found, are beautiful specimens of the cocoa-nib. *Messrs. Fry and Sons*, the famous cocoa manufacturers of Bristol, have forwarded to the Exhibition a very beautiful collection of samples, showing the cocoa in many different states.

There you may see preserved in spirits, the cocoa pods, with the beautifully regular rows of seeds, arranged just as they were described to you in our lesson on cocoa. You may also see specimens of cocoa-leaves, and drawings of the cocoa-tree.

There is also a picture of the tree called by the Spaniards the *Madre del cacao*, which means the mother of the cocoa. This tree, the real name of which is the *coral tree*, has, at one time of the year, a splendid appearance, being covered with bright red blossoms.

Ion. What a handsome mother it must make! the cocoa-tree must be quite pleased with its mother. But *why* is it called the cocoa's mother?

P. Because the young cocoa-trees are planted near to it, so as to have the benefit of its shadow. It is said that the shade of this tree is necessary to the growth of the cocoa.

Cocoa is a nutritious and refreshing drink, because it contains a bitter tasting substance, exactly similar to the *theine* in tea, and the *caffeine* in coffee. The name given to this substance is rather longer than the two former; it is called *theobromine*. The name THEOBROMA, which is given to the species of cocoa-yielding plants, is derived from two Greek words, meaning *the food of Gods*.

Like tea and coffee, cocoa is often shamefully adulterated. In making cocoa-paste, or chocolate, hog's lard and sago are added to increase the weight. Even red lead, it is said, has been mixed up, to give colour; and, in the manufacture of the powdered cocoa, red ochre, and all kinds of earth are dishonestly employed.

In a periodical called *The Lancet*, there was a few weeks ago an account of the tricks played on the public by some

* PLEASANT PAGES, vol. i. p. 186.

dishonest cocoa manufacturers, but I have not yet had time to read it.

W. When cocoa is pure, I think I should like it better than either of the other stimulants—the coffee and tea. So this is what I think, from the account you have given us, papa:—Tea is rather good, coffee is better, and cocoa is the best.

Now, may we have a lesson on SUGAR?

P. If you please. I will endeavour to give you a few more particulars than those you have had before.

17. SUGAR.*

It will not be necessary to describe to you the sugar-cane, or its mode of cultivation. You heard of both subjects in your former lesson. The sweet quality of sugar is more nutritious than theine, caffeine, or theobromine; for it is this sugar in plants which renders them nutritious; it also seems to be a *conservative* principle in vegetables. I think I said before that it is found in all vegetable substances. The bees find it in the nectaries of flowers; it is even found in potatoes; in the cabbage-stalk; in short, as you have already heard, it forms part of every living vegetable, and may even be made from sawdust. The sugars which we thus derive are not all alike: the principal are, the *Cane Sugar*, *Maple Sugar*, and *Beet-root Sugar*. The four last men-

tioned are very much like cane sugar in their composition. *Grape sugar* is less like the cane sugar; it is found in a liquid state, and will not become *granulous*. *Manna sugar* is found in the sweet gum, called manna, that oozes from the manna-tree. *Liquorice sugar* is that which is obtained from the liquorice-root; and *Mushroom sugar* is another kind, which may be obtained from mushrooms. There is an animal sugar, called *Sugar of Milk*, which is procured by evaporating the whey of milk. Besides these, there are artificial sugars formed from starch, and from malt.

W. I have noticed, papa, that malt contains sugar, because it has a sweet taste; but I cannot understand how starch can have sugar in it.

P. Nor can I tell you exactly *how* the change is made—except by saying that it is effected by a powerful principle called *diastase*,—which, however, you cannot well understand. But you can understand the *effect*, if you cannot understand the cause. Have you not noticed how very sweet most fruits are when they are ripe? This is not the case when the fruit is half-grown; it is then sour. The sugar, therefore, which the fruit acquires in getting ripe, must come from somewhere; and it is obtained by the *transformation* of the starch of the plant.

It is on this account—because the starch of a plant quickly changes to sugar—that the *Sago Palm* is, as I told you, cut down

* PLEASANT PAGES, vol. i. p. 57.

when it is going to flower, and when the leaves are covered with a white powder. This white powder on the leaves, and the pith inside the great trunk, are both *starch*, which is to be changed into sugar, to nourish the flowers and fruit as they ripen. Thus, to save the pith for themselves, and prevent it from changing into sugar for the fruits, the natives of the Spice Islands cut down the tree as soon as the white powder appears.

This change is constantly going on in plants, but not always in the same way. Sometimes the change is reversed, and the sugar is changed into starch. The stalks of grasses, wheat, and other corn-plants have a rather sweet taste. I dare say you have noticed this. This is because they contain sugar which, when their seed is ripe, becomes starch. When, however, their *seeds* begin to *sprout* and grow, the starch in them again becomes sugar, and is used up to nourish the young tender plant. This is the case with barley, which is full of sugar. When soaked in water, it begins to sprout, and has a sweet taste. It is then called *malt*.

L. Then I will remember that the malt has a sweet taste, because the starch in it has become sugar, to nourish the young plant.

P. True. You may observe the same thing in the garden pea, which we call the *sweet* pea. The hay, too, has a sweet smell because of the sugar in its stalk. It is said, that in Scotland the

farmers let their grass become too ripe before they cut it; for the sugar in the stalk having been changed to starch in the seed, the hay has not a sweet taste, and the English horses do not like it.

L. Will you please to tell us, papa, whether sugar is nutritious?

P. Yes; we use it as a luxury, but it is a universal article of food. It is more generally eaten in the cane, which is either chewed or sucked. It is said that it is inconceivable what an enormous amount of the sugar-cane is consumed in this way. Vast ship-loads arrive daily at Manilla; and in Rio Janeiro, and the Sandwich Islands, every child is seen going about with a piece of sugar-cane in his hand. Your uncle, who has been to CHINA, tells me that he has bought many a piece of sugar-cane for a Chinese boy—it is sold in little pieces on stalls in the streets, just as the pieces of cocoa-nut are sold on the apple-stalls in the streets of England.

Sugar in this state (or rather the *sugar-cane*) is eminently nutritious, and has been called *the most perfect food in nature*. This is truly seen in the appearance of the negroes, during the time of the sugar harvest. Then, although they undergo the most severe labour, they have a plump and sleek appearance. In the midst of their hard work they scarcely eat anything during the whole day, for the very air they breathe seems to nourish them. Old and sickly negroes often recover

their health by going to work in the cane-harvest.

L. How different that is from the account of the *rice*-harvest!

P. Yes; the truth is, that the plant itself not only contains *sugar*, but *water*, *gum*, *acids*, *green fecula*, *gluten*, and other nutritious things.

W. What a number of different substances in one vegetable! I will count them—1, 2, 3, 4, 5!—*five*!

P. The most nutritious are the green fecula and the gluten, which contain *azote*—

W. There is that word “*azote*” again! What does it mean?

P. Well, I will stop to explain to you. *Azote* is the quality in food which is necessary for it to sustain life; and the food containing *azote* forms new blood and new flesh in your body.

Ion. Then I suppose that all food contains *azote*.

P. Not *all*. There are some articles of food in which it is not found; therefore they do not form new flesh. The *sugar* of the sugar-cane does not—nor does *starch*—*oil* does not.

Ion. Then, papa, what is the use of eating them?

P. You may easily see. If you notice the meat from an ox or a sheep, you will perceive that there are two parts—the lean and the fat.

W. Yes, sometimes there are round masses of fat; and sometimes the fat is in *streaks*.

P. And you will also find it in much smaller quantities intermixed with the particles of the lean.

L. I have noticed that, papa. The lean consists of *fibres*, and the fat is deposited in very small pieces between the fibres.

P. And this fibrous “lean” we call flesh: so you may make a rule that the *flesh* (or tissue) of your body is formed by the food which contains *azote*, and that the *fat* of your body is formed by the part of your food which does not contain *azote*. Now you may answer your question yourself.

Ion. I think I can answer it. The food in which there is no *azote*, such as *sugar* and *starch*, *oil* and *fat*, are useful to make the fat in my body.

P. And they have some other use. Although they do not contain *azote*, they contain another gas, called *carbon*; and this gas is required to supply the heat in your body.

L. Ah, I have often heard of *heating* food!

P. Yes. I cannot stop now to tell you *how* the heat is formed, because the subject does not belong to our lesson, but you shall hear that some otherday. I will only tell you at present, that unless you had plenty of food containing *sugar*, *oil*, and the other substances which supply *carbon*, your body would not feel warm.

L. But, how is it, papa, that the *sugar* will sustain the little children in other countries, and will not make flesh in us, or keep us alive?

P. Because they feed on *sugar-cane*, which contains all the substances I mentioned; but in extracting the *sugar* from the

cane, the green fecula and the gluten are removed.

Ion. Ah! and you said, papa, that they are the qualities which contain the *azote*. And it is the *azote* that sustains life.

W. Are you sure, papa, that we could not live on sugar?

P. Yes, the experiment has been tried on dogs who were fed on brown sugar and water for some weeks. The consequence was that they died.

Before we leave the subject of sugar I must correct one mistake you have made, in saying that it does not contain *any* *azote*. The coarse, very brown sugar which is sold for three-pence per pound, is more nutritious than the white or *clayed* sugars which have been very much refined. The more the sugar is refined the less *azote* it contains; thus the sugar used by the poorer classes is a better article than that used by the rich.

W. You have not told us anything of the *conservative* quality in vegetables.

P. There will not be time to talk on that subject now; but I will just mention an interesting fact which you may perhaps have noticed.

You have seen fruits preserved in sugar, and have seen currants and raspberries preserved in the form of jam. How do those fruits taste before they are ripe?

Ion. They are *rather* sweet, but they have a sour taste also.

P. And thus the cook is obliged to add more sugar to preserve them. But there are some fruits which in themselves

contain so much sugar, that it is not necessary to add more. When hung up and exposed to the heat of a bright sun, they dry and are preserved by the sugar within them.

L. I know those fruits, papa; you mean the figs, raisins, and the little dried grocers' currants.

P. You may now make up your *sixth* lesson on the four articles of food we have lately talked about.

Lesson 6. ARTICLES OF FOOD (*Tropical Climates*).

TEA, COFFEE, COCOA, AND SUGAR.

TEA.—(Qualities.) *Tea is a light, dry, shrivelled, crisp, pulverable, black or green vegetable substance. It is a natural production, but is imported in an artificial state. In its effects it is stimulating, refreshing, and exhilarating.*

The tea produces those effects by its action upon the nerves, because it contains a peculiar element called THEINE. This Theine is said to assist in forming bile, and thus to help digestion. Tea, it is said, has been much used in the countries where vegetable food is eaten, as such food is harder to digest than animal substances.

(Natural History.) *Tea is the leaf of a shrub growing in countries outside the Tropics, and particularly in China and India. The operations of picking, drying, rolling, and cleaning of the leaves are performed with great care, and require much skill. The quality of the leaves depends on their age, and the age of the plant;*

it also depends on the situation and soil in which the plant is grown, and on the time of picking. There are three picking seasons in the year; the leaves of the first picking are the best. The two principal sorts of tea are the BLACK TEA, and the GREEN TEA.

(History.) Tea was introduced into England at nearly the same period as Coffee, about two hundred years ago.

COFFEE.—(Qualities.) Coffee much resembles tea in its qualities and effects; but it is less hurtful. Its stimulating quality is similar to THEINE, and is called CAFEINE.

Its history, &c., have been elsewhere described. It is often much adulterated by chicory, burnt bread, &c.

COCOA.—Cocoa has also been previously described. Its nutritious and refreshing quality is so excellent, that it is called THEOBROMINE (from two Greek words, meaning "food for a god").

SUGAR is another useful article of food. It is very refreshing; but like tea, coffee, and cocoa, it is not sufficiently nutritious to sustain life, because it does not contain much "azote." Its conservative quality renders it very useful, especially in preserving fruits, just as SALT is useful in preserving animal food.

W. And that is the end of the lesson! Vinegar, papa, is used to preserve other vegetable substances, such as pickles;—and fish, as pickled salmon, &c. Spirits, too, preserve both animal and vegetable substances.

L. I think, papa, that we must have heard of all the articles of food in the Tropical countries. You began with the seeds of the corn plants, such as RICE and MAIZE; then we heard of food from the pith and roots of plants, such as SAGO, ARROW-ROOT, TAPIOCA, and YAM; we then learned of the spices—GINGER, NUTMEG, MACE, PEPPER, CINNAMON, ALLSPICE, and CLOVES; and lastly, we have heard of TEA, COFFEE, COCOA, and SUGAR. What can come next?

P. Several important fruits, which you may see either in the Great Exhibition, or the grocer's shop—whichever you please. Can you remember any?

W. Yes. I have seen DATES, COCOA-NUTS, POMEGRANATES; and I have heard of BREAD-FRUIT, PLANTAIN, and one or two more, but those I have not yet seen.

P. Then we will make a short description of them, that you may be able to see them with your mind's eye.

We will begin with

18. THE COCOA-NUT.

This fruit is one which you well know. Its shape and qualities, therefore, I need hardly describe. It grows in CEYLON, JAVA, and SUMATRA.

W. Where the Sago palm is found.

P. Yes; and it is also found further east. Sail in a ship past the Spice Islands, and you may reach the islands of the South Seas.

Ion. I can read on the map,

papa, "*Society Isles, Friendly Islands, &c.*" All the islands round about here are together called "*Polynesia.*"

P. However important the pith of the Sago palm may be, it is not so valuable as the fruit of the Cocoa-nut palm. This fruit has been called "the most important produce of the tropics." Amongst the *Poly-nesians* it has been called with emphasis "the tree of life," for its uses are even more numerous than that of the sago, or even of the *Bread-fruit* tree, another famous tree of the tropics.

L. I wish, papa, that you would describe the Cocoa-nut tree to us.

P. I will do so with pleasure, as far as I can. There is no family of trees which have caused so much wonder and admiration as the *Palms*. They are one of the most ancient families, as you know, because you heard of them in the *Geology lessons of PLEASANT PAGES*.

W. Oh, yes! I remember that the palm trees grew before man was made, when the air was so full of carbonic acid;—and I remember how great forests of them were sunk to be made into coal.

But the most interesting points of their character are—their gigantic *size*, their handsome appearance, and present usefulness.

Let us think of the size of a Palm tree.

L. You told us, papa, that the sago palm was *thirty* feet high.

P. True; but, sometimes, when our friend the Cocoa-nut palm begins to grow, he does not stop until he has reached the height of seventy or even ninety feet! Then, having reached a commanding position, from which he can overlook all nature around him, he is satisfied.

Ion. I have no idea as to how high ninety feet is.

P. Ninety feet is twice as high as a house, if you can understand how high that must be. What an immense creature it must be for a man to look up to! Do you know how long a space *five* feet is?

L. I do, papa. Our uncle is only five feet high.

P. Then you can imagine how large must be the *leaves* of the Cocoa-nut tree—some are as long as *THREE UNCLES* placed together on the ground in a straight line—that is to say, fifteen feet long. Only a few are quite so large, but the length of many is twelve or fourteen feet.

W. What enormous leaves they must have! I should not like to carry home a caterpillar on a cocoa-nut leaf. I wonder how large the caterpillars are!

P. Never mind that subject; think of the stupendous tree! These magnificent leaves grow at the top of the trunk, and branch out from the centre; and in the distance the trunk looks like some vegetable Goliath, or Indian chief, with an enormous tuft of vegetable plumes, worn to shade his noble brow from the glare of the burning sun. Each slowly-waving leaf looks like an overgrown ostrich

feather. It is said of this tree, that "asserting its supremacy by an erect and lofty bearing, it may be said to compare with other trees, as man with inferior creatures."

W. Yes, it is all very well for a tree to be so fine and ornamental, but is it more *useful* than the others? Those who have a "lofty bearing" are not always the most useful—at least we found it so in the animal kingdom.

P. After all I have said, its numerous uses are more striking still. To give you a just idea of its worth, I will read you an account written by a gentleman who observed it very minutely.*

"The blessings it confers are incalculable. Year after year the islander reposes beneath its shade, both eating and drinking of its fruit; he thatches his hut with its boughs, and weaves them into baskets to carry his food; he cools himself with a fan platted from the young leaflets, and shields his head from the sun by a bonnet of the leaves; sometimes he clothes himself with the cloth-like substance which wraps round the base of the stalks. The larger nuts, thinned and polished, furnish him with a beautiful goblet; the smaller ones with bowls for his pipes; the dry husks kindle his fires; their fibres are twisted into fishing-lines and cords for his canoes; he heals his wounds with a balsam compounded from the juice of the nut; and with the oil extracted

from its meat embalms the bodies of the dead.

"The noble trunk itself is far from being valueless. Sawed into posts, it upholds the islander's dwelling; converted into charcoal, it cooks his food; and supported on blocks of stone, rails in his lands. He impels his canoe through the water with a paddle of the wood, and goes to battle with clubs and spears of the same hard material.

"The fruitfulness of the tree is remarkable. As long as it lives, it bears; and without intermission. Two hundred nuts, besides innumerable white blossoms of others, may be seen upon it at one time; though a whole year is required to bring any one of them to the germinating point.

"The tree delights in a sea-side situation. In its greatest perfection, it is perhaps found right on the sea-shore, where its roots are actually washed. But such instances are only met with upon islands where the swell of the sea is prevented from breaking on the beach by a reef. No saline flavour is perceptible in the nuts produced in such a place. It does not flourish inland; and I have frequently observed that when met with far up the valleys, its tall stem inclines seawards, as if pining after a more genial region.

"The finest orchards of cocoa-palms I know, and the only plantation of them I ever saw at the islands, is one that stands right upon the southern shore of Papeetoe Bay.

"At noonday this grove is

* Melville's Adventures in the South Seas.

one of the most beautiful, serene, bewitching places that ever was seen. High overhead are ranges of green rustling arches, through which the sun's rays come down to you in sparkles. You seem to be wandering through illimitable halls of pillars; everywhere you catch glimpses of stately aisles intersecting each other at all points. A strange silence, too, reigns far and near; the air flushed with the mellow stillness of a sunset.

"But after the long morning calms, the sea-breeze comes in, and creeping over the tops of these thousand trees, they nod their plumes. Soon the breeze freshens: and you hear the branches brushing against each other, and the flexible trunks begin to sway. Towards evening, the whole grove is rocking to and fro, and the traveller on the Broom Road is startled by the frequent fallings of the nuts, snapped from their brittle stems. They come flying through the air, ringing like juggler's balls; and often bound along the ground for many rods."

P. I need scarcely add anything to such a nice account as that. I will only say, therefore, that the fruit is called "Cocoanut" from the Portuguese word "*macoco*," a monkey, which name was given to it because the three black spots at the end of the shell have an expression something like that interesting animal's countenance.

I may also add, that these nuts grow in *bunches* of from five to fifteen, and that they are brought over to England at

very little expense, being useful "as wedges between the tubs, and other round packages in the cargo of vessels."

L. Then they are like the cargo *rice*.

P. You may remember, lastly, if you like, that the trunk resembles that of the Sago palm, in yielding (from the pith) a quantity of good starchy matter for food; while from the juice of the stem a kind of palm-wine is procured; it also yields a coarse, dark-coloured sugar, and an intoxicating spirit.

Which fruit shall we talk of next?

Ion. Please tell us about the *Dates*, papa.

P. Very well.

19. THE DATE.

We must not give much time to this fruit, although it is a truly valuable one, because the Date palm is not strictly a tropical tree, as the others are. This tree and the *Dwarf-palm* are the most northern of the Palm family. Dates are found in Egypt and the North of Africa, and in more northern climates. By far the finest dates are, however, found in *Persia*.

In Palestine, also, the date is well known; and it is often mentioned in the Scriptures. In the hot sandy deserts, also, they border the rivers, and their fruit is most refreshing to the tired traveller.

These trees by the side of the rivers and wells are supposed to have sprung up from date-stones, which have been thrown

away by travellers who have stopped for water and for rest. All gross and putrid matters are unfavourable to the growth of the young plant. The Arabs are very careful of all the young trees they find growing, therefore they surround the root of the plant with *salt* and ashes, so as to assist its growth and strength.

20. THE BANANA

(OR PLANTAIN).

The most striking thing about this fruit, is the wonderful quantity which the trees yield. We will go into that matter at once. The celebrated philosopher, M. Humboldt, calculated that the same space of ground which would yield 100 lbs. of potatoes, would yield 4,400 lbs. of plantain.

W. That is forty-four times as much!

P. At the same time he calculated that where you could grow 100 lbs. of wheat, 13,300 lbs. of Bananas would be yielded.

W. And that is *one hundred and thirty three* times as much.

Ion. How large is the fruit, papa?

L. It is about an inch in diameter, and eight or nine inches long; when ripe, it is yellow, and filled with a sweet, luscious-tasting pulp. It is said that when the fruit has ripened, and the stalk is cut, a new sprout springs forth which bears fruit again in three months. Thus, it seems that there is very little trouble in the cultivation of the Banana; the natives merely have to cut the stalks, which

are laden with fruit, and to dig round the roots.

W. Don't you think it would be a good thing if we had such a tree growing in our country?—how much trouble it would save!

P. I hardly like to answer that question. I have read that the natives of those countries where the Banana grows, do not find it necessary to labour, and thus they become *idle*. It is said that the native sits in his cabin, gathering the fruits of his little patch of bananas, asking no greater luxuries, and having no higher aim than to eat and sleep. It is also said that in the New Continent civilization first began on the mountains, where the soil is less fertile and the climate is colder, and where "necessity awakens industry."

W. But I do not think such a hard-working tree as the Banana could make the English people lazy, for industry is awake here!

Ion. Yes; look at the EXHIBITION OF INDUSTRY. I don't think that industry can ever go to sleep again in our country. Think of the great engine-fires which roar and burn all night, and of the industrious classes, the machines, which *work* all night!

L. You must not call the machines "the industrious classes." If you go to the Exhibition, you will see that they are the classes 5, 6, 7, 8, 9, section II.!

P. How often you children do run away from your subject! We were talking about the

Banana. I should tell you that there are many sorts of Bananas; as many varieties as there are of apples and pears in this country. Sometimes they are eaten instead of bread, sometimes they are fried in butter, and powdered over with fine sugar; sometimes they are eaten raw as fruit. The tree grows best in a rich fat soil. In sandy places it produces plenty of *flowers*, but no fruit.

We will next speak of a tree which is almost as valuable.

21. THE BREAD-FRUIT TREE.

This tree is found chiefly in the Society Isles, and the other Isles of the South Seas.

You may see in the Exhibition a beautiful picture of its fruit, and that of the *Jack-fruit*, which is very similar. It is said that they grow on the boughs like apples, and are as big as a large penny loaf, or, as some say, "about the size of a child's head." They are really the fleshy coverings of the seeds or nuts.

W. Are they like the coverings of the walnuts and the nutmegs, papa?

P. Yes, except that they contain a great deal more flesh or pulp. This pulp must be eaten when new, for if it be kept above twenty-four hours, it becomes too stale, having a harsh choky taste. Some compare its flavour to that of a roasted potato; others say that when baked it is like the soft, tender, and white crumb of new bread; others, that it

is very much like a piece of dried biscuit; while some say that if mixed with lime or orange juice it tastes like apple-sauce.

W. The best way to judge would be to taste it ourselves.

P. On the whole, the plant must be very useful, for in some places it is in season *eight months* in the year; and it was at one time said to be the most useful vegetable in the world. This, however, is by no means the case; it is not so valuable as the plantain. When the public had so high an opinion of its good qualities, a ship called the *Bounty* was fitted up to transplant a number from Otaheite to the West Indies. It was returning with a cargo of 1,015 plants carefully secured in boxes, tubs, and pots, when a mutiny broke out amongst the crew, who seized the ship for themselves, and turned the captain, and other officers, adrift on the ocean. You have, I dare say, read of the *Mutiny of the Bounty*, and of Captain Bligh?

L. I have heard, papa, of a tree called the *Cow Tree*. Can you tell us anything about it?

P. Yes. We will include it in our list.

22. THE COW TREE.

I think I cannot do better than give you the account of this tree which has been written by Humboldt. He says in one of his books of travels:—

"Among the many curious phenomena which presented themselves to me in the course

of my travels, I confess there were few by which my imagination was so powerfully affected as by the cow tree. On the parched side of a rock on the mountains of Venezuela grows a tree with dry and leathery foliage, its large woody roots scarcely penetrating into the ground. For several months in the year its leaves are not moistened by a shower; its branches look as if they were dead and withered; but when the trunk is bored, a bland and nourishing milk flows from it. It is at sunrise that the vegetable fountain flows most freely. At that time, the blacks and natives are seen coming from all parts, provided with large bowls to receive the milk, which grows yellow and thickens at its surface. Some empty their vessels on the spot, while others carry them to their children. One imagines he sees the family of a shepherd who is distributing the milk of his flock.

“It is named the *palo de vaco*, or cow tree, and has oblong pointed leaves, with a somewhat fleshy fruit, containing one nut or sometimes two. The thick glutinous milky fluid which issues from the trunk has an agreeable smell. When exposed to the air, this juice presents on its surface a yellowish cheesy substance, in layers, which are elastic, and in five or six days become sour, and afterwards putrefy.”

There is one more tree worth mentioning. Its name you have perhaps heard before; it is called

23. THE BANIAN TREE.

This is one of the many kinds of *fig* trees. After the trunk has grown to a great height, it sends out its branches in a *horizontal* direction to the length of about twelve feet. These branches then shoot downwards to the earth, and there take root; and when they have become strong enough, they grow onward again horizontally, and shoot downwards as before, until the tree is like a great *tent* supported by so many columns. Some of these trees grow to an immense size, and are more like *groves* than single plants. In an account of a large Banian tree, it is said that the space it covered measured 1,700 square yards. How beautiful must the cool shelter of such an extensive tree be to the Indian, and his herds and flocks! In the East Indies it is held sacred.

W. I think, papa, that such a tree would have made a splendid appearance in the Exhibition.

P. The fruit of the Banian tree is not much larger than a hazel, but it is very pleasant.

This is the last *tree* we will mention in our long account of the articles of THE VEGETABLE FOOD IN TROPICAL COUNTRIES. There are yet a vast number of fruits which might afford interesting lessons, such as the Pine Apple, and the Pomegranate, Mangoe, Citron, Orange, and Tamarind trees. There are also many more fruits produced from the various members of the palm family.

Although we shall not notice any more of the tropical trees, there is one *plant* to which we will turn our attention before making the next lesson. Indeed, it will be necessary to make our list complete, because it belongs to an important class.

24. THE LENTIL.

A specimen of the Lentil may be seen in the South Gallery of the Exhibition. It is numbered 103, and has been sent by M. GUILLEREZ, of Edinburgh, who cultivated it in the neighbourhood of that city.

W. But, is not the lentil a tropical plant?

P. It is one of those plants which may be cultivated in the temperate as well as the tropical climates. At the present day, it is an important article of food in Hindostan (or East Indies), which is a tropical country; it has always been much eaten by the working classes in Egypt and Palestine.

You may suppose from its being used in Palestine that it would be mentioned in Scripture.* We read in the Bible of the time when it was first introduced and brought into use in Palestine.

L. I don't think I have ever read it.

P. Yes, you have. You have read of the careful man who liked to stop at home in his father's tents, and who used to take an interest in the cooking, and other domestic affairs.

You read that he was making from some lentils a mess of red pottage, and that he sold this mess (perhaps the first he had ever made) for a very great price. He sold it to a hungry brother of his for his *birthright*.

W. Oh, you mean *Jacob*, papa!

P. That is the man; and you may remember from the pottage being *red*, that there are two kinds of lentils. The red lentil obtains its colour from the red soil in which it is grown; it is supposed that it was new in Palestine in Esau's time, because, when Esau saw it, he could only ask his brother to give him some of "that *red*."

Ion. Ah, he did not know what to call it!

W. But, papa, Egypt and Palestine are *not* tropical countries—I can see that on the map.

P. True. And, on the whole, the lentil is not much used in the tropics; but we will mention it now, because it *represents* an important class of foods. This class is said to inhabit "the coldest and hottest, the dryest and dampest parts of the world."

I will describe the lentil, and you shall tell me whether you have seen many similar plants. In its appearance it is something like the tare or the pea, and like those plants it has seeds which grow in a pod; these seeds are boiled just as we boil peas, and form a soft mass exactly like "peas pudding," which you have doubtless tasted. This was the kind of mess which I dare say tempted Esau. Now, will you think of all the plants you know, and

* Gen. xxv. ; 2 Sam. ii. 34; xv. 28, xxiii. 11; Ezekiel iv. 9.

tell me if you remember any which are like the lentil?

L. You mentioned the *pea*, *papa*, and the *tare*.

W. Beans, perhaps, are a part of the class—the broad beans and scarlet runners.

Ion. Do lupins belong to the same class?

P. Yes; or rather to the same order. In this order are not only lentils, peas, beans, and lupins, but clover, trefoil, indigo, liquorice, and many other plants; some grow to the size of large trees. The Tamarind tree belongs to this order.

L. But you have not given us the name of the order, *papa*!

P. They are called the *Leguminous plants*. They are more useful and nutritious as food than sugar, because they contain *azote*.

W. Then I suppose that they form the *fibre* of our bodies?

P. Yes: these vegetables would sustain life where the others, containing only starch, would not. You see now why I have noticed the lentil.

Ion. Yes, because it is a leguminous plant, and contains *azote*. I suppose that the *corn-plants*, too, must contain *azote*, because bread will keep us alive.

P. That is the case. That part of the CORN PLANTS which contains *azote*, we call *gluten*; and the part of the LEGUMINOUS PLANTS which contains *azote*, we call *legumen*.

Ion. So we have learned of three nutritious qualities in vegetables.

STARCH, &c., which does not

contain “*azote*,” and does not form *flesh*.

GLUTEN (*found in the corn-plants*), which does contain “*azote*,” and forms *flesh* (or *fibre*).

LEGUMEN (*found in the leguminous plants*), which does contain “*azote*” and forms *flesh* (or *fibre*).

P. But I must add once more, that the nutritious leguminous plants abound more in the temperate than in the tropical climates.

You may now make up the seventh lesson.

Lesson 7. ARTICLES OF FOOD (Tropical Climates).

THE COCOA-NUT, DATE,
AND BANANA PALMS;
THE BREAD-FRUIT,
BANIAN, AND COW
TREES.

The COCOA-NUT PALM is distinguished as being the most noble, and yet the most useful of trees: it is also remarkable for its gigantic size. It is useful for food, for fuel, for clothing, for dwellings and furniture; for making canoes, paddles, and all kinds of implements. It grows in SUMATRA, JAVA, the Spice Islands, and the South Sea Islands.

The DATE PALM is another good tree of this useful family. It grows in more northern climates than the other palms. As it grows in Palestine, its fruit is mentioned in the Scriptures. It is much valued by the traveller in the desert, and the young plants are carefully preserved. The tree is generally

found near the bank of some river.

The **BANANA** (or *Plantain*) is a smaller palm than the others, but is, perhaps, the most serviceable in producing food. With scarcely any trouble in cultivating it, an Indian and his whole family will depend on the plantain tree for their subsistence. 44,000 lbs. of bananas do not require more soil than 100 lbs. of potatoes.

The **BREAD-FRUIT TREE** is not so large as the former; and is not a palm. In its appearance it is something like an apple tree, and in its size it is equal to a middle-sized oak. The fruits at a distance are much like large apples, but on examining them closely, they are found to have a thick rough rind. The **JACK FRUIT** belongs to the same family. The taste of both is something like that of new bread or potatoes, but it varies very much, according to the manner of cooking. These trees abound in the South Sea Islands.

The **COW TREE** is a peculiar tree found in South America, and other parts. The white juice which flows from the trunk, has the nutritious properties of milk, and is drunk by the natives.

The **BANIAN TREE**, which grows in the East Indies, is a fig-tree of most peculiar shape and enormous size. It has been compared to a leafy temple, supported by numerous natural pillars.

The **LENTIL** is a leguminous plant something like the pea. It is very extensively eaten by the labouring classes in India. It also grows in Egypt and Palestine: it is therefore frequently mentioned in

the Scriptures, and we read of it in the history of Jacob and Esau. There are two kinds of lentil—the red lentil and another. The nutritious property in the lentil which sustains life, is called “legumen.”

Besides these food-bearing trees, there are many others which bring forth rich fruits, such as the **PINE-APPLE PLANT**; the **POMEGRANATE**, **MANGOE**, **CITRON**, **ORANGE**, and **TAMARIND trees**; which are graciously provided by the Creator to nourish, cool, and refresh those whom He has appointed to live under the burning heat of the tropics.

W. Before you begin to tell us about the animal substances used as food, I should like to know, papa, whether all these things are really in the Exhibition.

P. I have, I think, seen all except the Bananas and the Bread-fruit. Some which cannot be found in the department of the country in which they are grown, may be seen in the South Gallery. There you may see the only specimen of *Lentils* which I could find. There are also specimens of *Chicory* (No. 144) in all its stages, “from the kiln-dried root to the ground dust fit for use.” There are some leaves of a tree (No. 142) which are said to contain a quality very much like the *Theine*, which we talked about; and I suppose we shall one day try to see if we like them as much as tea. Another curiosity is a small loaf of sugar (No. 149), which has been made from sugar-canes grown

in *England*! They were cultivated in the county of Surrey. And, lastly, there are (No. 143) samples of tea from *Assam*, which I told you is a British colony in India. This tea is still, I find, a favourite article; for in the Catalogue it is said to sell for high prices, because of its fine qualities. It is prepared entirely by natives of India.

W. So that it is purely *Indian* tea. Now for the *animal* foods!

CHAPTER ELEVENTH.

RAW MATERIALS, ANIMAL SUBSTANCES USED AS FOOD.

(*Tropical Countries.*)

P. In the hot countries animal food is not eaten so largely as in the temperate and colder climates. Animal food is more *stimulating* than that from vegetables; and neither stimulating food nor stimulating drinks should be much used in such climates. We therefore shall not find in the Exhibition many specimens of such food to engage our attention.

W. When we were in the Exhibition, papa, you showed us some specimens of *preserved* meats for food in warm climates.

25. PRESERVED MEATS.

P. Yes; suppose we begin with them.

In the South Gallery (No. 12) is a canister, containing boiled mutton, which was preserved in 1824. How long ago is that?

W. That is 27 years ago.

P. And this has been preserved without salt, or any other conservative substance; yet after twenty-seven years it is fit for food. This fact is testified by CAPTAIN SIR JOHN ROSS, who in the year 1833 found it in *Fury Beach*, a place in the most northern part of North America. The canisters had been prepared for the ship *Fury*, when it was sent on an Arctic Expedition; the ship was wrecked, and thus the canister of food was washed on the beach.

The name of the Exhibitor who prepared it, is Mr. J. H. GAMBLE, 33, Royal Exchange.

W. Then, when I want to go on an Arctic expedition, or to a tropical country, I will ask Mr. Gamble to prepare some mutton for me!

Besides Mr. Gamble's canister, there are others, sent by Messrs. DONKIN, HALL, and GAMBLE, of Bermondsey.

One canister contains fresh mutton and vegetables, which were preserved in the year 1813,—nearly *forty* years ago.

There are also preserved hams for use in India, China, and the tropics.

Other canisters contain preserved fresh mutton, veal, beef, fresh salmon, and other fish; real turtle soup, ox-tail soup, and others.

There are specimens of *green fat*, preserved for making turtle-soup, and all kinds of soup for emigrants, and troops at sea. Pheasants, too, and partridges are preserved; and indeed all kinds of things, which, as we

read at the end of the list, will keep in *any* climate, and for *any* length of time!

Ion. I should like very much to know how it is done; I thought that salt and spirits were the only things that would preserve meat. What substance is used to preserve it?

P. Not any. You shall hear the account which is given of the way in which it is done.

The first part of the process is to cook the meat *partly*; it is then shut up in the tin canister with a little juice of the meat, and the cover of the canister, which has a small hole in it, is soldered on. The tin canister is then placed in a bath of hot salt water heated above boiling heat; but is only immersed partly, the top not being under water.

W. I suppose that is to prevent the water from getting in at the hole.

P. That is one reason; but the hole was made for a different purpose; it was made that the air inside might get *out*. When the canister has been in the water some time, the meat and the meat juice inside begin to steam, and thus all the air in the canister is expelled. As soon as it appears that every particle of air has been thus driven out, a damp sponge is placed quickly on the hole, and it is then stopped up and made air-tight with a little solder.

L. I can understand that, papa, but I cannot see how the driving out of the air can preserve the meat.

P. You will soon see how that is. I have often told you

of the oxygen gas in the air. When we speak of meat *decomposing*, we mean that its particles separate and change. This is because the gases of which the meat consists unite with the gas oxygen, and form new substances. But suppose that there is *no* oxygen for the gases of the meat to unite with?

W. Then the meat cannot change—cannot *decompose*, I should say.

Ion. And it must remain as it is for ever and ever, until some oxygen comes to it.

P. I should tell you that it is impossible to drive out every minute particle of this gas. I will therefore read to you what is said of the remaining oxygen; it is said that the “minute portion of oxygen still remaining in the tins, enters into combination with the animal matter, at the *induced temperature*” (that is, at the boiling heat), “thus further change is prevented.”

It is very easy, then, for you to understand the principle—the object is to remove *everything* from the case except the meat;—when the space is so perfectly “empty” that not even the thin atmosphere remains, then we call such a space a *vacuum*. Thus we read in the book that “*the vacuum must be complete* to render the preservation of the food successful.”

W. There is one thing I have been thinking about, papa. How do the people know that the vacuum is complete? there might be a little oxygen left, and the meat might be putrefying without their knowing it,

for they can't see inside, when the hole is stopped up.

P. The putrefaction would soon be discovered:—the water and gases which the meat would form, when decomposing, would burst the tins. So, we find that after the tins have been sealed they are placed in the *testing-room*, and made very hot. If the meat in any of the cases has begun to decompose, the heat hastens the decomposition, and the gases thus generated burst the tins at once.

In the same gallery may be seen some specimens of *concentrated* food, which we will talk about.

26. CONCENTRATED FOODS.

Ion. What is concentrated food, papa?

P. It is food in which all the nutritious quality has been brought into a small compass. The first specimen we shall notice is No. 16.

This is "Concentrated food prepared from the blood of cattle." Perhaps you have never examined your blood, but you are at all events aware that it is *red* in colour, and so is that of all Vertebrated Animals.

This blood consists of two principal parts which may be easily separated. 1st, the *colouring matter*; this is composed of a number of very minute red particles, of a circular shape, which are called "blood discs." 2ndly, the fluid in which they float; this is white and trans-

parent, and is called "*liquor sanguinis*," which is the Latin for the liquor of the blood; it consists of water, and other more important substances, from which new flesh is made.

I will mention one of these substances to you. If some blood just drawn from an animal be left at rest, it will *coagulate*; that is, a part of it will become thick and solid, forming what we call *clot*.

When it is thus left of itself to form clot, it does not separate into the two distinct parts I have just mentioned. The red clot is *more* than the pure "blood discs," for it consists of the whole of the "blood discs" entangled with a *substance drawn from* the "*liquor sanguinis*." This *substance from the liquor sanguinis* is called "*fibrin*," because as it becomes cold it forms strings, or fibres, and it is the substance from which the fibre or tissue of our body is made.

W. Do you mean by the fibre of our bodies the *flesh*, which we call "lean"?

P. Yes. That is the substance. Fibrin is flesh which has not yet become solid. By some people it is called "*liquid flesh*." If you were to examine a piece of clot, you would easily see that the red "blood discs" are in the midst of the "*fibrin*," but do not mix up with it. It is very easy to prevent the blood from becoming clotted. Go and ask the butcher, and he will show you! When I was a boy, a butcher once showed me. He had a pailful of fresh warm blood, and taking a stick in his

hand, he stirred the blood round quickly. I soon saw that the stick appeared to become larger and thicker, and when he took it out, it was surrounded by a stringy substance. This was the *fibrin*, which he had thus easily drawn out from the blood.

Now, if you like to think and answer me an easy question, I will tell you something else. Question—When the butcher took that fibrin out of the blood, what was left?

L. I can answer that, papa. 1st, The red blood discs; and, 2ndly, a *part* of the liquor sanguinis*—that is the watery part, without the fibrin.

W. And was there anything good left in the watery part?

P. Yes. There were several “good” substances, one of which I am going to talk to you about. If you were to hold this “watery part” in a saucepan over the fire, until it had reached a certain heat, it would separate into two parts, just as milk separates into curds and whey. The part which is like the whey of milk† we cannot now notice, but the other part, like the curds (or like the *white of an egg*, we may say, for it is almost the same substance), is very important—it is called *albumen*. It is from this albumen that the fibrin is made. You may, if you like, call the albumen “young fibrin.”

Ion. Yes; the *albumen* is “young fibrin,” and the *fibrin* is young flesh.

W. I wonder if papa can tell us what “young albumen” is?

P. Yes. That is the very point I wanted to lead you to. Of course you remember what I said to you of the food containing *azote*?

Ion. I remember it, papa. And I remember now, you said that only the food with *azote* in it would form flesh. Thus we may say—the food with *azote* forms *albumen*, the albumen forms *fibrin*, and the fibrin forms *flesh*.

P. How the food with *azote* forms albumen in the blood, is a point we must not now enter into; I only wished to show you which part of your blood is used to form new flesh. Now, when you see in the Exhibition “*the concentrated food from the blood of cattle*,” you may understand which part of the blood is likely to be nutritious.

Ion. I should like, papa, to know what is the use of the red “*blood discs*,” and of the “other part of the liquor sanguinis.”

P. This you may hear some other day, but it is no part of our present subject. The blood contains a great variety of substances—fatty substances and mineral substances, such as salt, iron, lime, and phosphorus—for, from our blood, there is formed not only flesh, but skin or membrane, gristle, bone, mucus, water, milk, bile, gastric juice, and so on—a very great variety of solids and liquids.

W. Really, what a wonderful liquid our red blood is! I am not surprised now that men make *concentrated food* from it.

P. I do not understand how the gentleman who exhibits this

* Serum.

† Mucus.

food has prepared it. He lives at Paris; therefore, if you want to know, you had better write and ask him.

At some distance from this food there are specimens of *Essence of Milk*—139 and 140. One is quite solid, for the curd of milk is solid *albumen*. This curd and the sugar of milk, and other nutritious substances, are preserved by driving off all the watery particles in the form of vapour; it is said that “in the absence of a certain quantity of water putrefaction cannot proceed.” This milk is useful for long sea voyages and hot climates; when it is only necessary to put a lump in boiling water and it produces fresh milk, which will keep pure for four or five days.

There are also specimens of coffee and cocoa *dried with the milk*, which must be very convenient.

In another part (35) is *Essence of Coffee*, which I have tasted, and find very nice.

You may remember that we spoke of the gluten in the wheat as containing *azote*, and being nutritious. There are specimens of biscuits which have been rendered very nutritious by the addition of wheat-gluten.

None of these preserved meats, however, have been sent from the tropics; they are principally made for warmer climates.

Ion. Now, papa, will you tell us of the *animals*, which are used as food by the tropical nations of the Exhibition?

P. I can only give you short descriptions. But to begin. The principal animals which form the food of man in all climates are those which feed their young with their own milk, and which, you know, are called *mammals*. Not all mammals, however, are usually eaten for food.

Ion. No, papa; Lions are not; neither are Wolves, nor Tigers, nor the other beasts of prey.

P. The principal animals which supply food are the *herbivorous* (or grass-eating) animals, which chew the cud; these we call *Ruminating Animals*.

(RUMINATING ANIMALS.)

27. THE SHEEP.

The SHEEP is a ruminating animal, and is one of the most useful; it is found in the tropics; but does not flourish there nearly so well as in temperate climes. It is the first animal we read of as subject to man, for the Bible tells us that “Abel was a keeper of sheep.”

In Egypt, which country, however, is outside the tropics, there is a breed of sheep with enormous tails. It is said that the tails of some, with the valuable wool upon them, weigh ten pounds, while others are said to have tails which weigh 70, 80, or even 100 pounds, and are then supported on a piece of wood drawn on wheels. The sheep of tropical countries mostly live on the high lands, where the air is thin and cold.

Some of our fine Southdown sheep were once exported to the West Indies; but in that warm climate, in the course of a year or two, they lost their thick woolly fleece, and, instead, were covered by short, crisp, brownish hair; they also became thin and lean.

(RUMINATING ANIMALS.)

28. THE ANTELOPE.

The ANTELOPE is another ruminating animal of the tropics. It supplies food for the beasts of prey as well as for man. The head-quarters of these animals is in Africa. There may be seen vast troops of the sub-family, which we call the *True Antelopes*.

The most beautiful of these is the Spring Buck Antelope, (often spelt Spring *Bok*). They spread themselves over the *karroos*, as the vast wild plains in the interior of that region are called. But sometimes these wonderful plains are subject to drought; for you have, I dare say, heard of the dry seasons in Africa, when there is no rain for many weeks. Then, the pasturage being completely dried up, immense multitudes of these animals flee from the *karroos* in search of food; and, as it is said, "literally inundate the fertile districts nearer the sea." Swarms after swarms are said to pass, like wave after wave, over the cultivated lands of the colonists, destroying their fields and crops, and all hopes of harvest. In turn, however, they afford abundant

and easy prey to man, and furnish him with food. When the rain begins to fall, the hordes return, but their numbers are much thinned by the attack of man and beast; yet it is said that their numbers whiten or speck the country as far as the eye can reach. A traveller who fell in with a swarm thus returning, supposes their number to have been from 25,000 to 30,000. In a few days, the whole disappear.

In Asia, antelopes are often hunted with dogs and falcons. The falcon flies at the head of the animal,—thus the bird stops its progress, and gives time for the dogs to come up. In India, the Antelopes we meet with are larger, more clumsy, and have more of the form of an ox; they are therefore called *Bovine* (or ox-like) Antelopes. One of the largest is called the *Nyl Ghau*.

(RUMINATING ANIMALS.)

29. THE DEER.

The DEER (which, by the way, are very different from the Antelopes) are not very numerous in the tropics. The Antelopes supply their place. The small *Musk Deer*, which is hornless, is found in Southern India, Ceylon, Java, Sumatra, &c.; and a larger species is found in the North of India and in China. They are hunted not only for their flesh, but for the costly perfume situated in a pouch in the body.

L. Are there any cows and oxen in the tropical countries?

P. Yes; the supply of food from the Ox tribe is considerable. We will mention them next.

(RUMINATING ANIMALS.)

30. THE BUFFALO.

The appearance and habits of the Buffalo are very different from that of our more genteel animal, the Cow. In the first place, the Buffalo is a clumsy, heavy, lurking animal, although he is stronger than an Ox. In the second place, he is a dirty fellow; for during the heat of the day, he will wallow in the thick morasses of India, rolling in the thick mud, or walking with only his head above the muddy water. The *Indian Buffalo* is, however, a very useful animal. I am sure you will pardon his dirty habits, when you know that he will drag a heavy, wagon-like cart, through places where it is chest-deep in the mud. Thus he is useful in more ways than in supplying food. The buffalo is found in other parts of the tropics, such as China, Siam, and the Indian Isles. The Brahmin Ox is another Indian animal; it is so called because it is held sacred by the *Brahmins*. It may be known by the hump on its back.

The *Yak*, which you heard of in your Physical Geography lessons,* is also an Asiatic animal.

The Cape *Buffalo* supplies food in Africa; and large herds

of buffaloes and bisons are found in America. When America was first discovered, there were no ruminating animals there except the *Llama*. Horses and cattle were, however, introduced by the Spaniards, and now they are found in immense herds. In some of the prairies beyond the tropics, herds have been seen numbering 20,000 individuals. In South America they are now so abundant that they are shot merely for the sake of their hides, and their carcasses are left for the birds and beasts of prey. The American bison is killed merely for its tongue.

(RUMINATING ANIMALS.)

31. THE CAMEL AND LLAMA.

P. These animals are not much used as food; still we find that in Arabia the *Camel* supplies milk, and is sometimes, though very reluctantly, killed for its flesh. The *Llama* is an animal found in the higher parts of the Andes, near Peru and Chili, in South America.

When the Spaniards invaded America, it was the only beast of burden which the natives possessed. It was useful to them not only in carrying goods, but in supplying food, just as the camel is useful to the Arabians. You might almost call the *Llama* the *American camel*, for it has cells in its stomach to carry water, just as the camel has; but it labours in a different sphere, for it carries gold and silver from the

* PLEASANT PAGES, vol. ii. p. 237.

mines over mountains, instead of carrying spices and silks over the flat sandy deserts.

Ion. That makes three animals which are useful as beasts of burden and for food—

The *Buffalo* (of India and the Cape);

The *Camel* (of Arabia); and

The *Llama* (of South America).

P. And you may add the *Horse*. When we talk of the temperate countries you will hear that horses are eaten by the *Tartars*; the milk of the mare is also used by them. *Sheep*, too, in the Himalayah mountains are used as beasts of burden, as well as for food. In the same region is also found the *Yak*, which I told you was used for both purposes.

There are other animals used as food in tropical climates, which however are *not* ruminant.

(NON-RUMINANT ANIMALS.)

32. THE HOG, BABYROUSSA, &c.

THE CHINESE PIGS form an article of food for many millions; they are smaller than our English hog, but, their flesh is not nice food; especially in the warmer parts of China, it is soft and “flabby,” and the lean is hardly more solid than the fat; in the colder parts, the flesh is more firm. Some people speak of it as being a *delicacy*.

The BABYROUSSA is a larger animal of the pig family, with a pair of singular hook-shaped

tusks; it is found in Java, and the Molucca Isles. There are other animals of the hog family in Africa and America. *Wild Boars* of different kinds are abundant, *Indian* and *American Tapirs*, *Peccaries*, &c.; the last two are the only pig-like animals which were found in America at the time of its discovery. The largest of all the pig family is found in the rivers of Africa; it is called the HIPPOPOTAMUS. Its flesh is very good food, and is much sought after; some parts of the fat are a *great delicacy*!

(NON-RUMINANT ANIMALS.)

33. VARIOUS SMALL MAMMALS, &c.

There is no accounting for tastes. As in the tropics there are all kinds of people, so do they eat “all kinds of things.”

In the small order “Edentata” (or toothless animals) is an animal called the ARMADILLO. It seems to be amongst the mammals what the tortoise is amongst the reptiles, for its body is encased in a bony armour. It lives in the plains of South America, feeding on the putrid carcasses of the oxen left there, as well as on vegetables, &c., &c. The natives, and the Europeans in America, roast these animals whole in their shells; and when they are very plump, *they* also are esteemed a “delicacy.”

The SLOTH is another American animal living in the dense tropical forests. This animal is “tropical food.” I have read

that “the Indians hunt him, for they like him, and eat his flesh.”

You have, I dare say, seen a *Bat*. The small bat of our country is not to be compared with the great *VAMPIRES* of South America and the West Indies. Some of these are called blood-sucking bats, and are even sometimes used as food. In the Old World, however, in the island of Madagascar, and in Java, &c., there are bats which feed on fruit, doing great mischief to the fruit trees. They are about the size of a fowl, and in the day-time, when they sleep, they may be seen in great numbers, hanging by the hind legs to the naked branches. Their flesh is another *dainty*—or is so called by the inhabitants of those islands. It tastes very much like hare or partridge.

