

Helping hands : a reading-book for girls.

Contributors

University of Leeds. Library

Publication/Creation

London : Blackie & Son, 1895.

Persistent URL

<https://wellcomecollection.org/works/whf2qbgr>

Provider

Leeds University Archive

License and attribution

This material has been provided by The University of Leeds Library. The original may be consulted at The University of Leeds Library. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

**wellcome
collection**

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

BLACKIE'S · DOMESTIC · ECONOMY
READERS. No. VI.

HELPING HANDS



1/6

LIBRARY
OF
THE YORKSHIRE COLLEGE.

PRESENTED BY

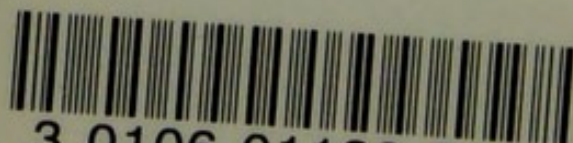
Principal Bodington
Date, November 1896.

LEEDS UNIVERSITY LIBRARY

Classmark:

COOKERY

A HEL



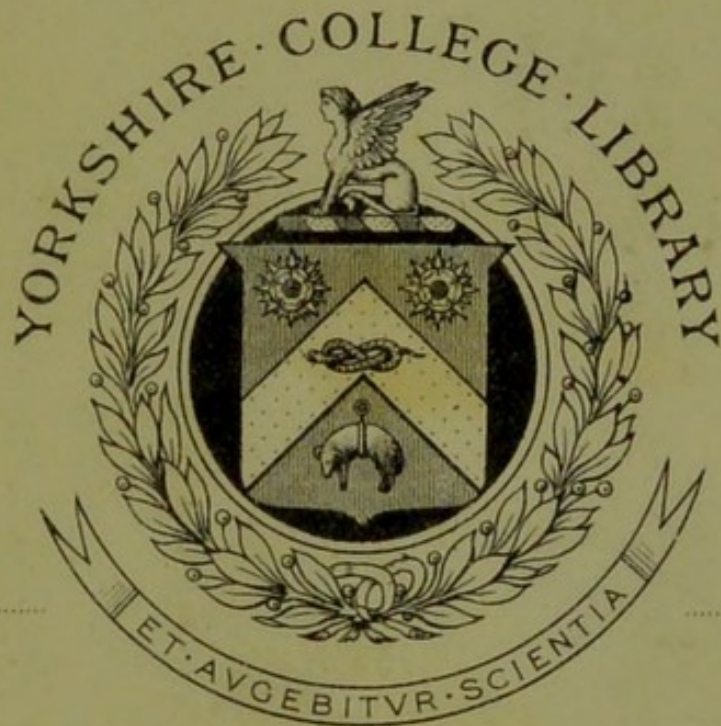
3 0106 01123 5024

COOKERY

K-2

1895

VICTORIA UNIVERSITY



Class

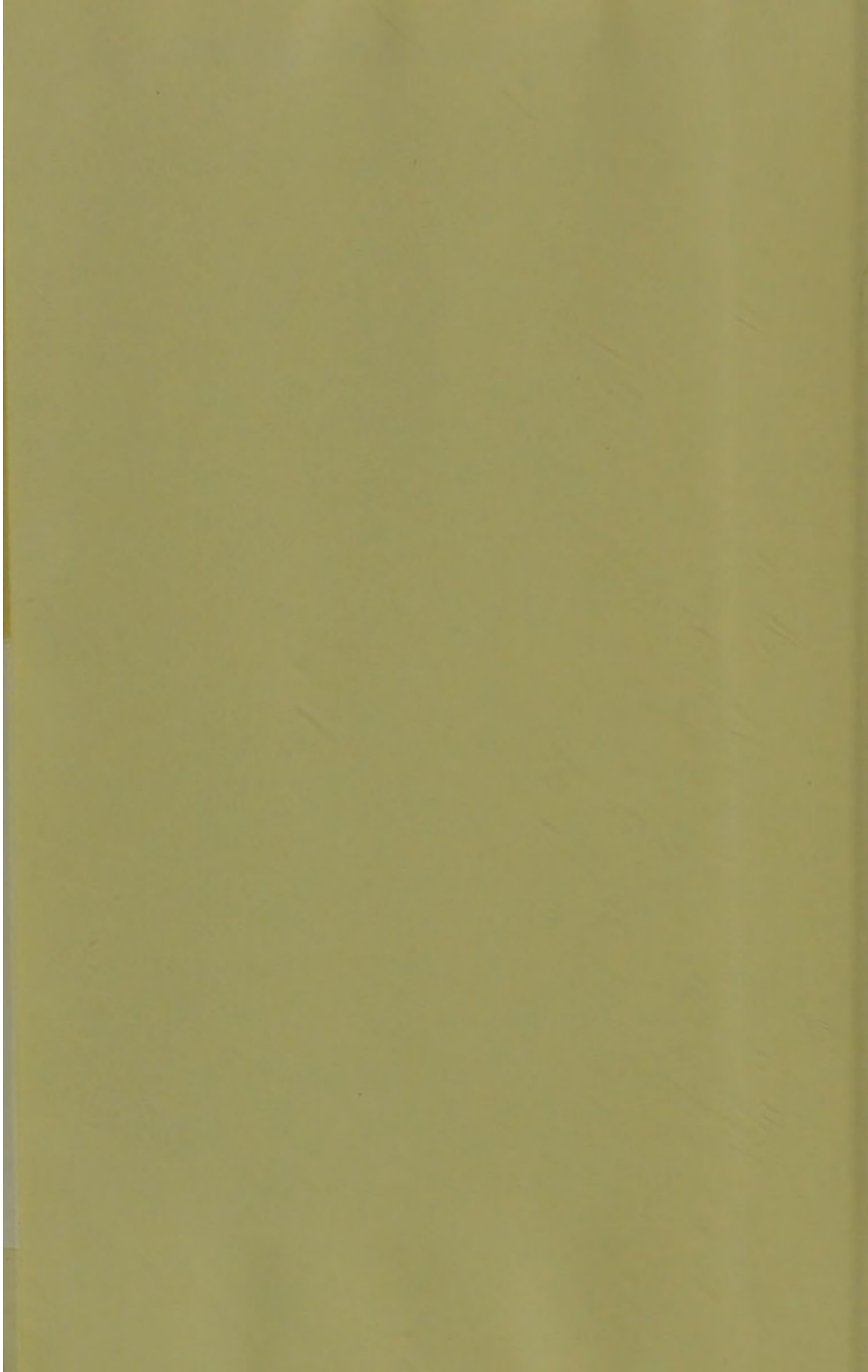
No.

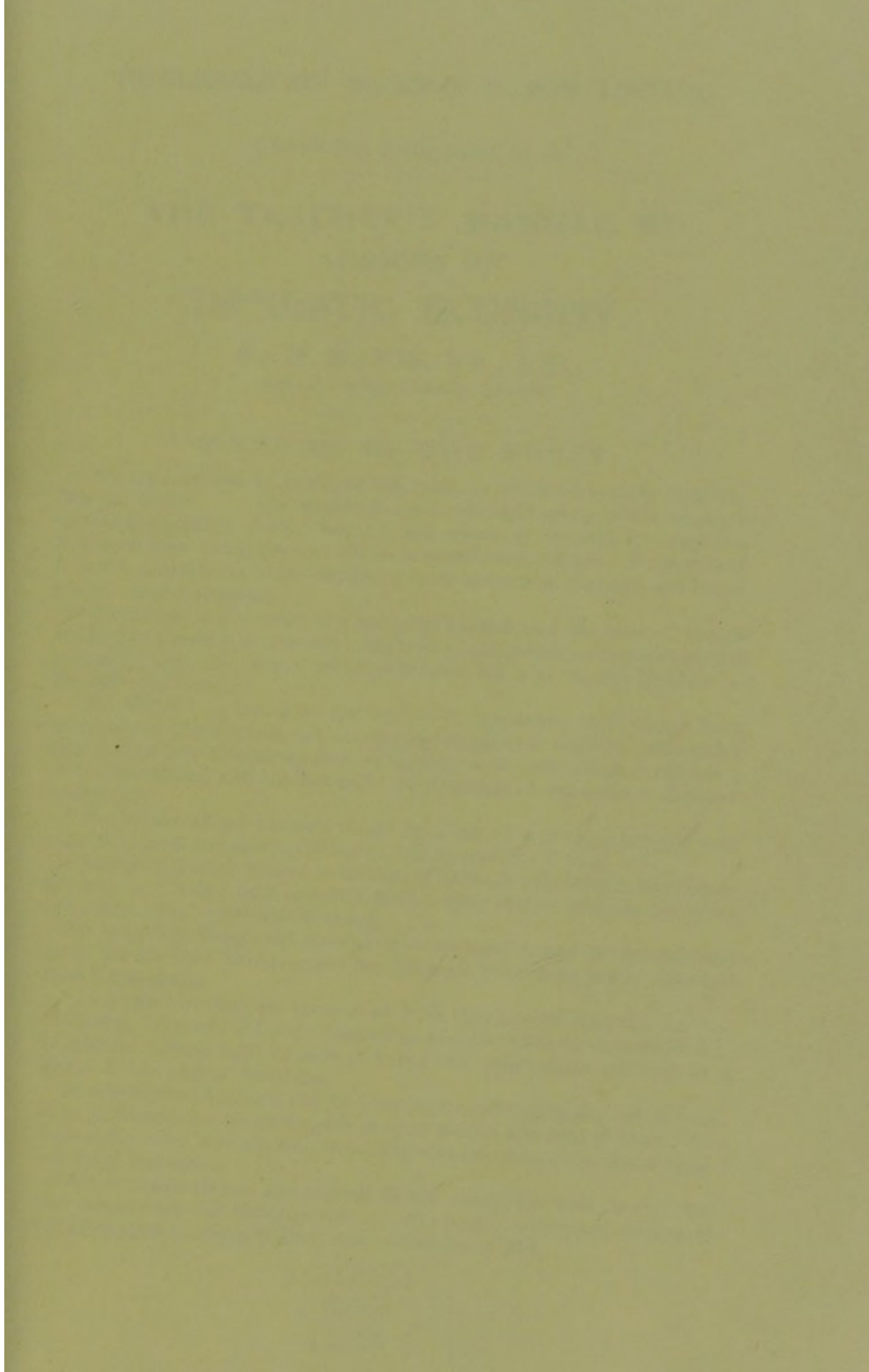
REGISTERED STUDENTS are entitled, on payment of the Entrance or Sessional Fee, to use the Library as long as they are in attendance upon Classes in the College.

Every Book must be returned to the Library on or before the Saturday in the week following that in which it was issued, or a fine will be inflicted of 1d. per volume for every day a book is kept beyond that time.

If a book has been in any way injured while in the possession of the person borrowing it, he will be charged with the expense of making the damage good.

At the end of each Term, all Books must be returned to the Library.







PUBLISHED BY BLACKIE & SON, LIMITED.

Crown 8vo, cloth, price 4s. 6d.

THE TEACHER'S MANUAL OF
LESSONS ON
DOMESTIC ECONOMY.

BY H. MAJOR, B.A., B.Sc.,
Inspector of Board Schools, Leicester.

OPINIONS OF THE PRESS.

"We cannot speak too highly of this work, on which we heartily congratulate Mr. Major. . . . The manual is a self-contained compendium, arranged in logical sequence, of the whole art and science of domestic economy, and will be of value in the home as well as in schools and colleges. We commend it to P.T.'s, assistants, head-teachers, cookery instructors, matrons, and housewives."—**Schoolmaster.**

"Everything is presented in a teachable manner, and the notes of lessons are perfectly plain and practical. The book is a thoroughly commendable and exhaustive one—not only a school text-book, but a household treasure."—**Educational News.**

"Mr. Major . . . has done his work with marvellous skill, with a keen appreciation of the wants and intellectual capacity of child-life, and with a true insight into everything that contributes to the comfort and well-being of the individual, and the healthful surroundings of the home."—**Schoolmistress.**

"We should advise teachers to get Mr. Major's well-informed and very suggestive book and study it carefully."—**Educational Times.**

"This goodly-sized volume is brimful of valuable information from cover to cover. . . . It is a book of such practical value that no mistress can afford to be without it."—**Infants' Mistress.**

"It is a whole library and storehouse on the subject, and the teacher may spend all the time he can spare for this work upon these pages."—**School Board Chronicle.**

"As a teacher's book we know of no work that can vie with this for real usefulness. It is one of the few books that the girls' mistress cannot afford to be without. From back to back it teems with information set forth by a master-hand."—**Girls' Mistress.**

"Inexperienced teachers will find the book most suggestive, and it would be an invaluable handbook for girls of every station educated at home. It is clear and concise, and the numerous diagrams are much above the average."—**School Guardian.**

"Every female teacher and student should obtain the work, as one which they cannot very well dispense with. . . . The book . . . should at once secure a leading place in students' literature."—**Teachers' Aid.**

UNIVERSITY
LIBRARY
LEEDS

NEW BOOKS FOR TEACHERS.

Crown 8vo, cloth, 1s. 6d.

HAND-AND-EYE ARITHMETIC FOR INFANTS:

THE TEACHERS' GUIDE TO NUMBER PICTURES.

Canon Daniel, Principal of Battersea Training College, says:—

“Hand-and-Eye Arithmetic is full of ingenuity, and based upon sound principles. The composition of numbers is the very best basis on which the science and practice can be based. The whole must grow out of ‘one and one are two’.”

The Glasgow Herald says:—

“The system, which is very ingenious, is carefully worked out. It seems excellently fitted to lighten the difficulties of the early arithmetic lesson, and to make it interesting.”

Crown 8vo, cloth, 1s. 6d.

THE CLASS-TEACHER'S ARITHMETIC

FOR “COURSE ‘B’”.

Part I. for Standards I. and II., by the author of “Typical Mental Problems”, “Typical Government Problems”, &c.

The Teachers' Monthly says:—

“This book . . . appears at a most opportune time, is well done, and should prove very useful”.

The School Board Chronicle says:—

“A valuable work for teachers who desire to adopt the comparatively new code ‘Scheme B’ of arithmetic”.

The Board Teacher says:—

“Crammed with useful hints and examples. Indispensable to teachers who have adopted ‘Scheme B’ of the last new code as their syllabus for instruction in arithmetic.”

The Girls' Mistress says:—

“This is an excellent handbook to the teaching of arithmetic to Standards I. and II., its chief feature being its eminently practical character. . . . A child who has had the thorough grounding advised in this book will find little difficulty in the higher standard arithmetic, for he has been carefully trained to think.”

The Educational Times says:—

“*The Class-Teacher's Arithmetic* is not arranged in the rigid form of lesson notes, but presents in an elastic and suggestive manner a valuable collection of practical hints for the young teacher. We strongly recommend it to head-masters solicitous about the arithmetical teaching of their assistants. It could scarcely fail to improve the work of the average arithmetic master—and even a clever instructor might gather useful wrinkles from its bright and attractive pages.”

In Two Parts, crown 8vo, cloth, 1s. each.

THE SUGGESTIVE DICTATION BOOK.

Companions and Aids to the Use of the *Suggestive Spelling Books*.

BLACKIE'S DOMESTIC ECONOMY READERS

No. VI.

HELPING HANDS

A READING-BOOK FOR GIRLS



LONDON

BLACKIE & SON, LIMITED, 50 OLD BAILEY, E.C.

GLASGOW AND DUBLIN

1895

BLACKIE'S DOMESTIC ECONOMY READERS.

- No. I. Home Stories. Part I. 8d.
No. II. Home Stories. Part II. 10d.
No. III. Tiny Housewives. 1s.
No. IV. Little Mothers. 1s. 4d.
No. V. Young Housekeepers. 1s. 6d.
No. VI. Helping Hands. 1s. 6d.
No. VII. Young Nurses.

PREFACE.

This book falls naturally into its place among Blackie's Domestic Economy Readers. It is designed for girls of Standard V., and in its lessons on *The Dwelling, Warming, Ventilation, Cleaning, and the Preparation of Foods* it follows the scheme as laid down in Schedule II. of the Code. While the narrative form has been preserved, as tending to sustain the interest of the young readers over what might perhaps be in other forms a somewhat unattractive subject, it is hoped that scientific accuracy has not been in any way sacrificed. The strictly matter-of-fact material has been summed up and augmented in an appendix, and those words in the text that are likely to be unfamiliar are explained at the end of the book.

CONTENTS.

PART I.—THE DWELLING.

	Page		Page
In Search of a House, - - -	7	Another Lecture, - - -	48
Further Walks Abroad, - - -	11	Decomposing Substances, - - -	52
Make Home Beautiful, - - -	14	The Evils of Dirt, - - -	56
A Health Lecture, - - -	15	Queen of the Heart and the Hearth,	59
A Model House, - - -	18	On Water-Supply, - - -	60
Light and Air, - - -	23	Hard and Soft Waters—Cisterns,	63
Lighting and Warming the Dwell-		The New Maid.—I., - - -	68
ing.—I., - - -	27	The New Maid.—II., - - -	70
Lighting and Warming the Dwell-		Washing Up, - - -	74
ing.—II., - - -	31	Pots and Pans, - - -	77
A Mother's Love, - - -	34	Drainage, - - -	82
Cleanliness, Air, - - -	35	More Drainage, - - -	86
My Own Fireside, - - -	39	The New House, - - -	89
Some More Air, - - -	41	The Captain's Return, - - -	92
Methods of Ventilation, - - -	44		

PART II.—FOOD AND ITS PREPARATION.

Victoria Haven, - - -	97	Some more Baking, - - -	151
More of Victoria Haven—The Cap-		Boiling, - - -	155
tain, - - -	100	Broiling, - - -	160
Why we Cook at all, - - -	103	A Rich Stew, - - -	164
More Reasons for Cooking, - - -	106	Vegetables and Fruits, - - -	169
A Tough Joint, - - -	111	All Hot! All Hot! - - -	173
An Old Story, - - -	114	A Dish of Fry, - - -	177
The Stomach and its Members, - - -	117	An Unexpected Visitor, - - -	181
May Protests, - - -	118	The Greek Poem, - - -	184
Early Artificial Cooking, - - -	121	A Nice New Loaf, - - -	186
Another Joint, - - -	125	May Helps at the Bread-making,	189
A Primitive Sauce-pan, - - -	127	A Cake, - - -	191
She made Home Happy, - - -	130	Light and Short, - - -	193
Some Soup, - - -	131	The Cooking of Starch Foods, - - -	196
Temperance in Diet, - - -	136	Kidney Pudding and Cottage Pie,	199
Something Nice, - - -	136	A Lecture on Cooking, - - -	204
Fish, - - -	139	The Lecture— <i>Continued</i> , - - -	207
A Dinner, - - -	143	The Lecture— <i>Continued</i> , - - -	210
Roasting, - - -	144	Conclusion of the Lecture, - - -	214
The Roast Beef of Old England, - - -	149	An Outing, - - -	216
Baking, - - -	149	The End, - - -	220
			223
Summary, - - -			234
Explanations of the More Difficult Words and Phrases, - - -			

HELPING HANDS.

PART I.—THE DWELLING.

IN SEARCH OF A HOUSE.

Mrs. Meredith was as proud of her husband as he was of his new ship. And the Captain was certainly proud of her from topmast to keel.

But perhaps this was partly because he had only recently been promoted to the post of captain of a new craft.

And Mrs. Meredith was proud of her housekeeping as well as of her husband. She, too, had but recently been promoted. From their marriage to the present time, her husband had commanded only a small schooner. As he had not often been ashore, Mrs. Meredith had been content to live in a tiny cottage, waiting for the time of their joint promotion, the one to be captain of a larger craft, the other to be mistress of a commodious house.

This time had now arrived, and the first thing to be done was to select their new home. Then Mrs. Meredith would show her husband what a splendid housekeeper she could be! She had fully

made up her mind that she would manage her house as well as he managed his ship.

But she remembered the old saying, "First catch your hare, then cook it". She was therefore aware that she must first get her house, before she could manage it. So one fine morning the Captain and his wife started out together to select their new abode.

"The first thing we must think about is the site," Mrs. Meredith said.

"Yes," replied her husband, "we must have a good site, and a pretty house on it, for it would never do for such a nice housekeeper as mine to have anything ugly near her."

"If we settle down in a house on an impervious soil," continued Mrs. Meredith, "we shall be liable to get rheumatism, agues, colds, and consumption."

"That would be to turn the house into a hospital at once," replied the Captain.

"And if we choose a house on a gravelly or sandy soil," she continued, "we shall almost as certainly be liable, if the drains are leaky, to have typhoid, scarlatina, scarlet fever, or some other infectious disease."

"And that would make the house a hospital again," replied the Captain, alarmed, not for himself, but for Mrs. Meredith and their child, May. "We certainly will not settle down on either of such sites," he continued, with decision.

"But it must be," said Mrs. Meredith, "either a



House ..  .. Hunting

pervious or an impervious soil, unless, like the birds, we are to nest up in the air."

They had not proceeded far before they came to a bit of waste land, on which was a travelling caravan loaded outside and inside with brushes, brooms, hearthrugs, matting, looking-glasses, and rocking-chairs; besides a hundred other articles of household furniture.

The Captain looked at this travelling furniture-shop with a smile on his cheery face.

"There!" said he, "that is the kind of movable mansion to suit us. If with this house on wheels we settle on a clay soil, we can readily shift quarters again, and so escape rheumatism, ague, colds, and consumption. And if we light on a sandy or gravelly site, there will be no fear of typhoid, scarlatina, scarlet fever, or any other infectious disease arising from leaky drains; for there will be no drains at all to be leaky."

A cold shiver ran down Mrs. Meredith's back; and she said, "Oh, horrible! I would rather not live at all than live such a wild-gipsy, uncivilized kind of life."

"Very well," replied the Captain. "Let us get back then to civilization; anything for a happy life and a quiet one."

For some hours they continued their house-hunting, going from one part of the town to another, and looking over several houses, but without finding one to suit them. It was now half-past four o'clock; and they remembered that May would soon be

coming out of school, and wondering where her parents were. They therefore put off any further search for their new house to another day.

FURTHER WALKS ABROAD.

The next day the walks abroad in search of the new house were continued. Mrs. Meredith meant to astonish the Captain with her wonderful knowledge of all that must be thought of in such an important matter. But it was very difficult to find just the kind of house she wanted.