The order of mammals called “the Gnawing Animals,” also supply food. There are in America and Africa animals which resemble our hare and rabbit; such as *Guinea-pigs*, *Capbyras*, *Agoutis*, *Porcupines*, *Chinchillas*, &c. In Africa we find a pretty little animal called the *Jerboa*. In the neighbourhood of Egypt lives a small animal called the *Coney*, which is mentioned in the Scriptures;* and in all quarters of the world abundance of *rats* and *mice*. These are all “gnawing animals,” but they are not all eaten as food.

L. No; I should think that the *rat* was not.

P. On the contrary, the rat is the next article of food to which I want you to pay atten-

tion. Amongst the various “delicacies” of the Chinese, are rats and dogs.

I will read you an account of the eatables of China, written by a gentleman who visited the Chinese:—

“They eat almost anything that comes to hand. Nothing can be more laughable to a European than to see a Chinese arrive in the streets of the city with a carrying-pole supporting two bird-cages, filled with dogs and cats, instead of birds. A small thin sort of spaniel appears to be most in request. The animals, when brought to market, sit quite downcast, whilst the cats make a dreadful squalling, as if conscious of their fate. The flesh of these last, when they are well fed, is much esteemed, and is often seen on the tables of the rich.

“Other Chinese bring upon these carrying-poles many dozens of rats, which, when they have been opened, like the pigs in our country, are hung up, by means of a cross piece of wood, through the hind legs. These rows of rats look very nice, but they are only eaten by the poor.”*

You know that I have not been to China, but your uncle has, and he tells me that the *dogs* have a very beautiful flavour. He could not persuade himself to eat any *rat*, but the flesh of the dog is, he says, nicer than that of the pigs.

And now, while we are on the subject of China, let us end our list of varieties by one very singular kind of food.

If you go to the Chinese department in the Exhibition, you

* Prov. xxx. 26.

* Meyen's Voyage Round the World.

will see a specimen of the *Chinese edible bird's nest*.

These bird's nests are found in Java, and the other Eastern Islands, and are sold to the Chinese for very high prices. They are the nests of a kind of *swallow*, and are found in caves by the side of the sea. The principal substance of which they are formed is a slimy gelatin, which is found on the sea shore; they also contain seaweed, and a soft greenish matter found on the rocks.

The natives of *Java* and the Eastern Isles cannot eat them, but the Chinese have persuaded themselves that they are very nice.

Ion. Ah! I have heard the expression, "Imagination goes a great way," and now I know what it means. These nests are not nice according to their *judgment*, but according to their *imagination*!

W. Yes; and the people of *Java* say that they are *not* nice, because they use their *judgment*! How can slime and seaweed be nice food?

P. Anything can be nice according to the taste of the person who eats it. To a hedgehog, snails and worms are "nice;" to the cat, black beetles are nice; and to yourself, cooked meat is nice. Now, suppose the hedgehog's nicety be given to the cat, the cat's black beetles to be given to you, and your food to be given to the hedgehog; in each case, that which before had been "nice," would now be called "nasty."

I should tell you that the question, "What is the princi-

pal substance in these nests?" has been a matter of some dispute. By some it is believed not to be the slime found on the rocks, but an animal substance formed from the bird itself. At all events, the nests are very much valued.

After they have been collected by the natives, they are dried in the sun, and packed in boxes. I have read that they are sold by weight, and that the price of the best is nearly £6 per lb. Thus, only the richer classes can have the pleasure of eating them; they are sold chiefly to the emperor and his court. Sometimes they are eaten in broths and soups, and sometimes they are "soaked in water, pulled to pieces, and put in the body of a fowl." I have also read of the total quantity sent to China. It is supposed that, every year, about a *quarter of a million* pounds' weight is consumed; and, allowing fifty or sixty nests to a pound, the annual supply would be from twelve to fifteen millions of nests—equal in value to £300,000.

How very true it is that "the imagination goes a great way"!

W. Please, papa, before you proceed any further, we should like to make a lesson on these mammals, and learn it.

Lesson 8. ARTICLES OF FOOD (Tropical Climates).

THE FOOD SUPPLIED BY MAMMALS, &c.

1. The most striking articles of food in the Exhibition are the

PRESERVED MEATS, which are kept fresh in air-tight canisters, by expelling every particle of the air. A "vacuum" is thus caused, and therefore there is no oxygen to cause putrefaction.

2. The CONCENTRATED FOODS, such as the essences of MILK and other substances, are useful in tropical countries.

3. The ANTELOPE and DEER, found in Africa, India, &c., afford a large supply of food. In Africa, the head-quarters of the Antelopes, there are enormous herds of from 25,000 to 30,000 feeding on the "karroos." These in the dry season migrate towards the shores for food, and damage the crops of the farmers.

4. The SHEEP is also found in the tropics. Those of Egypt and the Cape of Good Hope are celebrated for their enormous tails.

5. The BUFFALO, YAK, and BISON, are of the Ox tribe. These, with the Camel in Arabia, and the Llama in South America, are useful as food and as beasts of burden.

6. The BAT is also used as food in Madagascar, Java, &c. The species eaten are frugivorous (or fruit-eating), and nearly as large as a fowl.

7. The CHINESE PIG, the BABYROUSSA, the HIPPOPOTAMUS in Africa, the TAPIR in the Eastern and Western Hemisphere, and the PECCARIES of America, also supply food. Their flesh, however, is different in its appearance and substance from that of the "Ruminating Animals."

8. The ARMADILLO and SLOTH are Mammals of another

order, which are sometimes killed for the sake of their flesh.

9. The HARE, belonging to the gnawing animals, is represented by the Agoutis, Capbyras, Guinea-pigs, &c.

10. The RAT and DOG are strange articles of food, used by the Chinese, whose tastes differ from those of other nations.

We will next notice the food supplied by the birds.

THE FOOD SUPPLIED BY BIRDS.

34. DUCK, HEN, &c.

The most useful of all birds for food are those we call "poultry." To begin with China, an immense trade is carried on in the eggs of poultry. The Chinese are said to be the most skilful people in the world in managing and rearing these birds. Ducks particularly they bring up in great quantities; at Canton, a great many Chinese get their living solely by rearing ducks and other poultry.

In EGYPT, also, there are men who are egg-hatchers by business. It is said that the country contains four hundred artificial ovens, and that perhaps nearly a hundred million eggs are hatched every season. The men undertake to return two chickens for every three eggs, and they are paid very good wages for their work.

W. Are there any poultry in India?

P. Yes, indeed. Our common barn-door fowl is a native of India—and of Java. The

Peacock and *Guinea fowl*, which belong to the same *order* of birds, are all natives of warm countries. They are all used as food.

L. Do people eat *peacocks*, papa?

P. Yes; though not very extensively. I dare say you have read in your Roman history of the ancient feasts, when dishes were made from the heart, tongue, and liver of thousands of peacocks.

35. TURKEY, PIGEON, &c.

Turkeys and *Pigeons* also belong to the poultry tribe. They are found in some of the warmer climates, particularly in America. The turkeys may be seen in very large numbers; but it is difficult to imagine the multitudes mentioned in the accounts given of the pigeons. It is said that the passenger pigeons fly in flocks of *hundreds of thousands of millions*, darkening the country they pass over. According to Messrs. Audubon and Wilson, two celebrated naturalists, the flocks are about a mile wide, and two hundred miles long. When they alight, the branches of the trees bend under them, and thousands may be knocked down without difficulty. When they pass over a place, the inhabitants “for a week feed only on pigeons, and talk of nothing but pigeons.”

W. I wonder how large must be the place they live in!

P. It said that one of their breeding places consists of 40 square miles of forest.

36. THE QUAIL.

The smallest birds of the poultry tribe are the *QUAILS*. The quail lives in Europe, but when the cold winds of winter come, they “migrate” to Africa and other warm climes. It is said that in the autumn the air is nearly darkened by their prodigious numbers. As they cross the Mediterranean Sea, and reach Africa, they fly very low, being tired out by their long passage over the water. In some places they are caught by nets spread on high poles; against these the exhausted birds strike and fall. The sultan once sent orders to his officers to catch four hundred dozen, and in three days they were all caught alive, and brought to him in small cages. At harvest time the Egyptians take them by thousands, and, having stripped off their feathers, they dry them in the burning sand, and sell them for a penny a pound.

You have read in the Bible how the Israelites were fed by the swarms of quails, and how they spread them round the camp to dry.*

37. THE OSTRICH.

In the sandy deserts of Africa lives the great bird called the *Ostrich*. If you know anything of its habits, you will easily understand that its flesh cannot be very nice. If it would be content with the grass and rough herbage it finds, it would

* Numbers xi. 31, 32.

be all very well, but it is said to eat rags, leather, wood, iron, stone, &c.—anything! Its flesh certainly is an article of food, but the natives of Africa will not eat it while they can procure its eggs, which afford a more palatable meal.

Ion. I suppose that it would not be quite so easy to catch an ostrich with a net as to catch the *quails*?

P. No. The ostrich is hunted by men on horseback, and is often caught with a rope thrown round its head. I once read an account of an ostrich hunt in *Paraguay*, a place in South America. It is said: "With crest erect, and angry eye, towering above the tall herbage, the nimble, conspicuous, and athletic ostrich, flew before us at the rate of sixteen miles an hour. The chase lasted half that time, when an Indian, with admirable grace and dexterity, whirled his balos over the half running, half flying, but now devoted bird. Down came the giant foe, rolling, fluttering, and panting, and he was in an instant despatched. The company stripped him of his feathers, stuck them in their girdles, and left his carcase on the plain a prey to the vultures."

In *AFRICA*, the mode of ostrich hunting is different. The natives disguise themselves by putting over their shoulders a stuffed ostrich skin, with the head erect; thus only their legs are seen, and the trick is not detected by the bird. Armed with a small bow and arrow, the native then joins the company as a familiar friend; and

his true character is not discovered until the finest bird is brought down by his arrow.

Ion. But it seems that the ostrich is hunted for its *feathers*, not for its flesh.

P. Yes, the feathers are by far the most valuable part. There are many more birds which supply eggs and flesh for food. In China, the natives eat birds which we should object to as much as their rats—such birds as *Owls*, *Hawks*, *Eagles*, *Storks*, and others, which are not noted for their fine flavour.

The gaudy *Parrots*, which have always inhabited the forests of India, and the banks of the Ganges, are eaten there, and in other parts of the world, but I am not sure whether they are much used in China.

In many of the tropical islands, food is also obtained from wild ducks, gulls, and sea-fowl of all kinds. There is only one of these which I will mention—first, because it will amuse you; secondly, because it is like both bird and *fish*.

38. THE PENGUIN.

Imagine that you are in the South Sea Islands, on the sea-shore. In the distance you see a row of these birds, sitting upright with their bodies resting on their feet and tails. Their wings, like those of the ostrich, are short, and useless for flying; the feathers of their back are black, and their breasts are a shining white; so, as they stretch forth their short arms or wings, they look like a row

of children in black coats and white pinafores. They walk, or strut, about on the land, holding their heads high, with a stately look, and yet they are very stupid, for it is said that they permit the sailors to walk up to them and knock them down with sticks.

L. Is their flesh nice, papa?

P. No, by no means; it is only used as food when nothing better can be procured. It has a fishy taste, because the bird feeds on fish; and it has also a rank oily taste, for its feathers and skin contain oil to protect its body from the water. Some are called Hopping Penguins, and some Jumping Jacks, from their habit of leaping quite out of the water when pursuing their food.

W. Now, papa, we will make a lesson on the "Bird-food" of the Tropics.

Lesson 9. ARTICLES OF FOOD. (Tropical Climates).

THE FOOD SUPPLIED BY BIRDS.

1. *The most useful birds for food in tropical countries, are those which we call "poultry," such as the HEN, DUCK, TURKEY, PARTRIDGE, PHEASANT, PEACOCK, PIGEON, QUAIL, &c. The common Hen is a native of India and Java. In China and Egypt the people are very skilful in rearing poultry; in the latter country nearly a hundred millions of eggs are hatched every year by artificial means. The Turkey is an American bird; in North America it ranges wild*

in its native woods, and grows to a great size; it flourishes more in the temperate than the tropical climates.

The eggs, as well as the flesh of birds, are nutritious. In Africa the eggs of the OSTRICH are eaten; and are much nicer than its flesh. Even the flesh of the EAGLE, HAWK, and other birds of prey is eaten in China; while in different parts of the tropics food is procured from the PARROT, WILD DUCKS, GULLS, PENGUINS, &c. A singular food is also obtained in China from BIRD'S NESTS—the nest of a species of swallow, living in the Eastern Islands.

P. We shall, for a little while, see if any supply of food can be supplied from the class *Reptiles*.

FOOD SUPPLIED BY REPTILES.

39. THE TURTLE, &c.

You have heard in your Natural History lessons that the Reptiles are vertebrated animals, with cold blood, which live both on the land and in the water—laying eggs, as the birds do.

If you look at the map of the Western Hemisphere, you will see on the western side of South America a few very small islands called the *Galapagos*. These islands abound with Turtles, which are truly enormous animals; they have been known to weigh 500, 600, and even 800 lbs. They are most useful animals in supplying food for a ship, and the

sailors earnestly engage in the business of catching them.

The turtles come on shore during the night for the purpose of laying their eggs. They try to conceal themselves in the darkness, but the sailors lay wait for them, and as they return to the water, they are discovered either by the moonlight or torch-light; the men attack them with clubs and handspikes, and quickly lay them on their backs.

L. And then they can never turn themselves over again, I have heard.

P. No; they are then made prisoners. In less than three hours, it is said the sailors will turn over forty or fifty turtles full of eggs. When the daylight comes, the turtles are cut up, and their flesh and eggs are salted. Salt turtle is a favourite food, with the white men as well as the negroes. The *salt turtle* in the tropics supplies the place of the *salt cod* in the temperate countries; it is, however, much richer: it is more oily—quantities of greenish oil used for food, and for burning, are procured from each individual.

Sometimes in calm weather, and moonlight nights, the green tortoises are caught out at *sea*. They are soon discovered by the froth they make in the water, when rising to the surface, and they are killed with a harpoon like that used in the whale fisheries. It requires tremendous force to send the harpoon with sufficient swiftness to pierce the animal's hard horny buckler.

The word *Turtle* is only another name for the *Sea-Tortoise*; there being two kinds of tortoises—those living on the land, and those living in the water. There are small fresh-water tortoises living in the ponds and ditches of Europe. In the rivers of the tropics, in the Nile and the Ganges, there lives a very large fresh-water turtle—some individuals weigh as much as 240 lbs. They may also be seen in the rivers of Java and Sumatra; and in the Ganges there are four species which, it is said, are constantly seen eating the bodies of the natives thrown into the sacred stream. They also devour birds, reptiles, and young crocodiles—and in their turn become the prey of the older ones. I cannot say whether they are ever eaten by man. I should hope not.

Turtles are found all over the tropics. In the *East Indies*, the *Molucca Isles*, and *New Guinea*; in the *Bahamas* and the *West Indies*; in *Demerara* and the *Brazils*. If you will look for these places in your map, you will see how widely the tortoise family are distributed.

W. Are there any specimens of tortoises in the Exhibition?

P. I could not find any. Amongst the goods from *Trinidad*, there are specimens of tortoiseshell from the Hawksbill turtle, but I did not see any turtle itself.

The tortoises are an ancient family of animals, and they have the same standing amongst the land animals as the palms have amongst the trees.

There are many more reptiles in the tropics. Indeed, the tropics are their principal region, for they are about twice as numerous, and three or four times as large as their brethren in the temperate zone. JAV^A, in the Old World, and BRAZIL, in the New, contain the greatest variety. Besides the tortoises, there are all kinds of *lizards*, *chameleons*, *crocodiles*, *serpents*, *salamanders*, *toads*, and *frogs*. All of these are highly interesting; the great *bull-frog* of the West Indies, and the *tree-frog*, are curious specimens. Many of these reptiles are eaten as food, but not all.

L. Now, papa, will you tell us what *fish* are eaten in the tropics?

P. Yes, we will speak of them next.

THE FOOD SUPPLIED BY FISH.

40. SHARKS' FINS, &c.

P. The tropical fish are such that I should have to give you their whole natural history before you could feel any interest in them as food. In the Indian department of the Exhibition you may see specimens of *Isinglass*, *Fish Maws*, and *Sharks' Fins*, which remind me that the sharks in different climates are very different in character. Some are not near so dangerous as others; in the Chinese seas particularly there is a species of shark which is often used as food.

The sharks, and certain flat fish called *Rays*, belong to the order of cartilaginous fishes;

that is, fish with a skeleton of soft cartilage instead of bone. They contain largely a substance called gelatine, and a jelly-like slime which is highly nutritious. One family of this order contains the nutritious substance called isinglass.

L. I know that isinglass *jelly* is nutritious!

P. These fish, as I said, are found in the Chinese and Indian Seas, and thus it is that we find *isinglass*, *sharks' fins*, and *fish maws* in the Chinese and Indian departments. The Chinese enjoy the flesh of the Sturgeon, for it has a delicate taste, like veal.

W. How does the shark taste, papa?

P. Shark flesh generally is coarse food, but I believe that the sharks in those seas have a pleasant flavour; particularly their *gristly* fins, which are full of slime and jelly. The species called the Basking Shark is quite harmless.

In the Chinese seas *Soles* also abound. The cartilaginous fish the *Cod* belongs principally to the cold Northern Ocean, but we find members of the same family round about China and India. The people feed on what they call *Rock Cod*.

The RAY FAMILY, which I told you are cartilaginous fishes, are, I think, represented in the Chinese seas, for I have read of a flat fish found there, called the *Pomfret*. The *Skate* is a member of the Ray Family, with which, I dare say, you are acquainted.

W. Yes, I have often seen a skate!

P. And there is often found

in the tropics another member of this family—a flat fish, called the *Torpedo*, which is celebrated for the violent electric shocks it gives to those who touch it.

The *Torpedo* is still more abundant in the seas that wash the shores of Europe.

W. Are there many more fish eaten in the tropics?

P. Yes, more than we need mention now. Besides the true fish, there are abundance of *Molluscos* and *Articulated* animals, known by the name of “shell-fish.”

(MOLLUSCOUS ANIMALS.)

41. THE OYSTER, &c.

Oysters abound in the tropics, and they not only yield food, but the oysters round about Ceylon, Borneo, and some of the Spice Islands contain pearls.

L. I have read, papa, of the pearl fisheries of Ceylon.

P. The *NAUTILUS*, another shell-fish, is nearly tropical, but the largest “shell-fish” of the tropics are those belonging to the order of snail-like mollusks.

You have, I dare say, seen many of the large massive shells brought from the tropics. Many of these shell-fish are found in the temperate zone, although of smaller size. They are known under the names of *Whelks*, *Cowries*, *Cones*, *Limpets*, &c.

(ARTICULATED ANIMALS.)

42. THE CRAB, &c.

The articulated animals, which are called the *Crustacea*—such

as the *CRAB* and *LOBSTER*—are also very famous in the tropics. Just as the tropical *bats* are large compared with the English bat, so the enormous *crabs* of the West Indies are truly large when compared with those of England; although, perhaps, the English crabs have a better flavour. There are three kinds of crabs, just as there are three kinds of tortoises. There are the *Marine Crabs*, the *River Crabs* (living in the rivers, brooks, and *lakes*), and the *Land Crabs*. Most of the river crabs and all the land crabs live in the tropics.

The land crabs of the West Indies generally inhabit moist woods, and, it is said, “hide themselves in holes which they dig in the soil. Some dwell in low marshy lands near the sea, others in wooded hills far from the shore; the last-mentioned perform every year a pilgrimage to the sea, for the purpose of depositing their eggs there.” These important journeys are performed crab-fashion, by walking side-ways; the pilgrims journey, as pilgrims generally do, in large companies, moving toward the sea in a direct line, and seldom allowing any obstacle to interrupt their progress. They travel by night. A species of land crab has been noticed by Bishop Heber in his journal. You shall hear his account:—

“All the grass through the Deccan generally swarms with a small land crab, which burrows in the ground, and runs with much swiftness even when encumbered with a load of food

as big as itself. This food is either grass, or the green stalks of rice; and it is amusing to see the crabs, sitting, as it were, upright, cutting their crop of rice with their sharp pincers, and then waddling off with their sheaves to their holes."

There! I think you have had "description" enough. The *Lobster*, *Cray-fish*, *Prawns*, and *Shrimps*, might be talked about, but you know these animals very well—they are all supplied, more or less, to the inhabitants of the tropics, as well as ourselves. We may now close our account of the food eaten in tropical countries. Do you remember any other?

L. Yes, papa, *Locusts and wild honey!* That was St. John the Baptist's food.

P. True. The *insects* are the servants (as well as the enemies) of man in the tropics. The desert in which St. John the Baptist lived, is not, however, in those parts.

(ARTICULATED ANIMALS.)

43. THE LOCUST.

It is rather on the borders than within the tropics that Locusts are eaten. In Dr. Kitto's History of Palestine there is a good account of the manner in which the locusts are used as food. It is said—

"Locusts are eaten by the Bedouins: they collect them in great numbers in the beginning of April, when they are easily caught. After having been roasted a little upon the iron-plate on which bread is

baked, they are dried in the sun, and then put into large sacks, with the mixture of a little salt. Another way is to throw them alive into boiling water, in which a good deal of salt has been mixed; after a few minutes they are taken out and dried in the sun; the heads, feet, and wings are then torn off, the bodies are cleansed from the salt and perfectly dried, after which they are stowed away in sacks. They are never served up as a dish, but every one takes a handful of them when hungry. They are sometimes eaten broiled in butter; and they often contribute materials for a breakfast when spread over unleavened bread mixed with butter.

"In some parts, after being dried, the Arabs grind them to a powder, of which a kind of bread is made in small cakes. Of all Bedouins known, those of Sinai alone abstain from using locusts as food. In the towns of Arabia there are shops in which locusts are sold by measure. They are not eaten by the peasants of Syria; although some poor fellahs in the Haouran will make a meal of them when pressed by hunger. They break off the heads and take out the entrails before drying them in the sun, whereas most of the Bedouins swallow them entire."

The locusts belong to the same order as the grasshopper and the cricket, but they are much larger. The service which they may render as food is not very great, and it cannot be compared with the injury, past

calculation, which they do to the vegetation of Africa and other warm countries. I will read you another account of the locust which is very distressing:—

“Thus the ‘plague of locusts’ is not unfrequently repeated in tropical countries, and is dreaded by the inhabitants even more than an earthquake. These insects are of such extreme voracity, that no green thing escapes them; and their numbers are often so increased, that they fly in masses which look like dark clouds, and cover the ground where they alight for miles together, it may be easily conceived that they must produce incalculable injury.

“The North of Africa and the West of Asia are the countries most infested by these pests. It is related by Augustin, that a plague, induced partly by the famine they had created, and partly by the stench occasioned by their dead bodies, carried off 800,000 inhabitants from the kingdom of Numidia and the adjacent parts.

“They occasionally attack the South of Europe. It is recorded that Italy was devastated by them in the year 591; and that a prodigious number both of men and beasts perished from similar causes,—no less than 30,000 persons in the kingdom of Venice alone. These tremendous swarms usually advance towards the sea: and being there checked, and having completely exhausted the country behind them, they themselves die of famine, or are blown into the sea by a gale.

“In 1784 and 1797, they devastated Southern Africa; and it is stated by Mr. Barrow (in his travels in that country) that they covered a surface of 2,000 square miles; and that, when cast into the sea by a strong wind from the north-east, and washed upon the

beach, they formed a line fifty miles long, and produced a barrier along the coast three or four feet high; and that, when the wind again changed, the stench created by the putrefaction of their bodies was perceived at a distance of 150 miles inland.”*

Ion. Now, papa, will you tell us about the *Wild Honey*?

P. If you wish it; but *Honey* cannot fairly be called an animal substance.

44. WILD HONEY.

HONEY is the vegetable juice collected from the nectaries of flowers. You may read in your Natural History of the bees, how they have a long trunk (or proboscis) which they insert into the tubes of the flowers. This vegetable juice is passed from the proboscis of the bee into its cross or honey bag. Here it undergoes some change, so that when it is brought up again to be placed in the honeycomb it is not purely a vegetable substance.

The honey in Palestine and the borders of the tropics is, however, the most famous. There wild honey abounds. I have read that the account of Palestine as “a land flowing with milk and honey,” was literally true. The combs of the bees were placed usually in clefts of rocks and hollow trees; and when the honey which they had made from the rich vegetation around was melted by the sun, it actually flowed down in streams.

The traveller Buckhardt no-

* Dr. Carpenter’s Animal Physiology.

ticed in Palestine a honey which is a true vegetable substance. He heard of a tree growing in the valley of the Jordan, which is about the size of an olive tree. The "honey," as the Arabs called it, is found collected on the surface of the leaves, like the round drops of dew. The natives either gather it from the leaves or from the ground under the tree, which is often completely covered with it. It has a brownish colour and a sweet taste; and the Arabs eat it like honey with butter, or put it in their gruel. This is likely to be the kind of honey which Jonathan found on the ground under a tree, and ate.*

You may now make up your tenth lesson.

Lesson 10. ARTICLES OF FOOD (Tropical Climates).

THE FOOD SUPPLIED BY REPTILES, FISHES, MOLLUSKS, JOINTED ANIMALS, &c.

1. The principal REPTILE-FOOD of the tropics is that obtained from the Tortoises. There are three kinds of these animals—The LAND TORTOISE, the FRESH-WATER TORTOISE, and the MARINE TORTOISE; the two latter are called Turtles. The Turtles of the GALAPAGOS ISLES are of an enormous size, sometimes weighing as much as 600 or 800 pounds. They are caught by the sailors during the night, and are killed for the sake of their flesh, their oil, and their

shells. Salt Turtle in the tropics more than supplies the place of the Salt Cod in the colder climes.

Some of the other families of Reptiles are used as food, but not many, for they include the Lizards, Serpents, Crocodiles, Frogs, &c.

2. The TROPICAL FISH also afford food to man. The Shark-fins, Fish Maws, and Isinglass in the Great Exhibition, tell us of the sharks, rock-cod, sturgeon, and other "gelatinous" fish, which are found in the CHINESE, INDIAN, and other tropical seas. Various "Ray-fish," Soles, and others abound in the tropics.

3. The OYSTER and many other Mollusks, such as the Whelks, Cowries, and Limpets, are also eaten in these countries.

4. From the JOINTED (or "articulated") ANIMALS there is a large supply of Crabs, Lobsters, and other "Crustacea." There are Land, Fresh-water, and Marine CRABS, as in the divisions of the Tortoise family. The West Indies is the principal country for the land-crabs; a small land-crab is found in great numbers in the East Indies.

5. Even the INSECTS contribute to the supply of food. The LOCUSTS and the BEE are both of service. The food afforded by the body of the locust does not, however, compensate for the great injury it causes to vegetation.

Ion. Now, papa, I should like to make a list—merely a list of names of the different animal and vegetable substances. I feel that it would help my memory very much.

P. Very well, you may do so.

* 1 Sam. xiv. 25-27.

OBJECT LESSONS FROM THE GREAT EXHIBITION.

Part the Third.

RAW MATERIALS—FOOD OF TROPICAL COUNTRIES.

VEGETABLE KINGDOM.

RICE.
MAIZE.
SAGO.
ARROW-ROOT.
TAPIOCA.
YAM.
GINGER.
NUTMEG.
MACE.
PEPPER.
CINNAMON.
ALLSPICE.
CLOVES.
TEA.
COFFEE.
COCOA.
SUGAR.
COCOA-NUT.
DATE.
BANANA.
BREAD-FRUIT.
COW-TREE.
BANIAN TREE.
LENTIL.

ANIMAL KINGDOM.

PRESERVED MEATS.
CONCENTRATED FOOD.

MAMMALS: SHEEP.
viz.

DEER.
ANTELOPES.
BUFFALO.
CAMEL and Llama.
HOG, Babyroussa,
Hippopotamus, &c.
ARMADILLO, Sloth,
Bat, &c.
HARE, Rabbit, Rat,
Dog, &c.

BIRDS: HEN, Duck.
PIGEON, Quail, &c.
OSTRICH EGGS.
EAGLE, Hawk, &c.
WILDFOWL, Gull, &c.
PENGUIN.

REPTILES: TURTLE, &c.

FISH, &c.: SHARK FINS, &c.
ISINGLASS.

MOLLUSKS, OYSTER, Crab, &c.
&c.
LOCUST, &c.

W. Now I call that a very nice, easy list to remember.

P. And I see a nice thought which easily arises from it. Is it not pleasant to think that, though these animals and vegetables are so many and so different, there is One Maker to them all?—and that He rules over all, cares for all, and keeps all in perfect order?

It is pleasant, too, to think how each animal was made by Him for some good purpose. Many of them have their boundaries marked on the earth, and only go to and fro in their appointed place, to do their share of work in the great plan of nature. Suppose that each could think and know that?

L. Then he would be very pleased!

W. I think, too, that the animals would be very *thankful*.

P. To be sure they would. Then, how much more thankful

should *we* be! When we think how many and how different are the beautiful plants and animals; and that all are good for our use and comfort, then may we remember the great truth which this Exhibition so plainly sets forth.

"The earth is the Lord's, and all that therein is:

"The compass of the world, and they that dwell therein."

And you may sing also this good song—

"Mountains, and all hills; fruitful trees, and cedars:

"Beasts, and all cattle; creeping things and flying fowl:

"Kings of the earth, and all people; princes, and all judges of the earth:

"Both young men, and maidens; old men, and children:

"Let them praise the name of the Lord: for his name alone is excellent; his glory is above the earth and heaven."

SUN, moon, and stars, by day and night,
At God's commandment, give us light;
And when we wake, and while we sleep,
Their watch, like guardian angels, keep.

The bright blue sky above our head,
The soft green earth on which we tread,
The ocean rolling round the land,
Were made by God's Almighty hand.

Sweet flowers that hill and dale adorn,
Fair fruit-trees, fields of grass and corn,
The clouds that rise, the showers that fall,
The winds that blow—God sends them all.

The beasts that graze with downward eye,
The birds that perch, and sing, and play,
The fishes swimming in the sea,
God's creatures are as well as we.

But us he form'd for better things;
As servants of the King of kings,
With lifted hands and open face,
And thankful heart to seek his grace.

MONTGOMERY.

PART THE FOURTH.

CHAPTER TWELFTH.

ARTICLES OF FOOD IN THE
TEMPERATE COUNTRIES.

P. What is meant by the Temperate countries?

L. I will show you, papa, on the map. Here are the Tropical countries, in the centre of the earth; and the Frigid countries are situated around the poles. The Temperate countries are those between the Tropical and the Frigid.

W. I will read you some of their names, papa, and you will see whether any of them have sent any goods to the Exhibition. Great Britain, France, Holland, and nearly all the countries of Europe. The greater part of Russia, and of Asia—and the Islands of Japan beyond. And then again, in the Western Hemisphere, there is the great country of North America, where the people called Yankees live.

P. Goods have been sent to the Exhibition from almost all of these countries—so, let us observe their articles of food in the Exhibition.

W. Will you please to begin with GREAT BRITAIN, papa? I wonder what is the principal food of the English?

Ion. *Roast beef and plum-pudding!* Have you never heard of that?

W. Yes, but *I* do not eat much of either—I eat a great deal of bread and butter. Let me make you out a list of foods

for England and other temperate countries.

Bread and butter, cheese, onions, beef, mutton, veal, lamb, pork, venison, bacon, poultry, eggs, game, rabbits, German sausage, tongue, tea, coffee, and sugar, rice, tapioca, and arrow-root, gruel, porridge, pudding, dumpling, tarts, custards, jellies, sauces, potatoes, and other vegetables, biscuits and cakes, fruits, nuts, wine, beer, milk, honey, treacle, and many other things.

P. You have made a rare medley, Willie! We must not take them in such disorder. 1st, We will distinguish the vegetable from the animal substances. 2ndly, We will speak only of the principal things. 3rdly, We will only remember such as are cultivated in temperate countries. The articles coffee, sugar, tapioca, &c., are only used, and not *grown* in these parts; so, as you have already had their history, we need not mention them again.

As you mentioned the bread and butter first, suppose we begin with the corn-plants of the temperate countries.

The qualities and uses of BREAD we have talked about already.* The flour with which we make bread and pudding, and many other nutritious things, is procured from a well-known “corn” plant. We call it

* PLEASANT PAGES, vol. i. p. 25.

(CORN-PLANTS.)

45. WHEAT.

Suppose, Willie, that we recapitulate a little—just try and remember the distinctions of the corn-plants, and tell me *how* you know that wheat is one of them.

W. I will try. I suppose I must describe the wheat *as a corn-plant*, without saying anything else about it. Please, will you lend me the specimen of wheat to look at.

WHEAT is one of the tribe of grasses, which yield seed large enough to form food for man, and are therefore called “corn-plants.” It is known by having a fibrous *root*, a long, hollow, and jointed *stalk*—long and narrow *leaves*, with parallel veins—and an *ear* containing grain.

P. That is correct. Will you now compare this specimen of wheat with the other corn-plants which I have brought you?

W. The first difference I notice is that the wheat seems to be stronger.

P. True; the plant is stouter and stronger than most corn-plants. The seed, too, is not easily destroyed. There may be seen in the Exhibition specimens of *mummy-wheat*. The three grains of wheat from which this was grown are said to have been found in the hand of an Egyptian mummy. There, perhaps, they had been for thousands of years; still you see, they have not perished but have grown. Other specimens of *mummy-wheat* besides this

have grown when planted. The ear of the Egyptian wheat is different from that of English wheat.

Ion. I observe a second difference. The wheat has not any beard, as some of the other corn-plants have.

P. That is because this specimen is what we call *winter* wheat. There are two kinds of wheat—the winter wheat, which is sown at the end of the year, and lies under the hard ground during the winter; and the spring wheat, which is sown in the spring; this wheat generally has a beard—or *awn*, as it is called. Besides the winter and spring wheat, we hear of *red* and *white* wheat. The difference of colour is, I believe, owing to the soils in which they are grown. If white wheat be grown in stiff wet soils, it becomes red, and if red wheat be sown in a light soil, it becomes yellow and then white.

Wheat not only differs in its colour but in its substance. There are what are called the *hard* wheats, and the *soft* wheats. These may constantly change in their substance, just as the white and red wheats change in colour. The hard wheats contain more gluten than the others, while the soft wheats contain more starch.

What did I tell you was the most important difference between the gluten and the starch of a vegetable?

L. You said, papa, in one of our other lessons, that gluten contains *azote* (or nitrogen), which forms new flesh in our bodies, and that starch does not

contain nitrogen, and only forms—ah, you did not finish the subject!—you only said that the gum and sugar, and the starch in plants, would form *heat* in the body, but you did not tell us why—you promised that you would do so.

P. Very well; but, first, a word about the *gluten* of wheat. It is this tough gluten which renders wheat so nutritious that it has been called “the staff of life.” It is the toughness of the gluten which causes the dough to be tough. You know that bakers put yeast in their dough, which ferments and makes it rise. The gluten causes the particles to hold together, so that the bread becomes *porous*.

W. And, when we had a lesson on rice, papa, you said that rice did not make good bread, because it is nearly all starch. I can understand that now; it is because there is not enough gluten to hold the particles of the starch together.

P. True. Now, you have heard that the gluten forms the “albumen” in our blood, that the albumen forms “fibrin,” and that the fibrin forms “flesh.” Let us next talk about the *starch* of the wheat.

L. I remember, papa, that there were several specimens of starch in the Exhibition. In the corn-trophy of the Russian department there were bowls of starch; some was made from wheat, some from potatoes, and some from other vegetables.

P. Yes. But our question now is—What is the use of starch as food? I must first tell

you that, just as gluten contains the gas *nitrogen*, so starch is formed principally by a very different element called *carbon*. Whenever carbon meets with another gas called *oxygen*, the oxygen instantly consumes it, causing an intense heat. Thus if we happen to receive any carbon in our body, and afterwards to receive some oxygen, suppose that the oxygen happened to meet with the *carbon* inside, what would happen?

W. The oxygen directly it met with the carbon would *burn* it; and there would be a bonfire inside one's body.

P. There would not be so violent a burning as to cause a bonfire, but there would be combustion enough to cause *heat*, which we should feel. And this kind of combustion is going on within each of us now, and it continues all the day and night long, making us warm. You know how you receive the oxygen into your blood.

Ion. Yes. You told me a long time ago that the oxygen gas is a part of the air, and that when we breathe, the oxygen enters our blood through our lungs.

P. And as our blood passes through all the little arteries and veins of the body, it gathers carbon from the *waste tissue* of our flesh; this carbon the oxygen burns. But I must tell you that the tissue of our flesh does not waste fast enough to supply much carbon for burning; how, therefore, is more carbon supplied?

Ion. From the starch in our

food, papa. You said that the starch contains carbon.

P. True, this starch is literally burnt away inside the body. You must not suppose, however, that the carbon is "burnt into nothing," as I have heard you say. When the oxygen and the carbon meet, although there is a combustion, it is impossible for them to *destroy* each other.

L. Then, what becomes of them, papa?

P. By the union of the two, a new gas is formed, called *carbonic acid* gas. You call it "breath"! On a cold day you can see it, as it comes out from your mouth.

W. Now, papa, I think I can sum up the account.

The heat of our body is caused by the gas *oxygen* uniting with *carbon*. We get oxygen from the air, and we get a little carbon from our tissue (or flesh) as it wears out. But, the tissue does not wear out fast enough to supply all the carbon we want to keep us warm, so the greater part of the carbon is supplied by the starch, sugar, fat, and other kinds of food, which do not contain nitrogen.

Is that right, papa?

P. Yes, and you may also see that as long as we breathe, we want food to make carbon for the oxygen to burn; and the more we breathe, the more food we want. Thus if you go out and take a long walk, or run, you breathe more quickly, you consume more oxygen, and get rid of more carbon. What are the consequences?

W. Then there has been more burning going on inside;

and, when we come home we feel warmer, and our cheeks look red.

P. And something else—we then want more food to make fresh carbon; we then feel that we have an *appetite*. I may as well add that there are other gases in our food besides carbon and nitrogen. The oxygen unites with another gas, and forms water, which is passing out all day long through the pores of your skin. And when you have been taking strong exercise the oxygen and this other gas (hydrogen) form this water so quickly that you see it standing on the skin in drops, and call it *perspiration*.

Ion. But suppose that instead of taking exercise we sit still, and do not breathe so much?

P. Then you do not feel so much appetite; and if you still eat without taking exercise, you do not breathe enough oxygen to consume these starchy foods; therefore nearly all that is not thus consumed is formed into *fat*, and is stored up in the cells between the fibres of your flesh. And then, on the other hand, when you become too fat,—by taking more exercise, so as to get more oxygen from the air, this fat is used up in supplying the carbon required for that oxygen.

Ion. Yes, I have heard of people "running to keep down their fat," and now I understand—they run to get more oxygen to *burn* down their fat, or else to make it into "perspiration." Ha, hah! Willie! If you like I'll make you run all the way to school and all the

way back again, and then we shall see if you look thinner.

P. You will not see a difference so soon as that. In the works of nature we find that "order" is the first law. Such changes are not carried on violently or suddenly, but by slow and gentle degrees. But let us return from the subject of exercise and food in general to the Wheat. Now you can understand why the bread from wheat is called THE STAFF OF LIFE. In the seeds of this corn-plant God has provided all that we require for nourishment. 1st, The *gluten*, containing nitrogen to form albumen, fibrin, flesh, &c.; and 2ndly, The *starch*, containing carbon, &c., which form heat and perspiration, fat, &c. Here is another corn-plant yielding a grain almost equal to that of wheat.

(CORN-PLANTS.)

46. BARLEY.

Ion. I can always distinguish barley, papa, by its ear—it has such long regular awns.

P. And there is something else worth noticing in the barley—the grains are all exactly of the same length. Being so uniform in size they have been used as a measure, for we say that three barleycorns make one inch. Barley is even a more hardy plant than wheat, for it will grow in colder climates.

It is also an early plant, for it grows more quickly and ripens sooner than wheat; so that, in some warm countries

there are two barley harvests in the year. Accordingly, we find in the history of the plague of hail (in Exodus ix. 31) that "the flax and barley were smitten, for the barley was in the ear; . . . but the wheat and the rye were not smitten, for they were not come up." This happened in March.

W. Is not barley a cheaper grain than wheat, papa?

P. Yes; at one time the poorer people of this country could get no other bread but barley-bread. Now, however, they use wheaten flour, and the barley is kept for fattening poultry, and feeding the pigs; a small quantity is prepared as pearl-barley, but nearly the whole year's crop of barley is now used to make *malt* for the brewers. I have read of 30,000,000 bushels of barley being used for the purpose every year. Since the establishment of Temperance Societies, however, the quantity thus wasted has been much smaller.

There is another corn-plant, which grows in even colder climates than those of wheat and barley. The grain is called

(CORN-PLANTS.)

47. OATS.

The difference between this plant and wheat or barley is easily noticed.

W. Yes; I can see, papa, that the oats are not arranged in a close ear; they hang loosely, just like the seeds of the grass which grows in the fields.

P. There are advantages in

the grains being loose, as each grain has more *light* and *air* than if in a close ear: again, from their *drooping position*, the rain does not soak and spoil them, but trickles off. There are two or three kinds of oats: the bearded oats, the common oats, the black oats, &c. Oats, like barley, were formerly used by the English to make their bread, but now we have wheat instead, and oats are principally used to feed horses. It appears that they were used as provender for horses by the Romans, for the Emperor Caligula fed his favourite horse with gilt oats out of a golden cup.

As, however, oats are fitted for a colder climate, we find that they are still eaten very largely in *Scotland*. There, they are a most important grain, being ground into a coarse meal. This oatmeal is either made into porridge, or into cakes.

W. We used to have oatmeal porridge for breakfast, papa. The doctor said that it was very strengthening. It was boiled with milk, and we used to put salt to it.

Ion. And sometimes nurse put some treacle; then we used to call it "stir-about."

P. In England, we also grind the oats into a coarse powder, which we use also for making gruel. This powder is called Grits, or *Groats*—a word which is probably a contraction of Ground-oats. The Scotch are as famous for their oatmeal cakes, as the English are for their wheaten bread. These cakes are eaten universally, and Scotland is therefore

often called "The Land of Cakes."

In the *north* of England, in Lancashire, and in Ireland, as well as in Scotland, oats are cultivated. One reason for this is, perhaps, because they may be grown so easily in any soil. It is said that "wherever the land is of inferior quality, and wheat is apt to fail, oats are a much *safer* crop."

W. We may remember the wheat, barley, and oats, papa, in this way—*wheat* is hardy and will grow in a rather cold climate; *barley* will grow in a colder climate; and the *oats* will grow in a colder climate still.

P. Yes. The next corn-plant we will notice is—

(CORN-PLANTS.)

48. RYE.

RYE is another of the corn-family which has given place to wheat. It contains, however, more gluten than barley or oats, and therefore can be made into a spongy bread. It also contains much sugar, so that it would be very useful for making malt, if it were not that it quickly turns sour.

Rye-bread is eaten in the colder temperate countries, such as Sweden and Lapland, and the districts round about the Baltic Sea and the Gulf of Finland—districts which you may look for on your map. Quantities are *grown* in Germany and Prussia. The peasantry of Sweden eat rye-cakes, just as the peasantry of Scotland eat cakes of oatmeal. It

is said that they bake only twice a-year, so that during the greater part of the year these cakes are as hard as a board.

The Laplanders cannot grow rye in their country, and they give their dried fish in exchange for it. It is supposed that rye was so called because, in a certain time of scarcity, great quantities of the grain were brought from Germany, and landed at *Rye*, in Sussex.

W. Is rye ever cultivated in England, papa?

P. Yes, but not much. It will grow if sown in a field which has yielded a crop of turnips or potatoes, when the ground is not strong enough for wheat. Generally, however, it is cut down when it is green, and is thus used as fodder for horses.

49. BUCKWHEAT.

BUCKWHEAT is another plant which is used in England as fodder for horses. Indeed it seems more fitted for the lower animals than for man. Pigs will fatten upon buckwheat, and horses will take it if it be mixed with oats. The birds, too, are very fond of its seed, and when the crop of buckwheat is being reaped, they will take a large share if they be not scared away. It is said that no grain is so eagerly eaten by the poultry, or makes them lay eggs so abundantly; also that it increases the milk of cows greatly.

The people of some of the countries on the Continent mix it with wheat to make bread, but such bread is not good

food; it is black and bitter, and without nourishment.

You must not suppose, from my mentioning buckwheat in this lesson, that it is one of the corn-plants; it does not belong to the grasses, and is altogether a different shaped plant, having a very elegant appearance.

Its seed, you may remember, is something like that of barley; it is not eaten by the rich, although it is used by the poor, and the lower animals.

(CORN-PLANTS.)

50. MILLET.

This grass is found principally in the *South* of Europe—in Italy, France, Spain, &c. The flour from millet may be made into a bread, which is nice when warm, but when cold, is dry and husky; it is used principally by the peasantry of the different southern countries. I have heard that when planted in the tropics it grows to a great height, even twenty feet.

I do not remember any other plant which may be counted up with the corn-plants. Before we proceed any further, will you tell me which are the most important of these plants?

W. There are four of importance: *Wheat* is of the greatest importance; *Barley* is next; *Oats* next; and *Rye* next.

P. True; and we must not forget that the other corn-plants, *Maize* and *Rice*, are also grown in temperate climates, although you heard of them as tropical productions. *Maize* is largely used in the western hemisphere, in North America.

You may also remember that those corn-plants not only vary in their names and qualities, but in their *size*. In wheat, for instance, some species are much larger than others. The wheat of Syria is said by Pliny to be of the third rank. Yet it is much larger than English wheat. This you will see by the comparison of an ear of Syrian wheat with an ear of wheat from England:—

	Syrian Wheat.	English Wheat.
Weight	180 gr.	43 gr.
Length of straw .	5 ft. 1 in.	4 ft. 2 in.
Number of grains in ear	84	41

Let us next proceed with the ARTICLES OF FOOD which are made from these corn-plants.

Ion. The flour is sometimes made into *bread*, sometimes into *biscuits*, sometimes into *cakes* and *puddings*, and sometimes into *gruel*, and that sort of thing.

P. And the flour of wheat is sometimes made up into another, a very different form, which is called *Maccaroni*. In Naples, as well as other parts of Italy, this is a favourite food, both with the poor and the rich. There are specimens amongst the articles of food in the Exhibition.

L. What is maccaroni made of, papa?

P. It is made from a wheat which contains so much gluten that it is very hard indeed; it is called *grano duro*, a hard grain. Some maccaroni is made from the flour and water alone; in other kinds the flour has the white of eggs mixed with it.

When the dough for the maccaroni has been kneaded to its proper degrees of toughness, it is drawn out into long cords, which I dare say you have seen.

Ion. I have, papa, and have tasted them too. But how is it that all the long cords are of the same size and thickness?

P. The tough dough is drawn through holes of the size required. The hole running through the centre of the cord is formed by a copper wire. When the maccaroni is made smaller than the usual size, about the thickness of the body of a worm, it is called *Vermicelli*. Sometimes in making vermicelli a little beer, or yolk of egg and sugar, is mixed with the dough.

The great interest which the Neapolitans take in their maccaroni is rather amusing. If a poor man can only procure enough of this for his daily food, he willingly goes without meat; but all are not rich enough to afford it every day. The maccaroni-boiler stands at the corner of the street, wherever he can find room, and as soon as he has taken his place to sell his goods, he is surrounded by numbers who are anxious to buy. He has "hot maccaroni" to sell, in all qualities and in all shapes.—"Here is maccaroni in thin cords! maccaroni, long, narrow, and flat like ribbons! maccaroni broad and thin like sheets of paper! maccaroni round like balls or in the shape of beans and peas!" So those who are fortunate enough to have any money in their pockets, bring it out to buy. With five *grani* (about

twopence) the poor Neapolitan can buy enough for a meal. He is not particular about knives and forks, or other instruments; he sits himself down in the corner of some building, where he throws back his head, and opens his mouth; he then takes about a yard of the maccaroni cords in his hand, and slides them into his open mouth, and down his throat, without breaking them. If the poor lazzarone can afford *ten grani*, then he has a sumptuous feast, including scraped cheese! With three more grani he can buy a bottle of common wine; for in that sunny grape-growing country wine is very cheap.*

W. Yes, five grani are equal to 2d., so that thirteen grani are not 6d. That is very cheap for a dinner and a bottle of wine!

P. True; and the motto over the maccaroni stall is, "*Here you may eat well and at small expense.*" Let us now make the lesson on the corn-plants of the temperate countries.

Lesson 11. ARTICLES OF FOOD.

(Temperate Climates.)

FOOD SUPPLIED BY THE CORN-PLANTS.

1. *The grasses which supply grain for the food of man are highly useful in the temperate as well as the tropical climates. There are several different species.*

WHEAT is known by its close ear, and by its strength and thickness as a plant. There are two kinds of wheat; the Spring-wheat, which is bearded, and the Winter-wheat. Some wheat is of a red colour, and others white; the plant varies according to the soil in which it grows. Wheat is the most nutritious of the corn-plants, and most suitable for making bread, &c.

BARLEY is a more hardy grain than wheat. It is easily cultivated, and it grows quickly, therefore it is earlier than the other corn-plants, as we find in the account of the PLAGUE OF HAIL in Egypt. It contains much sugar, and is therefore used for making malt for the brewer.

OATS are still more hardy than barley. They are cultivated in Scotland, Ireland, and Lancashire. The ear of this plant is loose and hanging, like that of many other grasses. Oats are an important food in Scotland, where they are made into porridge and oatmeal cake. In England we use ground oats (or groats) for making gruel. Oats are also used in England as food for horses and poultry.

RYE contains more gluten than barley or oats. It forms food for the people of Northern Europe. The Swedes make it into cakes, which they are said to bake only twice a-year. The Laplanders buy it in exchange for their dried fish. In England, it is sown after a crop of potatoes, and is cut down when green, as fodder for horses.

BUCKWHEAT (which is not truly a corn-plant) yields a kind

* Knight's Pictorial Gallery of Arts,
p. 19.

of grain. Poultry are very fond of it; so also are cattle.

MILLET flourishes better in a warm than a cold climate; so we find that it is eaten in the South of Europe, as well as the tropics. The bread from Millet is very nice when hot and new, but it afterwards becomes dry and husky.

From the flour of these plants we make not only BREAD, but BISCUITS, CAKES, PUDDINGS, MACCARONI, &c.

P. Before we say good-bye to these corn-plants, I think we must stop for a moment to notice the order to which they belong. The order *Graminæ*, or grass tribe, is, of all others, the most useful to man. In the wheat, barley, oats, rye, and millet, we have five plants from the seed of which we get food in a direct manner. But, from the smaller grasses, such as the grass of the field, which does not afford seed large enough for our nourishment—we get food indirectly.

L. Yes; we live on the animals which they support. You said that they liked to eat the grass and hay, because the stalks contained sugar.