"We could not think of taking that house," she would say, pointing to the one most recently examined. "You see it faces north-east. There would be no sunlight in any of the rooms except those at the back; and what could we do without sunshine? You remember the proverb: 'A pleasant thing it is for the eyes to behold the sun'."

"I know I like plenty of it aboard ship," replied the Captain. "I think sunlight gets into one's heart, and makes one bright and cheerful."

"And it gets into your blood, too," replied Mrs. Meredith. "I remember that Miss Nightingale says somewhere, that 'Where the sunlight cannot come, the doctor will'. And we do not want the doctor for our May, do we?"

"No; nor for her mother either," tenderly replied the Captain.

The next empty house they visited had a different fault.

"Too cramped!" said Mrs. Meredith, almost as soon as she entered it. "Far too cramped! There is no breathing space at the back; and we should feel stifled, shut up like this, back to back with the house in the street behind. It is quite enough to be elbowed in at the sides, like a person in a crowd, without being squeezed in at the back, too. I am sure May would pine and droop in such close quarters as these."

"That will not do, then," said the Captain decisively. "You need not waste any more time in looking over this old hulk; let us seek out a lighter craft to carry our flag."

"It is all very well talking like that," said his wife, beginning to weary of disappointments. "But it seems to me house-hunting is not a very cheerful task."

"It reminds me," replied the Captain, "of the hermit-crab in search of unfurnished apartments."

"The sly old soldier lives, as you know, in a whelk shell. And when he grows too big for his berth, he drags his old quarters behind him, holding on by a twist of his tail, and sets out in search of better accommodation. When he comes to another empty shell, he screws himself into and out of it; and wriggles his tail up and down in it. He rejects a dozen abodes, as we are doing, before he settles down in the right one. And yet he has nothing to fear

from rheumatism and ague, colds and consumption, or from any of your terrible list of infectious diseases.

“But we have an advantage over the soldier-crab in one respect.”

“What is that?” inquired Mrs. Meredith.



The Hermit-crab in its usurped domicile.

“Why, we can build a house to suit ourselves, which that sea-robber cannot do,” replied the Captain, speaking as cheerfully as he could to cheer up his disheartened partner.

“That will be delightful!” cried Mrs. Meredith. “I could not have imagined anything I should like better.”

Thus it was finally settled that Mrs. Meredith should have a house built specially to suit her own wants and wishes.

Fortunately, just at that time she received help from an unexpected quarter on the most important matters belonging to the health of a house.

MAKE HOME BEAUTIFUL.

More than building showy mansions,
More than dress or fine array,
More than dome or lofty steeples,
More than station, power, or sway;
Make your home both neat and tasteful,
Bright and pleasant, always fair,
Where each heart shall rest contented,
Grateful for each beauty there.

More than lofty swelling titles,
More than fashion's luring glare,
More than Mammon's gilded honours,
More than thought can well compare;
See that home is made attractive
By surroundings pure and bright,
Trees arranged with taste and order,
Flowers with all their sweet delight.

Seek to make your home most lovely,
Let it be a smiling spot,
Where, in sweet contentment resting,
Care and sorrow are forgot!

Where the flowers and trees are waving
Birds will sing their sweetest song,
Where the purest thoughts will linger
Confidence and love belong.

There each heart will rest contented,
Seldom wishing e'er to roam,
Or, if roaming, still will cherish
Memories of that pleasant home.
Such a home makes man the better,
Sweet and lasting its control;
Home with pure and bright surroundings
Leaves an impress on the soul.

A HEALTH LECTURE.

Mrs. Meredith learned with great pleasure that it had been arranged that some "Health Lectures" should be given in her neighbourhood. She made up her mind to attend them, especially as the subject of the first course was to be "The Dwelling". These lectures, she felt sure, would help her to increase her knowledge of housekeeping, and especially in all matters relating to the structure, draining, warming, and ventilating of a house. For they were all to be given by medical men, and so they were sure to be practical and reliable.

The first lecture of the course was on the choice of a site for the dwelling. May, at her earnest request, was allowed to accompany her mother to the

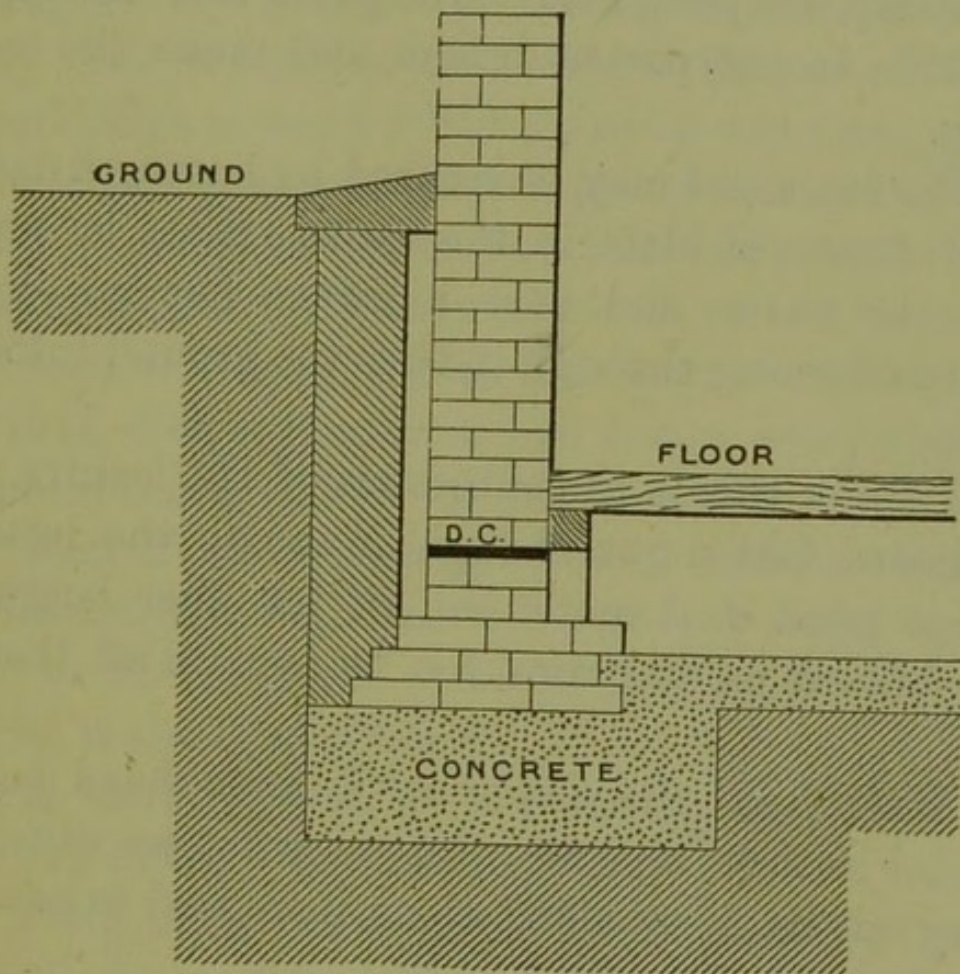
lecture. But she came home somewhat puzzled by the learned words that the lecturer had used. So next day Mrs. Meredith thought it would be useful to repeat, in her own words, what she remembered of the lecture of the previous evening, for the benefit both of May and of the Captain, who had not been present.

“The first matter of importance, you remember the lecturer said, is that the site should be quite dry. It may be dry from the nature of the soil; that is, the soil may be pervious and allow water to pass through it. This is the case with soils of which gravel, chalk, and sandstone form the major part.

“But if the site is not naturally dry, we must make it so by artificial means; that is by draining it. This is especially necessary in the case of clay soils, and where there is ‘ground-water’ beneath, or water travelling beneath the surface from a higher level, from a neighbouring stream or some other source.

“The next matter of importance is to avoid ‘made ground’, or hollows which have been previously filled up with ‘rubbish’ ‘shot’ there in order to raise the level of the ground. This ‘rubbish’ often contains vegetable, and even, more or less animal matter, which, when decomposing, is most injurious to health. When the house is built over such made ground, the heat of the fires warms the soil and draws up the foul gases these decaying matters give off; and so the house may become infected with fever.

“The next thing to attend to is the aspect of the house. In our country we never get too much sunlight; and, generally speaking, far too little of it for either comfort or health. Besides this, biting bleak winds from the east, north, north-east, and north-



Section of Wall and Foundation, showing Damp-proof Course, (D.C.).

west are very prevalent in winter-time and in the early spring. We should, therefore, try to get a frontage towards the sun; that is, facing the south, or south-west. But, of course, we cannot all hope to succeed in securing a house with the exact outlook we should like.

“Now, as the walls of a house draw up moisture

and foul gases from the soil on which it is built, the foundations should be made damp-proof and impervious to gases.

“One very good way of doing this is to have the foundations made of cement. Cement will not allow the damp to penetrate through it and thus pass upwards to the porous bricks, and make the walls damp.

“The same end may be secured by having a damp-proof course of slate in the walls. Slate is impervious to water, and thus moisture has no opportunity of rising through it from the ground into the walls.

“I think this is the substance of the lecture that we heard last night, though of course the lecturer said a great deal more, and in far finer language. He showed us diagrams, too, to explain all that he said.”

“Well,” said the Captain, “it must have been a capital lecture; and we must see what we can do to carry out its recommendations, in regard to our own new house.”

A MODEL HOUSE.

“Now, Mrs. Housekeeper,” said the Captain that same afternoon, “give your orders. And if I and the builders cannot satisfy all your requirements, we will fulfil as many of them as we can. So just

state as fully as you please what sort of a house you would wish to have, if you could get it."

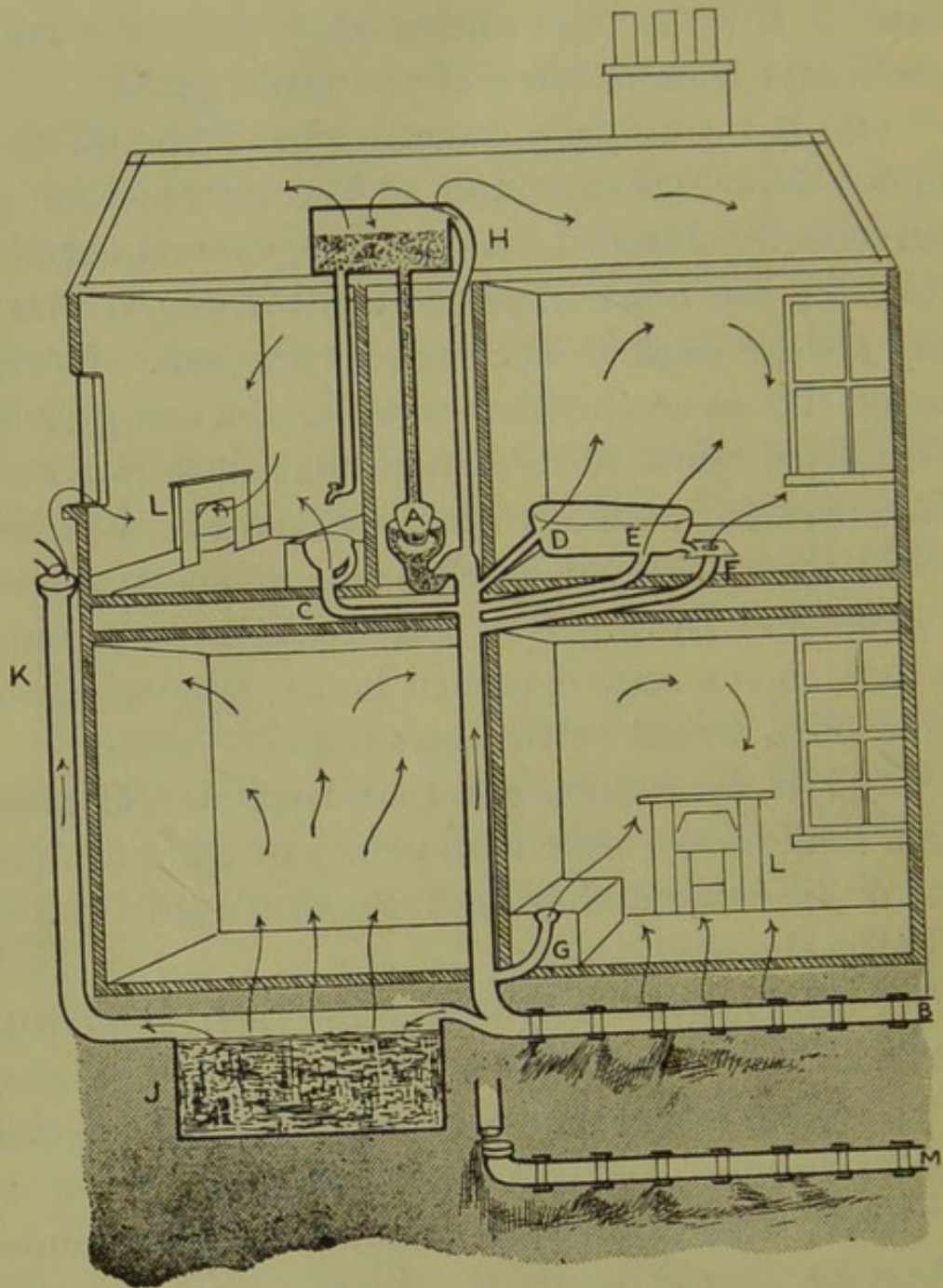
"Oh! if I could have exactly what I should like," replied Mrs. Meredith, full of the information she had recently obtained, "it would very soon be settled. First, let the house face the south-west, so that it may always bask in the smile of the sun. Next, I should like as much elbow-room as you can give me. A detached house in its own grounds, however small these may be, would be the best, because the house would then have plenty of air all round it to keep it sweet and fresh. But if I cannot have as much as that, then a semi-detached house, wind-swept on three sides, would be the next best."

"And if we cannot get that," said the Captain, "you shall have a craft with plenty of room fore and aft; or in front and behind, as you would call it. What is the next order?"

"A sandy, gravelly, or a rocky soil; but with perfect drains," replied his wife.

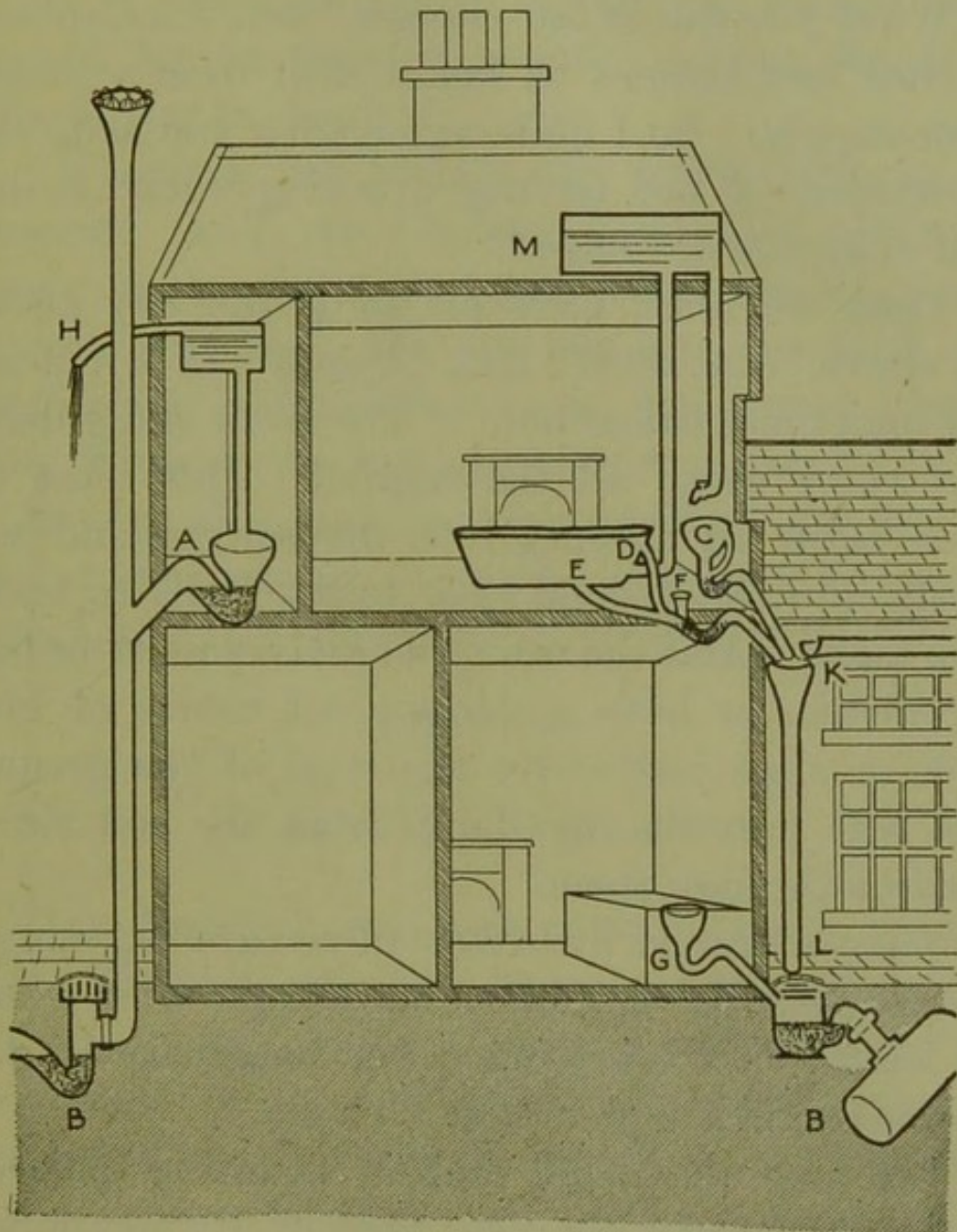
"And, pray, what am I to understand by perfection in drains?" inquired the Captain.

"Every drop of waste or fouled water, from sinks, offices, &c., should receive the shortest possible notice to quit, and be carried right away," answered the Housekeeper. "It must not linger in pipes which slope too slightly to allow it to run off quickly! And especially there must be no faulty joints, nor broken drain-pipes, permitting leakage of sewage into the ground soil."



House with every Sanitary Arrangement Faulty.

- A, Soil-pipe in middle of house.
- B, House drain under floor of room.
- C, D, E, F, G, Waste-pipes untrapped, communicating directly with drain.
- H, Overflow pipe of cistern turned into soil-pipe and acting as ventilator of drain.
- J, Rain-water tank under floor with overflow untrapped into drain.
- K, Fall-pipe communicating with drain opening under bedroom window.
- M, Drain under floor with uncemented joints leaking; also, defective junction of vertical soil-pipe with horizontal drain; the drain laid without proper fall.



House with Proper Sanitary Arrangements.

- A, Soil-pipe outside the house and ventilated by a large pipe carried up and away from all windows or chimneys.
 B, House drains outside house.
 C, D, E, F, G, Waste-pipes trapped, disconnected from drains by gully L.
 H, Overflow of cistern into open air.
 K, Fall-pipe near bedroom window discharging into gully, not into drain.
 M, Domestic cistern.

These two diagrams are copied, by kind permission, from Dangers to Health, by E. Pridgin Teale, M.A., Leeds. Published by J. & A. Churchill. London.

“What you ask is fair enough,” said the Captain. “I once had cholera on board ship from a fouled water-supply. So I quite agree with you as to the importance of not having drinking-water fouled from defective drainage.”

“Then we must have all snug and dry below and above,” continued “Mrs. Captain”, as Mr. Meredith sometimes called her. “The roofs and gutters must carry away all the rainfall. This must be taken right off at once into the sewers, and not merely into the ground close to the walls to make them damp. And the walls themselves must be laid in concrete, or have a damp-proof course of blue brick or slate just above the level of the ground. This will prevent any damp from the soil rising upwards through them.”

“What a learned little woman you are becoming!” said the Captain, smiling as he thought what a hold the lecture had taken upon her imagination. “Is your mansion complete now?”

“Let me see,” she replied, counting on her fingers the various items she had already mentioned. “There is the site, the aspect, the foundation, the walls, roof, and drainage. Yes! I think that will do!”

“Then I think I had better see what I can do,” replied the Captain. “It is a good load to carry; but I will try to keep the ship from sinking under it. But I shall want six months to complete the voyage, before she will reach port safely.”

So it was agreed that the cottage should be retained for another six months, whilst the Model House was building.

“We must not imitate the soldier-crab in one respect!” said the Captain laughing. “It would never do to quit one house until we were quite sure of another. We are not like the snail, that carries his house on his back; but rather like the slug, whose horns are left without a case.”

Saying this the Captain whistled for his dog Rover, who always kept him company, ashore and afloat, and the two went out for a stroll together.

LIGHT AND AIR.

May Meredith was now nearly twelve years of age. Hitherto she had been brought up at home by her mother, and was consequently rather “old-fashioned” in some of her sayings and doings.

It was intended that she should soon go to school for a year or two, and mix with other girls of her own age, but for the present she had still only her mother and, when he was on land, her father, for constant companions. As the latter was but seldom the case, May made the most of these opportunities of companionship when they occurred.

The Captain was soon to start off again on one of his long voyages to the East, and expected to be absent for the next six months. During the fortnight

before sailing he was very busy with the architect and builders, planning and arranging for the new house.

"Be sure you make the house tight and snug against the winter," said May to her father, when he and her mother were talking about the house that was to be. "Make it as warm and cosy as a bird's nest."

"I suppose, then, you are the 'little bird'," said her father. "Well, I will see what I can do for the 'Warming of the Dwelling', which occupies so much of your attention at present.

"In the first place I have already ordered double sashes to the windows; and they will be for the house what a couple of greatcoats are to a man in a snow-storm. I once found out the benefit of double windows, when I spent a winter in Germany, where the cold in the open air outside pierced to the very bones."

"You will give us open fire-grates, will you not?" said Mrs. Meredith. "I like the cheerful look of an open fire; and it is much more healthy, too, than a close, fusty stove. The open fire draws in a supply of fresh air from beneath the doors; and sends the foul air up the chimney, and thus helps to keep the ventilation good."

"I shall have hot-air pipes as well as open fire-places," said Captain Meredith. "Then you can keep the air of the house warm in every nook and corner;—in the hall and outside passages as well as in the rooms inside."