P. True; and that reminds me that we ourselves eat the stalk of one of the grass tribe, because of the sugar in it. It is a much larger plant than the sweet-stalked grass of the field.

W. I do not know what grass it can be!

P. It is called the *Sugar-cane*. I think I told you before, that the sugar-cane is one of the grasses.

W. Ah, I had forgotten that! So we get all our sugar from the stalk of “a grass,” just as the cattle do.

P. But I was going to show you how much we depend on the small grass of the field, as well as the large grasses—the corn-plants and the sugar-cane.

What would you do without Milk? You have heard of the “sugar of milk,” which gives to it so nice a flavour. This sugar the cow procures from the sugar in the grass stalk.

Again: in one of Dr. Carpenter’s books it is said, that “without computing pork, bacon, or poultry (much of which is fed on grass, or corn), upwards of 150,000,000 lbs. of meat are consumed in London every year.” It is supposed that the consumption of the whole country is ten times as much, or 1,500 millions of pounds. “Again, it has been calculated that the butter and cheese made in Britain every year is worth not less than £5,000,000.”

Now, remove from the earth, for one year, the small grasses of the grass tribe, and we at once lose nearly all this food! Here, then, is an exercise in arithmetic for you. Take 1,500,000,000 lbs., say at 6d. per lb. for the meat, and add that to the £5,000,000 for butter and cheese, then you only get an idea of the *annual* value to man of that portion of the grass tribe used for its herbage and fodder.

L. And then, papa, you have not taken into account the herbage which the horses eat.

P. Thus you may learn how

much we, mankind, who esteem ourselves *important*, depend on the little grasses which we esteem *insignificant*.

Or, better, you may learn that nothing which God has made is insignificant. Learn to think thus—"If the little grasses are important, how much more important must we be, for whom these grasses were made!" Let us try to feel our importance by thinking of the much more important objects for which we were sent.

Shall I go a step further, and finish the lesson?

L. Yes, papa, please.

P. Then, not only *think* of your important duties, but *act*. Whenever, in future, you look upon the grass, look up to the Maker of all; think for a moment how the *grass* fulfils its purpose! Then, in gratitude, pray to HIM, that by the help of His Holy Spirit you may be allowed to fulfil some high purpose to the advancement of His kingdom, "which hath no end."

(LEGUMINOUS PLANTS.)

51. THE PEA.

When we were speaking of the *lentil* in our history of tropical foods, I told you that it contained a nutritious substance called *legumen*.

Ion. And you said, papa, that there was azote in legumen, just as there is in gluten.

P. The pea is the most important of the leguminous plants, and will first engage our attention. You may know a leguminous plant by this distinction, that the fruit, in which

its seed is enclosed, is a *pod*, or *legume*, as it is called. You call it a *shell*.

W. Yes, I should never have called a pea-shell the *fruit* of the pea. I should call the peas the fruit.

P. No, the pea is the *seed*—the pod is the fruit, or, as it is more properly called, the "*legume*"—

Ion. So that we may make four names for a pea-shell, *shell*—or *pod*—or *fruit*—or *legume*.

P. The pea is an ancient article of food. This plant, and the bean, and kidney bean, are said to be the legumes cultivated by the Romans. It is likely that they grew in the first instance in Egypt or Syria. It is supposed that they were anciently called *Pisoa*, from the town of Pisa, where peas grew very plentifully. The plant was used in most parts of Europe long before it was known in England. It has been said by a poet that peas were hawked about London in the reign of Henry VI., but we read again that a century afterwards, in the reign of Queen Elizabeth, they were not at all common; they were spoken of as "*dainties for ladies*." Certainly the gardeners did not know how to procure *early* green peas, and they used to send over to Flanders to purchase them. Now, every gardener strives to raise early peas; and those which are first brought to market, are sold for a very great price.

It is hardly necessary to describe the plant to you *now*. I suppose that you know it better

than many people did during the reign of Elizabeth. The pea is a climbing plant, and the leaves are divided into six leaflets. For the assistance of its weak stem it is provided with beautiful tendrils, which twist around the plant which the pea is clinging to. The blossoms of the pea have a shape something like that of a butterfly—so, from the Latin word *papilio*, a butterfly, they are called *papilionaceous*, or “butterfly-shaped.”

W. Yes; now I think about it, the shape of the flower is something like a butterfly.

P. You know very well how, when these flowers or blossoms are dead, they are succeeded by the pod—and you know how, when the pod is ripe, it contains a row of round green peas. What taste have they?

L. They have a rather sweet taste when they are green; I suppose that they contain sugar.

P. Yes; just as the stalk of a corn-plant contains sugar, which, as I told you, is destined to become part of the ripe grain. What change did I say the sugar underwent in thus forming grain?

Ion. You said that it formed the starch of the grain.

P. And it is just so with the pea. As the plant ripens, the green pea becomes yellow and hard; it then has not a sweet but a *mealy* taste. This is because the sugar of the unripe green pea has changed into *starch* in the ripe yellow pea.

W. Then I suppose that peas are very nutritious.

P. Yes, although not quite so

nutritious as wheat. We make the ripe peas into peas-pudding and pea-soup. It is said that when boiled with animal fat or bones, they are excellent food for hard-working men.

The Scotch, it seems, cultivated peas before the English, for in the wars of Edward I. with the Scots, one of his armies was besieging a castle, and his soldiers were saved from famine by the beans and peas in the surrounding fields.

Ion. That shows that they were nutritious.

P. In some countries hard cakes are made from peas-meal, like the oatmeal cakes of Scotland, or the rye cakes of Sweden—but these peas-meal cakes are said to be rather indigestible. It is said, however, that peas are cultivated *principally* for the purpose of fattening hogs; the stalks and leaves (or straw) of the peas are also given to hogs, and are saved up for cattle in the winter. The sheep are very fond of the dry pods.

W. And I have seen the pigs eat pea-shells; I suppose that they like them because they are sweet.

P. Yes. There are several kinds of peas. There is one called the *sea-pea*, a native of England; it is said that “its root strikes deeply in the ground amongst the stones and sands of the sea-shore. This pea is very indigestible and hard, but it was the means of saving many persons in the famine of the year 1555.”

There is another kind, called the *chick-pea*, which the Hebrews

used to eat with lentils, when they went out to the battle-field. We have in our garden the *sweet pea* and the *everlasting pea*.

(LEGUMINOUS PLANTS.)

52. THE BEAN.

W. I remember, papa, when we took a walk through uncle John's bean-fields, what a pretty sight the black-and-white flowers were.

L. And if you recollect, Willie, the beans had a delicious smell—it was very sweet.

P. The flower of the bean contains a great deal of honey. This also has the shape of a butterfly.

W. Yes; I was just going to say so.

P. And what do you call it because of its shape?

W. A *papilionaceous* flower.

P. The *horse* is perhaps the animal who has the greatest interest in the beans. The beans are one of his most important articles of food. When the farmer prepares his beans for him, they are generally crushed or split,—then they are mixed with cut hay, or chaff.

The *hog* also is fed on beans, as well as peas,—they are used more particularly when the hog is to be fattened for bacon, for the beans give *firmness* to the flesh. *Mankind* eat them at the dinner-table, but they also eat beans as bread. The miller grinds them with new wheat to make bread-flour.

Ion. He has no business to do so—that is as bad as putting chicory with the coffee.

P. But perhaps a little bean-meal improves it—just as a little chicory is said to improve the coffee. At all events, the millers say that the *soft* wheat (page 102) will not grind well without beans. In some parts of the country a coarse kind of bread is eaten, which is nearly half bean-meal.

The meal of beans is certainly the heaviest made from the leguminous plants. It was eaten by the Romans as a sort of gruel, or pottage. The Roman ladies thought it useful to render the skin smooth, and to take away wrinkles. In this country ladies use *bean-flower water* for washing the face when it has been “tanned” by the sun.

The cultivation of beans requires great care and skill. The plant is subject to the disease of *mildew*, and it is frequently attacked by the *aphis*. The seed is generally sown in February or March, and the harvest is in the autumn. It is either sown by the drilling-machine, or dibbled in with the hand; it is sown in rows like the peas.

The bean is a much more ancient plant in England than the pea. It is supposed that it was introduced by the Romans. The plant was used in sacred feasts by the Romans and by the Greeks. It was also held sacred by the Egyptians. In the very early times it was so venerated that it was forbidden to be eaten.

The large broad kind, called the Windsor beans, were introduced into England by some Dutch gardeners, who came

over and settled near Windsor at the time of the Revolution.

(LEGUMINOUS PLANTS.)

53. THE KIDNEY-BEAN.

This is another plant with a *papilionaceous* flower, but it is very different from the common bean. There are two kinds—the white *French Bean*, and the *Scarlet Runner*.

The FRENCH BEAN seems to be a native of every quarter of the globe except Europe. It has been introduced into the different countries of Europe at different times. It was brought to England from Flanders in the year 1509. The people of Flanders called it *Turk's Bean*, but we took the name which the French had given it. It appears that they procured it from Italy, and called it the *Roman bean*. We find, therefore, that in England, in the reign of Queen Elizabeth, it was still called the Roman bean.

The SCARLET RUNNER was introduced into England from America in 1633. At first the bright red *flowers* were the favourite parts, which were sold for nosegays, and it appears that it was not used as food till nearly 100 years afterwards.

You know that the scarlet runner climbs up trees, or wire, or strings. The plant has this peculiarity—the tendrils, when holding to the support, twine round it from right to left, while the tendrils of other plants turn from left to right. In using the kidney-bean and scarlet runner as food, we do not use the seed, as with the pea.

Ion. No, we eat the pod—the *legume*, I should say.

W. And we eat the legumes—seeds and all—before they are ripe.

P. True. But sometimes we allow the beans to ripen, especially the French beans. We call them *Haricot* beans.

W. I think, papa, that I remember seeing some haricot beans in the shop-window of our corn-chandler. It was about two years ago.

P. That was soon after the potato famine in Ireland. When the potato crops failed, and scarcely a potato was to be had, it was thought that the Irish and English people would eat haricot beans instead, so that large quantities were grown to be eaten as a substitute for potatoes. Many people tried them, but they were not liked, and few would eat haricot beans while they could procure the potatoes themselves.

Ion. And we used to have rice to eat, instead of potatoes; but *I* didn't like eating rice.

P. No, neither the rice nor the haricot beans were so suitable for us as the potato. You see that people are very slow in making changes in their food. I told you that when the scarlet runners were brought to England, it was about 100 years before they were used as *food*.

Ion. Is it because people are obstinate?

P. No; by no means. It is quite right to be careful in making such changes. We generally find that the food which grows best in the people's

own climate, and which they have always been accustomed to, is the most suitable. If the Indians and the English were to change their corn-plants for a few years, both people would suffer—we should be very glad to have our wheat back again, and they would be glad of their rice.

(LEGUMINOUS PLANTS.)

54. THE LUPIN.

If an Englishman were asked to show you a Lupin, where would he take you to?

L. He would take me to the flower-garden, and say it was a very pretty *flower*. You could soon see that it is *papilionaceous*.

W. And we can easily tell that it is leguminous, because the seeds of some lupins grow inside a very large legume; it is almost as large as a bean-pod.

P. The lupin is much more plentiful in the *warmer* temperate countries. It is found growing wild in North and South America. In the South of Europe, the Neapolitans, who eat so much maccaroni, also eat lupins. They first soak them in water to take away their bitter taste, as the ancient Romans used to do. It is also found in Africa and Asia. If you were to travel to Palestine, and Egypt, and other Eastern countries, you would see large fields of lupins, which are sometimes eaten raw, and sometimes boiled, as we boil beans in England. They are sown in November, and are ready for harvest in about five months. The

seeds are beaten out with *rods*,—the ancient instruments used for thrashing in those countries where the *flail* is not known. In some countries, lupins were once used as a *green manure*, that is to say, they were allowed to grow to a good size, and then were dug into the ground to rot and form new mould.

W. That is like our gardener—when he dug up that weedy piece of ground in the corner of the garden, he dug the weeds *in*. He told me that when they rotted, they would be obliged to give back to the earth all the goodness they had taken out of it.

P. And that reminds me that lupins are famous for exhausting the “goodness” of the ground. They are said to be called lupins, from *lupus*, a wolf, because they devour the substance of the land on which they are grown.

(LEGUMINOUS PLANTS.)

55. THE TAMARIND.

This tree is better known to us as producing an article of medicine, than as an article of food; indeed, it belongs rather to the tropical than to the temperate productions. In the East Indies, the tamarind tree may be seen to perfection. There it grows to be large and handsome, with broad spreading branches; these branches have light green leaves, and flowers of a light yellow colour streaked with red; the legumes, which succeed the flowers, and contain the seeds, are very long. On opening one of these legumes, however, you

would find it filled with a pulp, which has fibres running through it: this is the part which renders the tamarind tree valuable; it is truly cooling and refreshing, and is eaten not only in India, but in Africa, where the tired travellers carry it with them across the desert to quench their thirst. The tamarinds which are brought to England are preserved in sugar. We sometimes form a cooling drink by pouring boiling water over them, and they are frequently used thus in India, forming a kind of sherbet.

L. Are not the seeds ever used as food?

P. They are not very suitable, but I have read that in times of scarcity they are soaked until their dark skin comes off, and then they are boiled like beans. Tamarinds are brought from the West Indies, as well as from the East Indies.

I think we have exhausted the principal leguminous plants. There are, no doubt, other plants of this order, which produce food, for it is a most extensive order, containing species which are widely different. The only other leguminous plant which is likely to be known to you, is the LIQUORICE PLANT.

Ion. I suppose that that is grown in Spain, for we often hear of *Spanish liquorice*.

P. Yes; it grows in Spain, and the other warm countries around the Mediterranean, but it will also grow in England. Near the town of Pontefract, in Yorkshire, there are large fields of liquorice. The juice of

the root is made into small cakes.

Before leaving the leguminous plants, I may add, that the legume and pod, when eaten as food, is called "pulse." Pulse is the general name for leguminous food.

You may now make the lesson on leguminous plants.

Lesson 12. ARTICLES OF FOOD.

(Temperate Climates.)

FOOD SUPPLIED BY THE LEGUMINOUS PLANTS.

THE LEGUMINOUS PLANTS are easily distinguished by having seeds enclosed in a pod, which is called a "legume." They supply azotised food; the azote being contained in a nutritious substance called "legumen," which is similar to the "gluten" of wheat.

THE PEA is perhaps the most important leguminous plant in the temperate countries; when green, it is used as a vegetable for the dinner table, and when yellow, it is used for soup, peas-pudding, &c.; its straw is used for fattening hogs, cows, and sheep, in the winter; the flowers of the pea are called "papilionaceous," from the Latin *papilio*, a butterfly. Peas, anciently, were unknown in England, and even in the reign of Elizabeth it was the custom to send for green peas to FLANDERS.

There are different kinds of peas—such as the common pea, the sweet pea, and the everlasting pea.

THE BEAN differs from the

pea in size and general appearance. The legume is larger, as are also the seeds, which are flattened, instead of being round; the flowers have a black-and-white colour, with a sweet smell. The plant does not climb, like the pea, but is shorter. Beans are used principally for horses, and also for fattening bacon-hogs, as they render the flesh firm. They are also used to grind up with new wheat for bread-flour.

THE KIDNEY-BEAN differs again from the common bean. The seeds are not used so much as the unripe legume, which forms a pleasant dinner-vegetable. There are two kinds—the Scarlet Runner, which is a climbing plant with red flowers, and the French Bean, a dwarf plant with white flowers. The ripe seed of the French bean is used as food in France, and it was lately tried in England as a substitute for potatoes, but was not approved of.

THE LUPIN is only known in England because of its pretty flower, but in Eastern countries it is cultivated and eaten like the bean.

THE TAMARIND is used in this country as a sweet preserve, and a medicine, but in the tropics it is eaten in its natural state. The part which is most prized is the highly refreshing pulp found inside the legume, in which the seeds are imbedded.

THE LENTIL was mentioned in the lessons on tropical foods.

THE LIQUORICE plant is useful because of its sweet root, which is a remedy in cases of cold, &c.

TARES, CLOVER, LUCERNE, TREFOIL, and many others, com-

plete the list of the leguminous plants.

56. THE CRUCIFORM PLANTS.

P. Did you ever see any Cabbages in flower?

Ion. Why, I never knew anything about the flowers of the cabbage; I always thought that a cabbage is a bundle of leaves.

W. So it is; and a good cabbage has a good heart. But now I remember something! On our way to school we pass every morning a little field where cabbages are growing, and there are a number of cabbages which have "run to seed." They only appear to have "run to flower" at present, for they are covered with bright yellow flowers; they are small flowers, like little stars.

P. If you look again, you will see that they are not star-shaped. I have brought you a piece of cabbage which has "run to seed." Here are both the flower and the seed upon it. Now, examine for yourselves.

Ion. I notice, papa, that there are six stamens inside the flower. Are there six in any of the others? Look, Lucy!

L. Yes; there are six in mine.

W. And mine has six stamens.

P. And mine, also, has six stamens. But I want you to notice their arrangement.

W. What is the name of this thick sort of stamen in the middle?

P. That is the pistil of the

flower. Now, when you look at the six stamens and the pistil, what shape do they remind you of?

L. They are something like the *Maltese cross* which you see over the porch of our church.

P. True; that is the form which all people say they resemble.

Ion. And the *four leaves* of the flower (or *petals*, as we call them) form a cross. See!



P. And because the cabbage, and other plants, have flowers which bear the form of a cross, we call them "*Cruci-form Plants*." This name is derived from the Latin words *crucis*, of a cross, and *forma*, shape.

W. So that cruciform means shape of a cross, or cross-shaped.

L. I think that *cruciform* is a very good name for such plants, because their four petals are like a common cross, and the six stamens are like a "*Maltese*" cross. And what *colour* have the flowers, papa? Are they all of a yellow colour, like these cabbage-flowers?

P. Most of them are either yellow or white, but some have bright crimson and purple colours, such as the *Stocks* which grow in our garden.

W. I remember, now, that the *single stocks* are cruciform.

P. Again, some of the cruciform plants have a brown colour, such as the wall-flower.

Ion. Now, let us examine the seed. Look! the seeds are in a *pod*, like the seeds of the

leguminous plants. Why are they not called leguminous?

P. Without pointing out any other difference, I may tell you that none of these seeds would serve as articles of food like the seeds of the pea and bean. They have not within them the substance called legumen, which, you remember, contains the azote that nourishes us. The seeds of the cabbage, and all the cruciform plants, have a hot or biting taste.

Perhaps it would be as well to add, that although we name them according to the shape of their flower, they *have been* called after their pods. They were called "*siliquose plants*," from *silique*, the Latin word for pod.

There is one more distinction: these plants are nearly all *annuals*—that is, they come to perfection and die in the space of a year; each plant supplying seed for the next year, except those which are "*double*" plants.

W. Yes, I was going to ask. I thought that the *Double stocks* did not supply seed!

Ion. And I know a cruciform plant which is not an annual—the *Brompton stock* is not. It only flowers every two years, so it is called a *Biennial*, which means a two-year plant. The Wall-flower, too, is not an annual.

P. True; but *most* plants of this order are. Now, in the Order of Leguminous plants, we find many that become tall trees, such as the *Tamarind* and the *Acacia*. The Corn-plants, again, are annuals.

W. Before we make the lesson on the Cruciform plants, I think I can see another of their distinctions.

P. What is it?

W. That we do not procure food from their *seed*, as we do from the corn-plants and the leguminous plants;—we only eat their *leaves*.

P. That is not a correct distinction. You have made the mistake because we are learning the distinctions of a *tribe* of plants from one individual. Do you know what I mean by *generalizing*?

W. Yes. You mean speaking of things in general. I was generalizing when I was speaking about Cruciform plants in general.

P. True; and you only had knowledge of *one* of the tribe. The truth is, that they are not all like the cabbage; for some supply food from their *root*,—we eat the *flower-stalk* of others. Shall I tell you what you may learn from your mistake?

W. Yes, papa, please.

P. You may learn that you cannot generalize (or speak generally) concerning a tribe from a knowledge of *one* specimen. You must either have seen most of the tribe yourself, or you must generalize under the guidance of some one else who has done so.

Ion. Then please to show us some more specimens, or tell us some more names, that we may see if we know them.

P. No. I have helped you to point out the chief distinctions, by observing the cabbage; so I shall not tell you any more

names. Now, you may easily *find out* the others, by looking for plants with distinctions like those of the cabbage, and we shall discover them as we proceed with our lessons.

You may now mark the distinctions of the Cruciform plants; and we will then begin the course with the plant in hand—the Cabbage.

THE CRUCIFORM PLANTS

Are a large and useful tribe of annuals. They are so called because they are distinguished by having—

A *blossom* with four petals, which have the shape of a cross, while the six stamens and pistil are arranged somewhat in the form of a Maltese cross.

Seed, which is found in a pod, and which nearly always has a hot biting taste. The seeds are small, and, as they do not contain any legumen or azote, they are not nutritious. On account of their pods, these plants were once called *Siliquose* plants, from the Latin *siliqua*, a pod.

(CRUCIFORM PLANTS.)

57. THE CABBAGE.

It is hardly fair to call a cabbage an annual, for there are some cabbages which, it is said, will produce leaves for several years—that is, if they are cut off regularly. You must take care, however, to cut off the *seed-stem* as soon as it appears, or else the plant will run to

seed. There are so many different sorts of cabbages, suited for winter and summer, that they may be produced all the year round.

The cabbage is a very *fruitful* vegetable; it is said that no vegetable can produce so much food from the same space of ground, if it be a good stiff soil, such as the cabbage likes.

I dare say that you have seen cabbages growing. They are cultivated in this way—The young plants are first raised from seed, and are then planted in the fields in long rows. These rows are kept straight by the help of a line, and the holes are made with a *dibber*. As the young plants grow, the rows are thinned; nearly every other cabbage is cut out, so that those standing may have space to grow to a good size; those cut down are not wasted—they generally form food for the pigs.

The cabbage crop does not always succeed. If the weather be too hot, many of the young plants do not take root; but even when they grow larger, very bad accidents often happen to them. Thus—1st, the outside leaves often turn yellow.

W. And, 2ndly, the *caterpillars*! Ah! I remember the caterpillars! Oh, what a sight those four cabbages were in the corner field at uncle John's! All their leaves were drilled through and through! and the nasty whitish green caterpillars crawled in and out, even into the very heart of the cabbage.

P. True. Then we may say, 2ndly, the caterpillars, and,

3rdly, the *slugs* are great enemies of the cabbage.

Ion. And, 4thly, some blight, perhaps.

P. Yes, indeed. The cabbage is sometimes covered with a very minute fly; these flies are so very small, that they look like a grey powder on the leaf.

There is another disease caused by an insect. 5thly, The cabbage sometimes has a singular appearance; the stalk increases in size near the root; it has a "breaking-out," as it were. This breaking-out forms a thick whitish-green crust, something like the swellings you sometimes see on the trunks and branches of trees. The disease is caused by an insect which lays its eggs in the part where the stem joins the root. When this happens in a field of cabbages, they never come to perfection, and it is best to cut down all the plants, mix quicklime with the earth, and not again plant it with cabbages for three or four years. The slugs and caterpillars are difficult to clear away; the greatest helps are fowls and ducks, which will eat them in great quantities.

W. What are the *uses* of cabbage, papa?

P. Most of its uses you are acquainted with—1st, it is useful at the dinner-table; 2ndly, it is useful for feeding cows, bullocks, and sheep. When used for feeding cows, they are cut up in slices; but care must be taken not to give them the stale, outside leaves, for they give a bad taste to the butter and milk.

W. I have heard, papa, of *sour-kROUT*, which is made from cabbage.

P. Yes; the “*saur-kraut*,” as it is called by the Germans, is a very favourite dish in Germany. It consists of cabbage cut into very thin slices, and preserved with salt. Alternate layers of cabbage and salt, with pepper and juniper berries, are placed in a tub, and pressed down by a weight, until the cabbage has fermented, and is thoroughly pickled.

The *different sorts* of cabbage are worth noticing. Of the garden cabbages there are two divisions—the close-hearted, and the spreading. The most common close-hearted cabbages are the *York* and the *Savoys*; the principal spreading cabbages are the *Cole-wort* and the *Scotch-kale*. The *Scotch-kale* are the green, curly-leaved cabbages; they are so hardy that they will live through very severe frost, in a long winter.

L. I have often seen those winter cabbages, and have tasted them. We have not mentioned the *Red* cabbage; that is useful, papa, for pickles.

W. Cabbage-sprouts also are another kind of vegetable. I can tell you how the cook gets plenty of sprouts! Whenever she cuts a cabbage out of the front garden, and leaves the old stump standing, she takes her knife and makes a *cross* on the top of it. “That,” she told me, “is to make him sprout;” and so he does!

P. I will just add another cabbage or two to our list. There are several tree-cabbages,

or cabbage-trees, as they are sometimes called. In Germany, there grows the large *Strasburg* cabbage; it produces an enormous weight of food, sometimes 70 or 80 lbs. In France, there is a tall cabbage, called the *chou cavalier*, which grows to the height of six feet.

W. Then it is taller than you, papa.

P. Yes. And in addition to its six feet of stalk, it has what I have not—that is, a spreading head, made of large broad leaves. And then, I have heard of another cabbage, called the thousand-headed cabbage. There is another in France, called the *Tree-kale*, which is sometimes 16 feet high; and another called the *Palm-kale*. There is a palm cabbage in the tropics which grows even to the height of 200 feet, but this we cannot properly class with the cruciform plants. Several years ago, this palm-kale was introduced to England from France; it has since been grown in Jersey, and it is called the *Cow-cabbage*.

Now, count up your cabbages.

W. Yes. There are plenty of them. Close-hearted cabbages—such as the *York* cabbages, and the *Savoys*; spreading cabbages—such as the *Cole-wort*, and the *Sea-kale*. And besides these—*Red* cabbage, Cabbage-sprouts, the *Strasburg* cabbage, the tall *French* cabbages, such as the *Tree-kale*, the *Palm-kale*, *Cow-cabbage*, &c.

P. Before we finish, I may mention that sea-kale has always been well known in Eng-

land, and the Saxons called the month of February "*Sprout-kale*," because in that month the cabbages began to sprout.

(CRUCIFORM PLANTS.)

58. THE CAULIFLOWER AND BROCOLI.

These are only varieties of the cabbage. The thick white part which we like to eat, is merely the flower-stalk, which has enlarged, and become succulent. The brocoli is not a distinct plant from the cauliflower, but is what we call a sub-variety of that plant. There are two or three kinds—the Red and the Purple brocoli, and the White.

These plants have not long been in use in England—not more than 200 or 300 years; for we read that "in 1619 two cauliflowers cost three shillings." We suppose, therefore, that they must have been very scarce at that time. The same Dutch gardeners who came over from Flanders at the time of the Revolution, and first cultivated the Windsor-bean at Windsor, were useful in bringing these plants to perfection; and since then, they have been very plentiful.

(CRUCIFORM PLANTS.)

59. THE TURNIP.

Let me see if you can tell me whether the next plant be a cruciform plant or not. Listen to its description. It has bright cross-shaped flowers, and small round seeds, in a long pod.

W. Yes, it is cruciform!

P. What is its name?

W. We cannot tell that; we can only tell, at present, that it is a cruciform plant. You must describe it more particularly, if you wish us to know it.

P. Well, then, just as the fleshy tissues of the brocoli enlarge at the *flower-stalk*, so the fleshy tissue of this plant enlarges in the root. Give the plant plenty of nourishment, and you will find that the part of the root nearest to the surface of the ground becomes gradually larger, until its fleshy tissue forms a round white ball.

Ion. Which we call "Turnip," I suppose.

P. Yes; that is the plant. The Turnip belongs to the Cabbage tribe, and, like the cabbage, its Latin name is *Brassica*. The root which is thus enlarged, we call a bulbous root.

W. I should not think, papa, that the turnip is very nutritious; it seems to be nearly all water.

P. That is the case; nearly ninety parts out of 100 are water; only one out of the 100 contains albumen. The composition of a turnip has been shown to us by the celebrated Dr. Lyon Playfair. I will read it to you.

Water	89 parts.
Unazotised matter .	9 "
<i>(starch, sugar, &c.)</i>	
Albumen	1 "
Mineral substance .	1 "
—	
	100 parts.

The greatest difficulty in the

cultivation of the turnip arises from the *turnip-fly*. You may imagine what injury a small insect may do, when I tell you that about sixty or seventy years ago they destroyed, in Devonshire alone, turnips which were valued at £100,000.

L. Will you tell us something about this insect, papa?

P. Its history does not belong to that of the turnip, but I may mention one or two particulars. You have no doubt noticed that when most seeds begin to grow, they come up with two smooth leaves, different from those which follow. You will see this particularly in the lupin.

L. I have noticed it, papa. The gardener told me that they were the halves of the seed itself, and were used up as nourishment for the young leaves which follow.

P. These two "leaves" we call *cotyledons*, and you can easily understand that if they be destroyed, the young leaves which follow cannot succeed well. As soon as the *cotyledons* of the turnip are above the ground, the turnip-fly comes to the attack. Although we call it a fly, it is strictly a very small beetle. They are differently coloured, some a brightly shining green, others yellow, and others brown. They come in great numbers, for they can smell the turnips at a great distance. On reaching the field, they not only feed on the *cotyledon*, but they deposit their eggs in the very young leaves; from these eggs come forth minute caterpillars, which soon

pierce the leaves with numerous holes. The beetles themselves come as early as the month of February, but in March and April are the times when the caterpillars flourish most. They like a fine April day, with warm sunshine and showers of rain. On such a day, I have heard the farmers say—"Ah! this is a bad day for the turnips!" I was stopping at a farm, and the poor farmer had to plough up several acres of turnips which had been destroyed by these insects.

L. And did he sow all the ground over again?

P. Yes. All his first labour was in vain. Ah! it is a very anxious time to the farmers when the turnips are just beginning to grow! They try all kinds of remedies; weak brine, lime and soot, decoction of wormwood are all applied, but with little success. It was not until they remembered that one animal often serves as *food* to another, that they began to get rid of the evil.

W. What did they do, papa?

P. They turned large numbers of *ducks* into the field; and, as the turnip-fly is the natural food of the duck, they destroyed them much more rapidly than man could have done. Thus, while the farmers were getting rid of their loss, they were also making a profit.

L. Yes; I suppose that the ducks became fat and plump.

Ion. And the turnips also?

P. Let us finish this long tale of the turnip, and its enemies and friends, by a word or two on its *history*.

The turnip was well known to the ROMANS. The price of some turnips in Rome was a *sestertius* (twopence) each. In ENGLAND, it seems to have been grown in the early times, and to have been lost sight of during the times of war and trouble. We hear of it, however, in Henry VIII.'s time; then they were baked, or *roasted in ashes*.

W. I have been wondering, papa, what vegetables the old Saxons really had to eat. They never heard of the potato—they had no turnips—and you told us, in the history of peas and beans, that those vegetables were not known in the early times!

L. And they had neither tea nor coffee!

P. In the northern part of Europe, the turnip has long been known. Even in the most northern and cold parts of SWEDEN, it is cultivated; and the Swedish turnips are very famous in England. The LAPLANDERS are so fond of turnips, that they will part with a whole cheese in exchange for one. In Russia the turnip is eaten as a *fruit*; it is cut in slices and eaten with brandy.

Ion. And in England, papa, the turnips are used for feeding cattle; they eat the *sweet* turnips in the winter time—so do the horses, and the sheep.

(CRUCIFORM PLANTS.)

60. THE RADISH.

Ion. I think I can begin the lesson on the Radish. The cook

has some radishes down stairs; I will get them.

Now then: 1st, There are two sorts of radish, the long radish, which is of a red colour, and the turnip-radish, some of which are red and some white.

2ndly, The radish, like the turnip, contains much water.

3rdly, The radish is a cooling vegetable, yet it has a hot biting taste.

4thly—I think I can find a fourthly!

W. I will tell you—4thly, Radishes are sold in bunches—four bunches a-penny; either at the market, at the green-grocer's, or by boys and girls in the street.

P. I do not think I have much information to add, except that they may be sown early in the year—from the end of January till May. In the cold, frosty weather the radish-beds should be protected by straw.

You have omitted one use of the radish; the seed-pods are sometimes picked when they are young, and are pickled.

L. Perhaps you can tell us something of the history of the radish, papa.

P. Yes. The *Greeks* liked radishes. They esteemed them so much that they used to present golden radishes at the shrine of Apollo. The great naturalist Pliny speaks of the radishes of *Egypt* as being very sweet, and also speaks of *German* radishes sometimes weighing the enormous weight of forty pounds. In France and Switzerland, the peasants roast their radishes under the ashes, and they are

thus useful to give flavour to soups. In *Portugal* they are boiled, and they were thus cooked formerly in *England*, being considered good for a cold, but they have an insipid taste when prepared in this way.

The radish has been used in England about 300 years. It is supposed that it was first brought from China.

(CRUCIFORM PLANTS.)

61. THE HORSE-RADISH.

This plant does not belong to the same family as the radish. Its leaves are different; its root also spreads more underground. It was not used at the dinner-table in England until about the year 1600. Before then it was used as a medicine. Horse-radish is also used for clearing the skin, being scraped and soaked in cold milk.

(CRUCIFORM PLANTS.)

62. MUSTARD AND CRESS.

There are two sorts of **MUSTARD**: the white mustard, which we grow with the cress for a salad; and the black mustard. The latter is ground up to form the mustard we use at the dinner-table. It is grown in great quantities in the fields of Durham and Yorkshire. In preparing this flour of mustard it is necessary to get rid of the black husk; this is done by delicate sifting.

Mustard is not only useful to eat with meat, because of its flavour, but because it assists

in digestion. A table-spoonful of mustard in a glass of water is useful as an emetic—that is to say, for causing sickness. It is also useful in case of cold, for if it be mixed with the warm water in a foot-bath, or be made into a poultice, it draws the blood to the part where it is applied.

The mustard-plant reaches a great size in Eastern countries; and was chosen by our Saviour as the subject of a parable (Matt. xiii. 31).

The **CRESS** which we eat with the mustard as a salad, is a hardy little annual, and is a native of Persia. It differs from the mustard in the form of its leaves and seed; it has also a slightly different flavour.

(CRUCIFORM PLANTS.)

63. WATER-CRESS.

This plant grows in running streams, and is much cultivated in the neighbourhood of London. It is positively necessary that the water be constantly in motion, or the plant will not grow. When, therefore, the market-gardeners cannot find a suitable stream, they cut out a number of beds in sloping grounds, and procure a supply of water, which they keep moving by artificial means. The cruciform flowers are small and white; and the pods are about an inch long. I suppose you know which part of the plant is useful as food?

W. Neither the flowers nor the pod, papa, but the *leaves*; they are useful because they have a warm pleasant flavour.

Ion. But there is another plant so much like the water-cress, that I couldn't tell the difference. I once picked some of it, and the water-cress man told me to throw it away because it is poisonous.

P. The plant which you speak of, is so much like the water-cress that it is called the *Fool's Water-cress*. It is not, however, poisonous; neither is it a cruciform plant, but it belongs to the "umbelliferous" tribe, which we shall speak of next. I will point out one difference by which you may easily know one plant from the other, without seeing them in flower. If you examine the Fool's water-cress, you will see that the leaf-stalk does not branch off at once from the stem, but it grows for some distance around it, forming a *sheath*. You see the same thing in the corn-plants; the long leaves grow round the thin weak straw for some distance, and form a sheath, before they branch out from it; but if you examine the water-cress, you will see that this is not the case with it. So, by remembering this difference you may easily avoid being deceived by the Fool's water-cress.

64. VARIOUS CRUCIFORM PLANTS.

P. There are yet many of these plants unnoticed. Some are cultivated for their seeds, some for their leaves, and others for their gay flowers; they are found in all parts of the temperate climates, but they will not grow either in the

tropics, or in the frigid countries. Altogether there are about two thousand species. Shall I mention one or two more?

W. Do, please, papa! then we shall have a good list.

P. There is the *Rape*, which is cultivated for its seed, from which a nice oil is expressed. I should have told you that most of the seeds contain a little oil. We can procure oil from the mustard-seed; rape oil is, however, better known.

Scurvy-grass, as it is called, is found near the sea-side, and is said to be a remedy for the scurvy.

Many of this tribe are weeds. One, called the *Shepherd's Purse*, is well known; it grows near the hedges, and produces a triangular, or heart-shaped pod, which is also something like a purse. Amongst those which are merely weeds or flowers, we have the Lady-smock, Wild Rockets, Jack by the Hedge, Candy-tuft, &c., &c.

Let us conclude by saying one very good thing about these plants—it has often been said before—"None of them are poisonous; you may *safely* make a salad of the young leaves, wherever you find them. The worst they can do to you is to bite your tongue."

Ion. Now for our lesson on the cruciform plants.

Lesson 13. ARTICLES OF FOOD.

(Temperate Climates.)

THE FOOD SUPPLIED BY THE CRUCIFORM PLANTS.

1. This extensive tribe of plants

supply many important articles of food. All the plants are distinguished by having a flower with four petals which form a cross; and six stamens, which with the pistil resemble a "Maltese cross."

They have small round seeds in pods, and from this circumstance they were once called "Siliquose plants." The seeds are generally hot, and contain a bitter oil; fortunately none of the plants are poisonous. In the tribe are included

2. The CABBAGE, of which there are two kinds, the "close-hearted," and the spreading. There are several varieties of cabbage, some of them of monstrous size.

3. The CAULIFLOWER and BROCOLI are mere varieties of the cabbage with the flower-stalk increased to a great size.

4. The TURNIP also belongs to the Cabbage family. It affords food by the great enlargement of the fleshy fibre of the root, which forms a large round bulb. The cultivation of this plant is often much hindered by the turnip-fly.

5. The RADISH is a small and useful vegetable; there are two kinds, the long radish, and the round turnip-radish.

6. The HORSE-RADISH is cultivated for its root, which, when scraped into thin shavings and mixed with vinegar, is pleasant to eat with roast beef.

7. MUSTARD and CRESS are grown principally as salad. There are two kinds of mustard,—the white, and the black, which has a reddish colour and a sharp pungent taste; this is ground to

a powder, and is used to flavour meat. It is grown in Durham and Yorkshire.

8. The WATER-CRESS is a plant growing in running streams, and is eaten for the sake of its young leaves: it bears a small white flower.

9. Besides these, there are many other species, altogether about two thousand in number. Amongst those cultivated for their flowers are the STOCK, WALL-FLOWER, and CANDY-TUFT, the SHEPHERD'S PURSE, LADY-SMCK, WILD-ROCKET, and SCURVY-GRASS. The RAPE plant is cultivated principally for the oil which may be extracted from the seed.

P. We will now turn our attention to another tribe of plants. Here is one with a long orange-coloured, fleshy root, and a sweetish taste. It is called—

(UMBELLIFEROUS PLANTS.)

65. THE CARROT.

Ion. I should have supposed that the Carrot belongs to the same tribe as the turnip.

P. You may soon tell the difference by looking at the green top of this carrot. Is it like a turnip-top?

L. No, the leaf is more like a parsley-leaf. How wrinkled it is! and then each leaf is divided into many parts.

P. See, too, how it grows from the stalk of the plant!

Ion. Yes. I remember what you said of the umbelliferous plants, and now I can see it. Look, Lucy, how each leaf-stalk grows a little way round the

large stalk, and forms a sheath to it.

P. But the most noticeable part is the blossom, or flower. This flower is so peculiar that it cannot easily be mistaken; it is, therefore, the grand distinction of the order to which the carrot belongs.

W. I notice that there are several branches bearing flowers, and that all these branches spring from one stalk; then, from each of these stalks springs a bunch of little stalks, each bearing a flower; they all spring from one place just like the spokes of a wheel, or the rays in a circle.

Ion. And they are something like the ribs branching out from the stick of the umbrella, for the flowers at the end of the stalks form a round head.

P. These peculiar bunches of flowers are called *umbels*, and all the plants with such flowers are called UMBELLIFEROUS PLANTS.

I have not much to tell you of the cultivation of the carrot, except that it is very *easily* cultivated; it will grow in almost any soil, and in very cold weather. If care be not taken, the carrots will *fork*—that is, they will divide into two or three roots instead of one. They are packed in straw, and stored up for the winter as food for cattle. You know that its succulent *root* is the part used for food;—it is nutritious because of the starch it contains.

L. And sugar also. Carrots are very sweet.

L. Is the carrot useful for anything besides food?

P. Yes. The ancients used the seed “as a medicine against the bite of serpents.” It may be used to poison crickets; for these insects are so fond of carrot, that if it be scraped and made into a paste with arsenic, they eat it readily.

P. The history of the carrot is like the history of the preceding vegetables. It was introduced by some of the persecuted Flemings who settled in Kent in the reign of Queen Elizabeth. It is said that in the reign of James I. the ladies used to ornament their bonnets with the leaves of the wild carrot, which are very beautiful in the autumn time.

(UMBELLIFEROUS PLANTS.)

66. THE PARSNIP.

Did you ever taste Parsnip?

W. I have, papa. I am very fond of them; for they are even sweeter than carrots, and they have a white colour.

P. From this sweetness one of its uses is derived; the quantity of sugar in the parsnip is such that a wine and a spirit may be procured from it. In Ireland it is brewed with hops, and forms a drink which is not unlike beer. In this country it is used particularly in Lent time to eat with salt-fish. The parsnip is even a more hardy plant than the carrot, for it will live out of doors, even in the most frosty weather.

(UMBELLIFEROUS PLANTS.)

67. CELERY.

Ion. I have seen some celery-beds. When people cultivate

celery they make trenches in the ground, in which they place the young plants. As fast as the young plants grow they are covered up with earth, until at last, a bank is formed, in which the long stalks of the plant are nearly buried. When the stalks are taken out they are quite white, because they have been kept from the light by the earth.

W. And *I* remember seeing a gardener cover up the young shoots of celery; he said he was "earthing-up" the plants, and afterwards they were "strawed over," for he covered the beds with straw to protect them from the frost.

P. The celery is covered up with earth, that it may be white and juicy; if it were exposed to the air, it would be too green and hard, and would have too strong a flavour. Some gardeners earth-up their plants until the stalks are two feet long. I may tell you, 2ndly, that the goodness of celery much depends upon its growing rapidly.

W. Now, please tell us a third fact.

P. 3rdly, Keep your celery dry by draining off the moisture from the bank. And, 4thly, I will tell you why. If you go to some of the marshes in the Isle of Thanet, near the sea, you will find it growing wild; but this wild celery is *poisonous*, because of the dampness of the soil.

L. And *why* is it not poisonous in a dry soil, I should like to know?

P. This is all the explanation

I can give you. Celery contains two principal "qualities"—the *narcotic* quality, which is poisonous; and the *aromatic*, which is pleasant. A damp soil causes the narcotic quality to increase, but if the plant be placed in a dry soil, it loses its narcotic quality, and becomes aromatic.

W. And very nice to eat with cheese! I did not know before that it was an aromatic flavour that I liked so much.

P. The earthing-up of the celery is another cause why the poisonous quality is lost; but *how* it causes this I cannot tell you. Perhaps one of the agricultural chemists can. I have heard that the *seed*, also, of celery is sometimes used in soup. There is a kind of celery with a root like a turnip, which is eaten in Germany, where it grows to a great size. It is seldom cultivated in England, but is sometimes imported; it is called the turnip-rooted celery, or *Celeriac*.

68. VARIOUS UMBELLIFEROUS PLANTS.

There are yet several small umbelliferous plants used for food. The turnip and parsnip supply food from their *root*; the celery from its stalk. There are two of which we use the *leaves*, while of others the *seeds* are useful.

I will describe one to you. It grows in the kitchen-garden, and its leaf has a pleasant aromatic flavour; therefore, the cook uses it in making broth, &c. It has, also, a very pretty appearance, for its bright

green leaf is very curly; so, the cook trims it nicely, and when she brings up a fowl, or a ham, or fish, or a cold joint, which is to be served in artist-like style, then—

W. I know—she arranges it all around the dish and on the meat. We call it *PARSLEY*.

P. Yes; she "*garnishes* with parsley," as the cookery book directs. There are two kinds of parsley,—the plain-leaved and the curled-leaved. The curled-leaved is better, not only because it is prettier than the other, but because it can be easily known from the weed called the *Fool's parsley*.

Ion. I know what fool's parsley is. I once picked some, and the gardener showed me that the leaf is *plainer* than the parsley leaf: he said, too, that it is poisonous.

P. There is another umbelliferous plant, which often grows wild; the leaf is long, *feathery*, and very beautiful. The smell, however, is unpleasant; it is too narcotic. You may easily procure some at the fishmonger's; if you buy mackerel, or some salmon, he will give you some of this plant to use in making sauce.

L. I have seen the plant, papa; it is called *FENNEL*.

P. True. The fennel grows plentifully near the sea, on chalky cliffs. It is found in Sussex, between Worthing and Brighton.

W. Some of the umbelliferous plants we have heard of give us food from their *roots* (such as the carrot and par-

snip), we eat the *stalk* of the celery, the *leaf* of the parsley and fennel, and—what umbelliferous plants give us *seed* to eat?

P. I suppose you have heard of caraway seed?

W. Oh, yes! and I have tasted them.

P. Very well, then; see how you like its history.

The *CARAWAY-SEED* is the produce of an umbelliferous plant. It is not strictly a seed; it is the pulp of the ripe *fruit*. The plant grows wild in many parts. In Suffolk and Essex it is cultivated upon "*old grass land*," broken up for the purpose." It is generally a biennial. Do you know what that means?

L. Yes; a *two-year* plant, like the Brompton Stock.

You know the principal use of the caraway-seed. Coriander-seed belongs to the same family of plant; so also does the *Dill* plant, the seeds of which are used to make "*Dill-water*;" this you know is often given to babes.

W. When they have the stomach-ache. Nurse told me so.

P. Nearly all these seeds are *medicinal*. The doctors use the seeds of caraway, coriander, dill, cummin, and anise. I dare say you have heard of aniseed, for that is as much used to comfort the babes as the dill-water.

We will notice one more umbelliferous plant. I told you of the "*narcotic*" quality in the celery. I said that some of these plants which grow wild have the narcotic

quality so strong that they are highly poisonous. The most poisonous is the HEMLOCK, which is described as a "rapid and deadly poison to all animals." The hemlock, nevertheless, is a noble-looking plant, and the root may be eaten if boiled; for heat will drive away the poison (volatilize it), just as it volatilizes the poison of arrow-root. The Athenians used to poison their criminals with the juice of the hemlock. I dare say you have read in the history of Greece how the famous philosopher Socrates was put to death by drinking hemlock.

Therefore, in winding up the account of these plants, what may we say of them?

Ion. We will say that they are not so safe as the cruciform plants, that they are a dangerous tribe to meddle with, unless you understand them.

Lesson 14. ARTICLES OF FOOD.

(Temperate Climates.)

THE FOOD SUPPLIED BY THE UMBELLIFEROUS PLANTS.

The umbelliferous plants are a useful tribe, supplying us with one or two pleasant vegetables. The chief distinction of the tribe is seen in the flowers, which have stalks arranged in peculiar bunches called "umbels."

1. The CARROT is a useful vegetable, well known from its orange-coloured, sweet-tasting root. It was introduced into England by the Flemings, and at first its beautiful bright green leaves were so admired that they were worn

by the ladies as ornaments in their bonnets.

2. The PARSNIP is much like the carrot, but it has a white root. It is, however, sweeter; and although the carrot is very hardy, the parsnip is more so, for it will live through the hardest winter. Parsnips are used during "Lent," being eaten with salt-fish.

3. CELERY is known from the aromatic flavour of its stalk. This flavour is preserved by keeping the stalks white; and the whiteness is preserved by covering them over with earth, to keep them from the light.

4. Some of these plants are useful, because of their seeds, which are either used by the confectioner for their nice flavour, or as medicine; such as the Caraway, Dill, Coriander, Cummin, and Aniseed. Others are highly poisonous, such as the different kinds of hemlock; but they also are useful as medicine.

P. Now, let me call your attention to one more order of plants which supply us with food. Look at this Dandelion! You are in the habit of speaking of it as one flower, but it is really a number of flowers clustered together. Each little part which you would perhaps call a yellow petal, is a distinct flower, or floret (as we say, which means little flower). The daisy is formed in the same way; it is not a single flower, but it consists of between two and three hundred florets. The flat white leaflets in the border of the daisy are all distinct florets, and the golden eye is made up of vast numbers of such florets which are not fully developed;

indeed, they are so small that they can only be discovered by a *microscope*. When the daisy is cultivated, this “golden eye” becomes smaller, just because these florets grow to their full size. You may see this in the large white daisy which grows in your garden, Willie.

W. Yes, it is quite round; it does not seem to have any eye at all.

P. You may see the same thing in the Dahlia, which is a very large daisy. Many become *single*, as we say when they have a yellow eye, because the florets in the centre are not developed.

W. And is each petal in the dahlia, a distinct flower, papa?

P. Yes. What name would you give to a flower, which is made up of several smaller ones?

L. I should say it was *compound*.

P. True; and because it is compound, or composed of smaller flowers, we call it a *composite* plant. The composite nature of the plant may be well seen in the Dandelion. When all the flowers have died, each leaves in its place a small seed with the *downy* flower-cup still adhering to the end, so that the seeds form a round feathery ball. You have, I dare say, seen what purpose is answered by leaving this downy flower-cup attached to the seed.

Ion. Yes; I have blown them all off from thistles and dandelions, and the feathery part is easily wafted through the air. Thus the seeds are scattered abroad, and new plants spring up.

P. And, after you have blown away these seeds, you may ob-

serve the round-shaped and flattened surface filled with minute holes. From each of these, one of the small flowers (or *florets*) grew.

The order of *Composite Plants* is a very extensive one, for it contains many thousand species. These plants abound in the temperate countries, and although they are smaller than those growing in the tropics, they are much more numerous. For instance, in England they form one-tenth of all the *native* flowering-plants; being about 140 species. In some other temperate countries they are even more abundant.

L. Then, I suppose that we shall find a great many “articles of food” in this order?

P. No; you will not find many. One large division of the order are known for their milky juice, which has a bitter and an astringent taste. The juice is also narcotic, for it will cause sleep; and if taken in quantities it is poisonous. You may have observed this juice, if you have ever picked a dandelion.

Ion. Yes; I remember picking some dandelions to make chains with. The stalks were hollow, and the white milky juice which came out of them made my fingers very sticky.

P. You may observe some of this juice in the first plant which we shall notice.

(COMPOSITE PLANTS.)

69. THE LETTUCE.

W. I think, papa, that the

Lettuce must contain a milky juice like that of the Dandelion; at all events the juice is *narcotic*, for I remember your saying that if much lettuce be eaten, without vinegar, it causes sleep.

P. True. I told you that *all* in one division of the composite plants have such a juice, and the lettuce belongs to this division. The narcotic quality, however, is not strong or poisonous. This is owing principally to the cultivation of the lettuce. If it be left to run to seed, or the plants be crowded together, or kept too long without water, then the narcotic quality becomes too strong, like that of the *wild* lettuces.

The very name lettuce may remind us of its qualities. The Romans called it *lac*, which means milk; the French, who have so many Roman words in their language, called it *laitue*, as the French word for milk is *lait*; and the name Laitue has been changed by the English into *Lettuce*.