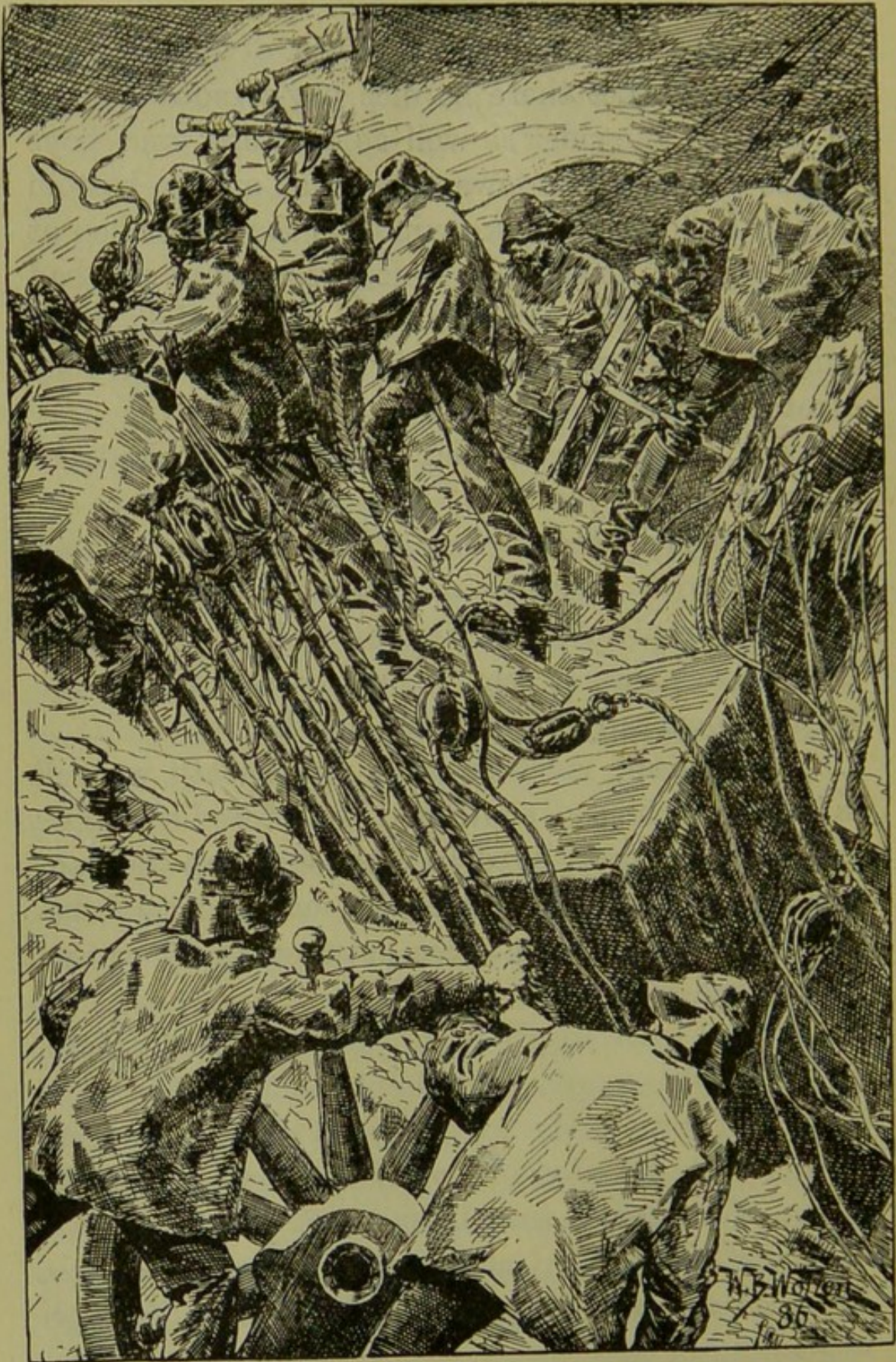
“Be sure to let us have plenty of light in the new house. Let there be nice bay-windows to let in light at the sides as well as in front; and bays at the bedroom windows as well as on the bottom floor. I should also like windows that will open at the top and bottom, so as to let fresh air in and bad air out. I very much dislike rooms that smell stuffy,” said Mrs. Meredith, who was always very careful about ventilation.

“You are very particular about having plenty of air, mother, are you not?” remarked May.

“I cannot be too particular,” replied her mother. “Good health depends almost more even upon a plentiful supply of fresh air than on food or exercise. That is the reason why people who work in the open air generally enjoy good health.

“And the air must be let in underneath, as well as inside, the house,” continued Mrs. Meredith. “You remember we once lived in a house where the floor was always damp, and even the carpet rotted, because there was no air-space between the floor and the ground-soil.”

“I have seen to all that!” replied the Captain. “I have ordered open grids to be built into the walls to let in the air underneath the floors, to keep them always dry by the air current passing beneath them. You may be sure I shall look very well after the ventilation, for I shall never forget a terrible thing that once happened on my ship through neglecting of it.”



Ship in a Storm at Sea—Hatches battened down.

Tell me!" said May, sidling up close to her father, and taking his arm to hug.

"We were going but a short distance," said her father, "only from Holyhead to Dublin; but it was a fearfully rough night to go anywhere! So stormy was it, that we were even obliged to batten down the hatches, and order the few passengers we had on board to stay down below. The waves swept over us in huge walls of water. Even the crew, except the two lashed to the helm, could not keep their feet without constantly clinging to the ropes and bulwarks.

"In the morning, when the storm had gone down a little, we opened the hatches. But, alas! when we went down between decks, we found in one cabin a mother and child that had died from suffocation in the night. No fresh air could reach their cabin; and for want of it they had been poisoned by the air fouled by their own breathing.

"You shall have plenty of ventilation in the new house, you may rest well assured!"

LIGHTING AND WARMING THE DWELLING.—I.

May Meredith had enjoyed the Health Lecture on the "Site of the Dwelling" so much that her mother took her to the second, which was on the Lighting and Warming of the Dwelling.

Next morning Mrs. Meredith again repeated the

substance of the preceding evening's lecture by giving May her own version of the principal points in it. Captain Meredith was not at home to hear this, for he had somewhat suddenly been ordered to rejoin his ship. "When I come back," he said as he took his leave, "I shall hope to find that my house has been built and that it is kept in perfect order by you women-folk." And May promised that he should.

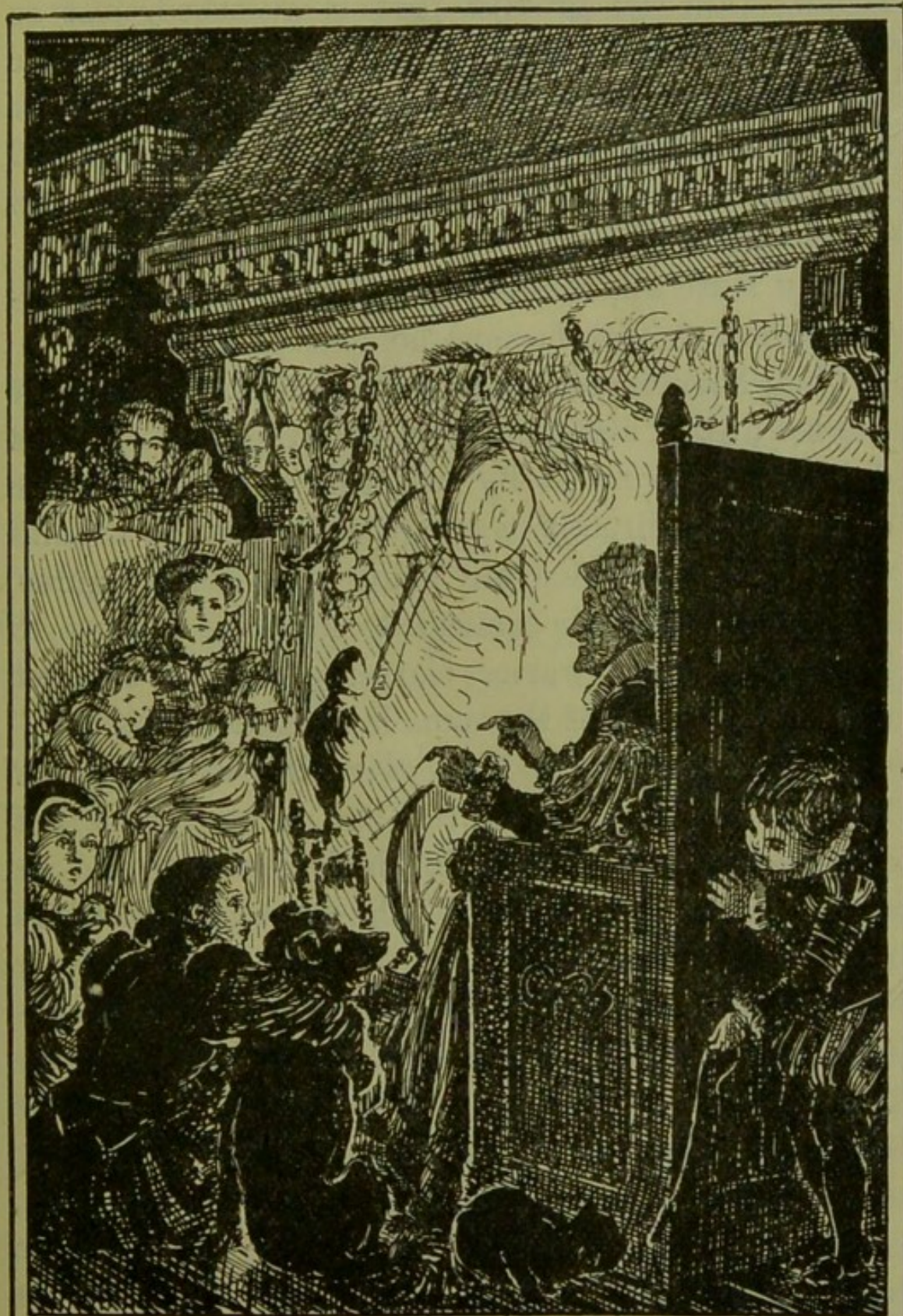
Mrs. Meredith's account of the lecture was as follows:—

"The lighting of a house is very closely connected with the heating of it; the gas that gives light produces heat, whether we intend it or not.

"The open fire-grate is the commonest and the favourite mode of heating a house. This is partly because the open fire gives us a cheerful blaze; it looks as well as feels warm. Besides the open fire-grate, however, there are various kinds of stoves used for heating. Thus there is the closed coal stove and the gas stove, and we have also heating by hot-air and hot-water pipes.

"These different means of heating the dwelling act in different ways. Thus, the open grate warms chiefly by *radiation*. That is, the heated fuel in the grate gives out, or *radiates*, its heat.

"That is to say, the heat of the fire strikes objects exposed to it, just as the light of the sun strikes the surface of the earth. Part of the fire's heat, it is true, is reflected by the walls and furniture of the



IN THE OLDEN TIMES

room. But the greater part is absorbed, just as the sun's heat is absorbed by a wall, which thus becomes heated and 'feels warm' to our hands. The heat of the fire then is absorbed by the walls and the furniture of the room, which in turn make the air close to them warm."

May Meredith remembered how soon clothes airing before the fire become hot.