The lettuce is cultivated much in the same way as the cabbage. In order that the plant may have a fine white heart, its leaves are generally tied round with a strip of matting.

There are two principal kinds in this country, the *cabbage-lettuce*, and the *cos-lettuce*, so called from the island in which it was found. The *varieties* of the plant are very numerous, for in the neighbourhood of London there are thirty sorts. The Romans used to eat a large purple lettuce, which is not found in our country, as the

climate is too cold; the Greek lettuce was even larger.

The use of the lettuce I need hardly mention. You know that we use it as a salad. In the time of Queen Elizabeth, it was used before meals, *before* supper "to stir up the appetite, and *after* supper" to keep away drunkenness.

(COMPOSITE PLANTS.)

70. THE ENDIVE.

I do not suppose that you know this plant so well as the lettuce, but it is much used in salads—it may be known by its broad, ragged, and curled leaves.

This plant is treated in the same way as the lettuce, and the celery—it is whitened (or *blanched*, as we say) by tying the leaves together.

W. *Why* is it done, papa?

P. For the same purpose that it is done to the celery and the lettuce, to weaken the narcotic quality. In its natural or wild state, the narcotic quality gives it such a bitter taste that it is unfit for use.

This plant is well known on the Continent, for in some kinds the roots become large and fleshy like that of the parsnip; they have a strong bitter flavour like the leaves, but in this instance the flavour renders them valuable. The roots are cut in slices, dried, or roasted; and are then ground with coffee to improve the flavour. The substance thus formed, is much used in England, and is called *chicory*.

The chicory plant also grows wild in England, in chalky soils. Besides the chicory, there is another wild endive, which we have lately been talking about; it is called the *dandelion*.

Ion. Yes, we all know that endive!

P. The root of the dandelion, then, is sometimes used for making chicory, and when the other endives are scarce, its leaves are "blanched" for salads.

(COMPOSITE PLANTS.)

71. THE ARTICHOKE.

The *Artichoke* is a handsome vegetable—it is very much like a fine thistle. The heads of the plants are gathered just before the flowers burst, and the part used is the *receptacle* of the flower-bud; it consists of fleshy kind of leaves or scales. Sometimes they are eaten raw, and sometimes boiled. The root and stalk of the plant are bitter, and are therefore not fit for food; but here we have another instance of *blanching*; in Germany and France the stalks are blanched like celery, and then are boiled and seasoned with butter and vinegar; sometimes they are preserved in honey.

(COMPOSITE PLANTS.)

72. THE JERUSALEM ARTICHOKE.

Although this plant has a similar name, it differs from the

common Artichoke, belonging to a different family. It also differs in its appearance, for it is a kind of sun-flower. The part eaten is the *root*, which looks sometimes like a potato, and has a sweet taste, like a parsnip.

L. Does it grow in Jerusalem, papa?

P. The word Jerusalem has no reference to the holy city; it is derived from the Italian word *Girasoli*, which means "to turn toward the sun."

There are many other composite plants supplying food, as we might expect of so large an order. Besides the artichoke there is another plant with a root resembling a parsnip, which is much used on the Continent. It has the awkward name *Scorzonera*, because its properties are an antidote to the poison of a snake called the *Scurzo*.

Ion. It is like the root of the Arrow-root plant, which is an antidote to the poison of the Indians' arrows.

P. Most of the fleshy roots of these plants are medicinal. The dandelion root which forms chicory, is also used as a medicine. There is one, something like a white daisy, which is used as a medicine; it is called the *Chamomile*.

W. I once had some chamomile-tea; it was very bitter.

P. Besides the *flower* of the chamomile, we sometimes use the *seeds* of the Sun-flower, another composite plant. You know many other composite flowers. I will mention some. The Marigold, Daisy, China-

aster, Dahlia, the common weed, Groundsel.

L. Ah! those are very familiar friends!

W. And now if we add the names which we know already we shall have a good list of *Composite plants*. I will count them. The Chamomile, Scorzoner, Artichoke, Jerusalem Artichoke, Sun-flower, the Endives (which include the Endive, the Chicory, and the Dandelion), Lettuce. And you may discover many others, if you will look for them in the garden or fields.

There are many more vegetables used as food in the temperate climates. We will notice two or three belonging to various orders.

73. THE POTATO.

This is one of the most useful vegetables in the world. In Ireland it forms a principal article of food; it was first cultivated there in the reign of King James I.

Its history begins with the reign of Queen Elizabeth. In the year 1584 (about 100 years after Columbus discovered America), the Queen sent out a fleet "to discover and plant new countries." This fleet was fitted up principally by Sir Walter Raleigh, who commanded, and in the course of his excursions one of his men, named Thomas Heriot, discovered the plant.

In the account which he sent home, he stated that the natives called it *openawk*, and that the round roots hung together as if fixed on ropes. He recom-

mended its use for making sweetmeats, and says that they should be eaten sopped in wine, or boiled in prunes.

Ion. How differently they are cooked now!

P. Sir Walter Raleigh first planted them in Ireland, but his first effort was a failure. You know that the plant yields a very pretty purple and yellow flower, and that it is succeeded by green berries. The gardener, when these were ripe, despised the "apples," as he called them, and laughed at them as specimens of the fine fruit which his master had brought from abroad. When they were brought to Sir Walter, he also despised them, and ordered them to be thrown out of his garden as useless weeds. In digging them up, the gardener discovered the tubers themselves, which he thought might be worth keeping, and saved them.

The plant did not grow into favour rapidly. Like the scarlet-runner, it is an instance how slowly people adopt any new food. The *Puritans* declared that it was not lawful to eat them because they are not mentioned in the Bible.

About the year 1700, when the first gardeners' calendar was published, it was still neglected, for the plant was noticed in this way:—"Plant your potato in your worst ground." It was also said to be of less note than the horse-radish, so that it was still despised in England; but by this time it had become popular in Ireland, for we read that there "potatoes were used as much as bread."

About thirty years afterwards (in the year 1728) its cultivation in Scotland began. A Scotch labourer, named Prentice, cropped his little garden with potatoes, and the value of his crops soon became known to his neighbours, who followed his example. Mr. Prentice soon made his fortune and retired from business, having the pleasure of knowing that, by introducing the plant, he had been of great service to his country.

I need not speak of the cultivation of the potato. In seed-time the old potatoes are cut into pieces, which are dropped into holes made by the dibber, and each piece containing an *eye* will produce a new plant. A few years ago the potato was attacked by a most destructive disease called the *rot*; it caused terrible distress and famine in Ireland, and in England the loss to the farmers was enormous; it has lately broken out afresh, and at the present moment some of the finest crops in Yorkshire are ruined by it.

The potato does not flourish well in tropical countries, for it does not like the hot climate; it thrives best in a damp soil.

W. I think that Mr. Young told us the reason of that in one of his letters; he said that the potato contains very much water.

P. Potato also contains much starch. The *starch* of potato is very serviceable, and is used by laundresses; there are many specimens of potato-starch in the Exhibition. Potato-starch, when it is dried properly and

formed into grains, is exactly like tapioca; it is sold as tapioca in some grocers' shops. Most cooks can prepare it in this way at home; and it does not then cost more than one-sixth the price of the tapioca.

74. THE ONION.

P. Here, *Ion*, is an Onion.

Ion. How large it is! It is one of the Spanish onions that you buy at the grocer's shops; I wonder how it is that they are so large!

P. The Spanish onion is larger than the English, partly because it grows in a warmer climate. I believe that it is the warmth, also, which causes the sweetness, for the larger they grow the sweeter they become.

L. I have tasted a Spanish onion, *papa*, and it was much sweeter than any other.

P. And if the Spanish onion be sown, and cultivated in our colder country, it soon becomes small like our own; at the same time it loses its sweetness, and has the strong, pungent, narcotic flavour of the English onion.

Ion. Now, *papa*, it seems clear to me that the warm climate takes away the strong flavour from the onion. Here are two reasons. 1st, because the onions of England have a stronger flavour than those of a warm climate; and 2ndly, because I have seen a ripe English onion placed in a warm climate, and in the course of a few hours it became quite sweet.

W. In the course of a few hours, Ion? Why, in what country was that?

Ion. It was in the country called "saucepan," which is situated in the tropical part of the world called "Kitchen." The cook did it all, and when the onion was *boiled*, as she said, and was taken out of the hot water, it tasted nice and sweet. So, I say that the heat took away the onion's pungency.

P. Very likely. Egypt is a warm country, though not so warm as the saucepan, and the Egyptian onion is said to have an exquisite flavour—the Israelites remembered the onions, leeks, and garlic, they used to enjoy when in Egypt, and we read in the Scriptures how they murmured for them. In some warm countries the onion is almost the only vegetable, except the bean; and in England, at the beginning of the last century, it was much more used than the potato.

L. I should think that the onions in India are very nice.

P. I dare say they are, but, unfortunately for the natives, they have taken it into their heads that it is a "sacred" plant; therefore it is not allowed to be eaten. It was formerly worshipped on the banks of the Nile also.

L. I have seen an onion which is dark red, and sometimes purple outside.

P. Such onions have a stronger flavour than the white kinds—there are indeed several kind of onions; such as the young *Spring Onions*, used in salads, the *Welsh Onion*, the

Strasburg Onion, the *Silver-skinned Onion*, the *Leek*, the *Garlic*, the *Shallot*, and the large *Spanish Onion* which we have been talking about.

One word more about this onion. What part of the plant is it?

W. I have heard what it is called, papa, but I forget. It is not a *root*, I know, for you see the fibrous root underneath it.

P. No, it is really a *bud*, and is called a "bulb;" it differs from the more fleshy potato, which is called a *tuber*.

There is another plant belonging to the same tribe as the onion, which yields us food. It is more expensive in the cultivation than the onion, as only a small part of the plant, the young shoots, are used. The shoots are kept white like the stalks of the celery by "earthing up;" and like the celery, again, they thus lose their pungent flavour, and have a sweet taste.

L. I wonder what vegetable it is!

P. Hear the way in which it is cooked, and you will know. The young white shoots are boiled and eaten with melted butter; they are sold at the greengrocer's in bunches, and are called—

W. ASPARAGUS, I am sure. And now I remember something curious. I remember seeing mamma eat some once. She did not touch the green part at the end of each stalk, but she told me that it had a pungent taste; it was rather bitter also.

Ion. Of course! it had not

been *blanched*. In what order of plants is the onion, *papa*?

P. It belongs to a large order, which we may call *lily-like* plants. They are known principally by their bulbs. The Lily, the Tulip, the Hyacinth, the Aloe, the Crocus belong to this order. The common *Rushes*, too, are found in the same order as the onion.

75. SPINACH AND BEET-ROOT.

The Spinach is another useful vegetable; it belongs, however, to a division of plants very different from the preceding one.

L. I have seen it growing, *papa*; the leaves are a very different shape from the onion-leaf.

P. Yes; if you will look at the leaves of some kinds of spinach, you will find that they are broad, and something like the foot of a goose in their shape; the tribe is, therefore, called the *Goose-foot* tribe.

The goose-foot tribe grows in the northern parts of Europe, and in nearly all the *waste* places of the world they are considered as "rank weeds;" and the spinach is an example of the reformation to be made in a plant by cultivation.

Ion. I have seen the spinach, *papa*, when it has run to seed. The *seed-vessel*, or fruit, as you would call it, is rather prickly.

P. Yes; and this is why it is called spinach, from the Latin *Spina*, a thorn. The next plant we shall speak of has a Greek name.

Ion. This is a piece of BEET-
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root, *papa*. Why have you placed it beside the spinach?

P. Because it also belongs to the Goose-foot tribe. It is called Beet, because the shape of its fruit (or seed-vessel) is like that of *Beta*, the second letter in the Greek alphabet.

The beet is cultivated for its fleshy *root*, which is of a bright red colour. What else can you say of it?

L. It is soft and watery.

Ion. It has a sweet taste.

W. It is used in making up salads.

P. True; there are two kinds—the *red* and the *white* beet. You know which we make use of. There is one kind used as food for cattle, which is both red and white—it is called the *Mangel Wurzel*. Cows are very fond of it.

Not many years ago, in the time of Napoleon Bonaparte, the French people were the enemies of the English, and Bonaparte said that the people were not to buy goods produced in the English colonies—then the French would not buy the *sugar* which we had grown for them, and were obliged to make their sugar from the beet-root. Beet-root sugar is very good, but it is more expensive than that from the cane. The French cultivated the beet-root very largely, and opened extensive manufactories for BEET-ROOT SUGAR. But they have since found it is better to have our sugar from the West Indies.

76. RHUBARB.

This is the last vegetable we

will mention—it is not eaten with meat like the others, but its large fleshy leaf-stalk is used as with sugar, to make tarts, &c. Rhubarb is a plant of the *dock* kind.

The root of some species is used as a medicine; some of the root is brought from Turkey, but much more from other places. In Turkey the men are very fond of it, they will carry it about with them, and will nibble a little bit every now and then. You have, I dare say, seen and tasted such rhubarb.

Ion. I have; it has a rich brown colour, and a very bitter taste. I call it nasty.

P. You may now make a lesson on the plants we have lately been talking about.

Lesson 15. ARTICLES OF FOOD.

(Temperate Countries.)

THE FOOD SUPPLIED BY THE COMPOSITE AND OTHER PLANTS.

These plants may be easily distinguished, as the flower consists of a number of very minute flowers (or florets) growing on one head; most of them contain a white milky juice, which is bitter and narcotic. They form, perhaps, the largest order of plants existing.

The LETTUCE is well known, the leaves being used as a salad. Like the celery stalks, they are rendered crisp and pleasant by being blanched—they are tied round, so that the leaves may form a white "heart." There are two kinds, the Cabbage and the Cos-lettuce.

2. The ENDIVE has an appearance something like that of the

lettuce—and is also used as a salad. The chicory, and the dandelion plants are endives, and the roots of both yield a substance called chicory, which is ground up with coffee to improve its flavour.

3. The roots of some composite plants are fleshy; in cooking them, the poison is driven off by heat, and they taste something like the parsnip and carrot. One, called the SCORZONERA, is used on the Continent. The root of the JERUSALEM ARTICHOKE is eaten in England; another plant, called the ARTICHOKE, which is very different, supplies food from the flower-buds. The seeds of the SUN-FLOWER may be used as food for poultry.

5. The order of Composite plants is said to be the largest order known—it contains several well-known flowers, such as the DAISY, the DAHLIA, the CHINA ASTER, the THISTLE, the MARIGOLD, and others.

6. There are many other useful vegetables belonging to various orders, such as the Potato, the Onion, Spinach, Beet, and Rhubarb.

The POTATO is cultivated for the sake of its fleshy "tuber;" it was brought into England from America in the time of Sir Walter Raleigh. It was a long time before the plant became a general article of food.

The ONION is cultivated for its fleshy "bulb." It has a strong pungent taste, but when boiled, this pungency is driven away by the heat, and the onion becomes sweet.

SPINACH and BEET belong to a division of plants called the Goose-foot tribe, because some have broad leaves shaped like the foot of a goose. The leaves of spinach are generally boiled like

the cabbage, while beet-root is cut in slices, and eaten with salads, &c.

Rhubarb is a plant of the dock kind; its thick leaf-stalks contain sugar, and from their nice acid flavour are useful in making tarts, &c.

P. We have now talked of the Corn-plants, and the grain they yield for food. Secondly, we talked of all these kitchen-garden vegetables and their uses. What other articles of food are found in the vegetable kingdom?

Ion. We have not yet heard of the *Fruits*, papa. There are apples, pears, cherries, gooseberries, plums, and so on.

P. Then we will have a few short lessons on the fruits next. What is “a fruit?”

Ion. I suppose it is the part of the plant which comes after the flower—the part which is good to eat.

P. That is pretty correct, *Ion*, although there are many fruits not fit to eat. The fruit is the *seed-case* of a plant; and when botanists speak of fruit, they mean all seed-cases. For instance, the *pod* of a leguminous plant is its fruit—such as the pea-shell; but we do not eat such fruit.

W. No; we give the pea-shells to the pigs, and we eat the *seeds*.

P. Yes. The red berry of the peppervine, which we talked of, is its fruit, but we do not eat such fruit.

L. No; the berries are *washed off* from the seeds when white pepper is prepared. The pulp

of the coffee-berries is also washed off from the seeds.

P. Again, if you allow one of your sweet-williams to run to seed, you will see that the seeds are kept in pods, which are open at the top, and that they fall out if the pods be turned upside down. These seed-cases are the *fruit* of the sweet-william, but you do not eat them.

W. No; they are only dry husky skins.

P. It is when the seed-case enlarges, and becomes soft and pulpy, that it makes pleasant fruit. The seed of the apple we call the *pips*, and there is a mass of fresh green pulp between the pips and the smooth rind of the apple: this we call the fruit. What do you say of such fruit as that?

Ion. That we *do* eat it.

P. True; and, although all seed-cases are fruits, in general conversation we only call those fruit which we are able to eat.

W. Now I can say what a fruit is—a fruit is “an eatable seed-case.”

P. Let us try to arrange our fruits in their proper places. Have you ever seen a wild rose?

Ion. I gathered a great many last year, papa. We called them dog roses.

P. And next time you gather one, will you count the *petals* of the flower—you will see that it has five spreading petals. Without stopping to describe this flower exactly, I may as well tell you that the blossoms of many large trees and plants

are rose-shaped flowers. Do you remember any?

Ion. Yes. The blossom of the strawberry is very much like a wild rose, only it is smaller.

W. So is the blossom of a cherry tree. Oh! the beautiful white blossoms that were on our cherry-tree last year! The plum-trees, too, and the apricot, indeed all the wall-fruit trees had such blossoms.

L. And mamma's *almond*-tree—that, too, has beautiful blossoms like light pink roses.

Ion. So have the apple and the pear trees.

P. I will count up the plants for you:—the strawberry, the raspberry, the cherry, plum, apricot, peach, and nectarine, the medlar, quince, pear, and apple—all these have blossoms like the wild rose, therefore they are all arranged in one order which we may call *rose-like plants (or the Rose tribe)*.

Ion. Well! I should never have thought that the strawberry, and the peach, and the apple belonged to the same order. Why, the peach has a *stone* in it; it is a “stone-fruit.” Then, the apple has a core and *pip* inside, and the strawberry—I don't know where the strawberry seeds are! There is plenty of *juice* inside.

P. But you see, Willie, that the plants were not arranged according to their insides, but according to their blossoms, just as the cruciform, the umbelliferous, and the composite plants are. We will begin, then, with the fruits of the *Rose-like plants, or Rose tribe*.

(“FRUIT”-BEARING PLANTS.)

77. THE ROSE TRIBE.

Apple, Pear, Quince, Medlar, Peach, Apricot, Nectarine, Plums, Cherry, Raspberry, Strawberry, &c.

APPLES are found in nearly all temperate countries. I should think that all the people of temperate countries, who helped to make the goods for the Exhibition, have tasted the apple. It is supposed that it was brought to this country by the Romans.

Did you ever taste a wild crab-apple?

L. I have not.

P. If I were to give you one to taste, you would then see another instance of the improvement of plants by cultivation. The wild crab-apple of the hedge is dry, sour, and bitter, and not to be compared with the sweet and juicy apple of the orchard; yet such would all apples become, probably, if they were not carefully cultivated.

There are very many different sorts of apples, for every seed sown will produce a new variety. Six seeds, although they be taken out of a single apple, will produce six different sorts of apple-trees. Without going through the hundreds of varieties, I may tell you that there are three divisions of apples.

Sweet Apples, for the parlour, such as the Ripston pippin, golden pippin, &c.

Boiling Apples, for the kitchen, such as the codlin, &c.; and

Cider Apples, such as the different crab-apples, red-streak apples, &c. Herefordshire and Devonshire are the principal cider counties.

Ion. I think I know the names of a great many apples, papa. There are the Russets, the Orange Pippin, the Lemon Pippin, the Hawthorndens, the great Beefins, and—I think these are all I know.

P. Apple-trees may be trained in several ways—either as *espaliers*, as *dwarfs*, or as *standards*. It is said that the *dwarf* apple-trees are the best—1st, because they occupy little space; 2ndly, they do not overshadow so much soil as the taller trees; 3rdly, the fruit is more easily gathered; 4thly, they are not influenced so much by the high winds; and, 5thly, the fruit is finer.

One peculiarity in these fruit-trees is, that the young trees must be grafted before they will bear. The operations of grafting, budding, and pruning, are such as belong to the gardener.

The *uses* of the apple you well know. They are of great service for pies and puddings in the *winter* time. There are several ways of preserving them for the winter. One of the best is to let the fruit lie, after it has been gathered, until it has lost its superfluous moisture; this is called *sweating* the apples. They should then be wrapped in tissue paper, and put away in silver sand; but the sand must first be dried in an oven.

The PEAR is another nice

fruit. In what does it differ from the apple?

W. I think I can find two or three differences—1st, its *shape* is different, for one end is generally thicker than the other; 2ndly, its *pulp* is different, for it is generally softer, and more juicy, and sweeter sometimes.

P. The different sorts of pear are almost as numerous as the apples. They are also arranged in three divisions. We have dessert pears—such as the Windsor, the Williams, the Jargonelle; then there are pears for baking and stewing; and 3rdly, the pears used in making *perry*, a drink something like cider.

They are cultivated much in the same way as the apples. Both the apple and the pear require a soil which is not too damp; the soil should be rather *shallow*, and well drained. It is said that the monks of former days knew this, for in the fruit-gardens of the old ruined monasteries stones and slates have been found below the fruit-trees. A soil of about two and a-half feet deep is considered the most suitable.

W. But I should think, papa, that if you placed rubbish and stones under the soil, the roots could find their way down *between* the stones.

P. Yes; therefore the harder and firmer the foundation, the better. Do you not remember what the gardener said of the large pear-trees and apple-trees in our old garden?

Ion. I do, papa. He said that they would not bear because the roots had found their

way into the layer of gravel which was underneath the vegetable soil. Don't you remember what a large gravel-pit we had in the corner of the orchard?

The QUINCE is another fruit something like the apple and pear. It has a peculiarly acid taste, which some people are fond of.

L. Do you like it, papa?

P. Yes, very much: the taste is so peculiar! but I should think that the fruit is very indigestible. I would not like to eat a whole quince at once.

The principal use of the quince is as a *stock* for pear-trees; that is to say, the young quince is planted, and when the stem has reached a certain height, the young branches of the pear-tree are grafted on it, and these bring forth pears.

W. What a shame! and so the poor quince-tree is obliged to produce pears all its life! That is as bad as making an old hen bring up ducks.

P. The PLUM is another nice fruit; but here we find a great difference from the apple and pear.

Ion. Yes, it has a stone inside.

P. True; and in the stone fruits you only find one seed, while in the core of the apple you find several. The cells for the seed (or the *core*, as I called it) are made of a horny kind of substance, something like cartilage, or like your finger nail.

L. While the stone of the

vegetable is something like the *bone* of an animal.

P. The plum will grow in almost any of the temperate climates, from Norway, which is at the North of Europe, to Barbary, at the North of Africa.

In *France* and *Germany* very large plums are grown, which are dried and preserved with sugar. If you want to see them, you must go to the grocer's shop and ask him for some *prunes*.

If you will look in your map for *Damascus*, you will see a place which was once very celebrated for plums. Many different kinds were imported from there into England, and were called *Damascenes*. This word was very easily shortened into *Damsons*, a name with which, I dare say, you are acquainted. Now, the greater part of our foreign damsons come from FRANCE.

Do you know any other kinds of plum besides the prunes and damsons?

L. I know of several. The Orleans plum, the Mussel plum, the Egg plum, the Greengage, and the Bullaces.

The cultivation of the plum is very easy, for the tree is even more hardy than the cherry-tree; it will live through the most severe frosts. The trees extend their roots under ground *horizontally* instead of descending to a great depth; thus they are apt to throw up young "suckers," but these must be destroyed directly they appear, else they weaken the tree.

W. Yes. I suppose that the roots take a fancy to support

the young suckers instead of the parent. They don't know that the suckers cannot bear fruit.

P. I cannot account for their partiality, I am sure. But if you have a plum-tree, and want to have fruit, you must destroy the suckers; then, if the tree be properly taken care of, it will grow luxuriously, and it will not only bring forth fruit, but *gum*, which will ooze out through the bark.

The CHERRY-tree belongs to the same tribe as the plums.

The boys and girls of England began to taste cherries in the reign of Henry VIII., when they were first cultivated in the county of Kent.

The Kentish cherries are still famous. Have you ever seen any?

W. I have, papa; they are of a bright red colour, and they have a rather sour taste—they are used for puddings.

P. And they have another peculiarity—the stalk of the Kentish cherry is joined so firmly to the stone that you may pull out the stone and the stalk together, without breaking the skin, except in the part through which the stone is drawn. You may then dry the cherries in the sun, or in an oven, then they will keep for a year, and will have the appearance of dried raisins.

The cherries used for dessert are the large white cherry called the *Bigareau*, and the black cherries—those used in the kitchen are the *Kentish* and the *Morello*.

The APRICOT, PEACH, and NECTARINE, are three favourite trees in the rose-like plants. In this country it is necessary to train them against a garden wall, so that they are called *wall-fruit*.

They are difficult fruits to cultivate, as they are apt to blossom too early, and the frost nips the young fruit before it is properly *set*.

The peach is so called because it came from Persia. The Romans, who were the first to enjoy this fruit, called it *Persica*, by the French it was called *pêcher*, and by us *peach*. It was once called "The Persian apple," but it does not belong to Persia only—it has been found growing wild in Turkey and other parts. In India, also, not only peaches, but pomegranates, apricots, and walnuts grow wild.

The ALMOND-tree grows in temperate countries, but the almonds do not come to perfection so easily as in the South of Europe.

What sort of a taste has the almond?

L. It is very nice, but I should hardly know what to call such a flavour—the skin of some almonds is rather bitter.

W. And I once tasted some "bitter almonds;" the almond was *all* bitter.

P. All the trees we have just been talking about have this bitter taste in the skin of the kernel.

W. Yes, the apple-*pip* has a bitter skin, papa—and so have the kernels of the plum and the cherry—why is that?

P. I can only say that it is so. These trees not only have this bitter taste in the kernels, but in their leaves. They also have in their kernels and leaves a certain quantity of *Prussic Acid*, which is a most violent poison, but the quantity is so small that it is not dangerous.

Ion. I should think that the bitter almond contains the most prussic acid.

P. That is the case, and the almond-tree gives the name to the tribe. The Almond, Plum, Apricot, Peach, Nectarine, and Cherry-trees, form what is called the *Almond tribe*, in the order of rose-like plants.

W. You have not yet mentioned the Raspberry and Strawberry, papa; they have a rose-like blossom.

P. These plants are so much known, that it will be almost enough to mention them. The RASPBERRY grows upon a cane, and requires a rich soil, well manured. The seeds are the most remarkable part of the plant. They are noted for their long life—for it is said that some raspberry seeds were found in the body of a man who was buried in the reign of the Roman Emperor Hadrian, about 1,700 years ago; and that when they were sown in the ground they grew, and formed new plants.

The STRAWBERRY in its form is much like the Raspberry.

W. Will you tell me which are the *seeds* of the strawberry?

P. The seeds are contained in the little bodies, like pips, which are scattered over the surface of the fruit. These little bodies

are called *carpels*, a name which you cannot at present understand. What do you think of the flavour of this fruit?

Ion. I think that it is *cooling*, *sweet*, and *delicious*; the pulp is *white* (sometimes red) and *juicy*. These are four good qualities!

P. You may add a sixth good quality—it is very harmless, it may be eaten in large quantities without injury; frequently cream and sugar, or wine, is added.

There are several kinds. There are the *Wood Strawberries*, which grow wild; the *Hautboy Strawberries*, which are nearly white; and the *Scarlet Strawberries*. One scarlet strawberry, called “Keen’s seedling,” is found to be finer than any of the other sorts, so that it is now cultivated very largely.

78. THE NETTLE TRIBE.

W. Does not the *mulberry* belong to the same class as the raspberry?

P. No. The MULBERRY tree has a fruit much like the raspberry, but the blossom is not a rose-like flower; the leaves are also different, while, instead of being a slender cane, the mulberry-tree is more like an oak.

L. Do not mulberry trees grow to a very great age, papa? What a very old tree that is in grandmamma’s garden!

P. Yes. They are like the oak in that respect also. There are trees in this country three or four hundred years old. The mulberry likes a warmer climate

than *England*. In the south of *France* they abound, but they flourish best in *Persia*, where there are large groves of mulberry-trees. They are cultivated principally for their leaves, on which millions of silk-worms feed.

L. I have often heard of Persian silk.

P. The mulberry is a delicious fruit; it should only be picked when it is quite ripe, and drops off the tree. The juice forms a beautiful syrup; mulberry vinegar is very useful in cases of fever, for gargling the throat.

L. Is not the *Fig* one of the fruits of the temperate climates?

P. Yes; and we will talk next of THE FIG.

The condition of a fig-tree depends very much upon the climate in which it is grown. In *England* the fruit will ripen. In *Scotland*, which is a colder country than *England*, it has to be cultivated under a glass. In the south of *Europe* not only will the fruit ripen, but the tree will yield *two crops* per year. These crops are called the summer, and the winter figs. In the autumn, just as the summer figs begin to ripen, the winter figs appear. Soon after Christmas, or by the end of January, these figs are ripe, and it is said that they are then picked as "delicious morsels."

Ion. I have seen a fig-tree, papa; and have seen the second crop begin to grow, when the first-crop figs were very large.

P. The second crop makes its appearance, but does not ripen in our country—the winters are too cold; while the fig-tree in the warmest temperate climes sometimes has *three* crops of fruit—they are called the *easter fig*, the *summer fig*, and the *winter fig*.

In the north of *Africa*, in *BARBARY*, and in *PERSIA*, such fig-trees are found. Can you describe the fruit?

Ion. Yes; I have often tasted a ripe fig—the inside is filled with seeds, and a rich sweet pulp.

P. I think I once told you that this fruit, like one or two others, contains sufficient sugar to preserve itself. The figs become so ripe as to fall off easily; and we read in the book of the prophet *NAHUM* (iii. 12), that they "fall into the mouth of the eater upon being shaken."

W. The fig is very different from the strawberry—the seeds are all *inside* instead of *outside*. What tribe of plants does it belong to?

P. You will be surprised to hear that it belongs to the *NETTLE TRIBE*. The *Fig*, and the *Mulberry* tree, which we have been talking about, the *Bread fruit* tree, the *Hop* plant, and the *Nettle*, all form one tribe.

W. How can such different-looking plants form one tribe, papa?

P. It is because they all possess certain important features which cannot be found in other plants. But these I cannot explain now.

L. Does not the Gooseberry

belong to this tribe, papa? Its seeds are inside like those of the fig.

P. No. Let us talk of that fruit next.

79. THE GOOSEBERRY TRIBE.

The GOOSEBERRY belongs to the *Gooseberry tribe*, and in the same tribe are the *Red*, *White*, and *Black Currant*. These plants truly belong to the temperate climes. They cannot endure the heat of the tropics; they are, I believe, *natives* of Britain, where they flourish better than in any other country. Some gooseberries grown in this country have been known to weigh from an ounce to an ounce and a half. In Lancashire *gooseberry-show meetings* are often held, and prizes are given for the largest specimens of fruit. There are red and white gooseberries, as well as red and white currants—properly, there are four divisions, the red, yellow, green, and white.

W. I can tell you a peculiarity of the gooseberry, papa; it is one of the *earliest* fruits; it comes in after the rhubarb.

P. That is because we use it in an unripe state; for the gooseberry plant bears so abundantly that, like the fig, we may get two crops from it—the ripe and the unripe crop.

Currants are not eaten until they are ripe, but they come into use next to the gooseberries. The black currant is a species quite distinct from the white or red; and the

taste is very different. In Russia it grows wild; the juice is made into wine; the leaves, too, are used as tea. They are also found in the colder parts of the mountains at the north of India, and in North America, a very different part of the world.

L. Do CRANBERRIES belong to the gooseberry tribe, papa? They are very much like currants.

P. No. They are very different plants. They grow in the fens and bogs of Norfolk, Lincolnshire, Westmoreland, &c. The plants require plenty of water, and are always found by the side of little rills; they will not grow in stagnant water.

Cranberries are brought by the *hogshead* from America. The Russian cranberries are also famous. There the plants are so hardy that the berries are not gathered until after the winter, and they are so plentiful that the snow is often stained crimson by the berries which are crushed when the sledges pass over them.

The cranberry is useful for tarts, puddings, and a kind of marmalade.

80. THE OLIVE TRIBE.

The OLIVE is another fruit of the temperate countries. Like the gooseberry, it gives name to a *tribe* of plants. They are a larger set of plants than the gooseberry tribe, such as the *Ash*, and the *Lilac*. The *Privet*, which is used to form hedges to gentlemen's gardens, is another of the order. A

curious proof of the relationship of the olive and the ash is, that they will *graft* well together.

Warm dry countries are the most suitable for the olive, such as the South of France, Spain, Italy, Palestine, and the North of Africa; the beautiful plain of Athens is almost covered with olive-trees.

The most important produce of the tree is the oil, which is eaten with salad in England, and as food in other countries. As it was first imported to England from Florence, it is here called *Florence oil*; sometimes *Flask oil*, from its being generally kept in flasks.

Perhaps there is no plant so much mentioned in Scripture as the olive. The *olive* branch was brought to Noah by the dove, when sent out of the ark; thus it was the emblem of peace to man; and it was afterwards adopted as the emblem of peace by the ancient Greeks. They had a fable that it was given to the world by Minerva, the goddess of wisdom.

In the history of the Israelites we learn how the tree flourished in Palestine. Moses directed the attention of the Israelites to it, for he knew that its cultivation would yield a great profit. Both olives and figs are often mentioned together; and "olive-yards" appear to have been as abundant as vineyards. It was from the Mount of Olives that our Saviour ascended; and in the Garden of Gethsemane, on that mount, He prayed and wept. There are now some ancient olive-trees, near the brook

Kedron, on the supposed place of Gethsemane, which, it is believed, were growing in our Saviour's days.

W. Did the Jews use olive oil for food, as we do?

P. Yes, for the same purposes as we use butter, lard, or gravy. They preferred it to animal food, and indeed in the present day you may see many a Jew eating fish which has been preserved in olive oil.

The *wood* of the olive is very useful for ornamental purposes.

MANNA is an article of food which we may mention here, for it is produced from the *Manna Ash*, one of the olive tribe. It is procured by making a cut in the bark about three inches long, when it exudes like the gum from the cherry-tree. When dry it is white and sugary, and is used as an "opening medicine." The leaves of the common ash have properties very much like that of manna.

L. You have not mentioned the *Vine* yet, papa; that will grow well in temperate countries.

P. Yes; but, like the olive, it prefers the warmer countries at the South of Europe. In Spain it is very luxuriant, and from the vines which grow around the city of Malaga, we have a good supply of *raisins*. In Greece and the Ionian isles, there are vines producing a small species of grape; these are dried, and when sold by the grocers are called *currants*.

We will talk more of the vine when we speak of the article WINE.

81. THE ORANGE TRIBE.

ORANGES and LEMONS must not be left out of our list of fruits. Although they strictly belong to the tropics, they will grow in the warmer temperate climes. No fruit is imported to our country in such quantities; it is supposed that 172,000,000 or more are consumed in England every year; this number allows a dozen oranges per annum to each individual.

In ST. MICHAEL'S—

L. Where is St. Michael's, papa?

P. If you get your map of the Western Hemisphere and look for the *Azores*, or Western Islands, you will find them a long way off from the tropics, near the 40th degree north. St. Michael's is one of the largest of the *Azores*. One of the orange trees there has been known to produce 20,000 oranges fit for use, besides about five or six thousand damaged or waste. On account of the extraordinary fruitfulness of these trees, they are sold in England almost as cheaply as the apples which grow in the country itself.

The fruit is gathered when it is green—for if it were allowed to ripen, it would spoil before it reached England, and the tree would only bear a crop every other year. The gathering season begins in October, and ends in December. Each orange is wrapped up in a leaf,

and they are then packed in boxes.

W. How is it that it keeps so long, papa, even after it is brought to England?

P. Because of certain important qualities it contains. The thick rind resists the changes of heat and cold. This rind is a very interesting subject; it contains an acid taste, which is a defence from the attacks of insects; it also contains much oil, so that the juice inside cannot easily evaporate through it; this oil also prevents the air from penetrating and decomposing the fruit.

L. I can see now why the oranges are so carefully wrapped up in leaves; if the rind should be injured the orange would be spoilt.

P. That is partly the reason. The smell of the orange is very nice; it is truly aromatic; the taste is sweet, acid, and also slightly aromatic. The trees are beautiful objects; the bright green leaves are smooth and shining, and the flowers are white and fragrant. As the plant blossoms all the summer, there may be seen the leaves, the flowers, the buds, and the fruit, all growing at the same time. In fact, the fruit in *every stage* may be seen at once, on one tree.

Oranges were introduced to the South of Europe from China and India.

Ion. I have heard of China oranges before.

P. The Spaniards introduced them to the New World—so that now they grow in the West Indies, America, the

Azores, and Spain and Portugal; they also flourish in the island of *Malta*.

The tree was introduced into Spain by the Moors. Near Cordova there are trees 600 or 700 years old, and in some parts the extensive orchards have formed the principal revenue of the monks for ages.

There are several kinds of orange. The Seville orange (or Seville *Bigarade*) has a bitter taste; the skin is used to make marmalade, and candied orange peel.

The LEMON is another fruit of the orange tribe. I need not describe it to you. Tell me how it differs from the orange?

W. First, in *shape*—it is almost oval instead of spherical.

Secondly, in *colour*—it is a lighter yellow than that of the orange.

Thirdly, in *taste*—it is more acid than the orange.

L. And, fourthly, in its *uses*—you have not studied cookery, Willie. It is used to eat with pancakes; to flavour apple-tarts and jellies; to make punch and lemonade; and it is used also to form a cooling drink for invalids.

P. And you may add, it is sometimes taken with *veal*, the juice being squeezed into the meat. It is also used with turtle, the bitter in the rind and the acid of the pulp being useful for digestion.

There are other fruits in the orange tribe, such as the CITRON, the LIME, the SHADDOCK, and the FORBIDDEN FRUIT.

Before leaving the subject of fruits, we must just allude to the NUT.

82. THE WALNUT.

The walnut is the favourite nut-bearing tree with me! What a fine hearty fellow a walnut-tree is! He grows to a good height with large spreading branches; the trunk is thick and massive, and is covered with a deeply furrowed bark. The broad leaves are light and graceful, and of a bright yellowish green colour—and the fruit, I dare say *you* can say a good word for that!

Indeed, all parts of the tree are useful. Of the timber from the *trunk* we shall speak another day; the *sap* of the trunk contains a large quantity of sugar, and in some countries the trunk is often tapped, and the sap is made into a wine or spirit. The *leaves* have a peculiar aromatic odour when bruised, and a rather bitter quality, which is useful in medicine; when dead, they are collected and burned for the *potash* contained in their ashes.

The same bitter quality is found in the green *husk* of the fruit, and in the *skin* of the kernel. There must be something nice in this quality, for anglers boil the leaves and husks in water, and pour the juice on the earth, in order to procure worms, which quickly rise to the surface for it. The fruit is, however, the best part. It is useful in every stage of its growth. When young and green it is used as a pickle, and

was at one time boiled in sugar as a sweetmeat.

W. That is like the GREEN GINGER.

P. True; but *we* generally eat the fruit when it is ripe. When the skin of the kernel *can be easily removed*, the fruit is wholesome and nutritious, but when the kernels are old and dry, so that the skins stick to them, they are indigestible. You would not suppose that they would become an article of daily food—

Ion. I should have thought that they are not wholesome enough for that.

P. But, I have read in the "Penny Cyclopædia," where I found these particulars about the walnut-tree, that in many parts of France, Spain, Italy, and Germany, the people live entirely on walnuts during the picking season.

In those countries walnut-trees are far more important than in England; there is a certain district on the Rhine which is almost entirely planted with them; and it is said that to this day "no young farmer living there, can marry a wife until he proves that he is father to a certain number of walnut-trees."

L. Have you told us all the uses of the walnut, papa?

P. In another place I shall have to speak of the walnut oil. The seeds are nutritious because they contain so much albumen, which I told you is the substance that forms the *fibrin* of the blood. The mode of gathering walnuts in this country is rather peculiar. The

fruit is beaten off the tree with a long pole; for it is said that the beating is good for the tree's health. Lately, however, certain unbelieving people have ventured to say that the beating *injures* the tree, and that it is better to let the fruit drop off, or pick it.

83. THE CHESTNUT, &c.

The CHESTNUT is another good fruit. In the Physical Geography lessons of PLEASANT PAGES, you had an account of the splendid chestnut-trees on Mount Etna.

L. Yes, I remember the CHESTNUT-TREE OF A HUNDRED HORSES. You said that a string, to surround it, must be as long as a street containing *ten middle-sized houses*—I forget the number of feet in length.

P. I said that the tree is 163 feet in circumference. The chestnut-trees even live to a greater age than the walnut-trees—those on Mount Etna are said to have lived *several thousand* years. The "tree of a hundred horses" is said to be the oldest tree in the world—its age has been calculated at about 5,200 years.

The chestnut does not belong to the same order as the walnut. The order (*Corylaceæ*) includes the *Chestnut*, *Hazel-nut*, *Filbert*, the *Horse Chestnut*, the *Oak*, the *Beech*, and others. You may know them, 1st, because they all yield valuable timber; 2nd, by the peculiar kind of flowers called *catkins*, which hang from the male plants; and from the fruit

being called either nut, mast, or acorn—

L. I have heard of beech-mast, but I never knew before, that it was the fruit of the beech. I have read that pigs eat it, as they eat the acorn of the oak.

P. The other nuts grown and eaten in temperate countries, are the FILBERT, the HAZEL, and the BARCELONA NUTS. Most of these you are acquainted with, so that we will not go into their history now. The *Brazil* and *Cocoa nut*, is brought from the tropics; all these nuts contain oil.

L. Now, papa, shall we make a lesson on the different fruits?

P. Perhaps it would be as well to make a list of their names, that you may commit them to memory.

Lesson 16. ARTICLES OF FOOD.

(Temperate Countries.)

THE FOOD SUPPLIED BY THE FRUIT-BEARING PLANTS.

The principal fruit-bearing plants are those belonging to the ROSE TRIBE, such as the APPLE, PEAR, QUINCE, and MEDLAR, with seeds contained in a horny case called a "core;" and the PEACH, APRICOT, NECTARINE, PLUM, CHERRY, and ALMOND; the seeds of which are found in a harder case called a "stone." This division of the Rose-like plants is called the Almond tribe.

The other rose-like plants are the Raspberry and Strawberry.

In the Nettle tribe are found the MULBERRY and the FIG.

In the Gooseberry tribe we have the Gooseberry, and the Black, White, and Red CURRANTS. The CRANBERRY resembles the currant, but belongs to a different tribe.

The Olive tribe contains the OLIVE-TREE, which is of very great importance in Palestine and the South of Europe—it also contains the MANNA ASH, from which manna is procured, the LILAC, PINES, &c.

The Orange tribe supplies us with the ORANGE, LEMON, CITRON, LIME, and other beautiful fruits.

There are also different kinds of Nuts, such as the WALNUT, CHESTNUT, HAZEL, FILBERT, BARCELONA, and BRAZIL nuts.

W. Now, shall we learn of the animal food from the temperate countries?

P. We have not quite finished the account of the vegetable foods. I have on my list two or three liquids which are used to an enormous extent. They are used *too much* to please me.

L. Please let us hear their names.

P. BEER, WINE, and SPIRITS; and we have a better liquid, which will lead us to the animal kingdom, MILK.

W. Then please tell us something about these liquids, especially their qualities.

84. BEER.

P. "Thank ye for a drop of beer, sir?" Do you know who says that?

W. Yes, the *coalmen* say so, when they bring the coals.

Ion. And so does a *porter* when he has been carrying a box.

W. And the *dustman*.

L. And the *chimney sweep*.

Ion. And the *gardener*—the man who mows the grass plot in front of the house—asked *me* for some the other day; but I had'nt any money.

P. And there are many more who like beer, but that does not prove that it is good for them; the general rule is, that the foods we like best are the most *injurious*.

But one more word to show *how much* beer people drink.

There is a certain beer-making establishment in London—a “Brewery,” I should call it. It belongs to Messrs. BARCLAY, PERKINS, and Co. This establishment occupies a space of no less than *eight or nine acres* of ground. Just think of your uncle's field, which measures five acres, and you can easily imagine how large a space this brewery covers!

But the size of the establishment would not give you a proper idea of the quantity of beer made there. You must go and look at the great *malt bins*. There are twenty or thirty of them, and each bin is about as high as a house. Then you may go to the *cisterns* where the water is kept for boiling the malt: some of these gigantic cisterns supply a *hundred thousand gallons* per day without becoming empty. After that go to the *vats*, in which the beer is kept when it

is made; some of these vats will hold three or four thousand barrels each. Lastly, when you have counted up all the other vessels of vast size, the mash-tuns, coppers, and boilers, go look at the thousands and tens of thousands of small, middle-sized, and huge barrels, butts, puncheons, &c., and if you take time enough to see them, you will come away filled with astonishment at the scale on which matters are conducted. You might wonder how even London, with all her inhabitants, could consume such quantities; but your wonder would be increased on hearing that this is only one of about a dozen giant establishments in London, besides hundreds of smaller breweries. Then you might be tempted to ask, How is it that people *can* drink so much beer?

W. Well, *how* is it? I don't drink any.

P. We shall see soon; but hear how the people of BAVARIA drink beer.

Ion. Where is Bavaria, papa?

P. Bavaria is one of the kingdoms of Germany; you may find it on your map of Europe. Like the English, “the devotion of the people to beer is such, that they resort to the cellars and large beer-shops in crowds, to drink. The conversation of the citizens constantly runs upon the quantity and quality of the annual brewing. At the beginning of the beer season there is everywhere seen the most surprising anxiety to discover where the best beer is to be had, and the favourite

beer-shop is crowded until the supply is exhausted.”* It is also said that brewing is the most flourishing trade in Bavaria, and that there are 5,000 establishments. This is not to be wondered at when we read that the real beer-drinkers drink as much as *ten quarts* per day.

L. And why is not beer good for these people to drink?

P. Partly because it contains alcohol; and to explain this I had better tell you how beer is made.

When I was about six years old, and lived with my aunt in the country, she used to brew her own beer—annually. Here begins the history of the beer. Certain men, called *reapers*, went into the barley-field, and cut down the grain. This grain, after it had been thrashed, was taken to a man called a maltster. This maltster took the grain, soaked it in cold water for thirty hours, and when he had drained it off, he took the wet barley to a *malting floor*. This malting floor was heated, and the heat dried the barley, caused it to swell and burst, and to begin to grow, by sending forth a young shoot or *sprout*. While thus growing, the particles of the grain changed very much; they *fermented*, as we say, and by this fermentation the starch of the barley became sugar, to form nourishment for the young plant.

L. Ah, you told us before, papa, of the starch changing into sugar; and that if the

sprouts were allowed to grow they would consume the sugar.

P. But it was for the sake of the sugar that the maltster caused the grain to ferment, therefore he removed it at once to a drying kiln, and there he heated it so much that the young sprouts were killed, and the sugar was saved. The fermentation which I have thus described is called the *saccharine fermentation* (from the Latin *saccharum*, sugar); it is the first fermentation which vegetables undergo when they decompose. The barley, when thus fermented, is called *malt*. It is next *crushed* and *mashed*, and then it is ready to be made into beer.

Now, at my aunt's, the beer was made thus: there was a great copper in one of the out-houses of the farm, which was filled with water, and in this a quantity of malt was boiled. The boiled malt yielded a sweet yellowish juice, which they called *sweet wort*. This sweet wort, I know, was very pleasant, and I thought that if the brewer would have let it alone it would have made very good beer; but, no! the sweet wort was boiled again with a number of bitter flowers called *hops*.

W. What are hops, papa?

P. They are the flowers of a climbing plant. You may see an account of the hop gardens of *Kent* in PLEASANT PAGES.* When the sweet wort had been boiled with these hops I tasted it again, but thought it was a decided failure; and I told the brewer so.

* Murray's Hand-book for South-ern Germany.

But the brewer had his own opinion, so he proceeded with his work. He drained the wort from the hops and poured it into several tubs, and proceeded to cool it as quickly as possible. When the wort was properly cooled it was strained again into a large vat, and then came another fermenting. A little yeast was put into the vat, and that set the whole of the wort in motion. All the particles began to change; the sugar was changed into a spirit called *alcohol*, and the nutritious part of the barley juice, that which contained the gluten, was changed into *yeast*. How I stood by the side of the vat and watched it! The particles of gluten which were thus being changed, rose to the surface in a white froth, and soon the froth rose so quickly that it formed a thick substance like pudding; this was called *yeast*. As fast as the yeast thickened on the top, the brewer skimmed it off, and took care of it.

W. What for?

L. I can tell you that, Willie. Yeast is used by the baker in making bread. What kind of a fermentation do you call that, papa? You say it changed the sugar into alcohol, and the gluten into yeast.

P. That is called the *Vinous fermentation*, from the Latin word *vinum*, wine. It changed the beer into wine, for beer may be called a "malt-wine."

The last process was the fining or clearing; isinglass was used for the purpose, and something else, but I forget what.

L. And is this the way beer is always made, papa?

P. I can't say. I know that this is the way my aunt's brewer made it. I have never seen it made at Barclay and Perkins', but I have heard that in no two counties of England is exactly the same plan followed. Besides, there are several kinds of beer. The light malt is used to make *ale*, and the dark brown malt is used to make *porter*. After the malt has been boiled, and the wort has been poured away, it is usual to add fresh water and boil it up again; this decoction is of course weaker, and forms what is called small beer, or table-beer.

Ion. There are several processes for making beer; I have been counting them—1st, the malting of the barley; 2nd, the grinding; 3rd, the mashing; 4th, the boiling; 5th, the boiling with hops; 6th, the cooling; 7th, the fermenting; and 8th, the clearing and fining. Now, papa, you have not told us why beer is not a good drink?

P. Because it is unwholesome. I told you in our lesson on the corn plants,* that the gluten of the barley is the part which contains albumen, and forms the flesh, or fibre of the barley. Now, by the fermentation, this gluten was nearly all destroyed.

W. Yes; you said it was changed into *yeast*.

P. And in our lesson on *sugar*, I said that it supplies carbon, which forms heat within the body.

* Page 105.

Ion. I remember that!

P. But by this fermentation, the sugar is changed into alcohol, a spirit which supplies heat far more *quickly* than sugar. So that if your blood circulates slowly, and you feel cold, if you drink a glass of beer, its alcohol will soon make you warm and lively.

Ion. Then alcohol is a good thing?