Then Mrs. Meredith proceeded with her account of the lecture. "But close stoves and hot-water pipes do not act so much by radiation as the open fire does. They directly warm the air that is around them. This warmed air, being thus made lighter, rises, and colder air comes into its place in turn to be similarly made warm. Currents of air are thus set up till all the air of the room is ultimately warmed."

This explained to May Meredith why the toy balloon, which the lecturer had held over a hot stove to illustrate the point, had risen into the air above it. The air heated by the stove had risen and carried the balloon with it.

"The difference in these two cases," Mrs. Meredith continued, "is that with the open grate the furniture and walls become warm, whilst the air between them and the fire remains comparatively cool; heat is then given out by them to the air. But with close stoves and hot-water pipes the air is made warmer than the walls or furniture. In the latter case we often say that the air of the room warmed by the stove feels, or smells, 'stuffy'.

“Now as combustion really means the combination of the oxygen of the air with the carbon of the fuel, and a consequent injurious production of carbonic acid, a means of escape for the latter has to be provided. There is, of course, first the chimney, by which the smoke, as well as a quantity of the impure air, escapes.

“But this is not nearly sufficient, and properly constructed rooms should have gratings near the ceiling, through which the bad air may make its exit.”

LIGHTING AND WARMING THE DWELLING.—II.

Mrs. Meredith proceeded with her account of the lecture.

“Air when heated by the fire ascends, and so passes up the chimney; and colder air, from the room and from the outside of it, must come in to take its place. As this exchange takes place rapidly, we get from it a certain amount of ventilation in the lower part of the room. But we may also get draughts if the rush of air towards the chimney is too rapid. Thus the cold air coming in under the door and passing along the floor may make our feet very cold, especially in winter time. This is a time when cold feet are not only uncomfortable but injurious to health.”

May understood this only too well, as she suffered a good deal from chilblains.

“To put all this in a very simple form,” Mrs. Meredith continued, “we may say that there must be enough air-supply to the fire to carry on the combustion of the fuel; and there must also be sufficient means of getting rid of the products of that combustion, that is, of carbonic acid gas.

“Most open fireplaces satisfy both these needs to a certain extent; but by no means perfectly, as I said before. For one thing, they do not carry off the air at the top of the room, heated and fouled by our breath and by the gas lights. Instead, they draw air into the fire from the colder lower part of the room.

“This has been very strongly expressed by saying, ‘Whilst the draughts chill one part of the body, the rest is roasted by the fire in the fireplace’.

“Nearly half the heat given out from an open fire goes up the chimney, and is thus wasted. But in a close stove rather less than a quarter is so wasted. So to this extent close stoves are the more economical.

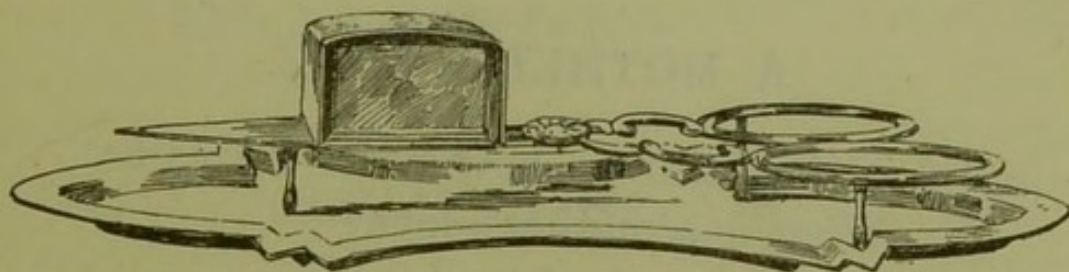
“Gas stoves are very convenient for cooking purposes. But for continuous heating of a room, they are very much more expensive than the open fire-grate.

“The lighting of the dwelling, effected by the sun during the day, is necessarily managed by artificial

means at night and on dark days. Formerly, among the poor, the farthing candle and the rush-light were used for this purpose; and the old-fashioned snuffers and tray are still kept by some as a curiosity."

Mrs. Meredith here showed May some snuffers that had belonged to her grandmother.

"In the olden days those that could afford it used sperm candles. But as these cost a shilling a pound,



Old Candle Snuffers and Tray.

or nearly twenty times as much as gas now costs for the same degree of light, they were beyond the means of poor people. Even tallow candles then cost ten times as much as gas does now.

"But candles have been really 'snuffed out' by the modern lamp much more effectually than they themselves were, in days gone by, by our old-fashioned snuffers. That is, petroleum and paraffin lamps are so much cheaper than candles that the latter are now little used, except sometimes for lighting bed-rooms.

"We could keep a lamp burning all day and all night for the same cost as a sperm candle, of the same lighting power, for one hour only. Indeed, the lamp would cost slightly less than even gas,

but it would not, of course, be so handy and clean.

“Then, in recent years the electric light has come very much to the front. It is now employed in many large country mansions and in some of the better houses of our towns. Perhaps we shall see the day when gas shall have been almost entirely superseded for lighting purposes by this new rival.”

A MOTHER'S LOVE.

A mother's love—how sweet the name!

What is a mother's love?

A noble, pure, and tender flame,

Enkindled from above,

To bless a heart of earthly mould,

The warmest love that can't grow cold—

This is a mother's love!

To bring a helpless babe to light;

Then, while it lies forlorn,

To gaze upon that dearest sight,

And feel herself new born;

In its existence lose her own,

And live and breathe in it alone—

This is a mother's love!

Its weakness in her arms to bear,

To cherish on her breast;

Feed it from love's own fountain there,

And lull it there to rest;

Then while it slumbers watch its breath
As if to guard from instant death—

This is a mother's love!

To mark its growth from day to day,
Its opening charms admire,
Catch from its eye the earliest ray
Of intellectual fire;

To smile and listen when it talks,
And lend a finger when it walks—

This is a mother's love!

CLEANLINESS, AIR.

It had been announced at the last health lecture that the next one would be on the subject of "Air and Ventilation", as part of the larger subject, "How to Keep the House Clean".

Accordingly, the next week found Mrs. Meredith and May again in the hall, expecting an instructive and useful lecture on this important matter. They were not disappointed: indeed, Mrs. Meredith was so pleased with the lecture that she wrote an abstract of it in her note-book when she got home. It read something like this:—

"Very few even of the grown-up people in this hall are aware," said the lecturer, "that daily they take into their bodies as much as two thousand gallons of air. You may realize what an enormous quantity this is, if you think how difficult you

would find it to drink only a single gallon of water in a day.

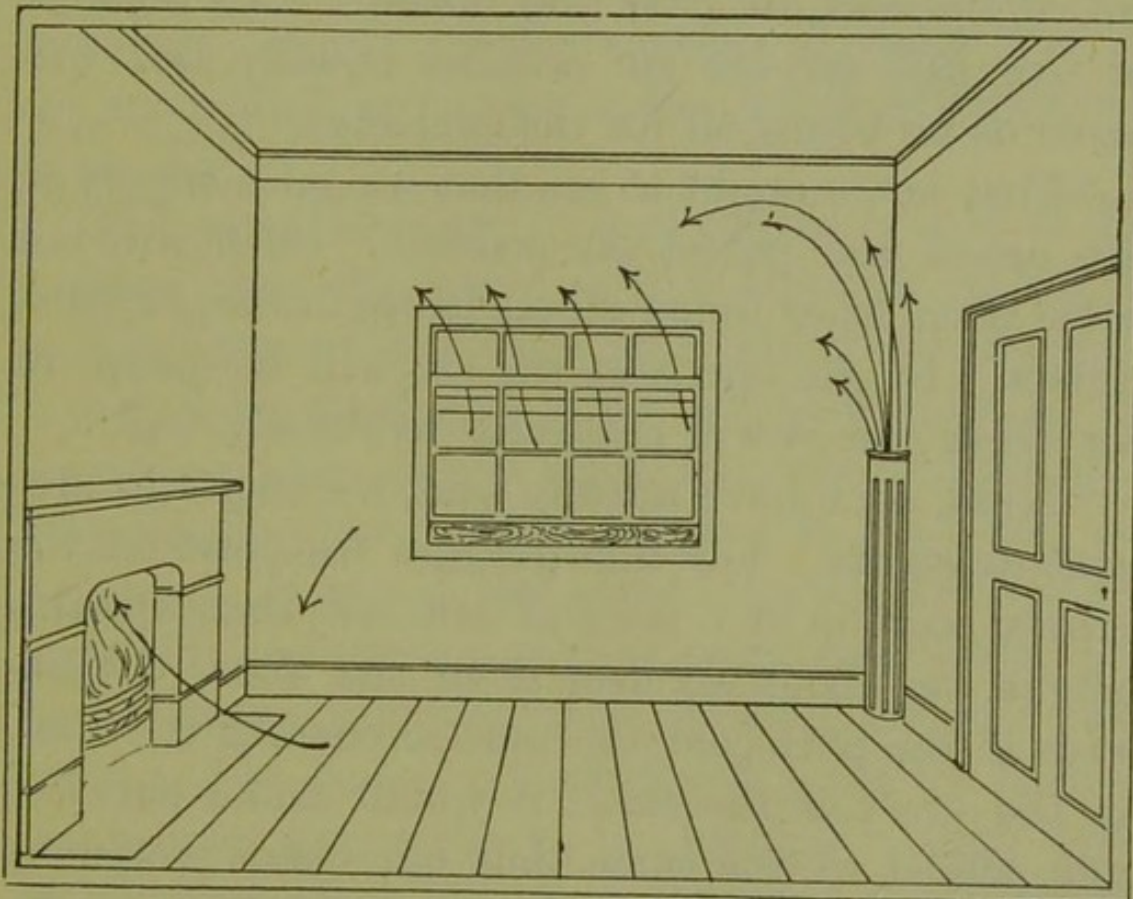
“However clean in all other respects you keep your house, which, as being good housekeepers, I am sure you do, yet none of you can help fouling them with human breath. If this bad air be not removed, the atmosphere in the dwelling, as you know, becomes stuffy; then headaches and bilious attacks may follow, and what is much more serious, lung disease in some form or other.

“Yet it is strange how little attention is paid to this important matter by many respectable people. People who would be shocked at the idea of drinking out of the same cup or glass with a stranger, or even with a guest, suffer no annoyance from, and feel no disgust at, inhaling what has already passed through the lungs of those who may be shut up in a room, or railway-carriage, or tram-car, with them.

“All my intelligent hearers will agree with me, I am sure, that it is absolutely necessary for health that this ‘breath’ be removed by ventilation; or to give it a simpler name, by ‘wind-blowing’. That is, we must somehow introduce air currents which will not only carry away or drive out the used-up and impure air, but will bring pure air to replace it.

“Now these wind currents should not strike on us forcibly as cold draughts, but be carried gently over our heads or up the chimney, and perhaps be artificially warmed.

“As ventilation is impossible without the movement both of foul air passing out, and of an equal current of pure air passing into the house, we must have a sufficient inlet for the one, and an outlet for the other. These openings should, as far as possible,



Air entering Room between Window Sashes and through Vertical Tube.
(After Teale.)

be independent of the doors and windows; though in many dwellings the latter alone must serve.

“The air that is befouled by our lungs, and by the combustion of gas and fire, is also heated in the process of becoming fouled; and heated gases rise. We can therefore take advantage of the movement that is caused by the rise of the bad air towards the ceiling. We only require to make small open-

ings near the ceiling, in such a way that, while the impure hot air can freely escape, there is no draught of colder air from outside.