P. Only on very rare occasions, for alcohol is too heating, and injures the nerves, just as tea does. If you take very much, it will cause your blood to circulate very quickly, your body will become very warm, and your nerves and brain will become so excited, that you will think strange thoughts, and say strange words, and do strange things, and people will say to you—

W. They'll say, "You are drunk!"

L. Or *intoxicated*, Willie; "drunk" is a rude word.

W. Is it?

P. Another bad part of the beer's history is the shameful waste it causes. About ten years ago, between *forty* and *fifty million* bushels of barley were annually used for malting. Think, now, of the ten thousands of starving men in this country! They cry for *nourishment* for their bony frames, yet the nutritious gluten, which God has placed in this barley, is nearly all destroyed and turned into *yeast*. The most nutritious substance in a brewery is the grain of the malt after it has been boiled—the gluten cannot be quite boiled out, and

these "grains" are used to feed the great *dray-horses* of the brewers.

L. Are you quite *sure*, papa, that there is so little nourishment in beer? The doctor ordered mamma to take it. He said she was to drink it, because she was nursing baby.

P. I cannot speak from my own observation, because I am not a chemist. But I have spoken to you before of a great German chemist, named *Liebig*—you shall hear what he says.

You heard of the fine *Bavarian beer*, and I said that nearly all the nutritious quality of the malt is destroyed in making it. Now, hear how *very* nearly it is destroyed. M. Liebig says:—

"We can prove, with mathematical certainty, that as much flour as can lie on the point of a table-knife is more nutritious than five measures (eight or ten quarts?) of the best Bavarian beer!"

What do you think of that? And then he makes the following calculation:—

"And we can prove that a person who consumes daily that amount of beer, obtains from it in a whole year, in the most favourable case, *exactly the amount of nourishment in a five-pound loaf of bread.*"*

Now, eight quarts per day, for 365 days, are 2,920 quarts. Therefore, 2,920 quarts "*best*

* Familiar Letters on Chemistry. By Justus von Liebig. London: Taylor & Walton—a book to be studied by every head of a family. Price 6s.

Bavarian beer" are only equal to five pounds of bread.

Do you think *now* that beer is "nutritious?" In another part of his book M. Liebig shows why it is not. When speaking of the *gluten* in the barley, he says, that "when *separated as yeast* during the fermentation, it is *lost* for the purpose of nutrition." I think I mentioned that to you in my account of the brewing process. In another part he says, "that every year, in the breweries of *Wurtemberg* (the capital of Bavaria), the gluten which rises when making the sweet-wort weighs 30,000 cwt., and would make 17,000 cwt. of bread." All this might relieve the hunger of the poor. How painful, then, is the thought of the *more than forty million bushels* of barley wasted annually in England!

W. I think we had better leave the subject of beer, papa. Will you see if you can make anything better of wine?

P. Let us try.

85. WINE.

I have a friend who drinks wine. One evening I saw him do it. But before we say a word about that, let me tell you something.

It is written in the Scriptures, "the blood is the life" (Deut. xii. 23), and we often show that by our own expressions. When any one's blood circulates slowly, his body becomes rather cold, and we say that he is not lively; and when it entirely ceases to circulate, his body is quite cold and dead. When

any one is warmed, his blood circulates more quickly, and we say that he has "a little more life in him;"—the more quickly our blood circulates the more "life" we are said to have.

L. You told us, papa, that the circulation of the blood *produces* warmth, because it causes the carbon in the body to burn.

Ion. And the blood is the life, because it contains the nourishment which supports our body.

P. Let us see what this has to do with wine. The warmth of the body depends on the circulation of the blood; and the circulation of the blood depends upon the food.

L. Yes; and you said that the most *heating* food is the food which supplies our blood with carbon, to be burned with the oxygen we breathe.

P. True. Nearly all foods supply this carbon, but there is none that acts upon the blood so quickly as a spirit called *alcohol*, which is found in wine. The action of this spirit on the blood can be felt almost immediately after it is taken.

And now, hear about my friend who drinks wine. One evening he had some work to do which required hard bodily labour. He worked away very briskly, for he was full of life, and the blood circulated so quickly that the carbon consumed not only came out of his mouth, in breath, but came through his skin in perspiration; then he was very warm and was full of life. But his blood could not

be always consuming carbon in this way; in the course of an hour it circulated slowly again, and he looked tired. So he took a glass of wine, to "put a little life into him."

L. Did it do so?

P. Yes; the *alcohol* in that wine seemed to stir up his blood once more, and make it circulate briskly—it *stimulated* him, as we say (from the Latin *stimulare*, to stir up).

W. So that a glass of wine is "stimulating."

P. Soon after he took another glass; and that made his blood circulate so quickly that it warmed, and *refreshed* him.

W. So that *two* glasses of wine are stimulating and "refreshing."

P. The two glasses only made him feel *warm*, but he took a third glass; this was not refreshing, for it *heated* his body.

W. So that three glasses are stimulating, refreshing, and "heating."

P. As he proceeded with his work, he thought he required a fourth glass, and took it. This caused his blood to circulate faster than ever; his brain and nerves were excited; his eyes sparkled, he began to talk and get merry, and he felt in what he called "very good spirits." We say that he was now *exhilarated* (from the Latin word *hilāre*, to make merry).

Ion. Then the fourth glass was "exhilarating." The qualities of wine are very much like those we learned in our lesson on COFFEE.

P. He soon became so exhilarated that he thought he would

try another glass; but he did not now go on with his work so well: he stopped to make merry, and to take another and then another glass—it did him so much good, he said.

W. And how did his blood circulate by this time?

P. Very rapidly indeed; it now circulated so quickly that it seemed to set his brain in a whirl; he could not see clearly what he was doing; he did not even know his head from his heels; and when he got up to take another glass, "just to clear his sight," he could not walk properly, but fell down. Poor man, he had taken far too much of that wine!—he was *intoxicated*.

Ion. Ah, that was foolish! but suppose that he had taken some more, what would have been its "effects?"

P. It would have brought him into a state of stupidity—it would have *stupified* him, as we say.

W. That makes two more qualities. Wine is intoxicating and "stupifying." Suppose when he had made himself stupid, he had taken some more, what would it have done?

P. It would have made him go to sleep. So that you may say again, wine is "sleepifying."

S. But, papa, if some one had shaken him to awake him, and had given him a great deal more, what then?

P. Then it would have had such an effect on his brain, that it would have rendered the poor man *mad*.

And if, when in a mad state, he still madly drank alcohol,

there would surely come upon him the last effect—it would be *fatal*.

Now let us count up the qualities of the wine, or rather, its *effects*; and see whether you like it better than beer. WINE is stimulating, refreshing, heating, exhilarating, intoxicating, stupifying, sleepifying, maddening, and fatal.

Ion. I think that WINE may be either a good thing or a bad thing. If you take a little, it may refresh you, and if you take too much, it will kill you.

P. I may as well tell you, that the wine was not *necessary* to stimulate the man. If he felt cold and tired, he should have taken nutritious food, that would have set his blood in circulation, and have warmed him. One reason why men take beer and wine is, because, as I told you, their alcohol acts upon the blood almost *directly*; while solid food, and other liquids, require some time before they can become a part of the blood.

W. Then, if only a little alcohol be taken, I suppose it is more useful than solid food, because it acts sooner?

P. It need only be taken in rare cases, where the stomach is weak and cannot easily digest the food.

L. Or when any one is *exhausted*?

P. True, but if a man be strong and well, he often finds this difference between alcohol and solid food; the more alcohol he has the more he requires; the appetite returns sooner than if he had taken real nourish-

ment; thus he is more likely to take too much.

W. We did not put down all the good qualities of wine, *papa*; it has a *sharp, pleasant taste*, then it is *bright, clear, sparkling*, and of a rosy and beautiful colour.

P. Those are good qualities, but do not be tempted by them. The scriptures say—

“Look not upon the wine when it is red, when it giveth his colour in the cup At the last it biteth like a serpent, and stingeth like an adder.”

We have spent so much time over the qualities of wine that there is not much time for its history.

Wine, generally speaking, is the juice of the grape. In the southern countries of Europe, the south of France, Spain, Portugal, Italy, Greece; in Switzerland, Germany, and on the banks of the Rhine, vines grow luxuriantly. They grow on terraces on the mountain-side, or in “vineyards.”

There is a very great difference in grapes and wines according to the soil and climate. The grapes of the north of Europe, where the climate is cold, are deficient in sugar, while the grapes of the warm south have so much sugar that it actually crystallizes. The degree of richness and sweetness does not depend wholly upon heat. In England grapes do not ripen well from the *humidity* (dampness) of the climate. As the autumn advances, the damp vapours which rise from the sea

intercept the sun's rays, and it has been found that for ripening fruit the *light* is as necessary as the heat of the sun. A *quiescent state of the air* also assists very much, and in England this is acquired by surrounding each bunch with a muslin bag. A high wall serves the same purpose; it protects from the wind and stills the air. The vines around *Worms*, in Germany, are very superior, from the height of the city wall.

The season for gathering grapes is called the "vintage." The grapes when gathered are taken to a wine-press, where the juice is squeezed into large wooden troughs. The sugar of the juice undergoes the *vinous fermentation*, like the sugar of sweet wort, and thus becomes WINE.

There are many different kinds of wine. From Spain we have *Sherry* and *Mountain wine*; from Portugal, *Port wine*; from France, *Burgundy*, *Champagne*, and *Claret*; from Germany, the wines from the banks of the Rhine, called *Rhenish wines*.

True wine is the juice of the grape; but fermented wines are also made from other fruits. We have the British or home-made wines from the gooseberry, currant, cowslip, orange, raisin, and from ginger. Wine may be made from any part of a plant containing sugar—from beet-root, from *sap*.

L. You told us that wine is made from the sap of the walnut-tree, papa.

P. True; it may also be made from the *stem* of the birch; from the cocoa-nut, and many

other palms. We have a wine from the apple, called *cider*, and another from the pear, called *perry*. NORMANDY is an extraordinary place for apples; I have read that, in one part, for more than sixty miles, the country is one continued avenue of apple and pear trees. These *home-made* wines are called "sweets" by the Excise, and they are not so injurious as those made from the grape. They contain more nourishment, and less alcohol.

W. I have heard, papa, that many Germans and French drink wine every day at their meals, just as we drink water and beer.

P. That is true; and we must not leave our subject without doing justice to the famous RHENISH WINES. They contain far less alcohol than those we drink, while their sugar is almost as nutritious as the sugar-cane itself.* *M. Liebig* says of these wines, that "they are distinguished by producing the least injurious effect. The quantity consumed by persons of all ages without injury to their health, is hardly credible. Gout, and similar diseases, are nowhere more rare than in the wine-drinking district. In no part of Germany are the apothecaries' shops so profitless as in the rich cities on the Rhine; for there *wine is the universal medicine*—it is considered as 'milk' for the aged. The people of this district are so merry, that they are called

'the jovial Rhinelanders'; and it is said that a 'valiant Brenner' drinks every day his seven bottles of wine, and with it grows as old as Methuselah; he is seldom drunk, and the only mark by which he is known is his red nose."

86. BRANDY, &c.

The word *Alcohol* is supposed to be an Arabic word, and means *ardent spirit*. It consists of three gases—oxygen, hydrogen, and carbon.

Ion. Those are the gases which sugar is composed of.

P. True. I was going on to say that alcohol is obtained from sugar by the *vinous* fermentation. Indeed, you heard in the previous lessons that the sugar of malt and of the grape is changed into alcohol. These gases, therefore, are found in the alcohol, but *not in the same proportions*.

It is the alcohol in the wine which renders it intoxicating; and brandy differs from wine in being the *alcohol itself*, separated from the sugar, water, or other matters in the wine.

W. How is it separated, papa?

P. It is separated by a process called *distillation*. To distil a fluid it must be heated, and the most volatile parts then fly off in vapour. The intoxicating alcohol is the most volatile part of wine, so that when the wine is heated this alcohol flies off in vapour. The vapour is collected in a vessel, and, as it cools, it forms drops, just as the steam does on the lid of a saucepan; so when these

drops form a tablespoonful of fluid, what would you call it?

L. I should call it the *Alcohol of wine*.

Ion. Or the *Spirit* of wine; that name would do as well.

P. Right; because it *is* the alcohol of wine, and this alcohol or spirit of wine we call Brandy.

W. But why not call it "Spirit of Wine"? That would be the best name for it.

P. Because there are spirits made from other substances. The word BRANDY is derived from the German, *branntwein*, which means burnt-wine. GIN is the spirit of Juniper-berries. RUM is a spirit made from *mollasses*, the part of the sugar-cane juice which will not crystallize. WHISKY is distilled from barley. Alcohol may also be obtained from anything which has sugar or starch. The French procure it from carrots, pears, &c., and call such spirits *Eau de vie*. But the true brandy (which can be procured only from wine) is called *Wine Eau de vie*.

Eau de vie means "water of life." The Irish call alcohol *Usque-baugh*, which means the same thing.

The English first called it *Aqua vitæ*, which is the Latin for "water of life."

The Indians called it by the expressive name *Fire water*; for being the *pure* intoxicating principle, it burns and injures the stomach almost as much as fire would.

Ion. We generally call such things SPIRITS, papa; do we not?

P. Yes; brandy, gin, rum, whisky, and other kinds of "Eau de vie," are all called *Spirits*,—the most intoxicating and injurious of all drinks.

Before we leave the subject of spirits, we will once more think over their effects. What were the last effects I mentioned when we spoke of the glass of wine?

L. You said that it was *poisonous* and *fatal*.

P. And bringing ruin and the most horrible misery to thousands and tens of thousands. It is said that "drunkenness destroys more than the sword." This is *true* of one of our articles of food, therefore we must not let it pass unnoticed.

I would not try to describe to you the horrors of the gin palace; you would be too much shocked. You shall only hear the words of the *judges* of this country, who have to deal with the wickedness which strong drink causes:—

JUDGE COLERIDGE: "There is scarcely a crime comes before me that is not, directly or indirectly, caused by *strong drink*."

JUDGE GURNEY: "Every crime has its origin, more or less, in *drunkenness*."

JUDGE PATTESON: "If it were not for this *drinking*, you (the jury) and I should have nothing to do."

L. But, papa, suppose that all people were to abstain from spirits, as well as beer, would not they be ill?

P. No. The best persons to ask are the doctors—it is their business to *study* such matters.

Therefore, in order to make men *quite sure* that they are speaking the truth, Two THOUSAND of the best medical men in this country have given this opinion of such food:—

"Total abstinence from alcoholic liquors and intoxicating beverages of all sorts, would greatly contribute to the health, the prosperity, the morality, and the happiness of the human race."

Now, do you know what you ought to do when you hear this? Would you not like to contribute to *the happiness of the human race*?

L. Yes, I should.

P. Then you should abstain from such drinks. I have heard you complain that you cannot be of use; that you cannot serve God by buying Bibles for the heathen; that you cannot preach to the heathen; that you cannot teach ignorant people.

L. Yes; I often say that.

P. Now let me show you that you can. There is only one good way to teach—that is by *example*. Poor people believe in such teaching; they say that is *real*, therefore they learn from it.

Do you know what is meant by a million pounds?

W. Yes; it means a thousand hundred taken ten times. Ten times a hundred times a thousand times! So many pounds would be a great deal of money.

P. True. Yet all that money is paid every year to print books, and support living teachers to teach God's word

to the heathen. There are eleven large societies in England, such as the

Bible Society,

Church Missionary Society,

Wesleyan Missionary Society,

London Missionary Society,

and others. The subscribers to these eleven societies give away every year nearly ten hundred thousands (or *one million*) pounds to spread the knowledge of God.

Ion. But what has that to do with the strong drinks?

P. A great deal. Or rather the strong drinks have a great deal to do with that; they make the million pounds look very foolish; and they render the people deaf, so that no one will hear the truth.

Hear what the Spirit of Strong Drink says! It speaks to all who love Jesus Christ and His Truth. It says,—

“I am the SPIRIT OF STRONG DRINK, known by my effects, ‘maddening,’ ‘poisonous,’ and ‘fatal.’ Ye servants of Jesus pay *one million pounds* every year to spread the spirit of your Master; but *seventy million pounds* are given every year by you and the people you teach that you may have me! If you will have me, I will make your million of pounds of little avail; I will not spread for you the spirit of Jesus, but I will spread hatred and vice. I will spread madness and death; I will make the people deaf, so that they cannot hear your truth. I will hinder every year many more than you can help!

“Will you teach them to have Jesus? I will hinder you, for they

will have me first! Will you teach them to leave me? You cannot! *They will not hear you, for you KEEP ME YOURSELVES!*

“Do ye serve Jesus? *You serve me more!* Upon ye I depend; for they learn of you, and they bring me seventy millions per year to make them deaf. I am ALCOHOL, I am an EVIL SPIRIT—the ‘maddening,’ ‘fatal’ spirit of WINE, and BEER, and STRONG DRINK!”

If the evil spirit could speak, such, I should think, would be the words it would say. This destroying demon is found not only in Britain, but all over the earth; as I have said, it “destroyeth more than the sword;” it is the form in which the evil one “goeth about like a roaring lion, seeking whom he may devour.”

You may see by this that there are two ways to “contribute to the happiness of the human race.”

L. Yes; if I cannot give money, I can teach, by my own example, that others may avoid the enemy of Jesus.

P. That you may do! It is time for you to think of such things; and to ask, “Cannot I fight against the enemy of the truth?”

While on the subject of fluids we might talk of the *effervescing drinks*, Ginger-beer, Lemonade, Soda-water, &c.; but I think we will be content with one other fluid, which is sometimes used with our food.

87. VINEGAR.

You have heard of the *sac-*

charine fermentation and the *vinous fermentation*. If wine be exposed, it *de-composes* once more, and ferments. In this fermentation an acid called *acetic acid* is formed, and is called "VINEGAR." This fermentation is called the *acetous fermentation*, and is the last which we shall notice. The acetic acid is really sour wine, and thus called vinegar—for the word "vinegar" is only a corruption of two French words, *vin*, wine, and *aigre*, sour.

The uses of vinegar you well know, it is seen so often in the cruet-stand. Vinegar has one quality, which is also found in salt and in spirits.

Ion. Yes; it is conservative, so it is useful for pickling.

P. There is one more fluid worth mentioning. It does not belong to the vegetable kingdom, but it is much more valuable than any that have yet been mentioned. It is a natural fluid, and is called WATER. We had several lessons on this subject, and you may find them in the first volume of PLEASANT PAGES.

You may now make the lesson on the vegetable fluids used in temperate climates.

Lesson 17. ARTICLES OF FOOD.

(Temperate Countries.)

FLUIDS.

There are several FLUIDS used with their food by the people of temperate nations. The most useful is WATER, because it is taken in its natural state; the other fluids are fermented liquors,

are "artificial," and are very different in their effects from water.

Beer is a fluid prepared from MALT and HOPS. The malt is barley, which undergoes the *saccharine fermentation*. The juice of the barley is then mixed with hops, and fermented again; the *vinous fermentation* producing beer. This drink is not nutritious, for the nutritious quality of the malt (the gluten) is turned into yeast, while the sugar is changed into alcohol. This alcohol quickens the circulation of the blood, or stimulates, as we say; and if taken too largely, it not only stimulates but intoxicates.

CIDER and PERRY are two sweet drinks resembling beer, and made from the juice of the Apple and the Pear.

WINE is made from the juice of the Grape, which grows in the warm southern countries of Europe. SPAIN, PORTUGAL, ITALY, GERMANY, and FRANCE, are noted for their wines. The principal are PORT, SHERRY, CHAMPAGNE, CLARET, and BURGUNDY. In England wines are made from other fruits, such as the GOOSEBERRY, CURRANT, ORANGE, RAISIN, and GINGER.

Wine may be made from BEET-ROOT, and indeed from any part of a plant containing sugar.

BRANDY and other spirits are stronger drinks than wine—they are almost pure "alcohol." The alcohol is separated from the other parts of the wine by a process called "distillation."

The spirit RUM is distilled from Molasses. GIN is distilled from Juniper-berries, and WHISKY is distilled from Barley.

VINEGAR is produced by the third fermentation, called the acetous fermentation. The name vinegar is derived from the French words, "*vin*" and "*aigre*."

CHAPTER FOURTEENTH.

RAW MATERIALS, ANIMAL SUBSTANCES USED AS FOOD.

(Temperate Climates.)

P. As we finished our course on vegetable substances with a *fluid*, we will begin the history of the animal foods with a *fluid*.

88. MILK.

P. This is the principal nutritious fluid found in nature. You heard of its qualities a long time ago in our lessons in the first volume of PLEASANT PAGES.

You learned that it is not found in birds or fishes, but only in those animals which *suckle* their young, and are called MAMMALS. You may remember, too, that there are substances in food which do not form new flesh, or fibre, such as all sugary substances, and all fatty substances,—they supply carbon to keep up the heat of the body. Again, there are substances containing nitrogen which do form new flesh, such as gluten and legumen. Now, it is very interesting to find that God has placed all these substances in a *fluid* for our use, when we are unable to take anything more solid. Milk contains *oily* mat-

ter, *sugar*, and a nutritious substance called *casein*, which is very much like legumen and gluten.

L. At the same time it is very *nice*.

P. And I showed you, too, that it is very plentiful; it is supplied not only in the tropics, but even in cold Lapland the Rein-deer gives milk.

In the Great Exhibition there are specimens of preserved milk. I have also seen some *powdered* milk. The milk was dried, and the solid substance thus formed would, if dissolved, again form milk.

89. EGGS, BUTTER, AND CHEESE.

EGGS are very popular articles of food. They are scarcely less useful than milk.

As you have already had a lesson on the Egg,* I will only add one particular as to the *quantity* used. The greater part are brought into this country from France, and no less than from 70 to 75 millions are annually imported into LONDON alone, besides those used in the other parts of England.

BUTTER is procured from milk, by separating a certain part of it. I suppose you can easily tell which part.

W. Yes; the *fatty* part, the cream makes butter.

P. The CHEESE is also procured from a part of the milk.

W. I forget which part forms the cheese.

P. Yet I think I told you

* PLEASANT PAGES, vol. i. p. 90.

that the milk may be divided into two parts, the *curds* and the *whey*. Cheese consists of these curds, pressed, dried, and salted.

L. You once told us, papa, how the curd is separated from the whey; but I have forgotten.

P. There are several ways. One way is to let the milk get sour; the acid fermentation which thus begins separates the curds from the whey; but the cheese is not so good.

W. Why not, papa?

P. Because, although you may draw off the whey from the curd, and press the curd, if this acid fermentation has begun, it is not easily stopped. We spoke of the *saccharine*, the *vinous*, and the *acid* fermentation, and I will now mention another. Supposing that the acid fermentation is allowed to go on without stopping, it is followed by the *putrefactive* fermentation. This causes the substance to become *putrid*, or rotten, as we say. Thus it is not good to separate the curd and whey by letting the milk become sour, for the acetous fermentation which thus begins cannot easily be stopped—it changes to the putrefactive fermentation, and the cheese becomes rotten.

The proper substance for the purpose is the lining of the stomach of a calf, called *rennet*. This contains the gastric juice, which curdles the milk as rapidly as the calf sucks. Those who make cheese are very careful in preparing their rennet. Directly the calf is killed they take out the stomach, wash the

skin, which contains the gastric juice, salt it, and dry it.

It is the *acid* in this dried gastric juice which curdles the milk. When rennet cannot be had, *muratic acid* answers the same purpose.

L. I have been thinking about that *putrefactive* fermentation. I should like, before we hear anything more about cheese, to stop and notice the “effects” of the four fermentations we have heard of.

1. *The saccharine fermentation* changes starch into sugar.
2. *The vinous fermentation* changes sugar into alcohol.
3. *The acetous fermentation* produces an acid taste.
4. *The putrefactive fermentation* causes the substances to become putrid, or decompose.

P. These four fermentations have very much to do with our food; but let us finish the history of cheese. You would suppose, that as the curd of milk is white, the cheese would be white. The yellow colour is produced by a substance called *Arnotto*.

There are many kinds of cheese. The Dutch perhaps make more cheese than any nation of the temperate zone; but their cheese is not so good as some others. The varieties of cheese in *Switzerland* are very great. Those cheeses which are salted and dried most keep the longest. There is a soft kind, made for immediate use, called *Cream cheese*. This is not salted, and will not keep long. *Stilton* cheese is another of the soft kind, but it will

keep longer than the cream cheese. The hardest and driest are the famous *Parmesan* and *Dutch* cheeses from the Continent, and the Gloucester and Cheshire cheeses,—these keep the longest time.

W. And I have heard that the Gloucester cheese keeps even longer than the Cheshire.

P. That is because it is more dry and rather poorer. The *less rich* as well as soft a cheese is, the longer it will keep. Thus you see that the plain Dutch cheeses keep much longer than any others, and are used for shipping, &c.; while the rich Stilton decays quickly.

L. When I was stopping at uncle's, I saw him put some wine into a Stilton cheese to make it decay.

W. You should say to bring on the "*putrefactive fermentation!*"

P. That reminds me of something else. I read some time ago that when a good cheese has been kept too long, and has become too hard and dry, it should be washed several times; then it should be laid in a cloth moistened with wine or vinegar. By this means it again becomes soft and mellow. It is said that this plan of improving old cheeses is not generally known.

I think that we have now exhausted the subject of cheese.

L. I should like, papa, to ask one more question; you said that milk contains a nutritious substance called *casein*. Is the casein in the curd of the milk, or the whey?

P. In which do you think it is found?

L. I think it is in the curd, because the cheese is made from the curd, and is nutritious

P. That is right. The curd is the casein. We know that it will form flesh, because it contains *nitrogen* (or *azote*). We have already talked of such food; can you tell me what substance it forms in the stomach?

Ion. You said that it forms "albumen;" and that the albumen forms the "fibrin" of the blood, and that the blood forms "fibre" or "flesh."

True; and you have heard of two vegetable substances containing nitrogen, *legumen* and *gluten*. The *casein* of the cheese is the first animal substance of the kind which we have noticed.

W. Are there any more such substances in animal food?

P. Yes. And we may as well mention them now. The white of an egg consists of a substance rather different from the casein of the milk; it is called *albumen*. Again, in the flesh of the animal you have a different substance. Flesh is principally *fibrin*, which, as I told you, is made from the *albumen*.

Ion. So we have now heard of five substances containing nitrogen:—

- | | | |
|-------------------|---|-------------|
| <i>Vegetable,</i> | { | 1. legumen, |
| | | 2. gluten. |
| | { | 3. casein, |
| <i>Animal,</i> | | 4. albumen, |
| | | 5. fibrin. |

P. And all of these substances form new flesh, and sustain life; God has in His wisdom provided them for us in different forms. The animal fibrin is the most easily digested,

and the legumen and gluten of the vegetable kingdom least easily. That is to say, the more the food containing nitrogen is like the flesh which it is intended to repair, the more easily the stomach digests it.

L. That is curious, papa, for when any one is ill, he does not like to eat the *fibrin* of meat; but he will be tempted with the *albumen* of egg—sometimes an egg is too strong for him, and he will only eat the *casein* in a bit of dry cheese—or, at last, he will come down to the *gluten* of wheat—

P. True; or he will take a little weak GELATINE.

Ion. What is gelatine, papa? Does it contain nitrogen?

P. Yes.

Ion. Oh, I am so sorry you did not mention it before. I would have added it up with the others.

P. But I did not wish you to do so, and therefore did not mention it. *Gelatine* cannot be used to form *albumen* and *fibrin* in the blood. Gelatine is found in the tendons, muscles, ligaments, and bones of animals—it is also found in hoofs and horns. The swimming bladder of the sturgeon is formed entirely of gelatine. We buy it in the form of little threads, which we call *isinglass*.

L. And there is *patent* gelatine, papa. Mamma bought a packet at the chemists the other day. Some had the same form as *isinglass*, and in another packet it was made in thin transparent sheets.

P. True; I have seen it. And I have seen thick, brown, semi-

transparent sheets of *glue*. Glue is a coarse gelatine.

But I was telling you, that although gelatine contains nitrogen, it will not form new fibrin, or flesh. In Paris, a little while ago, some experiments were made to see if it would sustain life. It was found that when made into jelly, soup, or broth, gelatine was very beneficial, but yet it was not sufficient (even when much bread was mixed with the soup) to restore the patient. Gelatine is useful principally to form new ligaments, tendons, and other parts which contain *gristle*. Indeed, the substance which we call *gristle*, or *cartilage*, is almost the same as gelatine. Thus, when we speak of the fish with skeletons made of cartilage (page 94) we often call them “gelatinous fish.”

You may now make a list, not only of the substances with nitrogen, but of those without nitrogen. Take those of the animal and vegetable kingdom also.

W. I will write the list—

FOODS	FOODS
containing oxygen, hydrogen, carbon, and <i>nitrogen</i> —such as in	containing oxygen, hydrogen, and carbon, such as in
<i>Legumen,</i>	<i>Oil and Fat,</i>
<i>Gluten,</i>	<i>Starch,</i>
<i>Casein,</i>	<i>Sugar,</i>
<i>Albumen,</i>	<i>Gum, &c.,</i>
<i>Fibrin,</i>	are useful to supply carbon, to be consumed by the
<i>Gelatine, &c.,</i>	the oxygen we breathe, causing
are useful to form new fibre, or cartilage, and to sustain life.	<i>heat</i> , to supply water and <i>fat</i> of the body.

Now, I will keep this table to look at; so, when I am going to eat anything new, I shall see whether it is a *heating* food or a *nourishing* food.

P. Remember that most foods are both. But let us go on with our account of the animals.

You will remember that in our lessons on the tropical climates, we spoke much of the *mammals* eaten as food. Almost the same mammals supply food in the temperate countries; but we may this time talk of the *birds* which supply us with food.

THE FOOD SUPPLIED BY BIRDS.

90. THE GOOSE.

Although we noticed some of the poultry in our lessons on the tropics, such as the Hen, Duck, Turkey, &c., we did not mention the Goose.

The goose is not to be despised, for any one who has dined off goose, will tell you that he owes too much to that bird to pass it over in silence.

If a goose could understand Natural History, he might explain that his place in the kingdom of nature is amongst the class *birds*, and in the order called *Natatores*.

W. That is a Latin word!

P. *Natatores* is derived from the Latin *natare*, to swim: so you may say that the goose belongs to the order of swimming birds, which include all kinds of ducks, the swan, the sea-gull, and many others.

The goose is a grass-feeding

animal, eating grain also, but the *Duck* lives on insects and mollusks also—indeed, ducks eat all kinds of dirty things. The *Swans*, again, eat the roots of plants growing in the water and under the water, which it is said they can reach with their long necks. The *Albatross* and the *Stormy Petrel* are noted sea-birds belonging to the same order as the goose—the *Pelican* is another interesting bird in the order.

The goose forms a nice food; the flavour of its flesh is very rich. In the time of the Romans, many thousands were killed for the sake of the "*great goose livers*," which, it is said, have been considered a dainty in all ages. In London, the trade is very important, especially at Michaelmas.

W. I just want to add a particular—geese live to a very old age. The father of one of the boys in our school has a venerable goose, 34 years old.

P. And I have read of a goose reaching his eightieth year; and it is said that he seemed strong enough to live eighty years longer, if he had been allowed to; but it appears that he became mischievous, and beat the younger geese.

I think that we need hardly talk of any other birds from the temperate climates. We have before talked of the Duck and the Hen. You have, I dare say, learned of some of the smaller birds. You may have tasted the WOODCOCK, the GROUSE, the SNIPE, and others.

L. I have even heard of

Sparrows and Larks being used for food.

W. Young *Rooks*, too, the farmers eat; they are eaten as pigeons,—and when a rook is young, it is supposed to be quite as nice.

P. You may now make the lesson on the animal foods we have been talking about.

Ion. How shall we arrange them? The milk, butter, and cheese may form one lesson, but what shall we do with the goose?

P. The goose may easily follow. These animal substances which are not strictly flesh, are sometimes called “Dairy produce.” The birds from the poultry-yard are generally included under the same head.

Ion. Then I will write the lesson—

Lesson 18. ARTICLES OF FOOD.

(Temperate Countries.)

DAIRY PRODUCE.

There are several animal substances which are not flesh, but are nevertheless used in immense quantities.

MILK is an animal fluid, formed to nourish the young of other animals, and also used to nourish man. In milk we find a substance containing nitrogen, called casein (or curd), and substances without nitrogen, such as sugar, and fat.

BUTTER is made from the cream or fatty part of milk; the cream is changed into butter by a process called churning.

CHEESE is the curd of milk,

salted, dried, and pressed. The curd is separated from the whey by means of the gastric juice in the “rennet,” or dried stomach of the calf. There are many varieties of cheese.

EGGS are also very nutritious. The substance albumen in the white of the egg, is almost the same as that from which the fibrin of the blood is formed. So fond are the English people of eggs, that nearly 75,000,000 are consumed annually in London alone, besides those used in other parts of England.

The GOOSE and other birds of the poultry-yard are valuable articles of food. In most temperate countries, the GOOSE, DUCK, TURKEY, and GUINEA-FOWL, are found, and food is also procured from the Pigeon, Wild Duck (or Mullard), Partridge, Pheasant, Woodcock, Snipe, &c.

FOOD SUPPLIED BY FISHES.

(THE HERRING TRIBE.)

91. THE HERRING, &c.

P. If you think, Willie, for a minute, you will remember that we talked about certain fishes, with skeletons made of cartilage (or gristle), while other fish have their skeletons made of bone.

W. I remember!—when we talked about the sharks’ fins.

P. Thus all the great class of fishes may be arranged in two divisions:—

1. OSSEOUS, or bony fish.
2. CARTILAGINOUS, or gristly fish.

It is said that “neither of these divisions of fish can be said to be above or below the other; there are advantages on both sides.”

The HERRING is an osseous fish. It is one of those which particularly belong to the people of the temperate zone. It lives both in the temperate and the frigid zones, in the great Northern Sea, and is found as far up as the polar regions, where immense swarms retire beneath the ice.

The riches of the sea, and the amount of food contained there, are immense. It has been calculated that, besides the lakes and rivers, the seas cover nearly “seven-tenths” of the earth’s surface. In some of these seas the fish are to be found down to the depth of *several hundred feet*; there are no walls or hedges in the water to stop their progress, as the sheep in the fields are stopped, therefore their pasture-grounds (or pasture-waters, rather) are wonderful in extent.

Now, the herring not only belongs peculiarly to this country, but shows more strikingly than any other fish how vast are the supplies of the sea. At a certain season of the year, they set out together from the North Sea. They come in “immense and closely packed legions,” numbering ten thousands of ten thousands. No words can give a good idea of their numbers. A league is the distance of three miles,—now, these vast companies of herrings cover the ocean to the extent of *several leagues*. Let

us suppose that there are ten leagues—

W. That would make *thirty miles*.

P. Which is a much greater distance than you could walk across in a day. A company of herrings, thirty miles long and several miles broad, would be an enormous number, if these were only single herrings on the surface of the water. But the truth is, that this mass of living food is said to be *several hundred feet* in thickness. Our parlours, you know, are about twenty feet long.

Ion. So that one hundred feet is about the length of five parlours. Only think that the mass of herrings is *several hundred feet* deep!

P. You cannot well conceive such a quantity of fish. Such a company is called a *shoal*. If you try and think of a shoal several leagues in length and breadth, several hundred feet in thickness, you will see that, if this shoal could be taken out of the water, and the fish could be pressed together, just as they are, they would form a mass of substantial food as large as some of the counties of England. Suppose that we wanted to make a *stack* of herrings, just as you do with the straw and hay, we should require a large island to place the stack upon. Perhaps you will not wonder at the number, when you know at what rate these animals increase. These shoals of fish come from the deep ocean to the shallow water near the land, for the purpose of *laying their eggs*.

Now, in the roe of a moderate-sized female herring, more than 60,000 eggs have been found. Suppose that half the herrings in that shoal deposited their spawn, and that half the eggs became young herrings!—the increase is too wonderful to be thought of.

W. I wonder that at that rate they do not become too numerous and choke up the sea. I suppose that is because there are so many millions of people in the different nations, and that nearly all can eat fish. Why, if everybody were to work as hard as he could for a twelvemonth, and eat nothing but herrings every day, not all the millions of people in the northern nations could eat them up!

P. You must remember that the herrings help to diminish themselves, for young herrings have been found in the stomachs of the old ones.

England being surrounded by water, with abundance of fishing-boats and ports, has of course a great interest in these fish. So also have the Dutch, the French, the Danes, and all the people of the north. It is said that Holland, with her herring fishery alone, once covered all the northern seas with her vessels, while in all her fisheries about one-fifth of the whole population was employed. England, however, now does the greatest trade in herrings. About fifteen years ago it was calculated that the herring and cod fisheries gave employment to 8,700 persons, either as fishermen, curers, or coopers.

How many millions of herrings were caught, it would be impossible to say.

L. At what time of the year do the herrings come, papa?

P. They arrive at the Shetland Isles, which are at the extreme north of Scotland, about the beginning of May, or earlier. Here the shoals, finding that they cannot swim through Scotland, divide into two parts. One part take the western coast of Britain, between England and Ireland; the other part take the eastern coast, between England and the Continent. The arrival of the herrings begins in May, but fresh swarms follow through the months of May and June, until the beginning of July. Then the numbers become truly immense and incalculable; swimming southward they find themselves stopped at Yarmouth, in Norfolk, by great numbers of fishermen armed with nets. Others escape and are caught at *Lowestoft*, in Suffolk; others are caught at *Hastings*, in Sussex; others escape into the ocean at the south of England; but it is said that the herring does not sail more southward than the 45th degree North latitude. Of course, in the seas around the Continent, vast numbers are caught.

YARMOUTH is the principal herring station in England—the larger and peculiar herrings caught there are called "*Yarmouth bloaters*."

Next in importance to the herring is the PILCHARD. This fish is one of the *Herring tribe*,

and is very much like the herring, but it has a more southern range, and is found principally on the southern coast of England. Just as Norfolk is the great herring station—Cornwall is the centre of the pilchard fishery.

Vast as the number are of the herrings, that of the pilchards is not much smaller. I have heard of “12,000,000 of these fish being sold for home-use in a single year,” and it is even *said* that “this number has been brought into port in a single day.”

In the more southern parts of the temperate zone, such as the Mediterranean, the herring and pilchard are not found. They are represented by two smaller fish of this tribe, called the *Anchovy* and the *Sardine*. The former is well known in England, and the sardines are often imported from France, preserved in oil. You may now buy a tin box of “*Sardines à l’huile*” for 1s.

L. Yes; I remember, papa, that you did so; and you were very angry that the box was soldered all round, and you could not open it.

The SPRAT and WHITE-BAIT are other small fish of this tribe.

The White-bait may be caught in the Thames as far from the sea as Blackwall and Woolwich. Their season ends about the beginning of October. The sittings of the Houses of Parliament generally end with the White-bait season. When you hear of the Members of Parliament having their *white-bait*

dinner at Blackwall, you may know that Parliament will soon be “prorogued.”

The *pilchard* and *white-bait* fisheries may be said to end first; and the *herring* fishery next. The latest are the *sprats*. Sprats are said to “come in” on the Lord Mayor’s day (the 9th November), and the supply is continued during the winter months.

We must not end our lesson on this tribe without one thankful thought of God’s bounty. Do you not notice how plentifully we are supplied with fish from the Northern Sea? Even the Herring tribe supplies fish nearly all the year round!

W. Now please to let me count up all of the Herring tribe which we have heard of,—the *Herring*, *Pilchard*, *Sardine*, *Anchovy*, *White-bait*, and *Sprat*. But you have not yet mentioned the *Mackerel*, papa. The mackerel fishery is very famous.

P. Then we will talk of this fish next.

(THE MACKEREL TRIBE.)

91. THE MACKEREL.

The Mackerel does not belong to the Herring tribe, but it just comes in the part of the year when the Herring tribe are wanting. When the sprats are “out,” and pilchards are not yet “in,” we have the mackerel. They arrive on the coast of Hampshire and Sussex about the beginning of March, sometimes as early as February. The principal months, however, for mackerel, are May and June;

by that time their numbers are very large.

The mackerel is known by the beautiful colour of its skin; it also decomposes very rapidly out of the water; it may be known, thirdly, because its flesh is very nice, and yet wholesome. Because of the second mentioned quality, the value of the mackerel depends upon their being perfectly fresh. A boat-load of mackerel brought to Billingsgate early in the morning has been worth £200; the next morning its value would be about 20s.

There is another fish of the Mackerel tribe, called the TUNNY; it is larger than the mackerel, and is found in more southern seas, such as the *Mediterranean*.

(THE COD TRIBE.)

92. THE COD.

These great fish, and all the tribe, may be distinguished by the softness of their bones, and the whiteness of their flesh. They live on smaller fish, also eating shrimps and other "crustaceous" animals, such as shrimps and young crabs. Thirty-five crabs, none *smaller* than a half-crown, were once taken from the stomach of a large cod.

The fins of this tribe are so placed that they can more easily ascend and descend in the water than the other tribes. Thus we find that they live nearer to the bottom of the sea. They multiply at a very rapid rate.

The cod abounds in the nor-

thern seas. *Newfoundland* is very famous for this fish—it also abounds near Great Britain. One of the most famous places for cod is the Doggerbank, in Holland. The fish used to be brought from there alive, in heavy boats containing wells for them to swim in; much cod is, I believe, still brought in this way; the greater part used in England is salted.

W. Do the fishermen catch the cod with nets as they catch the sprats? I should think they would want a very strong net.

P. The cod is taken with the line and hook. I have heard of a Newfoundland man catching nearly 500 in eleven hours. It is said, too, that at *Doggerbank* 1,600 were taken in one day by eight men.

I dare say you are acquainted with other fish of the Cod tribe. I will mention some—the *Haddock*, *Whiting*, *Hake*, and *Ling*.

(THE FLAT FISHES.)

93. THE PLAICE, &c.

These fish lay at the bottom of the sea; they seemed to have been flattened for that purpose.

W. Perhaps they were intended as a *pavement* to the sea.

P. Perhaps! They are singular creatures—they seem unable to rise in the water, for they have no *air-bladder*. Yet, perhaps, their low position affords them the highest enjoyment, and they will lie on their white sides quite motionless for a considerable time.

L. Like the oysters?

P. Yes; but they have more power of motion than the oysters. The Plaice, if disturbed by an enemy, will change from its *horizontal* to a *vertical* position; thus it can cut through the water like the blade of a knife, and can dart along with great rapidity. But it does not like travelling in this position, for, as soon as it feels itself safe, it shuffles back to its horizontal position, gliding along with an up and down motion, like that of the waves.

Ion. Which is the back of a flat fish, papa—the white side, or the brown.

P. Neither, *Ion*; both are the *sides* of the fish. The colouring is an instance of a law which you have before observed in your Natural History lessons—it is a *protection*. The colour is exactly like that of the bottom of the sea; so that the “pavement” is not noticed by its enemies. Now, if it were to lie with its white side uppermost—?

W. Then its enemies would see it. They would tear up the pavement, and—eat it, I suppose.

P. I will now give you the distinctions of this tribe. The FLAT FISHES may be distinguished,

- 1st, By their bony framework;
- 2nd, By their want of air-bladder;
- 3rd, By their flat shape;
- 4th, By having one side coloured, and the other white;

and you may say, 5thly, that they are very *tenacious of life*;

by which I mean, that they will live a long time out of the water.

Ion. Yes; I have seen them in a fishmonger’s shop. I have seen a sole jump up off the slab, and give himself a twist!

P. The principal flat fish are the *Plaice*, *Sole*, *Turbot*, *Flounder*, *Dab*, and *Brill*.

The Turbot is one of the richest and most valuable; it is said that the Dutch draw £80,000 per annum from the London market, for turbot alone.

(THE RAYS.)

94. THE SKATE.

I have mentioned this fish next, from its resemblance to the flat fishes, of which we have been talking. In this fish the brown side is the back, and the white side the belly; when attacked they glide along, keeping their horizontal position, and fighting with their tail, which is armed with sharp spines.

The skate is one of the real *cartilaginous* fishes; it forms excellent food. The *Saw-fish*, the *Dog-fish*, and the *Shark*, belong to the same *order* as the skate, but they are a different *tribe*—they form “the Shark tribe.”

We have now talked of the principal *salt-water fish* from which we procure food, but before we talk of the *fresh-water fish*, I will mention one or two which are found both in the rivers and in the sea.

(THE SALMON TRIBE.)

95. THE SALMON.

The Salmon is a noble fish; it is truly beautiful in its appearance and flavour. Just as the herrings, mackerel, and others come from the deep into the shallow water to lay their eggs (or spawn), so the salmon leaves the sea and swims up the rivers for the same purpose. When a salmon is ascending a stream it is not easily stopped. One afternoon, when I was in Wales, standing beside the river Wye, I saw a great salmon, which had evidently come from the sea; it was going far up the river to spawn, and had already travelled forty or fifty miles. "Ah!" I thought, "how will you get over that water-fall?" It was not a very great water-fall, but I knew that the salmon could not climb up over the stones. I watched, when, with a sudden stroke of its tail, it made a leap from the bottom of the water-fall to the top.

L. I should have liked to see that.

P. Yes; but that waterfall was not a large one. I mentioned the fact to a Welshman, and he showed me a waterfall *twelve feet* high, which he said the salmon would often leap. I have heard that nothing will stop this great fish. A salmon will travel hundreds of miles. When the salmon has found a suitable spot for its eggs, it is said that it makes a furrow with its nose in the gravelly bed of

the river; in this it deposits its eggs, and carefully covers them up.

After depositing its spawn, the salmon generally remains in the river during the winter, and returns to the sea in the spring. Many are caught on their way back by means of nets, baskets, spearing, &c. It is not *lawful*, however, to kill them on their way from the sea, as they are then full of spawn.

I have heard it said that we seldom see a full-grown salmon in this country, because they are so eagerly pursued by the fishermen, that few grow to their full size. A salmon weighing forty pounds is not uncommon; one specimen weighed eighty-three pounds.

The Salmon tribe also includes the TROUT, which is a fresh-water fish, found in the rivers, clear streams, and lakes of Great Britain. It is a very much smaller fish than the salmon. When a trout weighs twelve or fourteen pounds, it is said to be a present worthy of a place at a royal table; but that it can only be caught by a first-rate fisherman. An extraordinary trout was once caught weighing twenty-five pounds.

The trout likes his own particular place in the stream, and, in Devonshire, the peasants make the water muddy, and catch the fish with their hands. They call this method "tickling trout."

The CHAR is another fish of the Salmon tribe. In one of Mr. Young's letters on Westmoreland, you may read of the

char.* It is a lake fish; its flavour is said to be even more delicate than that of the salmon or the trout.

The SMELT is also one of this tribe; it is like the salmon, only it is much smaller. Again, it will live entirely in *fresh-water*; the salmon I believe will not.

So much for the *Salmon tribe*—will you count up the individuals?

W. I will! The SALMON TRIBE contains the *Salmon*, *Trout*, *Char*, and *Smelt*; all of which are useful as food.

Now, papa, will you tell us of some *fresh-water* fish?

P. Very well. Listen!

I know a *fresh-water* fish. It has one or two distinctions worth noticing.

1st, Its gills are so placed, that if it is taken out of the water, they do not get dry as soon as the gills of any other fish, so that the animal can live out of water for several days. Thus, it is more “tenacious of life” than any other fish; and the greatest cruelties are often performed upon it without killing it. It is sometimes cut open, sometimes skinned alive, or even cut into pieces—still the fish lives.

2ndly, Its shape is very different from that of the plaice. While the one is flat, the other is round, and of great length.

3rdly, It has not so many fins as other fish have; but it has great power of swimming, and of motion, both in and out of

the water. Take one in your hand and you will not be able to hold it; it will most surely “wriggle” its slippery body out of your grasp.

L. I know that fish, papa. It is the EEL.

P. That is it.

(THE EEL TRIBE.)

96. THE EEL.

The Eel, then, has the three distinctions which I have just mentioned. I may as well add that, as it has smaller gill-openings than those of other fish, its breathing (or “respiration”) is more feeble.

This is an instance of the general rule, that the animals which have a feeble respiration (or live *slowly*, as we may say) have the greatest tenacity of life. This is the case with the cold-blooded reptiles, such as the lizard and snake.

Ion. Ah! we may easily tell that they have *cold* blood, by their not breathing quickly. They scarcely take in any oxygen to burn with the carbon, so that their blood *cannot be* warm like ours.

P. The eels take advantage of these circumstances, for “in warm, damp nights, they will quit the water, and wander over the grass in search of frogs, and worms, and other food.”

Although I have called the eel a *fresh-water* fish, it regularly migrates to the sea,—it is supposed, for the purpose of spawning. They go in the autumn, and in the following

* PLEASANT PAGES, vol. i. p. 220.

spring you may see immense swarms of young eels, three or four inches long, swimming from the sea up the rivers. Mr. YARRELL, in his History of Fishes, says that they passed a certain point, at the rate of about 1,700 per minute,—this will give you some idea of the myriads which thus arrive.

Ion. While you are talking about their *place*, papa, will you tell us whether the eels live in the Northern seas, like the herring, or the cod?

P. No; the eel objects to the cold. None are found in the Northern Ocean; or in the great Northern rivers of Europe, such as the Danube and the Wolga. In order to avoid the cold, the eel will bury itself about sixteen inches in the mud.

W. Yes; I once saw a man catch eels in the muddy bank of a river. He was *spearing* them.

P. I may tell you one more fact concerning the place of these fish. Vast numbers are brought from *Holland*. You may see the great heavy Dutch vessels at Billingsgate. Each vessel has a large well inside; and here, in the dark, the eels are kept alive until they are wanted. It is said that in some of these vessels a cargo of from 15,000 to 20,000 lbs. weight is often brought. Eels, salmon, and skate are the only fish sold in London by weight.

There is a very large kind of eel living in the sea, called the *Conger*. There are other fish in this tribe, such as the *Electric Eel*, and the *Sand Eel*.

(THE CARP TRIBE.)

97. THE CARP.

We have reached a true fresh-water fish at last. Have you never heard of the "Golden Carp"?

Ion. I never have!

L. Nor I!

P. Then it does not matter much. They are not a particularly nice fish. Their flavour at the dinner-table greatly depends upon the cook. Indeed I am very angry with the Carp tribe, and you shall hear why.

Before I was married, the porter at our office used to look in every day and ask at what time I would have my chop or steak; but one day he brought in two beautiful fish!

"Aren't they beauties, sir?" said the porter.

"Yes," I replied; "what are they called?"

"BARBEL, sir; I never saw any before this morning. I've bought one for myself, sir, and perhaps you would like the other instead of your chop?"

"Yes," I replied cheerfully, "I will; it certainly is a beautiful fish,"—and, as I held it up, its beautiful scales glistened and glittered in the sun, like gold and silver. It seemed a great pity to boil it.

L. And did you like it?

P. You shall hear. You might have seen me taking off the dish-cover at two o'clock,—the next minute I was spitting the barbel out, and spluttering, and wiping my mouth, and the next minute I went

down to the porter's room, where I saw him hard at work at *his* barbel.

"Well, John, how do you like it?"

"Oh, pretty well, sir; I think it will do!"

"Oh, do you? then I will sit here and see you eat it!"

So John still kept his knife and fork in action, declaring that he thought it was very *nice*,—next time he said it was *pretty fair*,—so I kept him at his work! The pieces at the end of his fork, I saw, were becoming gradually smaller; presently, he said, "*it worn't amiss*;" but, at last, he could stand it no longer, and declared the honest truth, by throwing down his knife and fork, and saying that it *was* amiss! More, he added—"it was *the filthiest fish he had ever tasted in his life*."

W. What did you have to eat instead?

P. Why, we had nothing left for dinner but a MORAL LESSON—and we made the most of it. "'*The proof of the pudding is in the eating*,' sir," said John; "and I'll never again give up my beef-steak for anything with a golden skin!"

Ion. I think, papa, that that lesson was your *dessert*. You had for dinner the NATURAL HISTORY LESSON—"The barbel is the filthiest fish I ever tasted." So you had—

Dinner . . . *Natural History*,
Dessert . . . *Moral Lesson*.

W. And I dare say you had an OBJECT LESSON afterwards;

for if you were hungry you would discover the qualities of the potato or cheese.

P. Yes. But we were talking of the Carp tribe. Where were we? Oh, an important distinction of the Carp tribe is, that most have a beautiful appearance, but that not all have a beautiful flavour. This tribe includes the *Carp*, the *Barbel*, the "*Gold and Silver Fish*;" the *Tench*, *Bream*, *Roach*, *Bleak*, *Minnow*, and others.

P. We must do little more than mention the *names* of the other fish.

(THE PIKE TRIBE.)

98. THE PIKE.

The Pike may be remembered by his *voracity*. A pike will eat almost anything—not only small fish, but frogs, water-rats, and field-mice; it will even kill and eat young ducklings as they swim on the water. There have been two or three instances in which this fish has attacked a *man*. In the water, the fish is strong, swift, fierce, and active.

Pikes are of different sizes. A young pike is called a *Jack*. 12 or 14 lbs. is considered a good weight for a pike, but they often attain to the weight of 30 lbs. There are wonderful stories about the long life of the pike; it has been known to reach the age of 90 years. There is an account of a pike which was taken out of a lake in *Suabia*, in the year 1497—a brazen ring was found fastened to it, and on the ring was this

inscription: "*I am the fish which was first put into this lake by the hands of the Governor of the Universe, Frederick the Second. Oct. 5, 1230.*" The fish must thus have been 267 years old. The FLYING FISH also belongs to the Pike tribe.

The last tribe we shall notice is

(THE PERCH TRIBE.)

99. THE PERCH.

MR. IZAAK WALTON, who knew something about fish, has described the Perch. He says:

"The perch is one of the fishes of prey, that, like the pike and trout, carries his teeth in his mouth, which is very large; and he dare venture to kill and devour several other kinds of fish. He has a hooked or hog back, which is armed with sharp and stiff bristles, and all his skin is covered over with dry, hard scales; and he hath, as few other fish have, two fins on his back."

The perch is nearly as beautiful in appearance as the carp, but it has a better flavour. In this tribe are included the *Gurnards*, the *Bullhead*, and the *Stickleback*.

We have now finished the account of the fish-food of the Temperate Countries. The most interesting point is the instinct which leads the fish every year to leave the deep sea, and migrate into the shallow water to deposit their spawn.

L. That habit of the fish reminded me of the migrations of the birds, who come to this country and go back again

every year—"birds of passage," they are called.

P. By placing this instinct within the fish, God has brought them within the reach of man. Think of the millions of herrings coming in a thick shoal so close to our shores for the sake of the shallow water!—if these were to remain in the open sea, how few of them would be caught! The same instinct which guides the millions of mackerel, herrings, and pilchards within reach of our nets, leads the salmon to visit our rivers.

This law of nature, which compels the fish to seek the shallow water, has been truly described as "a wise and bountiful provision of God." Thus one tribe after another come close to our shores at their appointed seasons; and, it is said, "there is not a month in the year in which we are not supplied with some species of fish."

W. Yet, papa, although so many are killed every year, there are more the next year, from the eggs which the other fish leave.

P. True; you may think once more of their power of multiplying. I told you that in a single herring sixty thousand eggs have been counted; but in the *cod* the number is still greater, no less than 9,000,000 eggs have been taken from one roe. We are told that the spawn of the herring sometimes covers the surface of the sea; so that at a distance it appears very much as if sawdust had been spread over it for some miles.

Thus the supply of fish is not only regular, but it sometimes exceeds our wants. Frequently more *sprats* are caught than can be eaten for food; and they are sold as manure at 6d. per bushel. I have also read of *herrings* and *mackerel* being equally abundant. I have, in one of last year's newspapers, a paragraph which will show how bountifully Providence can supply our wants.

“DARTMOUTH.—On Monday week, Slapton Sands were crowded with spectators to witness an extraordinary catch of mackerel. The whole bay, extending nearly five miles, seemed one living mass of fish. One boat safely landed 150,000 fish, and not less than 500,000 mackerel were caught on that single day, between sunrise and sunset. There was some difficulty in disposing of this vast quantity. The price in the morning was 1s. per hundred, but this was soon reduced to 6d., and toward evening it fell to 6d. a donkey load. About 70,000 were left on the sands unsold, and the next day they were purchased by the farmers for manure, at 20s. per load. About forty-two years ago a large catch was made on the same sands, though not so extensive as the present one.”

Lesson 19. ARTICLES OF FOOD.

(Temperate Countries.)

THE FOOD SUPPLIED BY FISH.

Fish are more abundant in the temperate than in the tropical climates. The northern seas in particular contain immense shoals.

The principal tribes of SALT-WATER fish are—

1. *The HERRING TRIBE, which are perhaps the most numerous of their size. To this tribe belong the HERRING, PILCHARD, SPRAT, WHITE-BAIT, SARDINE, and ANCHOVY.*

2. *The MACKEREL TRIBE, known by their beautifully marked skins, and by the rapidity with which they decay, are larger than the herrings. This tribe includes the MACKEREL, the TUNNY, &c.*

3. *The COD TRIBE, which include the COD, the HADDOCK, the WHITING, the HAKE, and the LING.*

4. *The FLAT FISH, such as the PLAICE, SOLE, TURBOT, FLOUNDER, DAB, and BRILL. These fish are without air-bladders, and are compelled to live at the bottom of the sea.*

5. *The RAYS, which include the SKATE, and others; the SHARK, DOG-FISH, and SAW-FISH belong to the same order as the Rays, although they form a different tribe. These all belong to the division of cartilaginous (or gristly) fish—while the preceding tribes belong to the osseous (or bony) division.*

6. *The SALMON TRIBE, again, belong to the division of osseous fishes. They live partly in the rivers and partly in the sea. The SALMON, TROUT, CHAR, and SMELT, are the principal fish of the tribe.*

7. *The EEL TRIBE are very peculiar fish; they are at once known by their long, thin, snake-like bodies, and their soft, slippery skin; the scales are so minute that they are almost invisible.*

Their gill-openings are very small, and their respiration very feeble. Thus we find that, being a voracious fish, they will sometimes leave the water and travel through the grass, in search of food. Like the salmon, they are found both in the fresh and salt water. The CONGER and ELECTRIC EEL belong to this tribe.

We also obtain food from the FRESH-WATER FISH, such as

8. *The CARP TRIBE, including the BARBEL, GOLD and SILVER FISH, TENCH, BREAM, ROACH, BLEAK, and MINNOW. This tribe are very deceptive, for though their external appearance is very beautiful, their flavour by no means corresponds. The Barbel, in particular, has a very bad flavour.*

9. *The PIKE TRIBE are much larger fish; some specimens are almost as large as salmon. They are distinguished by their voracity, fierceness, strength, and tenacity of life. The FLYING-FISH belongs to this tribe.*

10. *The PERCH TRIBE are generally rather small fish, but are covered with brilliant and beautiful scales. Most have a sharp prickly fin on the back. The order includes the PERCH, the GURNARD, the BULL-HEAD, the STICKLEBACK, &c.*

With this lesson we will finish our account of the Temperate countries. Instead of making a list of the articles (as we did of the Tropical foods), we will first have some talk of the food in the Frigid countries.

L. There are not many people

living within the Arctic circle, are there, papa?

P. No; it is too cold. So we will mention principally those nations living in the neighbourhood of the Arctic circle. Look for them on the map! In the *Eastern Hemisphere* you have ICELAND, SWEDEN, NORWAY, LAPLAND, FINLAND, the most northern parts of RUSSIA, SIBERIA, KAMTSCHATKA, GREENLAND. Look again in the *Western Hemisphere*. You may see NOVA SCOTIA, NEW BRUNSWICK, NEWFOUNDLAND, LABRADOR, ESQUIMAUX COUNTRY, the COUNTRY ROUND HUDSON'S BAY, &c. Now, from some of these places goods have been sent to the Exhibition. All are more or less inhabited; and the question for us is, "How do these people live?"

Ion. I suppose that that depends upon how the vegetables grow.

W. And whether there are any animals living upon them.

L. And the animals and vegetables depend upon the soil.

P. And the soil depends greatly upon the climate. In order to understand what we are about, I think we must go and see one of the frigid countries. Let us go and look first at the general appearance of the place; we will have a look at the rivers and seas; then we will notice the vegetables; after that we shall know pretty well what animals to expect.

W. I am ready to go, papa!

P. Very well; but I have not imagined the country yet.

PART THE FIFTH.

CHAPTER FIFTEENTH.

ARTICLES OF FOOD IN THE
FRIGID COUNTRIES.

100. A FRIGID COUNTRY.

W. We are not going to see any particular place; I merely wish you to have some idea of a country on the shady side of the world.

The sunny side of our garden may represent the tropics, for the trees bring forth fruit abundantly. So also may the shady side represent the regions near the poles. What do you observe in that part of the garden?

L. 1st, that it is rather darker; 2nd, that it is rather colder; and 3rd, that the plants do not grow so well as on the opposite side.

P. Just so! Now imagine, all of you, that you have crossed the "Arctic Circle" (see map), and that you are standing with me in a frigid country.

Ion. How are we to imagine we are dressed?

P. In fur—in bear skin. Imagine that you have your new greatcoat on, and that you have a skin of fox or bear outside that—that your hat is made of fur also.

It is a very dreary scene! although it is the day-time. There is no sun shining, but leaden-coloured clouds darken the sky. The snowy face of the ground is dim, but the air is very thin and transparent,

so you can manage to see pretty well by the light of the stars. The stars twinkle most brilliantly, and even the moon seems to sparkle. There is just enough light to show you the place, that you may see how silent it is. It is all still as death! No man is seen—nothing moves! Even the stars, which make so much twinkling without any sound, they seem to tell you, "We are all very quiet here—we are all fast asleep!"

W. But what sort of a country should we see, papa?

P. A *snowy* one. Snow seems the fashion of the place. A long way off, you see the great mountain *Snee-hatten*, or *snow hat*. There are many more snow hats! All the mountains—the dusky distant ones—those in the foreground, which startle you with the strange shape of their crags and cliffs—all wear snow hats.

W. So that they may not catch a cold in the head, I suppose. I have heard that snow is very warm.

P. That is the general opinion up there, for the trees wear snow-gloves. Some few have leaves, even in the intense cold, but the others, which hold up their hundreds of branches, and thousands of twigs, pointing to the stars, have every twig covered with snow, which is frozen on quite hard. All the snow indeed is hard; as you tread on it, it crackles—indeed,

the only resemblance to a sound which you can hear, is caused by this snow; for the air is filled with its frozen particles—and as they float about, or are gently moved by the wind, they make a slight rustling or buzzing.

W. But are there no waterfalls to make a rumbling?

P. No! they are all locked up. You had better wrap up your ears! You can only look. You may look at the giant rivers which present a smooth glassy surface, broad and long, for the stars to shine upon—and the moon does, too! it spreads a broad sheet of silver light over the whole. "Well done, Mrs. Moon!" you would cry sometimes, for she not only bathes the river with light, but fills the air. See how the air sparkles! as she shines through the millions of minute crystals, which I told you caused a rustling sound; they glisten, and the air seems filled with diamond dust. No! There is no sound worth listening to. You had better look—look at the great range of towering mountains again—look at the black forests, see how dense and shady they are. There are the larch, the pine, and all kinds of fir-trees,—while other tracts abound in birch.

That's all! No! there is not a sound to listen to; no birds sing, not even a wolf howls—it is a sorrowful, dead place, for all is still as death, except the clouds! The black clouds roll heavily along, like clouds attending a funeral.

W. And is such the ap-

pearance of the place all day?

P. Nearly all day. The whole year is divided into one long night, and one short day,—eight or nine months of dreary darkness, called "winter;" and two or three months of beautiful brightness, called "summer."

Ion. Then please let us have the summer scene; I am getting cold.

P. But the winter night is long and dreary; we have not gone through it yet. During some of the winter days there is a faint sunlight for four or five hours; but that light is very cold, and the days are very nightly still. Five hours is a very little allowance of light, but soon the sulky sun gives even less; soon he only appears for four hours; he gets gradually more irregular in attendance—three hours, two hours; and then only shows himself *one hour* in the day. At last, he neglects business altogether, and does not show himself at all for *six* or *seven weeks*! This dreary interval is the worst part of all; the people call it "*skaabous*," which means an abomination.

L. And what are the people doing all this time? Are *they* asleep, too?

P. No, they all have business to attend to—but many spend their time near their fire of wood and oil; indeed, some nations up there are half awake and half asleep, and seem to live in a dream.

L. Do they never see the Aurora Borealis?

P. Yes; the great northern

light must be a great joy to them. You have, I dare say, heard of this wonderful sight?—of the streamers of rosy light which dart upwards, of the purple and red-coloured light it contains?—this is a glorious sight in those dreary days.

But let us suppose the winter to have passed.

Suddenly the **SUMMER** comes!

L. But where is the spring?

P. That is left out altogether, or nearly so. The sun seems disposed to make up for lost time; he shines forth at once, and wakes up nature to her work.

Soon you hear sounds. There is a cracking of ice, and a gentle tinkling of little rills; there is a silent melting of the snow, and as it sneaks away before the sunbeams, it joins the rills, swells them into streams, and vents forth its rage in angry rushing sounds. It may well roar; it can't help it; it is compelled to rush on quickly to make haste from the presence of the sun—and to go it knows not where. The sun is earnest now, and he soon clears all away.

Now is your time for sounds! Hark how the dismal water goes! The giant rivers have burst their icy chains; they hurry forward their great masses of unmelted ice, which join the mighty waters of the snow; and now the rumblings and roarings are loud and fierce! Who likes to be driven out of his place, which he has held in peace for eight months, and to be shaken like this by an immoveable, imper-

turbable sun, who all the while looks on and smiles?

But the sounds of grief pass away. Now listen to the sounds of joy, and look at the glorious sight. Nature has started up; she is wide awake! The birds seem to come from all the regions of the earth. It is said that "they people the woods and fields, the fens and marshes, and all nature is one universal song."

And Nature is well dressed for the occasion. The trees have thrown off their white gloves, and are covered with leafy verdure; the fields have cast off their night-gowns of snow, and have put on their best grass-green coat. The air is bright, clear, and elastic.

"Oh, 'tis the touch of fairy hand,
That wakes the spring of northern
land;

It warms not there by slow degrees,
With changeful pulse the uncertain
breeze:

But sudden, on the wondering sight,
Bursts forth the beam of living
light;

And instant verdure springs around,
And magic flowers bedeck the
ground."

All this change the sun has wrought in about seven days; and he takes care to keep up the gladness. Soon he shines not only by day but all night long; for seven weeks he never sets.

Ion. That is to make up for his seven weeks of absence in the winter.

P. But we have to talk of the **FOOD** of the people living there. Now, therefore, there is plenty of light, let us look at the productions of the soil.

You will not wonder to hear, in the first place, that vegetation proceeds at this rapid rate all through the summer, and that in some parts barley has been sown and reaped in seven days. While the sun shines, the inhabitants are not only making hay, but are doing all kinds of work, and have been cultivating all the fruits and vegetables that will grow and ripen there.

You must not, however, suppose that in their short summer the people can grow *all* that is necessary for the rest of the year. They must have *animal* food, for something more than vegetables is necessary in the winter.

You must not suppose, either, that all parts of these frigid countries are equally fertile. In one part you may see nicely cultivated arable land; but as you go further north it is not so. In another part there are 20,000,000 acres clothed with fir-trees alone, and all through the northern countries we find the cone-bearing plants in too great abundance. Birch-trees also, as I told you, are found; willows, too; poplar, and elder-trees. The timber of these trees is not of much value from its distance from the rivers and sea. The turpentine, therefore, is extracted, and the trees are burnt to the ground; their ashes form manure, and the soil is then used for growing corn.

In other parts there is an abundance of heath, furze, and broom; the broomwood and liquorice-plants. Many species

of flowers you would see—Rhododendrons, Azalias, and China-asters. Many more berry-bearing shrubs are found.

W. You told us of the cranberry, papa—that it would grow in the depth of winter, and that the snow often seemed to be stained with blood, from the red juice of the berries.

P. I have read, too, that flowers of the most vivid and varied colours grow. They spring up, blossom, ripen, then seed and die in six weeks. These, therefore, are not of much service for food.

When travelling very far northward, you reach not only forests, but swamps and thick morasses, which are so immense that they seem to be boundless. Here grow rushes, reeds, and long grass. So fenny and boggy is one part that it has been called *Fenland*, or Finland.—Farther northward, it is too cold for these plants—the dwarf willow, the reeds, and rushes are very small indeed, or are lost altogether. Some of the vegetation is too weak to take deep root in the earth—the flowers depend as much upon the air for nourishment as on the soil, and their roots merely creep along the surface.

At length you may, by travelling northward, find spots where no vegetables seem to grow. Here are only *mosses*, *lichens*, *sea-weed*, and, at last, mere *fungus*, but all these insignificant things have their uses, and, poor as they seem, many of them are far more important than the trees. Without

them, many of the animals and people would die.

Yes! the *world* owes much to these inferior plants; they are therefore well worthy of notice. Let us begin with the *MOSESSES*.

It is said that, in newly-formed countries, they are among the first vegetables that clothe the soil, and the last that disappear. Even on cinders they will form their green crust, and struggle hard for existence.

In the mosses, we see the same principle as we saw in the eel. The respiration of the eel was feeble—it lived slowly—therefore it had greater “*tenacity of life*.” Thus the mosses have a much more simple and lowly existence than other proud plants, but at the same time, their tenacity of life is wonderful,—they will resist extreme cold, and extreme heat. Even when they have been dried up by the sun, they may be restored to life after *many years*.

With this valuable quality within them, these humble mosses have most important work to do. Beginning near the poles, where no other plants could exist, they labour hard to form new soil for other vegetables to grow in.

L. But how can they begin to grow without a soil to get nourishment from themselves?

P. The truth is, they are formed so as to get nearly all their nourishment from the atmosphere. When, therefore, they form the first green coating on a barren rock, they use

their roots principally for *holding* thereto. They depend very much on the state of the air; and after damp weather they will surround the walls and trunks of trees with verdure at a very short notice. They also form a green coating over bogs; and as each moss dies, and is succeeded by another, it forms a rich vegetable mould. On account of their usefulness in this way, the great botanist Linnæus termed them *Servi*, which means slaves or workmen.

But those useful workmen have fellow-workmen, called *LICHENS*. A *lichen* may easily be distinguished from a *moss*. Instead of having “soft green leafy expansions,” they look like dry, tough, scaly crusts, being generally of a greyish, or light brown colour. Although they are vegetables, they seem to have no leaves or stem, or anything at all like them. Like the mosses, they are able to draw their nourishment from the gases of the atmosphere. As they grow on rocks where there is not a particle of soil, the upper part of their dry scales has organs for absorbing the gases, and the underside has little hair-like instruments by which it fastens itself to the rock or tree.

Although I have only to speak of them as articles of food, I can hardly help pointing out to you some of their other important offices. They seem, when fulfilling their duties, to be so chained to the rock, that Linnæus gave to them the name of *Vernaculi*, or bond-slaves. Humble plants! their

feeble life is a life of labour to benefit others; they gain no benefit themselves. The main object of their life is *to dig their own graves!* to make little hollows in the rock, in which their remains may be received. This plan, by which they form *soil* on the barren rock for other plants, is most remarkable. Whilst living, they contain within them much *oxalic acid*. This acid corrodes the rock, and forms the hollow, or “grave,” for their particles. Often the *moisture* is collected in these little hollows. This moisture finds its way into the crevices of the rocks, and when it is frozen it expands and breaks the rocks into very minute grains, which then become part of the soil. It is said that “successive generations of these bond-slaves continue to perform their hard duties, until the soil they form accumulates, and the barren rock becomes a fruitful field!”

How much, once more, do we owe to little things! When Northmen reap their corn, or when they cut down timber, or when their cattle multiply, they may say “Thank you” for their bread and meat to these little lichens—for without their aid the spot from which these things were procured, might still be a barren rock!

I have noticed the lichens of the northern countries, not only because they form soil for the food, but because they supply food itself. Without lichen the rein-deer would die, and without the rein-deer, many of the northern nations could not live;

they would have to move downward to the south.

If you lived in Iceland, you would there see, perhaps, more than in any other country, the great importance of the lichen which we call Iceland *moss*. It partly supplies the want of those corn-plants which will not grow in this severe climate. About the middle of summer, you may see the Icelandic women preparing to gather lichens. They give up their butter and cheese making, leave the cows and sheep in care of the younger branches of the family, and set off on an expedition to the cold uninhabited parts where the lichen grows. They are generally accompanied by a few men as protectors, and the weeks they thus spend, are looked upon as the happiest time of the year. The men are also useful to carry the tents, for they go about from place to place, and pitch their tents wherever there is an abundance of lichen. On their return home, the women dry the lichen in an oven, and then beat it in a bag into a fine powder.

The natives also prepare flour from the sea-reed, and two other plants; but I should say that all these preparations are poor substitutes for the flour of wheat. Some of the Arctic lichens were found useful as food by the adventurers in the Arctic Expedition. Many of the sailors managed to subsist on lichen for some days, but they complained that it was miserable fare.

Besides the mosses and lichens, SEA-WEED is another

kind of food. Sea-weeds may properly be called sea-*lichens*, for they are, in many respects, much like the lichens. Their appearance may be different, for the sea-weeds are much larger, more soft, and more easily decomposed; but if the small scaly lichens found on the rocks be placed in some damp shady spot, they will much increase in size.

Some of the sea-weeds are exceedingly large, and they form great *forests* under the sea. It was an immense field of sea-weed that hindered the ship of Columbus on his first voyage to America. You may remember that it so alarmed the crew, that they almost determined to return.

The kind of sea-weed which is used as food is called the *Alaria*; it has a broad, long, and succulent leaf. All along the shores of Northern Europe this sea-lichen is eaten by the poor. There are others which are reckoned a *luxury* by the rich. In the chemist's shop, you may see a moss which grows in this country; it is called the Carageen, or *Irish Bog Moss*; but it appears that the latter name is not a correct one.

You have heard of the edible birds' nests of China. The greater part of the gelatinous matter in these nests is prepared from sea-weed; the bird, before using it for nest-building, swallows it, and brings it into a gelatinous state by means of its stomach.

The forests and pastures of sea-weed under the sea afford

food to many marine animals. Cattle, too, eat it greedily.*

The FUNGI, or MUSHROOMS, are also an article of food in some of these countries.

There are one or two more odd things amongst the vegetable productions. The Norwegians have learned to apply the wood and juices of their *trees* for purposes of food. The inner bark of the elm, which is not very abundant in their country, and the inner bark of the *fir*, which is abundant, have been brought into use. This bark is dried and ground, and used to feed swine; but in times of scarcity, when there is a very severe winter, it is mixed with meal and used as human food.

The twigs of the *birch*, and the twigs of the *alder* and *aspen*, are used as fodder for horses, when nothing better can be procured.

A kind of wine is also procured from the birch; a deep incision is made in the trunk, near the root, and a sweet peculiar-tasted liquor exudes.

You have now heard of some of the *peculiar* vegetable foods of these countries; besides the food from TREES, from FUNGI, SEA-WEED, LICHENS, and MOSSES, there is in some parts abundance of grass for the horses, and corn for man. The three hardiest corn-plants, *Oats*, *Barley*, and *Rye*, are of course best known;

* For a considerable part of this account of the *Cryptogamia*, the Author is indebted to Dr. Carpenter's "Vegetable Physiology."

and many of our fruits and garden vegetables are reared, according to the position and climate of the country. During the fine weather the people are generally engaged not only in husbandry, but in preparing for the long winter.

Lesson 20. ARTICLES OF FOOD.

(*Frigid Climates.*)

THE FOOD OBTAINED FROM THE VEGETABLE KINGDOM.

The nations around the Arctic circle live rather upon fish and flesh than upon vegetable food. Many of the regions encircled by the frozen seas, and exposed to the icy blasts of the north wind, are covered with snow two-thirds of the year, while in some parts nothing but the very lowest form of vegetable life is seen.

The most interesting of these vegetable productions are the FUNGI (or mushrooms), the ALGÆ (or sea-weeds), the LICHENS, and the MOSSES. These are useful, first, in forming new soil for other plants; secondly, as food for the lower animals; and thirdly, in nourishing man himself.

Food for men and animals, and certain drinks, are prepared from the ALDER, BIRCH, PINE, and other forest trees.

BARLEY, OATS, and RYE, and the hardest of our fruits and vegetables, are cultivated in some parts.

101. FOOD PROCURED FROM THE ANIMAL KINGDOM.

P. You have now heard some-

thing of the frigid countries—which do you think are the principal source of animal food there?—the MAMMALS, BIRDS, or FISH?

L. I think that the *fish* are. If you look on the map, you will see that there is very much water within the Arctic circle.

P. There is an abundance of fish, and of certain mammals which live in the sea. If you ask one of the Fins, a Laplander, a Greenlander, or an Icelander, he will tell you that these mammals are far better suited to his wants than the fish, because of the abundance of oil they contain.

You may remember that oil and all fatty substances are, like sugar, *heating* foods; because they supply carbon, to be consumed in respiration. Now, if a native of the tropics were to see a Greenlander sit down to breakfast, he would be rather surprised; he would see the Greenlander take his dried fish and dip it in *oil*, eating plenty of oil at every mouthful. The Greenlander would tell him not to be alarmed—that there was nothing nasty in such a proceeding, but that it was his custom. He might add, “If you come to live up here, my friend, you will find that such oil is necessary. You will want it to supply carbon and heat for your body—and there’s nothing will keep you so warm except oil, unless it be *spirits*.”

Thus you will find that the antelope, deer, sheep, goat, and oxen, on which the *tropical* nations live, are nearly all

muscle (or lean) and bone—they contain very little fat; such fat would be very objectionable to the animal itself, and to those who eat him. On the other hand, the Seal, the Walrus, the Whale, the White and Brown Bears, of the *frigid* countries, have an abundance of fat. Unlike the muscular, swift antelope, most of these animals are slow and heavy in their movements, but their fat is a great comfort to them, and afterwards to those who eat them.

The FISH, as I said, are very abundant. SALMON, HERRINGS, COD, and others, are dried and put by for the winter. There are many birds, some of which live upon the fish; the great OSPREY, or Fish Hawk, and the GOLDEN EAGLE, are often seen. The GREAT NORTHERN DIVER, the AUKS, and PUFFINS, with flocks of Eider Ducks, Gulls, and all kinds of sea-fowl;—but not all of these are used for food.

The MAMMALS are the most serviceable—such as

102. THE SEAL.

This animal is reckoned amongst the carnivorous animals, because it feeds on small fish. It has an almost oval-shaped body, which tapers toward the tail. It is better adapted for living in the water than on the land. Being mammals, the seals, of course, feed their young with milk, and breed them on the land. They therefore find dwelling-places for themselves in the caves of

the rocks, and here they hide themselves while they suckle their young. To attack them then is a very easy matter. Men come in the night, armed with clubs, and carrying lighted torches—they make a great noise, and as the frightened seals rush toward the water, they are easily killed.

But this is a cowardly way—it is like the method of killing turtles. An Icelander or Greenlander will meet the seal on the water, and give him fair play. He will go in his covered boat, or *kajak*, in which there is only sufficient room for his body, and with his spear in his hand, he will ride over the rough waves. The seal, hiding behind the rocks, will often attempt to bite a hole in the boat, or upset it.

When killed, it is turned to all manner of purposes.

Its flesh forms food;
 Its blood forms soup;
 Its oil forms firing and candles;
 Its sinews form threads for sewing their clothing or tents;
 Its skin forms a covering for their tents, boats, &c.;
 Its stomach forms an oil flask; and
 The skin of the entrails forms window-curtains or shirts.

It is said that no man can pass for a right Greenlander who cannot catch seals. Most of the northern people are trained to this work from their earliest childhood.

103. THE WALRUS.

The WALRUS is another of the Seal tribe. It is much larger, and is distinguished by its enormous tusks. With these tusks it tears up long wreaths of the sea-weed, which form a great part of its food. It is said, too, that it uses them in battle with its enemy, the polar bear. The animal is hunted for the sake of its oil and skin. Its flesh is also very palatable. Many a feast of hot walrus have sailors had on the ice, after the oil has been taken from it.

104. THE POLAR BEAR.

This animal, like the walrus, lives on a mixed diet. It prefers seals and fish; but when these fail, it will eat mountain-berries, sea-weed, marsh-plants, &c. Some Polar Bears are of enormous size. The largest known weighed 1,600 lbs., and measured eight feet and a-half.

The BROWN and BLACK BEAR, and the GREAT GRIZZLY BEAR, also supply food. In KAMTSCHATKA, it is the custom to hunt the Brown Bear with a gun and dogs; the hunter hides behind a tree which he knows that the animal will pass, and fires directly he comes within reach. If the first shot do not kill the animal, or disable him, the consequences are often very dreadful; the hunter and dogs are probably torn to pieces. These bears, like the other animals, abound in fat; a part of it is very valuable, and is sold as bear's grease.

105. THE WHALE.

The whale is, perhaps, the "oldest inhabitant" of the Polar Seas. Certainly, it is the largest. The habits, and manner of catching the Greenland whale, are so well known that I need not describe them to you. They supply the fortunate fishermen, who have enterprise enough to become whalers, with abundance of oil.

106. THE PORPOISE.

The PORPOISE, too, is found in the northern seas. On the coast of Iceland herds are sometimes seen numbering, it is supposed, between *two* and *three hundred thousand*! The fishermen, in order to attack them, get far out at sea, and drive them towards the land. Directly one unfortunate porpoise happens to be thrown on the beach by the waves, all the others rush toward the spot with such violence that they are stranded, and taken in immense numbers.

107. THE REINDEER.

Leaving the marine animals, we come to the REINDEER, who is the prince of animals amongst the Laplanders. Who could say enough to a Laplander in favour of his reindeer? As the camel is to the Arab—as the horse is to the Tartar—as the pig is to the Irishman—as the cow is to the Englishman—as the dog is to the Esquimaux—so is the reindeer to the Laplanders.

To tell you how the reindeer

draws the Laplander and his sledge across the snow and ice for hundreds of miles; and takes him, with his load of provisions and clothing, to the different markets and fairs, does not belong to our subject. In her capacity as a *cow*—supplying milk, butter, cheese, flesh, and tallow—the reindeer is most worthy of notice. Just as the patriarchs in the time of Abraham counted up their riches by the numbers of their flocks and herds, or just as the wandering Arabs do now, so does the rich Laplander count up his flocks of reindeer. Some husbandmen possess as many as *two thousand*. The animals during the summer are every morning driven up the mountains to graze, and every evening they are brought down to be milked.

In the dreary winter, the reindeer has to shift very much for itself. Then the lichens, which we have lately described, come to his relief. These lichens cover the rocks which are under the snow. The reindeer scrapes away the snow with its feet and its broad shovel-shaped antlers, for it belongs to the family of Deer which are distinguished by their *palmated* antlers. If the stock of lichens fail, the reindeer must die, for they are its last resource.

108. THE ELK, &c.

The ELK is another deer with palmated antlers. Although it is a tall powerful animal, it is very gentle and

tame in the northern countries; in the winter it lives near the houses of the inhabitants. It is the largest of the Deer tribe. Its broad antlers are of immense size, and its body yields a large supply of food.

There are many more animals in these cold climates, such as the *Fox*, the *Wolf*, the *Ermine*, and the *Sable*. The *Beaver*, too, was at one time very numerous, especially in the Western World: there also may be seen the Esquimaux Dog. But these animals are not *articles of food*.

L Some of them are only objects of *chase*. I should think that nearly all the northern nations are good hunters.

P. Yes; I told you that to procure their stock for the winter is the chief business of many during the summer. I will read you an account of an old man who lived at Kamtschatka. Hear what he and his sons did during the summer:—

“The man and his sons had killed twelve bears, eleven mountain sheep, several reindeer, a large number of geese, ducks, and teal, and a few swans and pheasants. ‘In November,’ said he, ‘we shall catch many hares and partridges; and I have one thousand fresh salmon lately caught, and now frozen, for our winter’s stock. Added to this, in my cellar there is a good stock of cabbages, turnips, and potatoes; with various sorts of berries, and about thirty poods (of thirty-six pounds each) of sarannas (a root with a sweetish-bitter taste), the greater part of which we have stolen from the field-mice, who also collect them in large quantities for the winter.’

Tea, tobacco, and spirits, are the greatest articles of luxury in Kamtschatka, and bread or biscuit is a very acceptable present. The Reindeer Kariakees make a sort of bread composed of the boiled bones of the deer, with the marrow in them, pounded very fine, and mixed with a portion of the meat and fat. The scarcity of salt is a great evil, as the fish cannot be dried in the open air so as to keep properly until the next year. If salt were more abundant, as many fish might be cured in some seasons as would last for several years."

L. It is a very good thing to find so much food—but I don't think that I should like to live in a frigid country for all that.

P. On the other hand, the people of the north think that no one can be as happy as themselves. Some have a very high opinion of their own attainments; and ridicule other Europeans, calling them by nicknames. But most of those nations are very barbarous. It is said of the *Greenlanders* that in cooking and eating their victuals, they are most loathsome. They have no set time for meals, but usually cook their game as soon as it is brought in. When they eat, they sit upon the ground around a large wooden dish. From this they take the meat with their fingers; the men first, and afterwards the women, who sit on the opposite side of the house.

W. I call *that* barbarous!—for the men to eat with their fingers!

L. I think it is more barba-

rous for the men to help themselves first.

P. Yes. That is one of the true signs of barbarity—for the men to be unpolite to the women. But hear the remainder! "They prefer the blood of the dog-fish to any other drink; but usually they drink water."

I do not think that you would like the *dining-room* of the *Greenlanders*. It is said that "the air is often so impure with the effluvia of dead fowls and seals, the entrails of animals, the putrid remains of boiled or raw flesh, that to a European it is impossible to remain long within doors. Everything seems covered with the drippings of train-oil and smoke."

Ion. Have you finished the history of the food now, papa?

P. Not quite. We may add a great many more *general particulars* about these frigid countries: for instance, it is said that the *Northern Indians* (that is those within the Arctic circle) often eat their food raw. It is said that they also eat whortle-berries, and even a kind of unctuous (fatty) clay.

Ion. I suppose that that is when they cannot get meat—poor fellows!

P. And yet there is always an abundance of fish. I told you of the abundant shoals of *herrings*—

W. And of the *porpoises*.

P. And other animals of the sea are equally abundant. There are vast swarms of shrimps—which are very carnivorous. When Captain Parry travelled in the Polar regions,

the crew hung joints of meat from the side of the ship, and within a few nights, they were picked to the very bone. The animal life in these regions has indeed surprised many people; but you shall hear at once the account of the *Medusa*, which others have written—then you will understand why it is so. With this account we will close our history of the animal food.

109. THE MEDUSA.

“When we contemplate the aspect of the northern world,—bleak, naked, dreary, beaten by the raging tempest, and subject to cold which is fatal to life,—we naturally imagine that animal nature must exist there on a small scale. It might be expected that only a few dwarf and stunted species would be scattered along its melancholy shores. But the mighty Architect of nature makes here a full display of his inexhaustible resources. He has filled these naked rocks, and wintry seas, with a swarming profusion of life, such as he scarcely brings forth under the glow of tropical suns. He has stored them with the mightiest of living beings, compared to which, the elephant and hippopotamus of the tropics seem almost diminutive. Even the smaller species, as that of the herring, issue forth from the frozen depths in shoals which astonish by their immensity; they fill all the southern seas, and minister food to nations; the air, too, is darkened by innumerable flocks of sea-fowl.

“By what means does nature support, amid the frozen world, this immensity of life? According to the same plan by which nature supports the inhabitants of the seas—by making them the food of each other. Here we observe a continued gradation of animals, rising one above another, the higher preying upon the lower, till food is at last found for those of largest bulk. The basis of subsistence for the numerous tribes of the Arctic world is found in the *medusa*, which the sailors well describe as ‘sea-blubber.’ The medusa is a soft, elastic, gelatinous substance. Specimens may be seen lying on our own shores, exhibiting no signs of life except that of shrinking when touched. Beyond the Arctic circle it increases in an extraordinary degree, and is eagerly devoured by the finny tribes of all shapes and sizes. By far the most numerous, however, of the medusan races are too small to be discerned without the aid of the microscope. These medusæ occupy about a fourth of the Greenland sea, or above twenty thousand square miles; and hence their number is far beyond calculation. Mr. Scoresby estimates that two square miles contain 23,888,000,000,000,000; and as this number is beyond human words and conceptions, he observes that 80,000 persons would have been employed since the creation in counting it.

“This green sea may be considered as the Polar pasture-ground, where whales are always seen in the greatest numbers.

These prodigious animals cannot derive any direct subsistence from such small invisible particles; but these form the food of other minute creatures, which then support others, till at length animals are produced of such size as to afford a morsel for their mighty devourers.”*

W. Well, I admire those medusæ! They are wonderful things. They correspond to the *Lichens*.

P. The Lichens are the lowest sort of vegetables, and are the foundation of the vegetable kingdom, just as the medusæ are the foundation of the animal kingdom in the Polar seas.

Ion. Yes; because, you see, the lichens die and make earth, which becomes food for large vegetables; then these larger vegetables die, and form earth to support larger plants still, and so on. That is exactly like the medusæ becoming food for the animals above them.

P. And in both cases, they at last afford food and clothing for *man*. Ought we not, indeed, to be very thankful to “the Mighty Architect,” whose noble works we thus freely use? Let us once more learn to love and thank Him whose mighty hand brings forth food from the sea, and earth, and air.

You may now write your last lesson on the food of man.

W. And then may we write another list of articles of food?

P. Yes; but mind that you commit it to memory when you have written it.

Lesson 21. ARTICLES OF FOOD.

(*Frigid Climates.*)

THE ARTICLES OF FOOD FROM THE ANIMAL KINGDOM.

From the intense cold of the Arctic region, man could scarcely exist there without animal food. Thus we find some of the animals of the temperate countries living within the Arctic circle; and in the parts further northward they are replaced by the REIN-DEER, SEAL, WALRUS, WHALE, PORPOISE, BEAR, and others.

There are also abundance of Birds; but there is not one with brilliant plumage like that of the Tropical birds. The principal are the GULL, CORMORANT, the DIVERS, AUK, PUFFIN, PETREL, WILD DUCK, SEA EAGLE, &c.

From the sea is obtained an unlimited supply of fish, particularly HERRINGS and SALMON, which are found in immense shoals. The existence of these fish, and consequently of the Whale, Seal, Polar Bear, &c., depends on one of the lowest kinds of animals, called the MEDUSA, in the same way as the existence of the larger plants depends on the lowest kind of vegetables, the LICHENS. The numbers of the medusa are greater than the imagination can conceive, and they are so small, that they can only be seen by means of the microscope.

There are no Reptiles within the Arctic circle.

The mode of living and of eating amongst some of the northern nations is still very barbarous; but, from not knowing better, they are quite content with their present state.

P. Now make your table of the
ARTICLES OF FOOD IN THE TEM-
PERATE AND FRIGID COUNTRIES.

* Edinburgh Cabinet Library.

OBJECT LESSONS FROM THE GREAT EXHIBITION.

Parts Fourth and Fifth.

FOOD OF TEMPERATE AND FRIGID COUNTRIES.

VEGETABLE KINGDOM.

Corn Plants: **WHEAT.**

BARLEY.

OATS.

RYE.

BUCK WHEAT.

MILLET.

Leguminous Plants: **PEA.**

BEAN.

KIDNEY BEAN.

LUPIN.

TAMARIND.

Cruciform Plants: **CABBAGE.**

CAULIFLOWER.

TURNIP.

RADISH.

HORSE-RADISH.

MUSTARD AND CRESS.

WATERCRESS, &c.

Umbelliferous Plants: **CARROT, Parsnip,**

Celery, Caraway, Coriander, Aniseed, &c.

Composite Plants: **LETTUCE, Endive, Artichoke, Jerusalem Artichoke.**

Various Tribes: **POTATO, Onion.**

SPINACH and Beetroot.

RHUBARB.

Fruits: **THE ROSE TRIBE, &c.**

APPLE, Pear, Quince,

Medlar, Peach, Apricot, Nectarine, Plum,

Cherry, Raspberry,

Strawberry, &c.

Nettle Tribe: **MULBERRY, Fig.**

Gooseberry Tribe: **GOOSEBERRY, Currant**

Olive Tribe: **OLIVE, Manna Ash,**

Ash.

Orange Tribe: **ORANGE, Lemon, Ci-**

tron, Lime, Shaddock,

Forbidden Fruit.

Nuts: **WALNUT, Chestnut, Hazel-nut, Filbert, &c.**

Fluids: **WATER, Beer, Perry, Cider, Wine, Brandy, Rum, Gin, &c., Vinegar**

ANIMAL KINGDOM.

Dairy Produce: **MILK, Eggs, Butter and Cheese, Goose, and other Poultry.**

Herring Tribe: **HERRING, Pilchard, Sprat, Whitebait, Sardine, and Anchovy.**

Mackerel Tribe: **MACKEREL, Tunny, Cod, Haddock, Whiting, Hake.**

Flat Fish: **PLAICE, Sole, Turbot, Flounder, Dab, Brill.**

Rays: **SKATE, Shark, &c.**

Salmon Tribe: **SALMON, Trout, Char, Smelt.**

Eel Tribe: **EEL, Conger, &c.**

Carp Tribe: **CARP, Barbel, Roach.**

Pike Tribe: **PIKE, Flying Fish, &c.**

Perch Tribe: **PERCH, Bullhead, &c.**

FRIGID COUNTRIES.

VEGETABLE KINGDOM.

Cryptogamia: **MOSESSES, Lichens, Sea-weeds.**

MUSHROOMS, &c.

PINE, Birch, &c.

BARLEY, Oats, &c.

ANIMAL KINGDOM.

SEAL.

WALRUS.

POLAR BEAR.

WHALE.

PORPOISE.

REINDEER.

ELK, &c.

MEDUSA, &c.

PART THE SIXTH.

CHAPTER SIXTEENTH.

ARTICLES OF CLOTHING.

P. First a word or two on Clothing *in general*. You quite understand that as long as we are in the world we have to dwell in bodies made of "clay." You have learned, too, how, as long as we are thus connected with the body, we must take care of it and feed it.

W. Yes. And we have learned of more than 100 articles used for feeding it.

P. And we must not only feed our body, but we must *clothe* it; for you will observe that unless you take care of it, and see that it has the food and clothing it requires, you and your body must part,—or, as we say, you must "die." The clothing is of great importance, as well as the food; therefore, let us talk of it next.

Go and see some savage from the Southern Seas, and question him on the subject of clothing. Ask some native of Tunis, a Frenchman, or a Chinaman, and each will show his own plan for wrapping up his body; each has a different idea.

W. Yes. And though they laugh at each other, each believes his own notion the best.

P. There is something good in all their ideas, no doubt. The strangest idea is that of the savage.

Bring forward the savage,

and ask, "What are your rules for the toilet?"

The savage would say, "Put a ring in your nose;" or, perhaps, "one in each ear." "Tattoo thy face with black markings. Paint with pretty colours. Wash thy body well with oil, until it glistens in the sun. Let the oil of the cocoa-nut and the palm run over thee. Wear round thy loins the skin of some beast."

If you were to tell that savage that we do not think his a good costume, he might say that he thought his fine limbs and broad chest were much more beautiful to look at than a great *coat*; or, that he believed his thick flowing hair to be a much more handsome covering than a *hat*.

Now, that is a very simple idea!—very different from our idea of dress. He believes that nothing more is wanted; and his only "raw materials" are a little colour from the earth, or stain from the juice of plants; some oil (not Macassar) from the trees, and either a skin or some vegetable fibres to make coarse cloth.

But we may thus see how many men depend upon *ideas*. If the savage were to travel with you in England alone, how he would wonder at the trouble you take about dress! If you took him to Manchester, and only showed him one of the cloth factory chimneys, he would wonder why it should

smoke for the sake of making dress, or what chimney-smoking had to do with dress-making! And when you led him inside, and he saw the tens of thousands of wheels, the spinning-mules, and power-looms; when he saw 1,200 of these looms at work together, and heard their deafening clatter, he would wonder more how people could make so much "fuss" about dress. And he would feel more sure of what he said when you led him from one factory to another; when he saw all the processes of printing and dyeing, and was told that these belonged to one manufacture only, the manufacture of *cotton*. He would feel surprised, too, at the *number* of factories for making this cotton dress, and would be more surprised when he travelled from town to town throughout LANCASHIRE, and reached at last the giant port of Liverpool. How he would open his eyes at the fleets of merchant-ships, and the immense bales of cotton with which they were laden!

Lead him to Warrington, on the Mersey, and show him the hundreds of families who live by making *pins*.

Lead him to YORKSHIRE, and show him thousands more machines, and tens of thousands of families which get their living by making *woollen* dress. Lead him to Hull, that he may see the eastern port; show him vessels bringing *flax* from Holland, others with *wool* from Germany, and others from Russia laden

with *hemp*. Then tell him to count the merchants, the clerks, the porters, and the sailors, who depend upon the clothing market for their bread.

Lead him southward to Birmingham, where men and women make *buttons*, and show him the thousands of people whose living depends on the button trade. Or take him up northward, to Macclesfield and Derby, where *silken* dress is made. Then travel southward again, to Newcastle-under-Lyne, to see the manufacture of *hats*. Take him to Coventry; here are more tens of thousands employed in making *ribbons* and *watches*.

Lead him northward to Nottingham, where the people are making cotton *stockings*, and *net*, and *lace*. Lead him down to Leicester, where *woollen stockings* and *gloves* are made. Lead him southward again. Take him to the town of Northampton. Let the scared savage peep into the houses of the poor, and see how all are busy making strange leather cases for the feet! "What are these thick things with nails?" he would ask. These are *boots* and *shoes*. Take him eastward to Norwich. All the world here is making *bombazines*, and *stuffs*, and *crapes*. Lead him through the counties of Cambridge, Huntingdon, Bedford, and Buckingham, and he wonders what we want with so much *straw-plait*, or why the people plait straw at all. Many he notices making *pillow-lace*, at which he wonders more.

Then lead him to "LONDON

TY." Take him to Bermondsey, where the leather is tanned—take him to Spitalfields, where poor men weave silk; and, when you have shown him all these places, you may tell him that in this country some millions of people earn their daily bread by making articles of dress. What do you think he will say?

W. Why, he will say that those people would not get many customers in *his* country; they don't wear hob-nailed shoes there, nor hats.

P. And thus you may learn the value of an idea. Suppose that the civilized part of the world should suddenly take to the savage's philosophical view of dress, and think exactly as he thinks—what would become of the millions of people to whom our articles of clothing give employment?

Ion. They would be thrown out of work; then they must starve.

P. But these people depend confidently on the ideas of dress which the world has now. They know that since the time of the Ancient Britons, the people of this country have changed their ideas of dress, and that they will not go back again.

We have, however, to talk of the articles of clothing in THE EXHIBITION. Suppose we go and see them—

W. Let us take the savage too, papa?

P. Very well; and it would be well if we could also have an Ancient Briton, stained with woad, that he might see how

the ideas of the nation have enlarged.

But let us enter the Crystal Palace. The list of raw materials rather surprises our savage friend. I need hardly count them up. From the ANIMAL KINGDOM we have *skins, fur, wool, feathers, silk, bone, ivory, horn, pearl, tortoiseshell, whalebone, &c.* From the VEGETABLE KINGDOM, *cotton, hemp, flax, straw, gutta percha, India rubber*; and from the MINERAL KINGDOM, *gold and silver, precious stones, brass, iron, &c.* Our savage looks upon all these things, and he cannot make out in what way we use them—he cannot believe, indeed, that they are all brought into use.

Well! if he won't believe, let him walk on through the Exhibition. Let him see the various articles into which these raw materials have been formed. Look, Mr. Savage, at our *ribbons*! In how many different styles do we get them up! Here are "gauze, satin, sarsnet, and lutestring—plain, figured, flowered, stamped—of open pattern, and of open texture—with edges plain, scalloped, pearled, and vandyked: some are not *smooth* ribbons, but they are *gofered* and *quilted* with beautiful skill."

"But what do you do with the *feathers*?" grumbles the savage. "Surely you would not be dressed like geese!"

Come and look at the FEATHER BONNETS. Here are bonnets made from the feathers of the ostrich, the guinea-fowl, the pheasant, the goose, and the swan. These are "novelties!"

these bonnets,—yet you see rows of different shapes and colours. What do you say to them, Mr. Savage? They are light, yet they are *warm* and *soft*. Would you like to take one home to your estimable squaw?

“One of those!” he would reply. “My squaw does not wear bonnets—she has not the *idea* of such a thing.” But he would still like to see the novelties. Then you might show him the ARTIFICIAL FLOWERS. How many things are used to make these ornaments! There are flowers made from wax, cambric, shells, feathers, and beetles’ wings—from hair, satin-wood, box, ivory, bone, and precious stones. Here, too, are flowers made from seeds, and not far off are singular flowers made from lace. “What’s *this* ’ere?” our savage might say.

Ah! here are strange varieties of FANS. Would you like to buy Mrs. ——— (what’s her name?) a FAN? Here is one enriched with jewels, and worth nearly a thousand pounds; you see, it would buy up half of your island at home. Perhaps you have never heard of M. *Duveleroy*? He is a French gentleman, and he makes fans. He employs two thousand people in this work. Here is a set which he has made for the ladies who dwell in the Sultan’s harem; you see they are ornamented with designs from the “Arabian Nights,” if you have ever heard of such a book. And now look at the *feather-fans*!

W. Perhaps he could like to see the article of dress called KOH-I-NOOR.

P. Yes. Here, Mr. Savage, is a little article, one of our Queen’s jewels; its value in money is greater than all your island, and half a dozen others beside—£2,000,000. Look at those *noughts*! if you understand numeration, and think about them.

Our savage chieftain wonders how many such things are worth all the world, and whether our Queen ever wears all the world in her crown. But the heavy idea oppresses him; he is tired—lead him to something else.

Come here, friend. Here are some articles of dress. Here are some of Mr. Nicholay’s FURS. And when the savage sees the skins of the lion hanging from the gallery, and the helpless look of the grim bear, he grins with satisfaction. He is amused, too, with the strange collection of furs from the fox, the ermine, the stoat, the beaver, the chinchilla, and the marten; but he does not understand what is meant by a “*victorine*.”