“Of course we should take thought of what sort of air we let into the house, as well as of getting rid of the bad air from the inside. An exchange of one bad servant for another equally bad will leave us no better off for the exchange.

“That is, we ought to see that we get a supply of the driest and purest air possible. Such will not come from other living-rooms in the house, or from cellars. In the one case the air will be damp; in the other case it will naturally be already foul.

“Next, as I have already said, we ought to prevent draughts. For this purpose we must let the supply come in at a level of not less than a man's height, or about six feet from the floor. Otherwise, if the pure cold air came in beneath the door, at the level of the floor, it would make our feet cold, whilst at the same time our heads would be enveloped in over-heated air. For the sake of health we require to keep our feet warm, and our heads cool; not our feet cold, and our heads hot, and therefore congested by the over-supply of blood sent to the brain.

“But we should not neglect the simplest means of ventilation, to be found in opening doors and windows. A very good rule with reference to open windows exists in one of the bye-laws for lodging-houses of a large town. ‘The windows of every

sleeping-room in the house are to be kept open to their full width from nine to eleven o'clock every morning, and open from two to four every afternoon (weather permitting), unless the sickness of any inmate of such room should require the window thereof to be closed. During the times such windows are opened, the bed-clothes of every bed in the room shall be turned down and freely exposed to the air.'

"It is more necessary to open the upper sash of the window than the lower, as it is through the upper opening that the heated and fouled air escapes. A lady," he concluded, "the energetic mistress of a country house on the coast, recently told me of a very simple plan she had adopted to ventilate her bedroom. It was a low room; the window-frames were old; and the top sash in every case fixed. As the old sashes would not bear altering, and new ones could not be had, she instructed a joiner to bore as many holes as possible in the top rail of each fixed sash. The effect was that the room, which had always smelt close and fusty before, to use her own words, felt 'clean' and healthy afterwards."

MY OWN FIRESIDE.

My own fireside! Those simple words
Can bid the sweetest dreams arise;
Awaken feeling's tenderest chords,
And fill with tears of joy mine eyes.

What is there my wild heart can prize
That doth not in thy sphere abide,
Haunt of my home-bred sympathies,
My own—my own fireside?

A gentle form is near me now;
A small white hand is clasped in mine:
I gaze upon her placid brow,
And ask, What joys can equal thine?
A babe, whose beauty's half divine
In sleep his mother's eyes doth hide;
Where may love seek a fitter shrine,
Than thee—my own fireside?

My refuge ever from the storm
Of this world's passion, strife, and care;
Though thunder-clouds the skies deform,
Their fury cannot reach me there;
There all is cheerful, calm, and fair;
Wrath, envy, malice, strife, or pride,
Hath never made its hated lair
By thee—my own fireside!

Oh! may the yearnings, fond and sweet,
That bid my thoughts be all of thee,
Thus ever guide my wandering feet
To thy heart-soothing sanctuary!
Whate'er my future years may be,
Let joy or grief my fate betide,
Be still an Eden bright to me,
My own—my own fireside!

—Alaric A. Watts.

SOME MORE AIR.

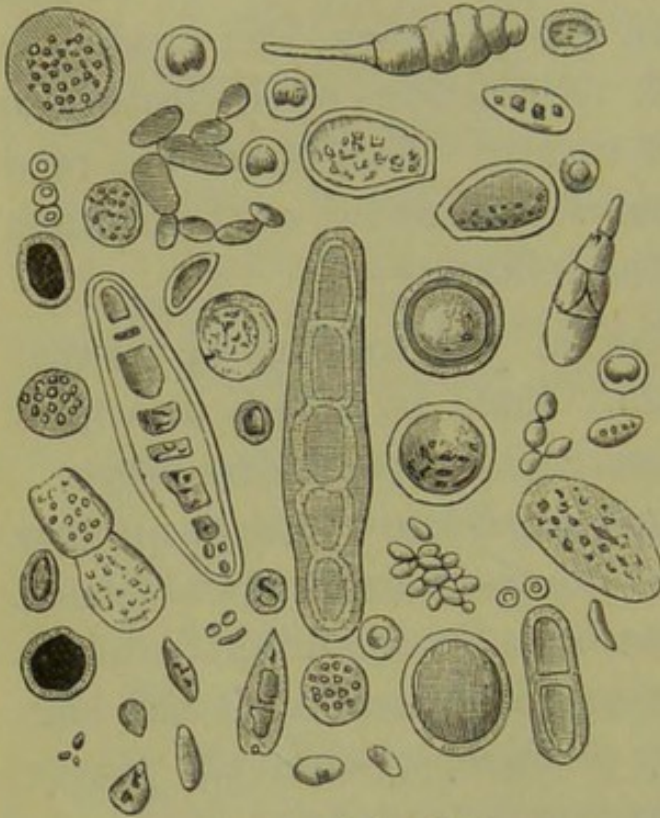
The subject of ventilation was recognized as so important to health that a second lecture was devoted to it. At this also Mrs. Meredith and her daughter were among the audience; and again the former committed her recollections of the lecture to her note-book on her return. This report she read aloud to May as she sat at her sewing next morning, and it ran somewhat as follows:—

“The ill effects of bad air due to want of ventilation”, the lecturer said, “could be shown in a hundred different instances, and in very many ways.

“For instance, we might refer to the large number of deaths that used to take place in the ill-ventilated hospitals of days gone by. Or we might refer to the great mortality among soldiers in all the barracks of every country of Europe, before the proper ventilation of barracks was attended to.

“The same story could be learned even from the lower animals; for horses, sheep, and cows often died from consumption, and from other diseases brought on by want of ventilation. Thus at one time cavalry horses used to die in their ill-ventilated stables at the rate of two hundred in every thousand yearly, or one in every five. Now that stables are better ventilated, the rate is only twenty in every thousand, or only one-tenth of the former number of deaths.

“The ill-effects of imperfect ventilation are not solely due to the carbonic acid in expired air in crowded dwellings. Even if we were to remove this carbonic acid, as we can do by chemical means, the air would still be poisonous. Indeed it has



Atmospheric Organisms.

been found that mice die in such expired air from which the carbonic acid has been removed. There is, therefore, some other poisonous matter exhaled from our lungs, as well as carbonic acid. Of course this makes the need of ventilation still more urgent.

These poisonous

matters in bedrooms cling to the bed furniture, bedding, clothes, and even the wall-paper.

“In addition, the products of combustion, especially from burning gas, are very injurious to health. Any one mounting a chair or ladder in a room lighted with gas soon discovers the presence of unpleasant fumes. Sometimes, through their owners' thoughtlessness or ignorance, birds, hung high up in cages, drop from their perches and die, poisoned

by this heated and foul air accumulated just under the ceiling.

“But after all it is the bedroom that it is most important to ventilate properly.

“We spend more hours in our bedroom than in any other single room of the house, and we do so continuously, not moving about, and thus getting occasional change and better air from a better ventilated apartment, or from the open street. Moreover, during sleeping hours there is no opening of doors in the bedrooms, as when we pass in and out of the living rooms during the day. We are sealed up, as it were, for eight out of the twenty-four hours of the day; or for one-third of all our time.

“In the bedroom, too, as a rule, there is no fire to draw in fresh air from the outside. Indeed, in many cases there is really no chimney: that is, no chimney that is allowed to serve for ventilation. The flue is too frequently blocked up, for fear of down-draughts entering the sleeping-chamber.

“It is the bedrooms, therefore, that give us the most trouble, as we can only rarely alter the structure of the house itself. All the more, then, should we do what little we can. That is, we should flush the bedroom with air, during the day, by means of opened doors and windows. That will help both to get rid of the stuffiness of the room produced by the want of ventilation during the night, and to cleanse and sweeten the bed linen spread out for that purpose.

“In all but the very severest weather, we should also leave the bedroom window sash open for an inch or more at the top. There is an error, strong almost as a superstition among some housewives, that the night air is very injurious. As a matter of fact it is the freshest, and, except for dampness, the best air we can get.”

METHODS OF VENTILATION.

Mrs. Meredith considered the subject of ventilation to be so important in regard to health, that she determined to devote a whole evening to it. This was to be given specially to the consideration of the different Methods of Ventilation employed to secure a supply of pure air from the outside of a house or other building, and to remove the fouled air from the inside of it.

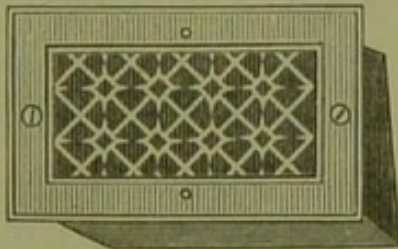
“Nature”, she began, “is the great ventilator. She is constantly, by means of the winds, trying to blow away foul air and to disperse it widely. It is for us to assist nature; or, rather, to refrain from hindering her work, as we too often do, by closing up every aperture that otherwise might form a possible means of escape of foul air.

“Brick is porous, and a certain amount of air will pass through a brick wall. By this means the air of a room is, in some small measure, purified without any special arrangements for ventilation.

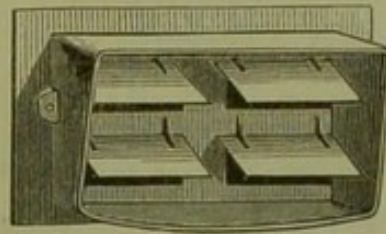
“But it is of *artificial* arrangements for ventilation of which I wish to speak more particularly to-day.

“Among the most common of the methods employed are the following:—

“By *fires* we heat the air inside the room for warmth and for cooking. These fires assist ventilation, for the heated air, being lighter, flies up the chimney, and is replaced by fresh air drawn



Mica-flap Outlet Ventilator (front view).



Ventilator (back view).

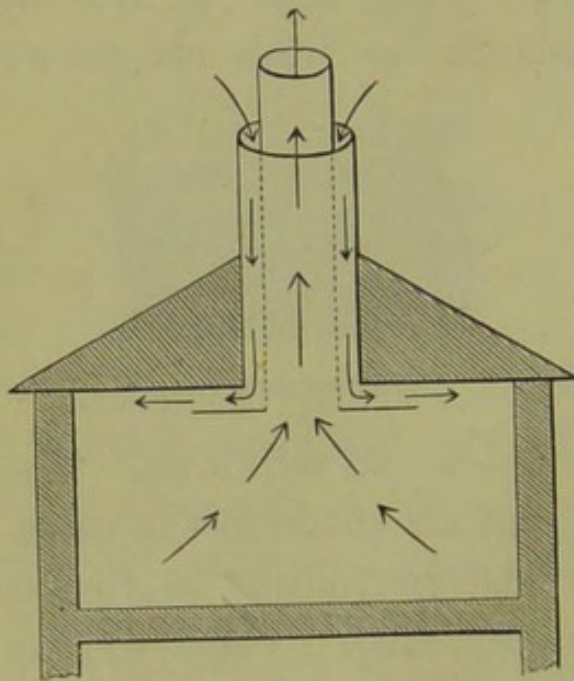
in from without, through doors and windows. The fire thus sets up a draught of air through the room.

“Another plan of artificial ventilation is to put a ventilator into the chimney, with a valve to stop down-draughts, and to prevent soot from choking it up. It was Dr. Arnott who introduced these *Arnott valves*, which in various forms are now well-known appliances of ventilation.