Here is beautiful LACE to be seen from Belgium; veils worth hundreds of guineas; a lace dress which cost five years’ labour in making. The savage does not care for such things; he passes on.

Now examine the Cotton, the Woollen, the Silk Goods. Here, too, are some Mixed Goods. Try and understand, Mr. Savage, while I give you their names. Here are bombazines, paramattas, merinos, cobourgs, poplins, which are corded, watered, and brocaded; crapes, Cashmeres, Barèges, twilled Ban-

danas, Indian shawls, spun-silk, cambrics, muslins, camlets, chintzes, tartans, tweeds, linsy-wolseys, flannels, figured gauzes, flouncings, fancy checks, scarfs, printed handkerchiefs, embroidered vests, embroidered robes, and tamboured dresses—I hope you *understand* these names. Here are gorgeous specimens of velvets, with plush satins, gros de Naples, and watered silks; here are flannels, corduroys, railway-wrappers,—you don't use these in your island, I believe?—saddle-cloths, druggets, baizes, friezes, and *rumswizzle*. Ah, here I have puzzled myself! Here is the *rumswizzle*! Take it up and examine it yourself. *Rumswizzle* is—*rumswizzle*—that's what it is. It is made of wool, which is undyed and foreign. Here are more camlets, and waterproof cloths; Mackintosh capes and cloaks; oil-skin capes, and other convenient things. Here are gingham, calicoes, plain and striped, shirtings, sheetings, damasks, diapers, huckabacks, dimities, quiltings, lambskins, doeskins, angolas, kerseymeres, broad-cloths, both piece-dyed and wool-dyed, net, Honiton lace, bobbin-net, gimp, braids, fringe, tassels, cords, cordings, glazed linings, Persian silk, hooks-and-eyes, buttons, stay-laces. Here are—

But the savage will not hear any more, he is bewildered quite.

"You don't mean to say," he asks, "that you *wear* all these different kinds of things?"

Yes, indeed. Let me go on!

There are—"No, thank you; let me go!" So we'll send him off to the refreshment-room. It is very clear that the improvements which are brought forth in the Crystal Palace are not to his taste; he does not understand the *idea* of them. He has seen enough to know that the civilized world pay wonderful attention to their articles of dress, and that is all!

So we will leave our savage in the midst of the jellies and the ices—such "improvements" he quite understands. We are now in the Transept. Let us start from here. We will travel through each department, down the whole length of the Exhibition.

Properly speaking, we have only to notice the *Raw Materials* of each country; but as we shall, I dare say, see in each department some articles of dress, we will also say a word or two on the people's costume.

TURKEY.

Here is TURKEY. It is the nearest place to the Transept, so we will begin. This country is partly in Europe and partly in Asia, but the people are more like the Asiatics than the Europeans. The outer garment of a Turk is a long, loose robe; underneath his robe is a wide waistcoat tied with a sash; his trousers are quite loose, and he wears ornamented slippers. These slippers are only for the streets; for, when entering a house, the Turk leaves these articles at the door. On his head our Turk wears a peculiar

dress of white cloth or muslin. Ask him what it is. He does not say "hat," but "turban." "Here is my turban; I take great pains in folding it." So you would say, if you saw him do it. Every one seems to fold his turban in his own way; for a barber of Constantinople once showed the world that the muslin of a turban may be arranged in *sixty-six* different ways. Many Turks also wear a broad sabre, or scimitar, at their side. The Turkish women are dressed much like the men, except that their faces are veiled; but it is said that they will unpin a corner of the muslin to eat some sweetmeats, or smoke one of the long Turkish pipes.

Here, in the Exhibition, we may see these articles. Here are some *turbans*, and another kind of head-dress, called a *fez*—"flowered muslin for turbans"—a "scarlet cloak embroidered in gold"—a "ladies' suit complete"—vests, belts, silk sashes, and so on; here are daggers, pistols, and sabres, "gold and steel mounted."

EGYPT.

Egypt, an African country, is found in the same department with Turkey. The dress of the Egyptian is much like that of the Turk; the every day colour is black, blue, grey, or light brown. Those who are descended from their prophet Mahomet, are allowed the privilege of wearing a green turban. The Egyptian, as well as the Turkish women, wear loose trousers, like those of the men.

It is from these women that the ladies of America have introduced a new style of dress, called the *Bloomer costume*.

PERSIA.

Persia is our next department. The dress of the Persians is much like that of the Egyptians and Turks, except that it is more expensive. The Persians are said to have surpassed all other Eastern nations in their love of pomp and show. No Persian thinks himself properly dressed without a dagger in his girdle. Their daggers and sabres do not speak well for the people; it is a bad thing to feel that you may have to defend yourself by force. If all the Eastern nations would put away these things, they would find it much easier to settle their disputes without such helps. The Persians wear high-heeled boots; their head-dress is a black sheep-skin cap. Although, like the Turks, they take off their shoes on entering a house, they do not uncover the head. "This is a very bad plan," said an English officer who had often dined with the Persians. "We are obliged to do as they do, and while we dine we have to bear the weight of our heavy cocked hats and feathers."

GREECE.

Here is the department of Greece, but there are not many dresses. Here, indeed, is one (numbered 56), and it tells you by its wonderful smartness the

character of the Greeks. The Persians wear expensive dress, but generally of sober colour; the Greeks, on the other hand, dress with a great deal of show. "A physician's janissary," it is said, "wears a rich robe of scarlet; his vest is of blue velvet, trimmed with gold lace; and in his silk girdle is a brace of pistols." The Greek wears short petticoats, and a short jacket, and sometimes scarlet leggings; but his dress is very much varied. Sometimes he wears a snowy white turban, but more often the tasseled, red-cloth cap, called the Fez; and sometimes a fur cap, like a muff. The young Greeks are very handsome, and the costume of some is the most graceful in the whole world. But all classes of Greeks dress showily; and it is said that even a servant will spend every farthing of his wages in fine clothes.

SPAIN, PORTUGAL, AND MADEIRA.

The costume of the European differs much from that of the Turks and the Eastern nations. But we must not look to Spain for the character of the European dress. When a traveller passes through that country, it is said that nothing strikes him more than the wonderfully different dresses of the people. If the people were judged by their costume, you would almost suppose that the inhabitants of neighbouring provinces belonged to different hemispheres. It has been said

that there is as much difference between two inhabitants of the north and south of Spain as between an Englishman and a Russian.

The most striking article of dress belonging to all the Spaniards is the great *cloak*. This is truly a national garment, and is worn almost everywhere. "To the Spaniard it seems his only garment for holiday and everyday, for rain and sunshine, for winter and summer; the very children wear it, and are often encumbered with it at play." The whole nation is so much attached to this cloak that a Spanish minister (in the time of Charles III.) lost his life for attempting to cut it down to what he thought was a more reasonable size. The Spanish *hat* is generally high-crowned, and with a large brim.

The Spanish ladies are known by their large *mantillas*, or shawls, which are nearly always black; by their black lace *veils*, and the great *fans* which they always carry with them. "A Spanish woman," it is said, "would be as likely to go out of doors without her shoes, as without her fan." Bonnets are not worn; the ladies' heads are covered by their *mantillas*.

In Portugal, the dress is like that of Spain.

ITALY.

In the department of Italy, we have splendid articles of dress. From *SARDINIA*, there are *silk velvets*, black, blue, crimson, spring green, ruby, emerald green,—figured *satins*,

silk gros, and flowered damask—embroidered cambric handkerchiefs—black lace mantles—boots made of leather prepared with the hair on, boots without seam. From ROME there are samples of silk and crape. From TUSCANY there are all kinds of raw silk, straw-plait, and straw-bonnets.

There is every variety of costume in Italy, as much as in Spain. The bandit with his great slouched hat—the Jesuit with his black shovel hat—other priests with triangle-shaped hats; some with black dresses, and red crosses; others with violet robes. In Tuscany the women wear black beaver hats with high crowns, and with plenty of pretty ribbons streaming from it on holidays.

FRANCE.

Who will describe the French costume? If you begin your description in the morning, you will have to alter it in the evening, for the fashion will have changed before you have finished. Even if you do alter it, your description is not safe; the next day, there will be a new fashion. That Frenchmen wear *blouses*, will hold good for a long time; and that they wear the moustache and beard will always be true, for this is the settled fashion of the Celtic nations. If you go to Normandy, you may there see women with stiff, white, high-crowned caps. They are made of muslin highly starched; some are half a yard, and others even a *yard* in height: bright

coloured handkerchiefs are worn over the shoulders.

But it is in *Paris* that the true character of the French dress is seen. There are seen the most gorgeous satins, velvets, and silks; men and women ornamented with chains and jewels; while the dresses are continually being changed in shape, forming new and most elegant patterns. The French are particularly noted, too, for their *gloves*, *ribbons*, and *artificial flowers*. It is not worth while to look into the French department to try to describe the articles sent. There is almost everything in the shape of dress that can be imagined.

BELGIUM & HOLLAND.

Belgium is the country for lace and broad cloths. The lace sent from there is truly beyond description. There is nothing striking in the Belgian costume. It is said that throughout the country it is very rare to see a man, woman, or child in rags. In both Belgium and Holland the children wear wooden shoes, called *sabots*; they are cut out of single pieces of wood, and may be bought at *sixpence* per pair.

AUSTRIA, ZOLLVEREIN, NORTHERN GERMANY.

AUSTRIA is placed next to Belgium in the Crystal Palace. This is a very large empire, at the South of Europe. The word "ZOLL-VEREIN" is derived from the German *zoll*, a toll or tax, and *verein*, union. Thus, the word means a *Tax-union*, and it

is given to a number of German states which have united their taxes, so that they may all be collected at once. These states are situated on the river Rhine, and at one time they were a great hindrance to commerce; for when a vessel was sailing up the whole length of the Rhine, it had to stop and pay toll at the custom-houses of *twenty-seven* different states. You may easily imagine how great a hindrance this must have been. These states on the Rhine, therefore, formed the union called the *Zollverein*, by which all the duties due from a vessel are collected by one state, and afterwards divided.

W. Then the *Zollverein* department in the Exhibition, I suppose, means the department of those states on the Rhine?

P. Yes. Prussia and the states in the *centre* of Germany constitute the *Zollverein*. You will see that the next department in the Exhibition is marked *Northern* Germany. The towns of Northern Germany from which these goods are sent, are called the *Hanse Towns*, from the old German word *hanse*, a league.

Ion. Did they form another league?

P. Yes; a union was formed by these towns to protect and help one another; and in matters of trade they certainly did so. They once had the whole trade of the North of Europe in their hands, and the towns became very rich. *Bremen*, *Lubec*, and *Hamburgh*, are amongst the largest.

The costume of the Germans

is varied, because of the number of nations. The small low-crowned cloth cap forms one of the distinctions by which we know a German; the *blouse* is also worn by many of the Germans. The poorer women wear long coats and thick woollen petticoats, like those worn by the "buy-a-broom" girls. In Austria, again, the women wear full short petticoats, with coloured boddices, tightly laced.

In Prussia the ladies are noted for their skill in needlework. From Berlin, the capital, we have the well-known embroidery, the Berlin wool work. It is said that in needlework "Germany stands first amongst the nations, then Russia, then England, and then France."

RUSSIA.

Russia is, you know, the largest country in the world. It includes the most varied of climates, and therefore sends different sorts of produce. From Russia we have all kinds of stuffs, silks, cotton and linen goods—various leathers, and furs.

With every description of raw material, you find in Russia every description of dress. Some are clothed in the European, and some in the Asiatic style. Most of the peasantry wear a high-crowned cap. In the winter, instead of wearing stockings, their legs are bandaged with coarse cloth or flannel; the shoes (or sandals) of many are made of linden bark,

while others travel on *skates* over the frozen rivers and lakes; their coats often consist of sheep's skins, worn with the wool turned inward. The costumes of the *Tartars*, the *Cossacks*, and other tribes, are very various; some are gay and gaudy, others are very coarse.

SWITZERLAND.

In Switzerland and the Tyrol, there are many oddities of dress. One of the Cantons, the *Grisons*, is said to be so called from the grey colour of the men's dresses. In the *Tyrol*, the peasantry "strangely wear stockings without feet to them, tight black breeches, and leathern *girdles*, with knives stuck in them." Their blue smock frock is tastefully worked, and worn by the gentlemen as well as the peasantry. The aged women, it is said, wear tall white or red worsted caps, of sugar-loaf shape, and weighing six or seven pounds; and their dresses appear *hooped*, from often consisting of no fewer than ten petticoats.

SWEDEN, NORWAY, AND DENMARK.

In these cold countries, warm woollens are worn. The blue skirts and homely *linsey-woolseys* are well-known in Sweden.

Ion. What are *linsey-woolseys*, papa?

P. Linsey-woolseys are mixed goods—a cloth made from a mixture of wool and cotton. "In Stockholm, the boat-women wear huge muslin caps,

bright scarlet boddices, striped aprons of blue, black, or red, over greyish petticoats, thick stockings of flaming red, and 'the largest and most marvellous shoes in the world.' These shoes have beech-wood soles, several inches thick, heavily shod with iron, and a round lump in the *middle*."

The people of the UNITED STATES have sent many goods to the Exhibition, but their clothing is very much like that of the English, except that the *Bloomer costume*, which I spoke of before, belongs particularly to them. It has not yet been adopted in England; whether it ever will be, we cannot yet tell.

TUNIS.

As we return down the Nave towards the Transept, one of the last places we reach is TUNIS.

The costume of Tunis, and the natives of the North of Africa, is a mixture of the European and Arab dress.

The three principal tribes living in this district are the *Moors*, *Arabs*, and *Berbers*. There is little difference between the races; the wandering tribes are called Arabs, and those dwelling in cities are called Moors. The dresses of the rich men of *Tunis* are most magnificent; a rich Moor wears a gold-laced *waistcoat*—a *jacket* with embroidered sleeves—immense *trousers* of silk or cloth—and a *broad belt* of silk or gold. Over his dress he wears a woollen cloak, bordered with gold lace; his boots, shoes, or slippers,

are made of yellow morocco leather.

The women of TUNIS and TRIPOLI also dress in magnificent style; they wear "*a silk shirt of many colours* in stripes, a highly-embroidered waistcoat, silk trousers, and a large gaudy silk wrapper. The head-dress is a cap of cloth of gold, with many rich ornaments; the eyelids are stained with antimony; the cheeks are painted with rouge. On the ears, and ankles, and wrists are worn earrings, anklets, and bracelets of massive gold or silver."

The JEWISH women of these parts may only wear black or yellow slippers; they are also prohibited from wearing boots.

The dresses of the MOORS are similar to those of the people of Tunis.

The BERBERS are a wild people, from whose name the word "Barbary" is derived. Their costume differs from that at Tunis. It is said that they cover themselves with a black woollen garment like a sack, which is never taken off, but generally made to last a whole life. The women dress much like the men; they tattoo their legs and arms, and stain their hands and nails, but never veil. Both sexes wear buskins, like the ancient Romans.

Let us look into the Tunis department of the Exhibition. Here is a real Arab's tent. See how it is covered with the skin of the black camel! Here are rare articles of dress for man and horse. Velvet-saddles, embroidered with gold and silver. Plated stirrups used by the

Bedouins (Bedweens). Iron bridle-pieces. Water-holders used on horseback. Gold foot-rings. Bracelets. Lizard skins. Complete Arab belt, &c. Leather cushions. Foot-rings for girls. Ring, used by Arabs to tie up their waist-girths. Pins and breast ornaments. Ear-rings. Silver ornaments for the head. Boy's belt. Tunisian otto of roses. Otto of jasmin. Mixed essences. Amber lozenges and necklaces. Parasols, with ostrich feathers, and in red silk. Lion and leopardskins. *K-hol* used for blacking the eyelids, &c., &c., &c. Indeed you may find here almost everything used for Arab clothing.

W. How does the *Arab* dress himself, papa?

P. "The costume of the ARAB, generally, is a large loose shirt and cotton trousers; sandals, or red leather half-boots, laced; a red hanging cap with a blue silk tassel; a woollen wrapper *thrown over the head*, and hanging down the back. The female dress is almost the same as the men's. The young women decorate their hair with beads, coral, and a silver crescent; they also wear 'charms' against misfortunes."

W. I think that the silver crescent must make them look very pretty. I should like to see an Arab girl.

P. You will alter your mind, perhaps, when I read you the rest of their description. "An Arab belle is almost covered with *tattooed* flowers, with circles, the names of gods and of her

friends; and she often wears two or three pounds' weight of jewellery. All the women tattoo themselves, and stain their hands and nails, but they never dye their hair."

CHINA.

The CHINESE department is united to that of Tunis. The most striking part of the Chinese dress is—What do you think is most striking, Willie?

W. The Chinese shoes, I should suppose.

P. Yes; just as you distinguish the Frenchman by his blouse, the Turk by his turban, or the German by his cap, so you may distinguish the Chinese by their shoes.

Here is a specimen of a Mandarin's dress, which—But, see! here is a real live Chinaman, who is "in attendance." Now notice his costume! His dress is nearly all silk. Silk, you see, is a favourite raw-material in the warm countries; it is cheaper than in England, because it is more easily cultivated. Thus, we have met with it in Tunis, Egypt, Turkey, and Persia; it also abounds in *China*, and we shall find it much in use in *India*.

But look at our Chinaman! He wears a close skull-cap, and has two long ropes of hair hanging down his back—we call them "pig-tails."

Just please to take off your little cap, Mr. Chinaman. Now you see that his head is shaved, all except the crown; this fashion is like that of the Tartars, and others of the Mongolian race.

W. I have seen a picture of a Tartar with a "pig-tail," papa.

P. Yes. Now I think of it, it is to the Tartars that they owe the custom. A long time ago these Tartars conquered China, and forced the Chinese to preserve their hair with great care; to cut off the greater part, and to wear pig-tails reaching to the calves of their legs.

Now look at his coat. It is made of green silk, and it fastens on the right side with gold or silver buttons. Please let us unbutton this coat, and see what there is underneath. Ah! here are certain robes made of nankeen—a sort of cotton cloth.

W. I have worn nankeen; it is of a light buff colour. Why is it so called?

P. Because the cotton grows near *Nankin*, a city of China—it grows of a buff colour, just as we wear it. But the Chinaman does not wear it of this colour. See! it is dyed brown (sometimes the nankeens are dyed blue and black). He also wears loose linen trousers, cotton stockings, and wooden-soled shoes. Now fasten up his robe again, and tie the girdle round! To this silken girdle are fastened his fan-case, tobacco-pouch, bag for flint and steel, and a case containing a knife, and a pair of chopsticks.

But the dresses of Chinamen differ. Some wear tight leggings as well as loose breeches; some ornament their dresses with gold embroidery and pearls. They also ornament with the costly Chinese *crape*, and wear crimson-coloured socks. The richer people wear

fur dresses, but these are very expensive, and descend from father to son; some can only afford fur-*trimmings*. One of the most important things in the Chinaman's case, is his *fan*. No one in China thinks himself thoroughly dressed without his fan.

We must add, whether it is agreeable to the Chinaman or not, that many of the Chinese are dirty fellows! Their persons and dress are both dirty. They seldom change their shirts or under-garments to wash them; most of them never employ a bath, either cold or warm. They use no soap, and scarcely ever wash their bodies; they carry no pocket-handkerchiefs. At night they sleep huddled under a coverlid, nearly in the same clothes that they wear during the day. The consequence of this habit, and of their filthiness, is, that they often swarm with vermin. It is said that sometimes the highest officers of the empire will, even in public, call their attendants to take some of these vermin from their necks.

The Chinese ranks are distinguished by different-coloured dresses. Just as in Turkey none but a descendent of Mahomet may wear green; so in China none but the emperor may wear yellow. That is the royal colour.

The different classes of mandarins are known by the different-coloured knobs on their caps. *White* is the colour for mourning in China.

We must not talk of the dress of the Chinese women.

Their *faces* are often daubed with different-coloured paint; their *teeth* are tinged green and yellow; and their *nails*, particularly amongst the higher classes, are often allowed to grow to the length of six inches. It would be almost as well if they allowed their toe-nails and toes to grow equally long; but you have heard, I dare say, how cruelly the poor feet of the Chinese ladies are served. As soon as a female child is born, her feet are tightly wrapped up. The bandages are at periods renewed, and the poor child is thus tortured that its foot may not grow to the natural size. It is a painful sight to a European to see a Chinese lady hobbling along with her feet in shoes four inches long, and two inches or so broad.

L. Such feet are really hardly large enough for her to stand upon.

P. The truth is, that the lady is a *cripple*.

If you ask Mr. Chinaman what other articles of dress have been sent to the Exhibition, he will show you. Here are the celebrated *crape shawls*; they are manufactured by the ladies of China at home. Here are *scarfs* made of crape and gauze; here are all kinds of silks, Pongee silks, Pongee silk handkerchiefs, plain and figured; filagree necklaces, and mother-of-pearl ornaments. But let us leave the Chinaman. We will cross the Transept.

Now let us see where we are. We are now in the *Western Nave* of the Exhibition. Here is the INDIAN DEPARTMENT.

INDIA.

To say how all the people of India dress would be very difficult. Come with me, and I will show you a collection of figures which will represent the different castes and trades of India. The room in which these figures are placed is a most magnificent place. It is fitted up in the style of an Indian palace. The collection of figures is a very extensive one. You may observe that each caste has a different costume.

W. What are *castes*, papa?

P. By castes we mean the different *ranks* of society in India. The whole nation of Hindoos is cut up into divisions, and each division has no connection whatever with any other. Whatever caste a man may be born in, in that caste he must remain all his lifetime. This system is a great curse to society in India. No man can ever raise himself to a better caste, so that few make any attempts at improvement. The highest caste is that of the *Brahmins*. They are the *priests* of India, and they enjoy privileges which are disgraceful to think of, for they are more than ought to be allowed to any mortal. Being priests, they cannot become kings, but they account the office of a king to be beneath their dignity. In the most trifling matters, they claim the first attention. Thus, it is said, if one has occasion to cross a river along with others, he enters the boat first, is first landed on the opposite side,

and then stalks away without paying for his passage.

Ion. What a shame!

P. The poor boatman does not think so. He would tell you that the privilege of carrying over so holy a person is quite a sufficient reward. The caste next in importance to the Brahmins are the *Warriors*. From them are chosen the kings, princes, and other rulers. The third class consists of those engaged in useful pursuits—such as agriculture and commerce. The fourth class includes the labourers and workmen.

The lowest of all classes are the *Pariahs*, or outcasts. These poor creatures are not admitted into any “caste”; they are accounted worthless, and are in a worse condition than the brutes. Many have no dwelling-place whatever, but live as the dogs do; indeed, they often quarrel with the dogs for the food which is thrown to them. Their countrymen abhor and shrink from them; they will not allow them to enter a temple, lest they should defile it. They are only employed to perform the filthiest of work and the meanest of offices—such as brutes perform.

We read in the Scriptures of man’s wicked inventions, and oh, how truly do you see the result of man’s inventions in the condition of these poor creatures! The religion of the Hindoos was made by man, and you may see what such religion does. These poor Pariahs are God’s creatures—“created in His image.” How

angry must the Almighty feel at an invention which causes His creatures to be so treated!

W. I am very glad that I was not born in India.

P. And so am I, Willie. Suppose we had lived there, and I had been born a *Pariah*. Such should I be now, and you also. Be thankful, too, that you live in the land which has been reached by the "glad tidings." May such glad tidings reach India soon, and cause the heart of man to flow with love toward his fellow-man!

But we were talking of the *clothing* of the Hindoos. Look at this little army of clay figures! Did you ever see such a variety of costume?

W. Some of the lower castes are almost naked.

P. Yes. Look at this group. Here you have a gardener, a shepherd, a village waterman, carpenter, blacksmith, ploughman, waggoner, and many others; none of these wear anything more than a piece of cloth round their loins and a turban on the head. The dress for the other part of their bodies is simply—*oil*. They rub it plentifully over their naked skins, and as there is plenty of oil in India, the natives find it much cheaper clothing than a coat or trousers. The turban was not anciently worn by the natives; indeed, the greater part of them do not wear it now. It was introduced by the MAHOMETANS when they conquered India, just as the TARTARS introduced pig-tails when they conquered China.

L. What is their cloth made of, papa; is it *cotton* or linen?

P. Cotton, which grows there abundantly. Cotton is one of the principal articles of manufacture in India; the most important is *silk*. The soft fingers of the Hindoo natives are well suited for all the fine processes of making silk and cotton cloth, and before we introduced steam-machinery to help our manufactures, the Hindoo cloths were much more valuable than the English. At the present time, vast numbers of these natives get their living by spinning and weaving. The muslins, calicoes, ginghams, and silks of India cannot, it is said, be surpassed. I may here mention to you that "*muslin*," which is a very familiar name to you, is so named from *Mosul*, the capital of Mesopotamia. This city is on the banks of the Tigris, and was once the greatest commercial city in the East. Look for it on your map.

W. Why is calico so called?

P. The word *calico* (another "household word") comes from Calicot, the capital of Malabar. From this town calico was first exported. You may look for this, also, on your map. But enough of India. As I said, it would be wearisome to describe the costumes. Let us say, lastly, that, as usual in Eastern countries, there is plenty of ornament worn by those who can afford it. Turbans of the richest velvet, "crimson and gold brocade," gold and silver tissues, and so on, are worn by the men. The women wear all sorts of things—gold and silver lace; elegant, yet massive trinkets,

such as bangles, ear-rings, chains, and necklaces; pearls, too, of the size of a pigeon's egg, and strings of diamonds are worn by the wealthiest classes. There are in India singing and dancing girls, called *nautches*. (I do not think you would like their dancing from the accounts I have read of it.) Let us conclude with the dress of a nautch:—

A nautch wears "grey silk trousers embroidered with silver, rich anklets strung with small bells—the *toes* covered with rings, and a silver chain across the foot—a very full petticoat of rich cloth, *deeply trimmed* or fringed with gold and silver. The *vest* is almost hidden by an immense veil which crosses the bosom several times, and hangs down in broad ends. The *hands*, arms, and neck, are covered with jewels, and in the hair are silver ribbons and bodkins. The *ears* are 'fringed' with rings, and through the *nose* is worn a large gold wire ring, from which hang a pearl and two other gems."*

Suppose our "savage" friend were to see this nautch, how he would wonder! He would think the whole thing very ridiculous, perhaps.

But India has long been famous for jewels, and the most costly contribution in that department is the large case of diamonds and precious stones. The principal is the *Durra-i-noor*, a rival of the *Koh-i-noor*, worth, I cannot say how many hundred-thousand pounds. In

the case are two necklaces of pearls, valued at £7,000, and varieties of rubies, emeralds, opals, some of which are wrought into exquisite patterns.

MALTA, CEYLON, JERSEY, AND THE IONIAN ISLANDS.

These places are widely apart, as you may see on the map. But their departments in the Exhibition are close together. This is because they are British possessions.

From MALTA we have many good specimens of black silk lace, bracelets, studs, hair-pins, &c.

From CEYLON—"Pearls, of course," you will say, for you have heard, ever since you were a baby, of the "Ceylon pearl fisheries;" but I cannot find a single pearl in the department.

From JERSEY, the principal articles of clothing are the specimens of Jersey knitting—"pair of knit stockings," "richly knitted jacket," &c.

The IONIAN ISLANDS are a republic in the east of the Mediterranean Sea—they cannot be called a British colony, being only under the *protection* of Britain. The most remarkable productions from there are the spendid aprons which the peasant girls of that country wear. I will read you the account of them from the OFFICIAL CATALOGUE:—

"An apron of muslin, made in Corfu, with a border worked on linen with the needle; somewhat similar to Dresden-work, but of

* Chambers's "Foreign Costumes," from which most of the preceding information has been obtained.

larger stitch, on a very elegant and classical pattern, of grapes, vine-leaves, and butterflies.

"An apron of *crochet-work*, remarkable for the beauty of the pattern and execution, and showing that *what has but recently appeared in England as an accomplishment, has been for ages the common needlework of the Ionian peasant-girls*. The border is of deep Dresden-work, of magnificent effect, with emblematical designs of lions, cupids, flowers, &c.

"These aprons are the ordinary work and every-day wear of the peasant-girls of Corfu; the dress of the Greek peasant-women, in general, being of an extraordinary richness, so that a peasant-bride's dress is often her dowry, being not unfrequently worth 400 or 500 dollars."

CAPE OF GOOD HOPE, WESTERN AFRICA, GOLD COAST, AND ASHANTEE.

These places you may also look for in the map. They are all colonies or "dependencies of Britain."

The most curious things from the Cape are the *karosses*, or cloaks, such as the Kaffres wear; they are made of the skins of wild animals. There are also a Kaffre warrior's head-dress; a Bushman's blanket; a very handsome tippet made from the feathers of the Cape birds. There are numerous skins of wild animals, collections of ostrich feathers, buffalo horns (you have heard of the Cape buffalo before), goat skins weighing 65lbs. each, sheep's-tail oil (you may remember the

account of the large-tailed African sheep which are found in Egypt), sea-elephant oil, elephants' tusks, and teeth of the sea-cow, rhinoceros hides, sticks, whips, &c.

One of the most peculiar articles sent was a pair of horns which showed to what an immense age the horns of the ox tribe grow in those parts. These famous horns measured "8 ft. 4 in. from tip to tip," and the circumference of one horn was 21 inches.

The contributions from WESTERN AFRICA are interesting. Here is a contribution, sent, I suppose, to show how much the African damsels work:—

"*Lime* made of bones burnt into ashes, mixed with water, and dried in the sun. Used by those who spin thread to keep their fingers dry."

Again, we have

"Female *fashionable* dress of cloth, worn by the higher classes. The brown cotton is taken from the silk cotton-tree, which grows on the Gold Coast, and most other parts of the west coast of Africa. The natives make their canoes by hollowing it to the required size. The green leaves just budding are very wholesome, and used as vegetables."

Here we have more fashionable dresses:—

"Fine and blue-glazed tobes, worn by the higher class. The manner in which the tobe is glazed is as follows:—After the cloth has been well dyed, it is taken out of the indigo dye, and hung up until it is thoroughly dry; then it

is spread on a wooden roller, and is well rubbed with the shell of a snail as hard as the force of the wrist can bear, which gives the gloss."

Here you find how Africa is beginning to learn the love of dress from its neighbours:—

"Fine checked long robe, and Haussa trousers, braided with red silk about the ankles, made after the Turkish fashion; worn by the higher class of people."

There are also many articles sent from Dahomey; including the throne and cushion of the king, who is the chief supporter of the slave trade,—he is, in fact, a *slave-hunter*.

ISLANDS OF THE EASTERN HEMISPHERE BELONGING TO BRITAIN.

I will give you the *names* of these islands in the Eastern and Western Hemispheres, and you will then, I am sure, be glad to find out their places. In the *Eastern Hemisphere* the only two islands from which goods have arrived, besides those already mentioned, are ST. HELENA and the MAURITIUS.

The inhabitants of the Mauritius have lately begun to cultivate a most important article of clothing, which will soon increase the prosperity of the island. The important specimen which they have sent is *seven pounds of white silk*, "reared from silkworms in the district of Tamarin." It is said that—

"The quality of the silk must not be taken as a criterion of what Mauritius will produce, as the manufacture is in its infancy.

"About 300 acres of ground have been planted in the cooler districts of Mauritius with mulberry trees, which have rapidly grown up, and are now fit for use. A company has been formed in Mauritius by the exertions of Mr. Evana Dupont, a barrister and planter there. An experienced 'fileuse,' has been engaged from the neighbouring island of Bourbon, and is now giving instruction to various proprietors. Some ten persons rear worms, and send to the company regular supplies of cocoons; and eighty-seven other proprietors have received cocoons and mulberry cuttings from the company. It is considered that this manufacture will flourish and increase rapidly in the island, and form eventually an important branch of trade, the climate and the soil being peculiarly suitable to the rearing of the silk-worm."

It is stated that

"Silk was sent from Bourbon, of such fine quality, as to fetch in Paris about £2 4s. the pound."

The Islands in the *Western Hemisphere*, belonging to Britain, are NEWFOUNDLAND, BERMUDAS, PRINCE EDWARD'S ISLE, CAPE BRETON ISLE, and *Islands of the West Indies*, such as GRENADA, MONTSEERAT, JAMAICA, BARBADOES, ANTIGUA, ST. VINCENT, TRINIDAD, the BAHAMAS, &c.; but not all of these have sent goods; indeed, the articles which some exhibit, were scarcely worth sending. The tortoiseshell from the hawk's-bill turtle, the silk grass fibre, some of which has

been made into very pretty fans, and the hats made of the bark of trees, are the most curious productions. Of course there are specimens of *cotton*; for you know that from the WEST INDIES and AMERICA the greater part of our cotton is procured.

THE BRITISH POSSESSIONS IN NORTH AND SOUTH AMERICA.

England once had much larger possessions on the continent of America than she has now. The great country called the United States once consisted of English colonies. The present possessions of England in *North America* are UPPER and LOWER CANADA, NEW BRUNSWICK, NOVA SCOTIA, and the large dreary tracts of land round HUDSON'S BAY. In *South America* are DEMERARA, ESSEQUIBO, and BERBICE, which three places are called BRITISH GUIANA.

CANADA has not sent many articles of clothing. There are specimens of flax and hemp, which flourish in that cold climate. There are bear, wolf, and fox skins, and dresses fit for those travelling in sledges; there are the horns of the moose-deer, or elk, and leather from that animal; there is also *whale-skin* leather, and leather from the skin of the porpoise, and other sea-mammals. There is a perfect *sledge harness*; for in the winter the Canadians travel much in sledges, which are drawn by horses.

From NOVA SCOTIA a very

important contribution has been sent. This is a collection of different sorts of iron. It includes pig, grey, bar, and rod iron; steel-iron, and steel. This collection is intended to prove that Nova Scotia can supply steel and charcoal iron in quantities *sufficient for the supply of the whole British Empire*. And what is more, the quality is said to be equal to that of the best foreign articles, and at greatly reduced prices. From NEW BRUNSWICK we have a specimen of jet coal, or *asphalte*, which has lately been discovered there. The description given of this coal shows it to be very important; it is said to produce "gas of the purest colour, and in greater quantity than any other coal used for the purpose." This coal is not only valuable in itself, but it increases the value of something else which has been mentioned.

W. You mean the iron ore found in NOVA SCOTIA; because, as the coal is in the neighbourhood, it will be useful for smelting it.

P. True; the articles just mentioned are not used for dress; but if you can trace the connection between coal and iron, you may also trace the connection between the iron and many articles of clothing.

BRITISH GUIANA is at the north part of South America; you may easily find it upon the map. This colony is a curious place, for it contains a very mixed population. English, French, Dutch, and the natives of America are all numerous there. The articles of

dress exhibited are not important:—the fibre of plantain, of silk grass, and leaves of the cabbage, palm cotton, barks of many strange trees, panther and leopard skins, and other articles used as clothing.

AUSTRALIA, &c.

“A case containing 132 specimens of Merino wool” is perhaps the most important article of clothing from AUSTRALIA; for wool is one of the greatest sources of wealth in that part of the world. The country seems to be particularly fitted for wool-growing; and at different times the Merino sheep, the Thibet sheep, the Cashmere goat, and all the breeds producing the finest wool, have been introduced there.

It is said that, “in 1807, the first importation of wool into England from Australia was 245 lbs.; but in 1848, it was 23,000,000 lbs. from New South Wales alone; and from all Australia 36,000,000 lbs.; which quantity is worth nearly £2,000,000.” That seems to be a wonderful amount of money to be produced from the backs of sheep!

The kangaroo is, as you know, an Australian animal. We therefore find *patent* kangaroo skins, and *enamelled* kangaroo skins, in the Australian collection.

It is worth while, here, to tell you about the Australian mines. We have specimens of copper from the *Burra Burra* mines, which have made a “great noise” lately amongst those

who understand the mining business. The mine was started about six years ago by a few merchants; their capital was £12,380, a very small amount for such a purpose. In the short space of five years, copper was procured to the amount of £738,108; and the mines now yield employment to 1,003 people.

These mines may be very celebrated, but recently certain “diggings” have been found, which have caused a great deal more noise. In these diggings, as they are called, quantities of gold have been discovered; and that part of Australia seems likely to become as famous as California. It is said in the newspapers that one lump has been found weighing *eighty pounds*. But we must not talk any longer about mines; they do not belong to our subject.

There! we have been a long time trying to find out what articles of dress have been sent to the Exhibition, and really there is very little that is at all describable. I think that you would have liked better to hear of their raw material—to have heard the history of the wool and cotton, to have known how it is all grown, and how it is changed into clothes. Suppose we wind up the account with some remarks on dress in general.

GENERAL REMARKS ON DRESS.

It is said that after all there is very little change in the style of dress in Europe. In St.

Petersburgh, in Copenhagen, in Paris, in London, and in America, you may see trousers and coats of cloth which only differ in their "cut." The same kind of cloth coat is worn by the rich and the poor, and a working man in his Sunday clothes may look as spruce as a lord. "Previous to the French Revolution," it has been observed, "the sword was the badge of a gentleman; but now that last difference has been put away."

"But in the East it is very different; there is a different dress for almost every rank. In Persia, Turkey, or China, the nobles are labelled with the signs of their importance; they carry their rank on their backs, and their honours on their sleeves; the rich nabob is distinguished from the 'fellah' by his cloth of gold and embroidery." It is said of the departments of the Eastern countries in the Exhibition, where the costume of the upper classes is found, that the sunburst of "barbaric pearl and gold" flashes around you on entering, showing "a taste for glittering trumpery, and display of riches." An Eastern noble, as he rides abroad, looks pleasantly at the magnificent figure he cuts; but it is said that his gold-embroidered robes are stiff and lumpy, while his saddle "gleams like a burnished throne."

It must, I think, be rather unpleasant when the signs of rank sit heavily on a man. How much more comfortable are some of the poorer classes whom

I described—those who will not be troubled by any burdens, but in the warm weather dress their bodies with oil! The *great* Indians, it appears, have the same feelings. Clothing, instead of being a necessary, is an ornament. Sir Thomas Munro says, that an Indian prince, after appearing in public, blazing in jewellery, in splendid shawls of countless price, in gold-embroidered silks, on an elephant, or a prancing Arab, will return home and pull off nearly everything. He will sit nearly naked, in a calico wrapper, just as Europeans do in their slippers and dressing-gown. Poor fellows! it is hard work to be noble!

One great distinction between the East and the West of the world is seen in the people's head-dress. The *turban* is the natural covering for a burning climate; it defends the scalp from the sun, and although it is rather heavy, it protects the wearer from any chance of being "sun-struck," while it sometimes produces perspiration. Besides this, it serves the Mussulman as a pocket. With all his *piastres* wrapped around his head, the turban-wearer will sleep soundly in the caravanserai, knowing that none but a most expert thief can deprive him of his money. Knowing these advantages, and that the Eastern folks have worn turbans for ages, you will be surprised to hear that certain reformers have sprung up, and have introduced a new head-dress. This head-dress is becoming very general, but it

has caused the old steady-going Turks to be very angry.

W. What is its shape, papa?

P. It is a sort of close fitting skull-cap, and in shape it is almost exactly like an English gentleman's *hat*, except that it has no rim. It differs, secondly, in colour, for it is of a bright red; and it differs thirdly in having a tassel at the top: it is called a *fez*.

L. Ah, I saw some people wearing them in the Exhibition! But it must take a Turkymen much less time to put on a *fez* than a turban. Pop it on! and then you are ready to go out.

P. That, I suppose, is its greatest advantage. But this *fez* shows how much people think about their articles of dress. The new head-dress has caused more excitement to the gentlemen of the East, than the Bloomer costume amongst the ladies of the West. They say it is an ungraceful red night-cap; that it gives no shelter to the head from the sun; that it makes no pleasant shadow on the face—which last particulars are true. But the new style is very rapidly adopted, notwithstanding. All the "fast" and *young* Mussulmans wear it; the Sultan has adopted it in his army; and in Constantinople there is a great *fez* factory, where enormous numbers are turned out every day. The regular slow-coach Turks look upon the abomination with horror. In some countries where the turban is worn, such as the North of Africa, an addition is made in the shape of an enormous broad-brimmed straw-

hat, which is clapped upon the turban itself. A good assortment of these were seen in the *Tunis* department of the Exhibition.

Now for a word on the head-dress of the West. In England, also, the head-dress is called an "abomination," and justly so. Ask an Englishman who does not like his hat, "What is the matter with it?" and he will soon tell you. "First, it has a queer shape—it's like a *pot*. Secondly, it is very dear, and soon becomes shabby. Thirdly, when the weather is windy—ah, then! the hat has little hold on the head, it presents a good broad surface to the wind, and accordingly the wind blows it off. You also know what follows—a round shape is a very good one for rolling, and it's very delightful amusement to see a man try to catch his hat; therefore the hat affords its owner a little exercise. Fourthly, a Scotchman may sit upon his 'bonnet,' and a German or a Frenchman may put his cap in his pocket and wear it again; but if an Englishman serve his hat so, it directly becomes 'a shocking bad hat,' and must not be worn. Fifthly, it is *heavy* in look and in weight; and, sixthly, it is little protection from the sun, for it is said that neither felt nor beaver will ward off a sun stroke." People in England have lately been trying to reform their hats, and articles called "*wide-awakes*" have been invented, but they have not become popular.

L. If I were a gentleman I would wear a *turban*.

P. Very nice-shaped turbans might be made; indeed, the turban is the most graceful of head-dresses. But it is objected that it is not fitted for our rainy country; and that an April in England would soon spoil it.

Now for a word or two on the subject of *foot-dress*. Of the *foot-dress* in general, there is not so much that is striking. There is a strong contrast between the top-boots of England and the slipper-like shoes and sandals of the East. The Orientals are, it is said, "a slipshod people." The yellow slippers they sent to the Exhibition are sadly wanting in comfort; there is scarcely room for the toes, and it is only by fitting them tightly into the shoe, that it can be kept on at all. The prevailing colour seems to be yellow. The shoes of some of the Turkish gentlemen are said to be of "majestic breadth," and "to be made as if they were intended for the slaughter of black beetles and other interlopers, which are too plentiful in Eastern places." It has been remarked that one of the reasons for wearing loose and easy shoes, is seen in the rules of etiquette in these countries; for, in entering a great man's house, it is necessary to leave your shoes at the threshold of his door; also, in wandering *around* the mosques, or in the mosques, or in any part which may be called "holy ground," the feet must be uncovered. The foot-dress of the West is also open to some objections. Travel along the north of France (Normandy),

up through Belgium and Holland, and you meet with those wooden shoes which, as I said, may be bought for sixpence per pair, and are called *sabots*. These *sabots* are awful things to look at; it must be almost as comfortable to be put into the stocks as a pair of *sabots*; and yet the little Norman and Dutch children run along in them at their ease—so great is the power of habit.

The *body* dress is generally found between that of the head and the feet. The most striking point in Eastern dress is the looseness of the robes. Instead of fitting close to the body, like the coat of the Englishman, the robes are loose and flowing, and in this respect they are far more elegant and natural than our own.

It is curious to see how, as people get nearer together, they learn from each other. The disposition to imitate is a prevailing part of our nature—thus we find that the Turks, who are found both in Europe and Asia, and the people of Egypt and the North of Africa, are more like the Europeans—wearing tight-fitting jackets over their robes, whilst others have jackets which hang loosely like our *paletots*. In noticing the patterns of the Eastern dresses at the Exhibition, you will observe that the most popular pattern is the stripe—there are some patterns "crossed." In Arabia the proper costume is of a pure white, although some few of the Bedouins have lately adopted the striped cloth; generally the white and red.

ARTICLES OF DRESS, RAW MATERIAL.

We will now leave the article of costume for a few words on the raw material from which it is produced. You know pretty well which are the chief raw materials for clothing.

Ion. Yes, we have heard them so often. I will see if I can mention them once more. The *Vegetable Kingdom* yields cotton, flax, and hemp.

The *Animal Kingdom* wool, silk, and fur.

These are the principal. The less important are the barks, gums, and fibres of trees, and the skins of the animals.

COTTON.

To begin with COTTON, you know that the WEST and EAST INDIES are the most famous places for this substance; but it will grow in other countries, if they be not too cold. For instance, the cotton-tree will grow in North America, and it is also procured from the South of Europe. It has often been described. I will read you an account of it.

“Cotton is a delicate fibrous substance found within the seed-pod of a tropical plant. It is in fact a series of vegetable hairs springing from the surface of the seed-coat, and filling up the cavity of the vessel in which the seeds are contained.

“The number of different kinds of cotton is very considerable. The plants vary in height from three or four to

fifteen or twenty feet, according to the species. The leaves are downy, and sometimes undivided. The flowers are either yellow, or dull purple. The seed-vessel is a capsule opening in three, four, or five lobes, and then exposing many seeds enveloped in cotton. The fibre is in some species much longer than in others, thereby giving rise to the commercial names of ‘long staple’ and ‘short staple’ cotton.

“The common herbaceous cotton-plant is the species most generally cultivated. It is an annual, and rises only to the height of about eighteen inches. It bears a large yellow flower with a purple centre, which produces a pod about the size of a walnut; and this pod bursts when ripe, exhibiting to view the fleecy cotton, with the seeds securely imbedded in it. This variety is sown and reaped like corn.

“The tree-cotton grows to a much greater height. If left to grow without being pruned, it sometimes attains a height of twenty feet. Marco Polo, the Venetian, who travelled in Asia four or five centuries ago, spoke of this tree thus:—‘Cotton is produced here (Guzerat) in large quantities, from a tree that is about six yards in height, and bears during twenty years.’

“The colour of the seed seems to be connected in some way with the quality of the cotton fibre. There is a West Indian wild cotton-plant, with so short a fibre that it cannot be spun.”

The quantity of cotton sent from America is immense. The

plant is well worth a great deal of care, and the planters are *obliged* to treat it carefully. You shall hear a few particulars concerning its *cultivation*.

“The crop is subject to many injuries, some of which the planter can contend against, while others baffle all his care. A single night’s frost, which sometimes occurs so late as the month of April, will ruin his whole prospect, and require a renewal of the labour; nay, one day of a strong north-east wind will blight a field of growing plants. If these sources of trouble are escaped, there is another often looked forward to with dread. This is a species of cockchafer, or cutworm, which cuts the young and tender plants close to the ground, sometimes ruining a whole field at once. When apprehension from these dangers is over, then comes on the labour of thinning the plants, which would injure each other if left as close as they were sown. The cotton-plant is of the tap kind, which sends its root straight down into the ground, and draws much of its nourishment from the atmosphere by means of its broad leaves; and the distance between the plants in the ground is regulated according to this circumstance.

“As the spring has its sources of mischief to the cotton-grower, so has the autumn. There appears about this time a *caterpillar*, which commits great ravages. This insect deposits its eggs upon the leaves of the cotton-plant during August; which hatch a few hours

after they are deposited. They do little or no damage during the first nine or ten days of their life, but a few days before completing their growth, they become so excessively voracious as to destroy an entire plantation in a few hours. Instances have been known of four hundred acres of cotton plantation being ruined in four days by them.

“Supposing the planter to have escaped all these multifarious evils of winds, insects, and rains, the cotton-fields begin to display a very beautiful appearance. ‘Wide-waving groups of viny foliage, blended with three-coloured blossoms of brilliant hues, and pods of darker shades in various states of ripeness. When the flower comes forth, it has a fine *yellow* colour, which it retains during the first day; under the influence of the night it changes to a *red* or crimson hue; in the third day it darkens into a *chocolate-brown*, and then falls to the ground, leaving a pod already half an inch in diameter.’

“The cotton plants begin to open about the 1st of August; from which time to the 1st of December the whole attention of the cultivator is directed to the ‘picking’ of the cotton, as the pods daily open. During the autumnal season, the winds are violent, and the rains heavy, so that the picking is a tedious operation.”

I mentioned to you, a little while ago, that the Hindoos were particularly famous for spinning and weaving. It ap-

pears, too, that they made cotton-goods long before the English did. It is said, in proof of the quality of these goods, that a Persian ambassador, on his return from India, presented his king with a cocoanut, which contained a muslin turban thirty yards long, and so fine as *hardly to be felt* when expanded in the air.

Dr. Ure, who has written much about manufactures, mentions this natural fitness of the Hindoos for the work. He says that, in Coromandel and Bengal, in nearly all the villages, every man, woman, and child is employed in making cotton cloth. He then goes on to say:—

“The peculiar tact of the natives causes their success in the manufacture, for as they are deficient in mere muscular strength, so are they endowed with exquisite sensibility and pliancy in every organ and limb. The hand of an Indian cook-maid is more delicately formed than that of a European beauty. An English workman could scarcely manage to work a piece of canvas with the simple loom with which the Gentoo weaves gossamer muslin.

“In India a weaver is no ignoble caste, looked down upon with disdain. He takes rank next to the scribe, and above all other mechanics. Were he to condescend to the performance of any drudgery out of the line of his business, he would lose his caste. Thus their fine physical organization, guided by experience, gave to Hindostan the monopoly of the cotton

trade, for at least three thousand years.”

Such was the case; but the fingers of the Hindoos have been surpassed—by what, do you think? By machinery and steam. It is said—

“So wonderfully perfect has the machinery become, that the Manchester manufacturers can pay for the importation of the raw cotton, for the process of manufacture, and for the expense of shipment to foreign parts, and yet undersell the Hindoos, who spin for three farthings a-day.”

The principal articles made from the cotton are Calicoes, Gingham, Muslins, Dimities, &c. You may yourselves sit down and make a list of the other cotton goods. You will find that the various sorts are very numerous.*

FLAX.

The FLAX-PLANT is next in importance to the cotton. I dare say you have seen this plant; if you have not, you had better buy a pennyworth of linseed from the chemist, and sow it in your garden. There it will grow up with a stem, about twenty inches in height. It will bear a blue flower, which will be succeeded by the seed. As the Latin name for the plant is *linum*, the seed is called *linseed*, and the cloth made from the plant is called *linen*.

* The accounts of Cotton and Flax are taken partly from Knight's Pictorial Gallery of Arts.

Ion. From what part of the plant is the cloth made, papa?

P. From the long stalk of the plant, which separates into very fine silk-like fibres; but when you hear how it is cultivated you will understand better.

"The flax-plant, like the cotton, requires great care in the cultivation. The flax-plants come up thick and evenly, and with them also some weeds. As soon as the flax is a few inches high, the weeds are carefully taken out by women and children, who do this work on their hands and knees, both to see the weeds better and to avoid hurting the young plants. They tie coarse pieces of cloth round their knees, and creep on with their face to the wind, if possible; this is done that the tender flax, which has been bent down by creeping over it, may be assisted by the wind in rising again."

It appears that the sooner the plant is gathered the finer the fabrics are. If very fine flax is wanted, for making *cambrics*, the plants are pulled as soon as they get yellow at the bottom of the stem. They are gathered in small bunches, which are laid upon the ground to dry, and are afterwards stacked.

They are next steeped in water, which is an operation requiring great care. It is said that—

"The object of this process is to separate all the bark from the stem, by dissolving a glutinous matter which causes it to adhere. The usual mode of

steeping in England is to place the bundles of flax horizontally in shallow pools or ditches of stagnant water, keeping them under water by means of poles or boards, with weights laid upon them; water nearly putrid is sometimes employed, but at the hazard of staining the flax. In Flanders, however, where flax-steeping is a distinct trade, matters are thus conducted. The bundles of flax are placed in a frame made of oak rails, and then immersed in the river Lys. Boards loaded with stones are placed upon the flax, till the whole is sunk *a little* under the surface of the water; the bottom does not reach the ground, so that the water flows both over and under it. There are posts driven in the river to keep the box in its place; and each steeper has a certain portion of the bank, which he calls his own. The flax takes somewhat longer time in steeping in this manner than it does in stagnant or putrid water; but the resulting colour of the flax is very much superior. When it is supposed that the flax has been steeped nearly enough, it is examined carefully several times in the day, to ascertain whether the fibres readily separate from the wood throughout the whole length of the stem. As soon as this is the case the flax is taken out of the water; for the quality of the flax is injured by the steeping being either too much or too little by only a few hours."

In this way the *bark* is separated from the fibres, but there is yet a woody portion inside

the stem, from which the fibres have to be drawn off without injury. To do this the steeped stalks have to be again dried, and go through certain processes called *breaking* and *scutching*. You may easily understand these. The stalks having been dried until they are quite brittle, and some of the fibres separate of their own accord; the “breaker” lays them in rows, and lets a heavy weight fall on them, or they are rolled by heavy iron rollers. The wood inside is thus smashed without injury to the fibres. The scutcher has then to take these stalks, and beat them with a “scutching-bat,” until all the broken pieces of woody stem are knocked off.

The flax is now ready for the factory, where it undergoes the operation of “scutching the ends.” It is next “heckled”; that is to say, it is passed through five or six iron combs, beginning with a large-tooth comb, and ending with a small-tooth comb, until it becomes soft, silky, glossy, and free from dirt, and is quite fit for spinning. The other processes you must see to understand; they are named “doubling,” “carding,” “drawing,” and “roving.”

Flax is made into many different cloths,—table-linens, shirtings, damasks, and sheetings; huckaback and diapers are the principal.

L. Which are the principal flax-growing countries?

P. By far the most famous people for flax are those of BELGIUM and FLANDERS. The Flemings have been

noted for ages as cultivators and dressers of flax, and have had in their own hands the raw materials for the most finished goods. This partly accounts for the superiority of the Belgium lace, which has already been mentioned. A long time ago, they were able to form thread of so fine a texture that its value was *ten times the price of standard gold*. How fine a thread they can make now, it is not easy to say.

The process of steeping in the river Lys gives the Flemings the main advantage, and therefore they are now being imitated by others. IRELAND is famous for its linen, and some years ago a large society was formed for improving the manufacture in that country.

When the Exhibition prizes were distributed, the society received a “council medal” for its improvements in flax. I saw one of the reports of the society a few days ago, and it appears that they are doing a great deal of good. They have brought over some Flemings to teach the natives, and have almost doubled the produce of the island since they began. It appears that the inferiority of the Irish flax was caused principally by carelessness. The cultivators would not pay enough attention to the soil, the weeding, and steeping—they chose rather to say that it was the fault of the country, and that it is impossible for a crop of flax to be as profitable in Ireland as on the Continent.

W. How much we do owe to those Flemings, and the

French people! The Flemings taught the English to make woollen cloths, at Canterbury and other places. Do you not remember Mr. Young's letters? And in our history of England we learned how the persecuted French introduced the silk-weaving when they settled in Spitalfields.

L. And we owe many of our garden vegetables to the Flemings; they introduced the Windsor bean, and the brocoli, you may remember. And you told us, papa, that we used to send to Flanders for early green peas.

P. True. The raw material next in importance to flax, is perhaps *Hemp*. The hemp plant grows in Russia and other cold countries; hemp is stronger and longer than flax, and is used principally for coarse goods, such as sacking, sail-cloth, ropes, and all kinds of cordage, twine, &c.

STRAW-PLAIT.

The straw-plait manufactory must not be passed by unmentioned. It has been of very great importance. Some of the plaited straw once sent from Leghorn, in Tuscany, was almost worth its weight in gold. In England, in the counties of Buckingham, Bedford, Essex, Cambridge, and Suffolk, straw-plait affords in-door employment to many of the women and children. In the summer, they sit all day long at their cottage doors, plaiting straw—but they earn very little. You know the use of straw for hats and bonnets.

WOOL.

Wool is the principal raw material from the *animal* kingdom. One of the most interesting woollen contributions in the Exhibition, is the case of CASHMERE SHAWLS and dresses, which was sent by *His Royal Highness THE PRINCE ALBERT*. The case contains two shawls, two dress-pieces, and a piece of coarse woollen cloth, made from the wool of the Cashmere goats kept by his Royal Highness in Windsor Park.

The wool which is shorn from the Cashmere goat consists of substances of two qualities: one part is a beautifully soft and *fine* down, which is found close to the animal's skin; the other substance is outside the fine wool; it is harsh and coarse, and is called *kemp*. These two wools are, unfortunately, so intermingled, that they cannot be separated by machinery, and the coarse wool can only be drawn out from it one fibre at a time by hand; of course such a process is exceedingly slow and tedious.

It would never answer, as a matter of business, thus to separate the fibres to make fine shawls; the cost of the goods would be so great, that no one would buy them. But, as soon as it was known in the districts of the woollen manufacture that the Prince wished to try the manufacture from the fine wool, it is said that there were hundreds of hands, from the highest to the lowest, who *offered* to help. They all set about separating the fine from

the coarse wool, most earnestly, without asking to be paid. They were as anxious to make this woollen manufacture for the Prince as the English ladies were to manufacture their carpet for the Queen. I have read, that for some months, upwards of 1,000 persons were engaged during their leisure hours in this "labour of love."

From the fine wool which these parties so willingly picked, the shawls in the Exhibition have been made. The piece of coarse cloth is manufactured from the coarse wool or "kemp."

But, as I said, goods manufactured from the wool of the Cashmere goat are too expensive. The articles called Cashmere shawls in this country are not *really* so, they are made of other wool. Real Cashmere shawls seldom find their way to Europe; they are so eagerly sought after by the rich "Sultans" and "Rajahs" of the East, who frequently pay thousands of rupees for a pair. To make a large handsome pair requires, we are told, the labour of twelve or fourteen men for half a year.

L. Now, papa, will you tell us where the *raw material*, wool, comes from, principally?

P. I think I have mentioned the principal woollen countries before. SPAIN, with her merino sheep, was once the most important, but is not so now. GERMANY is of greater importance; large quantities are bought at *Leipsic*. A great deal is also brought from ASIA; but perhaps the greatest quantity is brought from AUSTRALIA.

Abundance of wool is procured from WALES, too; from SCOTLAND, and various parts of ENGLAND.

The principal kinds of cloth made from wool are BROAD CLOTHS, *kerseymeres*, *serges*, *bombazines*, &c. These are all used for purposes of clothing; they are made from what is called *short wool*, and are called "Woollens." The other class of goods are STUFFS, *blankets*, *flannels*, *baize*, *moreens*, *camlets*, &c.; these articles are made from the *long wool*; they are principally articles of hosiery, and are called "Worsted."

L. What is *crape*, papa?

P. Crape is a mixed substance. The *Norwich crape* is formed of wool and silk; the *Lyons crape* is formed of *worsted* and silk.

SILK.

What a different substance from wool is SILK!—the wool growing on the back of the sheep, the silk drawn out in an almost endless line from the inside of a caterpillar. One grows like a vegetable, the other is only spun.

The CHINESE were the first people who wore silk dresses. The Europeans admired their smooth glossy appearance, but they thought that the silk was a *vegetable* production. At length the secret was found out by two monks. In the year 522 some silkworm-eggs were smuggled away from China in a hollow cane; they were hatched, and the young worms were fed upon the leaves of the wild mulberry-tree.

Now, the principal silk-producing countries are CHINA, INDIA, PERSIA, TURKEY, ITALY, and the South of FRANCE. Many attempts have been made to produce good silk in this country, but the expense of rearing and attending to the worms has always been greater than the value of the silk.

FUR.

FUR is the principal animal clothing for cold countries, just as silk is the animal substance used in warm countries.

We might almost have included its history with that of the wool, for both substances are really hair.

W. And both are “coverings of the skin.”

P. Yes. But we find the smooth glossy form of the fur to be so convenient that we do not shear it from the skin as we do the wool; we rather shear the skin from the animal.

The finest collection of furs in the Exhibition was that sent by Mr. Nicholay, of Regent Street. The Emperor of Russia sent some fur articles, one of which was a black cloak “made from the neck of the silver fox.” He valued it at £3,500. Mr. Nicholay, however, did not agree with the Emperor’s “estimate”; he offered to make a finer cloak for £1,000. He says that these black skins are brought from Hudson’s Bay, and are *smuggled* into Russia in consequence of the high price they fetch.

LEATHER.

LEATHER is perhaps a more

important animal produce than fur. You know that it is the skin of animals rendered hard by the peculiar properties of the oak bark. This bark, and those of most other trees, contain, as I have said, a principle called *tannin*. The tannin is very “astringent”; it binds the particles of the leather together, and renders it almost waterproof; at the same time it preserves the substance from decay.

Of the processes of “*leather-dressing*” and “*tanning*,” I have hardly time to speak. Calf, kip, morocco, roan, kid, and sheep, are the principal kinds of leather.

The other raw materials, such as *horn*, *whalebone*, *bone*, &c., are all more or less important; but these you may study for yourselves. You may also acquire for yourselves much more information on the subjects we have talked about.

Ion. If you will lend us some books, papa, I should like to read more about them.

P. I am glad to hear you say so. Who would not wish to know more than he knows already? I would like you to learn much of all things round about you. Tell me why you should want to gain more knowledge.

W. I like to gain knowledge because it is pleasant.

P. Try also to gain knowledge for the sake of others. *Get* knowledge that you may *give* it. The getting will afford you pleasure—the *giving* will afford you more pleasure; and more still, you will thus be pleasing God.

When PRINCE ALBERT designed the Great Exhibition, he had such thoughts as these—he wished men to *learn*, that they might *teach*. The providence of God has ordained that by teaching one another men may become as brethren, and live together in peace. Thus, when the Prince spoke of the Exhibition to which he was looking forward, he said,

"I conceive it to be the *duty* of every educated person, as far as in him lies, to add his humble mite of individual exertion to further the accomplishment of what he believes Providence to have ordained."

Can you understand those words?

W. I cannot understand them very well.

P. Then you may read them over again, and think about them. And as you grow up to be a man, ask for God's help that you may become a truly "educated person." Ask that you may be educated in spirit as well as in mind; then God will honour you to be of service in promoting the designs of His providence. You may also learn this beautiful hymn, to help you to remember God.

PRAISES FROM THE GREAT EXHIBITION.

THY bounteous hand, O Lord !

This gathered wealth bestows ;
By thee the swelling tide is poured,
From thee its fulness flows.

Thine are the gold and gems
O'er Indian surges borne—
The glistening pearls, the coral
stems,
From ocean caverns torn.

Thine the warm colours bright,
Of every tint and mould ;
Thine the pale marble's purer light,
All colourless and cold.

The gorgeous rainbow plumes
From tropic forests wide—
The downy webs of Eastern looms—
The palm-tree's waving pride—

All, great Creator, all,
E'en as ourselves, is thine ;
Nought, of all this, our own we
call,

Save by thy gift divine.

Then let thy blessing crown
The world's great jubilee,
And smile with beams of mercy
down
On earth's one family.

Too long thy children's blood,
Shed by each other's hands,
Unchecked hath rolled its crimson
flood

O'er all the guilty lands.

Too long—but now no more—
We blush at what hath been—
Henceforth, from sea to furthest
shore,

Be peace and concord seen.

Like brethren, hand in hand,
The nations mingle here ;
Our Palace is their fatherland—
We bid the nations cheer.

We clasp in one embrace,
One brotherhood of soul,
Our kindred of the human race,
From Afric to the pole.

And to thy name, O Lord !

Eternal Three in One !

From every heart the strain is
poured,

As from the heart of one.

"All glory and all praise,"
To Thee, the great I AM,
And to the Spirit of thy grace,
And to the incarnate Lamb.

Worcester, 1851.

II.

PART THE SEVENTH.

CHAPTER EIGHTEENTH.

THE "LIONS" OF THE EXHIBITION.

Do you remember any objects in the Exhibition which you noticed more than the others?

Ion. I do, papa. I looked more at the CRYSTAL FOUNTAIN than anything else. There were a great many more things all down that "Nave" which pleased me. Let me count up all that I can remember.

P. Very well; proceed.

W. First, there was the *Crystal Fountain*; secondly, the *Koh-i-noor*—every one will remember that; thirdly, there was a great lump of *Rock Crystal* near the *Koh-i-noor*; fourthly, there was that large *Wine Jar* from Spain. Then I remember the great statue of *Godfrey de Bouillon*; the statue of *St. Michael and the Dragon*; and the statue of the *Amazon*.

L. And the *Greek Slave*.

Ion. And the great *Bavarian Lion*.

L. There was also the beautiful case from France.

W. Yes. *Constantin's Artificial Flowers*; the *Silk trophy* from England; and the pretty *Corn trophy* from Russia. The *India Rubber trophy*, too, was a remarkable thing. The *Timber trophy* from Canada; and the great *Jaw of the Sperm Whale*; the *Stuffed Animals from Wurtemberg*; the *Coalbrook-dale Iron Dome*; the great *Slab of Mahogany*; and the large masses of

Crystalized Alum. I think they were the principal things that we noticed.

P. And these, and many other things, have been long remembered, not only by you, but by most of the visitors. From the great share of attention they have attracted they have been called the *Lions* of the Exhibition.

I have made you some drawings of these objects. Suppose that I arrange them in the order in which you mentioned them, and tell you something about each.

L. Yes, do, papa. Just tell us enough about each to help us to remember it.

P. Very well. First,

THE CRYSTAL FOUNTAIN.

I should think that every one who went to the Exhibition saw the CRYSTAL FOUNTAIN. When people went in parties and separated, or when they made engagements to meet one another, the rule was, nearly always, "Meet me at the Crystal Fountain."

And it was a very pleasant place to meet at. It was pleasant to look at its brilliant columns of glass, and the glittering water. The falling spray not only made music, but seemed to cool the air. The water rose through a tube which is silvered, but it could not be seen, for the glass of the column

is so cut that the reflection of the light hid it.

W. What a large basin there was, papa, surrounding the fountain!

P. Yes. The basin is said to be 24 feet in diameter; the fountain is 27 feet in height; and the weight is said to be 4 tons.

W. That is 80 cwt.!

P. True. It was made by Messrs. Osler, of Birmingham. Their names, as glass-makers, will not easily be forgotten now.

THE KOH-I-NOOR.

I said, perhaps every visitor saw the Crystal Fountain; so, I suppose, every one saw the Koh-i-noor; and also, that every one must know what Koh-i-noor means. All day long the thousands of people were asking the guardian policemen, "What is its name?" and all day long did the policemen answer, "The Koh-i-noor, or *Mountain of Light*."

W. I should like, papa, to hear the Koh-i-noor's history—very much.

P. I have here a work called "The Crystal Palace and its Contents," which contains both the ancient and modern history of this wonderful jewel. I will read it to you:—

"The KOH-I-NOOR is one of the most valuable diamonds known; there are only two others estimated at a higher price. One of these is the *great Russian sceptre diamond*, a perfectly round and beautifully cut brilliant, the finest diamond in the world, and valued at £4,800,000. The other belongs to the little kingdom of Portugal, but is uncut; it is the size of a turkey's egg. It is supposed to be

still more valuable, but it has never yet been entrusted to a lapidary.

"The Koh-i-noor has long enjoyed both Indian and European celebrity. Hindoo legends trace its existence back some four or five thousand years, and in a heroic poem of great antiquity, which is still preserved, it is called *Mahabarata*, which would imply that it is one of the most ancient of all the valuable precious stones that have come down to our times. The poem in question details its discovery in the mines of the South of India; it states that it was worn by one of the warriors slain during what is called the Great Indian War, which is supposed to have happened nearly 5,000 years ago. No mention is made of the diamond in Indian record from this period up to the year 56 before Christ, when it is referred to as being the property of the Rajah of Nijayin. From him it descended to his successors, the Rajahs of Malwa, until the principality was conquered by the Mohammedans. Into their hands it fell, with other spoils, said to be of greater value than were ever before or since amassed in India."

W. I remember, papa, that when you spoke of the costume in India, you spoke of the Mohammedan Conquest. You said that the Mohammedans introduced the *turban* as a head-dress.

P. You shall read about the conquest of India one day; but let us proceed.

"About the beginning of the fourteenth century, the Mohammedans, in their turn, were subjugated. The principality of Malwa was overrun by the armies of Ala-adin, the Sultan of Delhi, in 1306, and the KOH-I-NOOR became the property, with other treasures, of the Sultan Ala-adin.

"About 200 years back may be said to commence the modern history of this singular diamond.

JEAN TAVERNIER, an enterprising French traveller, and an eminent jeweller, visited India about the year 1660, for the purpose of purchasing diamonds and other jewels. His profession and his personal character recommended him to the nobles of the court of Delhi, and even of Aurungzebe himself. By the Sultan's command, Tavernier was permitted to handle and weigh the jewels in the imperial cabinet. Among them was one which far surpassed all the rest in size and value. Tavernier describes it as rose-cut, the shape of an egg cut in two lengthwise, of good water and great transparency, and weighing 280 carats. There is but little doubt that the diamond thus examined, and described as forming one of the collection in the Delhi cabinet 200 years ago, was the Koh-i-noor.

"AURUNGZEBE's great grandson, named MOHAMMED SHAH, is the next important person connected with the Koh-i-noor. His kingdom, Delhi, was conquered by another great Eastern ruler, named NADIR SHAH, and the diamond then changed hands in a singular way. It is said that Nadir Shah, on his occupation of Delhi in 1739, compelled Mohammed Shah to give up to him everything of value in the imperial treasury; and his biographer, a secretary, mentions a *pesh-kash*, or present, by Mohammed Shah to his conqueror of several magnificent diamonds. But this was not enough. Mohammed Shah was in the habit of wearing the great diamond in the front of his turban, and on the first interview between himself and his wily conqueror, the latter *insisted upon exchanging turbans as a proof of his regard and friendship.*"

L. Poor Mohammed! I should think that he would hardly like such friendship; he would not believe it to be true.

P. No. Only a *conqueror* would ever have made such a request; the value of a kingdom changed hands when those two gentlemen changed turbans. But I will read on.

"In whatever way it was obtained, there is little doubt that the great diamond of Aurungzebe, which was then famous all over the East, was in the possession of Mohammed Shah at the time of the Persian invasion, and that it then changed masters and became the property of Nadir Shah. It was when it came into his hands that it first obtained the name of *the Koh-i-noor*. Upon the death of Nadir the diamond became the property of AHMED SHAH, of the kingdom of Kabul. It is said that Ahmed Shah prevailed upon the young son of Nadir Shah to show him the diamond, and then retained it; the young man not having the means of enforcing its recovery.

"The subsequent fortunes of the Koh-i-noor are no longer matter of doubt or question. The jewel descended to the successors of Ahmed Shah, and Mr. Elphinstone saw it worn by SHAH SHOOJA as an armlet surrounded with emeralds. When Shah Shooja was driven from Kabul, he became the nominal guest, and actual prisoner, of RUNJEET SING, the ruler of Lahore. Runjeet spared neither opportunity nor menace to get possession of it, and in 1813 he induced or compelled the fugitive monarch to resign the precious gem, presenting him on the occasion with a lac and 25,000 rupees, or about twelve thousand pounds sterling. Shah Shooja, however, gives a different account. He states that Runjeet Sing assigned to him in exchange for it the revenues of three large villages, not one rupee of which he ever realised."

W. What did Runjeet Sing do with it, papa?

P. He wore it, to be sure. It is said that he was "highly elated," and he wore it as an armlet on state occasions. But the precious jewel had more adventures. Runjeet Sing must die! but not so the Koh-i-noor. Thus, when the Prince's death-time came, there was the great question, "Who is to have the diamond next?" The crafty priests of the land had a try for it, but failed. The ruler's life was ebbing away; and they persuaded him to make it a present to the great Indian idol *Juggernaut*. Runjeet could not speak, but he made a slight bow with his head to say "yes." Runjeet's secretary, however, would not agree. No! no! He declared that he must have a better authority for such a wonderful gift than the movement of a dying man's head—he would not give it up until he had a *written order*, properly signed. But before this could be made out, poor Runjeet died.

L. Then who had it next?

P. It passed to Runjeet's successors, and was much worn by them. On all state occasions, at every public festival, out came the wondrous Koh-i-noor! SHEE SING was the last monarch who wore it, and he was murdered. It then remained in the treasury of Lahore, until their last monarch was superseded by the BRITISH GOVERNMENT.

W. When was that, papa?

P. A year or two ago. You have often heard me talk of the great war in India, with the *Sikhs* (seeks). These people are the inhabitants of Lahore; their country is sometimes called the Punjab, which means "the country of the five rivers." In the last great Indian war our army conquered the Sikhs, took possession of Lahore, and "annexed" it to British India.

All that they found in the Lahore

treasury they seized, to pay the expenses of the war. Amongst the articles was the Koh-i-noor, which was then destined to leave the Eastern land for the West. The East India Company said that it was a state jewel—that it could not easily be exchanged for rupees, and that it should therefore be presented to the Queen of England. Accordingly, Lord Dalhousie sent it to England, in charge of two officers.

Since the arrival of the gem in England, it has passed through a more "glorious career" than ever. It has engaged the attention of *all nations*. More, from being the ornament of tawny Indian princes, it is now to adorn the person of our fair and beloved sovereign, who shines forth more brilliantly than many Koh-i-noors amongst the rulers of the earth.

W. Well, I heard the people at the Exhibition grumble that it did not shine enough—perhaps the Queen will teach it to shine.

Ion. Or, perhaps the Queen has "taken the shine out of it"; it's a very different thing to be an ornament for black princes.

P. This wonderful diamond, after all, is very badly cut and polished. It is not known where the operation was performed, but it is said that it was done by an Italian lapidary; and when it was found in what an unworkmanlike manner he had cut it, he was immediately executed. The last point worth noticing is, that no one has ever yet *bought* it. Two million pounds is a rather heavy amount to pay down in hard cash.

W. Yes. I noticed that every time it changed hands it was taken by force. You told us of its being gained by conquest four times. I hope that no one will ever conquer England and take it away. It seems to be more safe now than it ever has been.

P. We have had such a long talk over this Koh-i-noor that we shall only have time just to mention the other "lions."

THE MASS OF ROCK CRYSTAL, &c.

This was sent to the Exhibition principally on account of its great size. You may read in "Little Henry's Holiday" what rock crystal is composed of. This mass was cut out of the *Simplon*, a celebrated road which was cut through the Alps by Napoleon Bonaparte.

THE SPANISH WINE JAR.—This great *Jar* is an ugly-looking thing, but it well represents Spain. The making of wine is one of the principal employments in that warm grape-growing country. The jar is a wine-cooler; when used, it is filled with wine and is placed under the earth.

GODFREY DE BOUILLON, &c.

Of this statue you may also read in "Little Henry." I have only time to say that Godfrey was a great crusader: he was the leader of the second crusade, and was proclaimed King of Jerusalem, A.D. 1099. There was also a giant statue of RICHARD I., the Prince of the Crusaders, outside the building. The figure in the Exhibition is only a cast from the original, which was made in bronze, and is at Brussels. It is the work of an artist named M. Simonis.

ST. MICHAEL AND THE DRAGON.—The colossal proportions

of this statue render it a striking object. It is the work of a French gentleman, M. Le Seigneur, and is intended to represent the Archangel overthrowing his enemy Satan. The subject is a very good one, yet both this and the statue of Godfrey de Bouillon have been found fault with as works of art.

THE AMAZON.—M. Kiss, of Berlin, is the artist who designed this famous piece. Directly the Exhibition was opened it became a great favourite. So also did the GREEK SLAVE, which was more *beautiful* and interesting than fine. I need not describe them to you; you may better understand them by the pictures.

The great BAVARIAN LION was looked upon by our artists as a failure. Its size was its great recommendation; it was a truly monstrous lion.

THE SILK TROPHY, &c.

The silk trophy was truly interesting as a specimen of the English manufacture of silk. The art of silk-weaving was introduced into England by the persecuted Protestants of France, who were obliged to flee from their country. You may read in many history books of "The Revocation of the Edict of Nantes," by which so many hundreds were compelled to flee to England for protection. A great number settled in London, at a place called Spitalfields. It is from Spitalfields that the trophy was sent, by the manufacturers, Messrs. Keith and Co.

THE CASE OF ARTIFICIAL FLOWERS is a beautiful testi-

monial of the wonderful skill of the French. Nothing could possibly be more like nature than these artificial flowers. Although they are made of cambric, they have often been mistaken for real flowers. Visitors have been seen to stand and admire them for two or three minutes without knowing that they were artificial.

THE CORN TROPHY, &c.

This collection is from Russia, and is a very tasty display of seeds and grasses. Some very fine wheat is shown, and there are specimens of dried green peas, which, when boiled and brought to the table, look as fresh as though just picked from the garden. Russia ought to produce a fine corn trophy, for this large empire contains *one-seventh* of all the land on the earth. Thus it has every variety of climate and soil. It is said that—

"There are in the world two great districts composed of '*vegetable soil*'; one in RUSSIA, and another in HINDOSTAN. In the centre and south of Russia, the soil consists entirely of decayed vegetable matter, to the depth of three to six feet. This tract of vegetable soil is as great as all France and Austria together: it is most fertile, and on it is grown the immense quantity of wheat with which Russia supplies so many nations of Europe."

Ion. Then I say that, with such land as that, Russia ought to have sent a good corn trophy.

P. True. The INDIA-RUBBER TROPHY is another interesting object. It contains some useful articles, such as India-rubber pontoons, and life-boats, of which there are a wonderful variety in the Exhibition. You know, I presume, that India-rubber is the juice or gum of a tree. It grows principally in America, where it flows from the tree like milk. Gutta Percha is a very similar gum.

The TIMBER TROPHY, from Canada, is a most useful collection. The sugar maple, the hard iron wood, and many others, are sent from Canada's ancient and immense forests. These forests contain all varieties of timber; and the timber trade of Canada supplies employment to from 8,000 to 10,000 men.

The JAW OF A SPERM WHALE is a monstrous thing. The whales from which we procure oil have not any teeth; they have instead, a substance called "Whalebone." The Sperm Whales are so called, because they contain a substance called Spermaceti. These are the whales in which we find teeth. They live in the South Seas.

The STUFFED ANIMALS FROM WURTEMBERG. — Wurtemberg is, as you know, one of the kingdoms of Germany. Some of the Germans are fond of making amusement with the lower animals. The children's books are full of droll stories of animals; and the "comical creatures" at the Exhibition afforded amusement to thousands.

THE COALBROOK-DALE IRON DOME, &c.

This immense casting was admired by many, although it was often asked, For what purpose is it made? It is, I suppose, a garden ornament. Its principal use has been to prove the skill of the *Coalbrook-dale Iron Company*, who sent it. Coalbrook Dale is a beautiful valley in Shropshire, through which runs the river Severn.

THE GREAT SLAB OF MAHOGANY gives an idea of the wonderful size to which trees *can* grow in the tropics. It was sent from Honduras, a place between

North and South America. It measures 57 inches across, and 64 from the top to the bottom.

THE MASS OF CRYSTALIZED ALUM is the last subject which I have drawn for you. The process of alum manufacture is a very singular one. You will find it described in "Little Henry's Holiday." In "Pleasant Pages" we will have an object lesson on this substance, and other chemicals.

There were, as I said, several other "lions," but I have scarcely time to describe those which I have drawn for you. You must try and make out an account of them for yourselves.

THE TROPHIES OF PEACE.

ADAPTED FROM "HOUSEHOLD WORDS."

A MIGHTY dome is reared in solemn state,
To hold the produce of the world's invention ;
The spacious palace of *the labouring great*,
Whose bloodless triumphs history loves to mention.

The "trophies" of the past fade into gloom,
Which conquerors planted on the field of battle ;
When breathing armies sank before their doom,
And shouts of glory drowned the low death-rattle.

These things were once, while yet the world was young,
Ere it drank wisdom from the fount of reason ;
Now let a curtain o'er such scenes be hung—
War's winter fled, we hail a softer season.

The love of art engenders love to man,
And this, in turn, the love of his Creator ;
'Tis ignorance that mars Heaven's gracious plan,
And rears in blood the murderer and man-hater.

But now the children of the human race,
Crossing their bounds to mingle with each other,
In foreign nations kindred features trace,
And learn that every mortal is their brother.

PART THE EIGHTH.

CHAPTER NINETEENTH.

THE VISITORS TO THE EXHIBITION.

P. At the beginning of our book, I read to you the description of the Crystal Palace, and the opening of the Exhibition on the 1st of May. Since those pages were written, the Exhibition has run its course; it is now closed, and the wonderful days of its career are matters of history.

I need hardly tell you of the crowds of visitors who came to see the grand sights. Just as the light of the sun and "the rain from heaven" are given to all, so also the glories of the Exhibition were prohibited from none who had a mind to understand instruction, or a soul to enjoy pleasure.

So, all people came. The Queen, and the nobles; the boys and girls from the charity schools; learned men, and men of science; ploughboys, and old people from country work-houses; clergymen, and men of war; merchants; tradesmen; clerks; shop-boys, errand-boys, costermongers, nursemaids, and other household servants,—all kinds of folks were there.

And their numbers. A thousand people means *ten hundred*; that is a great many! Ten thousand is a great many more; they form a vast crowd. Yet when the Exhibition was to be opened, and every one talked about it, many thought, "Ah!

there will often be *three times ten thousand* there in one day."

W. That would be too many!

P. Well, some said that the vast Crystal Palace would hold even forty thousand people—if so many should ever come together. They did not think that the number could ever be larger; but it was prophesied that if the number should ever reach 50,000, great mischief must happen. It was said, too, that no more than 60,000 could be *crammed together* within the walls.

So people waited till the Exhibition was opened. During the first three weeks, the period of the *five-shilling* days, from fifteen to twenty thousand had met daily. But when the *shilling* days came, before a fortnight had passed away, it was found that more than *fifty* thousand at a time had met inside the Palace of Glass.

W. That was ten thousand more than had been expected!

P. In a few more weeks, people read in the newspapers reports which made them to wonder more. They heard of *sixty* thousand people being there; and, one day, it was said by every one that *seventy* thousand had assembled together.

Ion. That was a mistake, I should think!

P. No; it was true. And even that number increased. When the end of September came, the Exhibition had been open four months, and it was

known that it would positively close on Saturday the 11th of October. There were tens of thousands who thought that they must go to see it "only *once more*"; thus the crowds increased until the last week. Then came the great crush! On the Monday, 107,815 people came. On the Tuesday, there were 2,100 more; that is, 109,915. On the Wednesday there were 109,760; and on the Thursday, the last of the shilling days, the visitors numbered 90,813. The day happened to be very rainy, or the number would, no doubt, have been even higher than before. Such remarkable numbers were far beyond anything that the most extravagant imagination had thought of.

W. But, papa, how did they all get there? How full the streets must have been!

P. Indeed they were. Enough conveyances to carry half the crowd, could not be had. All the great city of London was excited. Early in the morning, from the terminus of each great London Railway—from the North Western, the South Eastern, the Great Western, the Eastern Counties, the South Western, the Great Northern, and from the London and Blackwall line,—along these seven principal lines enormous trains conveyed the shoals of country folks. And when these country folks reached the street, the cabs were instantly filled, the omnibuses were crowded inside and out, and vans and carts, old stage-coaches, and all sorts of queer

vehicles, did duty that day. The pavement and roads round the railways were choked up.

W. But as they came near the Exhibition, when the different crowds met, papa?

P. Then came the hubbub and noise; all seemed confusion, yet all was order, for the "mighty mass" of human beings moved on in one long, dark, dense stream. From early in the morning until long after midday, this dark moving stream of people covered the pavement of the whole length of Piccadilly, past Hyde Park Corner, Sloane Street, Knightsbridge, and all the way to the Crystal Palace. Nothing could be more wonderful than the crowd, except the numberless vehicles in the road. For all the conveyances I have mentioned came from all parts, making one ask with uplifted hands, "Where can they all come from?"

L. And the inside of the Palace?

P. That I would rather not say anything about. The scene would take too much time to describe. Many hundreds of people went in who quickly came out again. Some were filled with awe and fear even at the hum and buzz of the great busy bee-hive, as it seemed to swell upon their ear.

Ion. I wonder whether any one has counted up all who came from beginning to end.

P. Yes. The total number of visitors from the opening to the close, from the 1st May to the 11th October, 1851, was 6,201,856. I will read to you

the account which has been given of the numbers:—

NUMBER OF VISITORS.

In the month of May the number of visitors was .	734,782
In June	1,133,116
In July	1,314,176
In August	1,023,435
In September	1,155,240
In October, up to the 11th.	841,107

Grand total . . . 6,201,856

The amount of money received is the next remarkable point. You may remember the early history of the undertaking. Then it was feared that not enough money could be found to meet the great expenses which would be involved. But these expenses have been paid, although they amounted to more than £350,000. And, what is more, there yet remains a surplus of £150,000.

Here is the total of the receipts:—

Public Subscription	£67,400
Entrance Fees . . .	424,400
Receipts from various other sources* . . .	13,200
	£505,000

Ion. That is a wonderful sum, papa! What is the next remarkable point?

P. *The quantity of refreshments* eaten is, perhaps, the most remarkable thing of all. There were three refreshment-courts. The principal, in the north end of the Transept, was kept by Messrs. *Younghusband and Son*; those in the east

and western Nave were kept by Mr. *Masters*.

What a famous place that Crystal Palace was to eat in! You saw the crowds that gathered around the refreshment-stalls, eating ices and jellies all day long. Now hear *how much* they ate. In one department, Mr. *Younghusband's* (which was the principal), the following articles were consumed:—Bread, 24,536 quarters; coffee, 9,181 lbs.; pound cakes, 28,828 lbs.; Savoy cakes, 20,415 lbs.; Bath buns, 311,731 lbs.; plain buns, 460,657 lbs.; cottage loaves, 57,528 lbs.; milk, 17,257 quarts; cream, 14,047 quarts; ice, 180 tons; meat, 113 tons; ham, 19 tons; potatoes, 30 tons; salt, 16 tons; soda water, 40,869 bottles; lemonade, 130,698 bottles; ginger beer, 365,050 bottles.

W. I could not have believed that so much would be eaten. What a large amount of money must have been paid for all those goods! I saw you pay 6d. for *one* ice, papa, and there were ices sold for 1s. each; so that the 180 tons of ice alone, yielded a very large sum!

P. Yes; it is said that the money taken for refreshments inside the building, was even more than the immense sum paid for admission at the doors. Thus, you have five remarkable points in the history of the Exhibition since its opening.

Ion. I can say them, papa, I think. The *variety* of people who went to the Exhibition—the *number* of people—the *money* taken at the doors—the quantity of *refreshments* eaten

* The amounts paid by the contractors for supplying the catalogues and refreshments; with the royalty on the articles sold, &c., &c.

—and the *money* paid for refreshments.

P. True; and I have here a list of curious facts, which are also worth remembering:—

“Of the money received at the doors, £275,000 was in silver, and £81,000 in gold. The weight of the silver coin so taken (at the rate of 28lbs. per £100) would be 35 tons, and its bulk 900 cubic feet! the rapid flow of the coin into the hands of the money-takers prevented all examination of each piece as it was received, and £90 of bad silver was taken, but only one piece of bad gold, and that was a half-sovereign. The half-crown was the most usual bad coin, but a much more noticeable fact is, that nearly all the bad money was taken on the half-crown and five-shilling days.

“The cash was received by eighteen money-takers; on the very heavy days six extra ones being employed during the busiest

hours. From them it was gathered by three or four money-porters, who carried it to four collectors, charged with the task of counting it. From them it went to two tellers, who verified the sums, and handed it to the final custody of the chief financial officer, Mr. Carpenter, who locked each day's amount in his peculiar iron chests in the building till next morning, when in boxes, each holding £600, it was borne off in a hackney-cab in charge of a Bank of England clerk and a Bank-porter.

“The money was received in all forms, ranging between farthings and ten-pound notes. Contrary to the notices exhibited, change was given. Occasionally foreigners gave Napoleons, and these coins being mistaken for sovereigns, they received nineteen shillings out, and liberty of admission into the bargain. The monies of America, Hamburg, Germany, and France, were often tendered and taken.”

MORE CURIOUS FACTS FROM THE GREAT EXHIBITION.

(INDITED BY MR. PUNCH.)

THIS Palace tall,
This Cristial Hall,
Which Imperors might covet,
Stands in High Park
Like Noah's Ark,
A rainbow bint above it.

The towers and fanes,
In other seaynes,
The fame of this will undo,
Saint Paul's big doom,
Saint Payther's Room,
And Dublin's proud Rotundo.

'Tis here that roams,
As well becomes
Her dignitee and stations,
VICTORIA Great,
And houlds in state
The Congress of the Nations.

Her subjects pours
From distant shores,
Her Injians and Canajians;
And also we,
Her kingdoms three,
Attind with our allagiance.

Here come likewise
Her bould allies,
Both Asian and European;
From East and West
They send their best
To fill her Coornucopian.

I seen (thank Grace!)
This wondthrous place
(His Noble Honour Misther
H. Cole it was
That gave the pass,
And let me see what is there).

With conscious proide
I stud insoide
And looked the World's Great
Fair in,
Until me sight
Was dazzled quite,
And couldn't see for staring.

There's holy saints
And window paints,
By Maydiayval Pugin;
Alhamborough Jones
Did paint the tones
Of yellow and gambouge in.
There's fountains there
And crosses fair;
There's water-gods with urnns;
There's organs three,
To play, d'ye see,
"God save the Queen" by turrrns.

There's statues bright
Of marble white,
Of silver, and of copper;
And some in zine,
And some, I think,
That isn't over proper.

There's staym ingynes,
That stands in lines,
Enormous and amazing,
That squeal and snort,
Like whales in sport,
Or elephants a-grazing.
There's carts and gigs,
And pins for pigs;
There's dibblers and there's
harrows,
And ploughs like toys
For little boys,
And elegant wheel-barrows.

For them genteels
Who ride on wheels,
There's plenty to indulge 'em;
There's droskys snug
From Paytersbug,
And vayhycles from Bulgium.

There's cabs on stands
And shandthry danns;
There's waggons from New
York here;
There's Lapland sleighs
Have crossed the seas,
And jauntingeyars from Cork here.

Amazed I pass
From glass to glass,
Deloighted I survey 'em;
Fresh wondthers grows
Before me nose
In this sublime Musayum!

Look, here's a fan
From far Japan,
A sabre from Damasco;
There's shawls ye get
From far Thibet,
And cotton prints from Glasgow.

There's German flutes,
Marocky boots,
And Naples Macaronies;
Bohaymia
Has sent Bohay;
Polonia her polonies.

There's granite flints
That's quite imminse,
There's sacks of coals and fuels,
There's swords and guns,
And soap in tuns,
And ginger-bread and jewels.

There's taypots there,
And cannons rare;
There's coffins filled with roses;
There's canvas tints,
Teeth insthrumints,
And shuits of clothes by Moses.

There's lashins more
Of things in store,
But thim I don't remimber;
Nor could disclose
Did I compose
From May time to Novimber!

Ah, Judy thru!
With eyes so blue,
That you were here to view it!
And could I screw
But tu pound tu,
'Tis I would thrait you to it!

So let us raise
VICTORIA's praise,
And ALBERT's proud condition,
That takes his ayse
As he surveys
This Cristial Exhibition.

CHAPTER TWENTIETH.

THE CLOSE OF THE EXHIBITION.

LET us now talk of the Exhibition's last days. Thursday, October 9th, was the last of the shilling days. There remained two *half-crown* days during which it was open—the Friday and the Saturday.

The Great Exhibition closed on Saturday, the 11th October, 1851. This was the 141st day since the opening, and at five o'clock in the afternoon, the organs gave the signal for closing. At the same moment they struck up the national anthem, "God save our gracious Queen." The organs were joined by the many voices in the crowded avenues, but, unfortunately, the building being so large, those who played and sung could not hear each other very well. So, although the organs sounded forth with all their might, and the people sung forth with all their might, they could not keep very good time. Never mind! If there was not harmony of sound, there was a harmony of spirit, which is better still. English people always sing with spirit "God save the Queen."

On the Monday and Tuesday following, the Crystal Palace was thrown open to the exhibitors and their friends only, who were admitted by tickets, without payment.

The next day was appointed for the last great business—viz., *for announcing the names of those exhibitors who had gained prizes.* In "Little Henry's Holiday at

the Exhibition," you read of the principle of *competition*, and of the importance of these prizes. On Wednesday, the 15th October, His Royal Highness the Prince Albert met the gentlemen who had examined the different goods and had decided to whom the prizes should be given. These gentlemen presented their report to the Prince, and the Prince made a speech in reply.

This ceremony was performed in a business-like manner, the prince and the gentlemen being seated on a raised platform in the transept, at the part where the nave and transept meet; the crystal fountain had been removed to make room. The other part of the building was crowded with visitors, such as the exhibitors and others.

W. If I had been one of the exhibitors, I should have listened very anxiously to hear my name mentioned. I cannot think how the gentlemen could tell which articles gained prizes when there was such an immense quantity of goods to examine.

P. I will tell you how it was done. All the goods in the Exhibition were arranged in thirty-four classes, and for each class of goods a *jury* was formed, consisting of half foreigners and half Englishmen. The men selected were those who *understood* the articles which they had to examine. Thus one jury had to examine all the clock-work; another all the tapestry and lace; another the musical instruments; another the philosophical instru-

LIST OF PRIZES.

ments, and so on. Each jury had a chairman, who used to take the chair when they sat and talked over the goods they had to examine.

These thirty-four chairmen of the juries also had to meet frequently, and to form a higher jury of themselves. When the chairmen of the juries thus met, they formed what was called the *Council*.

W. I think that that was a very good arrangement; for there might be some articles which *one* jury alone could understand properly—but if each of these thirty-four chairmen understood a different business, they could help one another.

P. True. And on the Wednesday, when the Council of Chairmen met the Prince, they told him that all the meetings of the juries and the council had been held, and the prizes had been decided upon. In each department the exhibitors of the goods which were very excellent, but not quite good enough for a prize, had received *honourable mention*; those whose goods were more excellent, were to receive a *prize medal* (from the jury); and those who had brought forth novel inventions, and most beautiful goods, were to receive a more important medal—they were to receive a *Council medal*, which was to be given by the council of chairmen.

The following is the list of the numbers of "*Council medals*," "*Prize medals*," and "*Honourable mentions*," given by the thirty-four juries, and the council:—

RAW MATERIALS.—JURIES I. TO IV.

	Brit.	For.	Tot.
Council medals . . .	6	16	22
Prize medals . . .	125	437	562
Honourable mentions	131	535	666

MACHINERY.—JURIES V. TO X.

Council medals . . .	52	36	88
Prize medals . . .	301	191	492
Honourable mentions	51	114	165

TEXTILE FABRICS.—JURIES XI. TO XX.

Council medals . . .	1	2	3
Prize medals . . .	337	498	835
Honourable mentions	185	277	462

METALLIC, VITREOUS, AND CERAMIC MANUFACTURES.—JURIES XXI. TO XXV.

Council medals . . .	14	21	35
Prize medals . . .	312	214	526
Honourable mentions	208	199	407

MISCELLANEOUS MANUFACTURES.—JURIES XXVI. TO XXIX.

Council medals . . .	4	10	14
Prize medals . . .	142	232	374
Honourable mentions	100	154	254

FINE ARTS.

Council medals . . .	2	2	4
Prize medals . . .	27	60	87
Honourable mentions	41	47	88

Besides these, there were council medals which were not classified, such as that given to HIS ROYAL HIGHNESS THE PRINCE ALBERT for the idea of the Great Exhibition, and the model lodging-houses. Another was given to the Government of Turkey; others, to the Bey of Tunis, the Pasha of Egypt, and so on.

Besides the council medals not included in the above classes, there were *thirteen* money prizes, of £50, £40, and £10 each, given principally to poor people. The total number of medals, honourable mentions, &c., was thus 5,084—2,039 to British subjects, and 3,045 to foreigners.

All these matters were explained to the Prince by VISCOUNT CANNING, the President of the Council, in the report which he read. When the Prince had replied, as I said, and had thanked the gentlemen of the different juries for their exertions, the National Anthem was once more sung. Once more thanksgiving was offered to the Almighty, in a prayer which was read by the Bishop of London. The hallelujah chorus, which had been sung at the opening, was again sung. The Prince and Commissioners then left the platform; and the business of the day was ended.

L. GREAT EXHIBITION! Is it all over?

P. Yes. While we are talking the goods are still being removed; but the great *Crystal Palace*, which is perhaps the most wonderful part, remains. There are still the questions, "What is to become of the Crystal Palace?" "What will be the effects of the Great Exhibition?" "What is to be done with the £150,000 surplus?" For the answer to these questions we must wait.

W. I know one of the effects—it has delighted everybody.

P. Say *nearly* everybody. The Exhibition was not quite perfect. There were just faults enough to show that it was a human invention; for it could not be without faults, unless it had been Divine. There was a great fault that there were no *prices* affixed to the goods to show their different values; for

the merit of many articles greatly depends on the price at which they can be sold. There was a still greater defect. In very few stalls could people be found to give *explanations* of the articles shown. I had purposed to give you a course of Object Lessons on all the strange and peculiar objects in the Exhibition; but I found that it was almost impossible to do so. On examining many curious objects, I found that they could not explain their own qualities; they could not tell me their uses; neither could they tell me their own history. The Catalogue would not help me—it only gave their names, which were matters of little importance. Now, supposing that there had been at each stall a man who knew all that could be said about each article, how interesting a history of the Exhibition might have been made! What a peculiar series of Object Lessons we should have had!

W. But why did you not write to some of the exhibitors?

P. I did so; but some had not time to write descriptions, others would not send any answer at all. Nearly all people felt the want of explanations. Many thousands could do little else but *stare* and *wonder*, while they ought to have been able to *examine* and *understand*. With the help of such attendants the Exhibition would have been not only a great *show*, but a *school*. But although their absence was a defect, perhaps it could not be helped; the expense of

hiring such men would perhaps have been too great.

So let us leave the defects. They were not many. We will rather have one more word in favour of the men by whom the idea was conceived and realized.

Ion. Yes! What do the people say to Mr. Paxton now? And to Messrs. Fox and Henderson?

P. They do not say "Mr. Paxton" now, but *SIR Joseph Paxton*, and instead of "Mr. Fox," *SIR Charles Fox*.

L. Oh, papa! then they are made noblemen!

P. No. They were made "knights;" they were *noble* men before. Did I not tell you long ago, that the *working-man* is the true nobleman. Indeed, the *working-men* are the only noblemen. He who can, and will not work, is a *base-man*; no matter how he may be born. They who work—whether they work with mind or body—whether they *work* to improve the laws of the country—or to improve the habits, manners, or dwellings of the people—whether they *work* to improve the manufactures in which they are engaged—whether they *work* to make discoveries in science—whether they *work* to teach the young—whether they *work* in the high and holy calling of the ministry—no matter how they work, if they only work "to make the world better than they found it," they thus become more like their Heavenly Maker, who causeth all things to work together "for good," and thus

only do they rise "to be truly noble."

So, Willie, the truth has come out at last! Two *working-men* are acknowledged as "noblemen." How much better noblemen do they make than if they had been fighting-men!

L. Yes. Because, you see, they are more like God.

P. And may many more such men—men of science and industry—become the nobles of this land; and may all the present noblemen become men of learning, science, and religion; ever doing good to the world, instead of being men of war.

W. And what do the people say to *PRINCE ALBERT*, papa?

P. For him, also, they utter forth praises, which we must not keep back.

They say, "All honour to our truly noble Prince!" There were times when most princes and kings were the destroyers of the earth; their honours were built on the blood of their fellow-men. But the Exhibition has brought out another great truth. To His Royal Highness the Prince Albert a "Council Medal" has been awarded for "*the idea of the Great Exhibition of 1851, and the Model Lodging-house for the labouring classes.*" This may remind many princes of the earth that each has work to do within his kingdom—work which leads to higher glories than those of war.

L. And will other princes and nobles attend more to these things?

P. No doubt they will, for already some effects of the ex-

ample of the Prince are seen. The Duke of Northumberland, it is said, has given orders for *one thousand* new labourers' dwellings on a better plan. The Duke of Bedford has already erected a great number of better dwelling-places for his labourers; and we have a "Society for improving the Condition of the Working Classes."

Thus we see how the Exhibition will bring forth fruit. With many working nobles, headed by a working Prince, all labouring to further improvements in the sciences and arts

for their country's good,—will there not be joyful results?

W. Yes. I should think that the people will become much happier, and the poor people will love those who are rich.

P. And princes and nobles of other nations may also learn to change their pursuits, and learn the true meaning of the word *noble*. Thus will other nations become happier.

May many more princes become servants of Him who "went about doing good," whose noble title is, THE PRINCE OF PEACE.

THE CLOSE OF THE GREAT EXHIBITION.

GLORY to the God of Heaven,—

Peace on earth, towards men good will!

Now shall honours due be given

To the best of human skill;

Always will we deal with others

As we would they dealt with us,

And rejoice, as men and brothers,

To befriend each other thus.

For it is a glorious teaching,

ALBERT, thou hast taught mankind,—

Greatly to perfection reaching,

And enlarging heart and mind;

Stirring us, and stirring others

Thus to do the best we can,

And with all the zeal of brothers

Help the Family of Man!

God be thank'd! that thus united

All the world for once has been,

Crowding, welcome and delighted,

Round the throne of England's Queen:

God be thank'd that we and others,

England with the World around,

Thus have sought to love as brothers,

And the good we sought, have found.

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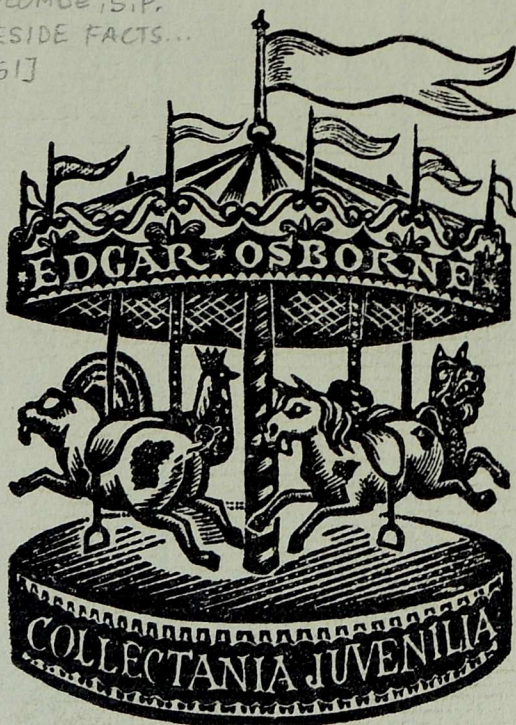
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