“Arnott’s valve, which admitted smuts and made a clicking noise, was improved upon by *Boyle*, who employed mica plates for valves in windows and chimneys. Thin sheets of this mineral are fitted into a framework in such a manner that the slightest current of air outwards produces movement of the mica plates, and thus allows the fouled air to escape.

Any in-draught is prevented by the outside pressure of the air causing the mica plates to close tight upon the framework. But in practice these plates are so easily moved by the slightest current of air, that they are really too sensitive to serve our purpose well.

“M'Kinnel employed two pipes, one inside the other, of which the inner pipe was longer than the outer. By



M'Kinnel's Ventilating Shaft.

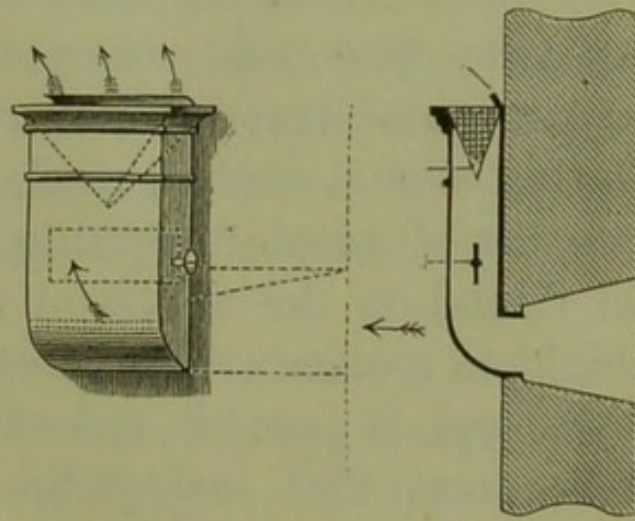
reason of this difference in the lengths of the pipes, one communicated with the outer air at a different level from the other. The fouled air of the room where this method of ventilation was employed thus escaped by the central

and longer tube, and the fresh air entered by the other.

“It was soon afterwards noticed that two pipes, one inside the other, were not necessary; but that two pipes of unequal lengths in different parts of the room would serve the same purpose.

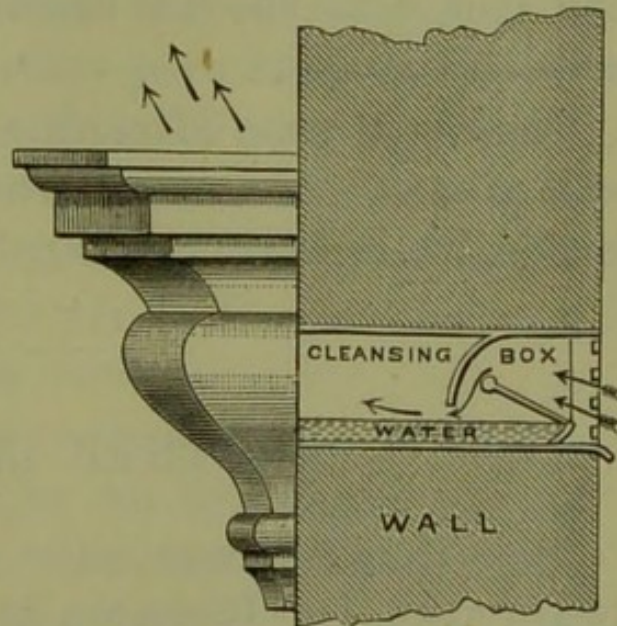
“At the present time *Tobin's tubes* are largely used to assist in artificial ventilation, especially in schools.

“These take up but little room, and are very effective. They consist of openings in the wall, which allow the external air to pass into a tube opening upwards, inside the room. The air issuing from the tube, having an upward course, continues to ascend and is warmed by the general heat of the room before it is forced downwards by further currents from outside. An unpleasant draught of cold air upon the heads of those sitting near the inlet is thus avoided. In winter the current can be checked by a valve, or by means of a perforated grid at the top of the tube. The latter is generally about four or five feet above the level of the floor.



Wall Bracket Inlet on Tobin's System.

Section of Wall Bracket Inlet.



Ornamental Wall Bracket Inlet Ventilator, with Arrangement for Purifying the Entering Air.

“And now, May, perhaps you have had air enough, so I will finish by summing up the principal points

to attend to in this important question of the different methods of ventilation.

“These are that heated air, generally speaking, ascends; that cold draughts should be guarded against; and that the amount of external air admitted should depend on the size of the room, the number of people breathing, and of lights burning in it, and on the season of the year. Besides, we ought to remember that the air admitted should be pure, and, if possible, not too different in temperature from that inside the building. Lastly, we must take care that the current be not so strong as to be felt; and remember that cold draughts to the feet, and hot air around the head, are to be specially avoided.

“But as a treat after this rather difficult Talk, I will give you to-morrow what Dr. Ransome said in his health lecture on this subject of ventilation.

ANOTHER LECTURE.

May Meredith was quite eager the next day to hear what Dr. Ransome had said on the subject of ventilation. So her mother began her report almost in the words of the lecturer himself, as follows:—

“Fortunately, in most English houses, and especially in the cottage dwellings of the poor, there are a good many cracks and crevices left, through

which the air can insinuate itself, sometimes even too perceptibly, in the form of a draught.

“The fire in the living room draws in a considerable amount of air; and even the brick walls, covered with plaster and paper, allow a large amount of air to pass through them. If it were not so, many would die of suffocation in the course of a night.

“Even with doors and windows and all crevices thoroughly pasted up, there is a great change in a room, simply owing to a difference of temperature between the inside and outside of the room. With $9\frac{1}{2}^{\circ}$ difference in temperature, the spontaneous ventilation through the wall is about 43 gallons of air per hour for every square yard of surface.

“Mud walls, from this point of view, are better than brick; and brick walls than walls of limestone or sandstone. So that the more perfect the materials of which houses are built, the more care should be taken to secure ventilation.

“Warmth in the living room keeps the walls dry and porous, and produces an indraught of air. Hence those who try to alleviate the poor man's winter by gifts of fuel, not only procure for him the benefit of a warm room, but also of a better and purer air in the room.

“But a much greater quantity of pure air is required than could be supplied by merely lighting a fire. If, judging by the test of closeness, sufficient ventilation is not effected by the crevices about a

room, it must be effected by special artificial means. In bedrooms artificial means will be found essential.

“There are many excellent and simple plans that may be adopted. Ventilation may be effected by Tobin’s tubes, or by means of grates standing in the hall, near the front door, which draw in fresh air from the outside, and pour it warmed into the room; or by means of Calorigen or other stoves that produce the same result.

“All these appliances are good in their way, but it might be difficult to get landlords to permit of their general adoption in working-men’s homes. I will, therefore, simply speak of open doors and open windows; and especially of the latter. Open doors admit to a sleeping-room the already used-up air of the house; and in rooms which have no fireplace the window should be kept open both night and day.

“Many people are contented with opening a room window for a few minutes before nightfall, and again for a short time in the morning; forgetting that in the course of an hour all the air, even of a moderately large room, would be used by a single person.

“With regard to night air, I will only say that the night air in towns is often the purest. In low-lying country places, where the air is damp and heavy, such as in the Fens, evil may result from admitting the night air freely. But in most towns there is no danger in breathing night air from without; the real danger is from the night air

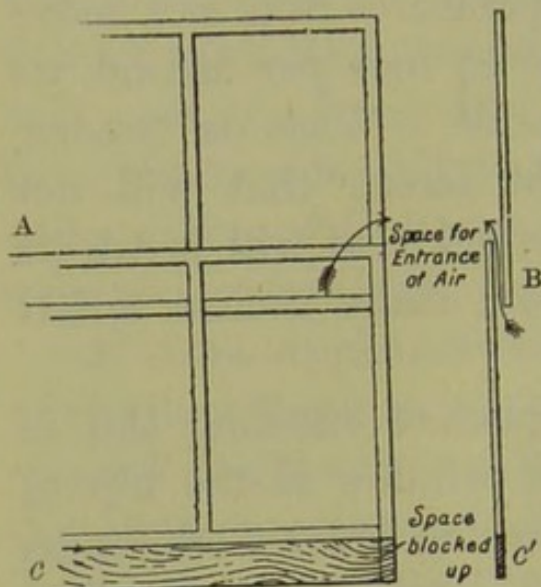
within doors. Draughts of course must be avoided; and it is wonderful how easily they may be prevented.

“If air at ordinary temperatures does not move at a greater rapidity than $1\frac{1}{2}$ foot per second, its movement is not appreciable. What is needed, therefore, is some kind of screen that will not prevent the entrance of air, but that will break its force, divide its current, and make it flow unfelt into the room.

“Perhaps the simplest plan of effecting this is the following:—Open your window at the top to whatever degree is necessary to prevent closeness in the room, but if there is a draught, open it wider still. Place a little loosely-packed cotton between the upper and the lower sash, and in the open space above the upper sash place a strip of perforated zinc, with its lower edge turned upwards, so as to direct the draught towards the ceiling. If there is still too much draught, open it still wider, but fasten in front of the perforated zinc a screen of gauze containing loosely-packed cotton wool.

“Another simple plan is to put a properly-fitted piece of wood under the lower sash to hold it up, and thus make an air-space at the junction of the sashes. This plan was recommended long ago by Mr. Hinckes Bird, and called by him ‘costless ventilation’. It consists, as I say, in raising the lower sash of the window some three inches and filling up the space below it by a piece of wood of the

necessary length and breadth. The air enters the room between the two sashes, and being given an upward direction does not readily produce a draught.



How to Ventilate a Room.

A, Front view of window; B, side view;
c, c', ventilating board.

“It remains to be pointed out that the air used for ventilation must be as pure as possible. In so far as impurity comes from within the house, this must be the care of the householder, and especially of the house-mother. The former must see that there is no dampness about the house or its cellars, and

that the drains are in good order. The latter must obtain cleanliness in all things, in house, offices, clothing, and the persons of the family. Only by such constant care can the house deserve the name of ‘home’, where father, mother, and children may find rest and happiness when the day’s work is over.

DECOMPOSING SUBSTANCES.

The next morning Mrs. Meredith said to May, “We have already made up our minds that our new house shall be kept sweet and clean; but I have not yet said anything of the possible dangers that may

lurk around us in the neglect of this household cleanliness. Yet many more people die in the course of a year from the lack of cleanliness than from accidents.

“We will therefore speak this morning about decomposition and decomposing substances.

“Putrefaction, or decay, sometimes beyond, but more often within, our control, is going on in substances all around us.

“Thus we have decomposition taking place in our own bodies, even whilst we are alive; but, of course, we cannot prevent this. For instance, in order to live we must take in air in inspiration, and give it out again in a very altered form, in expiration. But the fouled air thus coming from our lungs contains decomposed and decomposing animal substances arising from the waste of the body, and passing off in a gaseous form.

“If these animal effluvia, as we call them, were not removed by ventilation, our own health and that of others living with us would suffer in consequence. For it is really the substance of our bodies, and of the food we have taken into them, that thus becomes decomposed, and is got rid of in the act of breathing.

“Again, decomposition takes place outside of us, in the food-scrap and other household refuse that are too frequently allowed to decay and taint the air inside and outside our dwellings. The oxygen of the air combines with this household refuse, and

causes it to putrefy, and in so doing to give off ill smells.

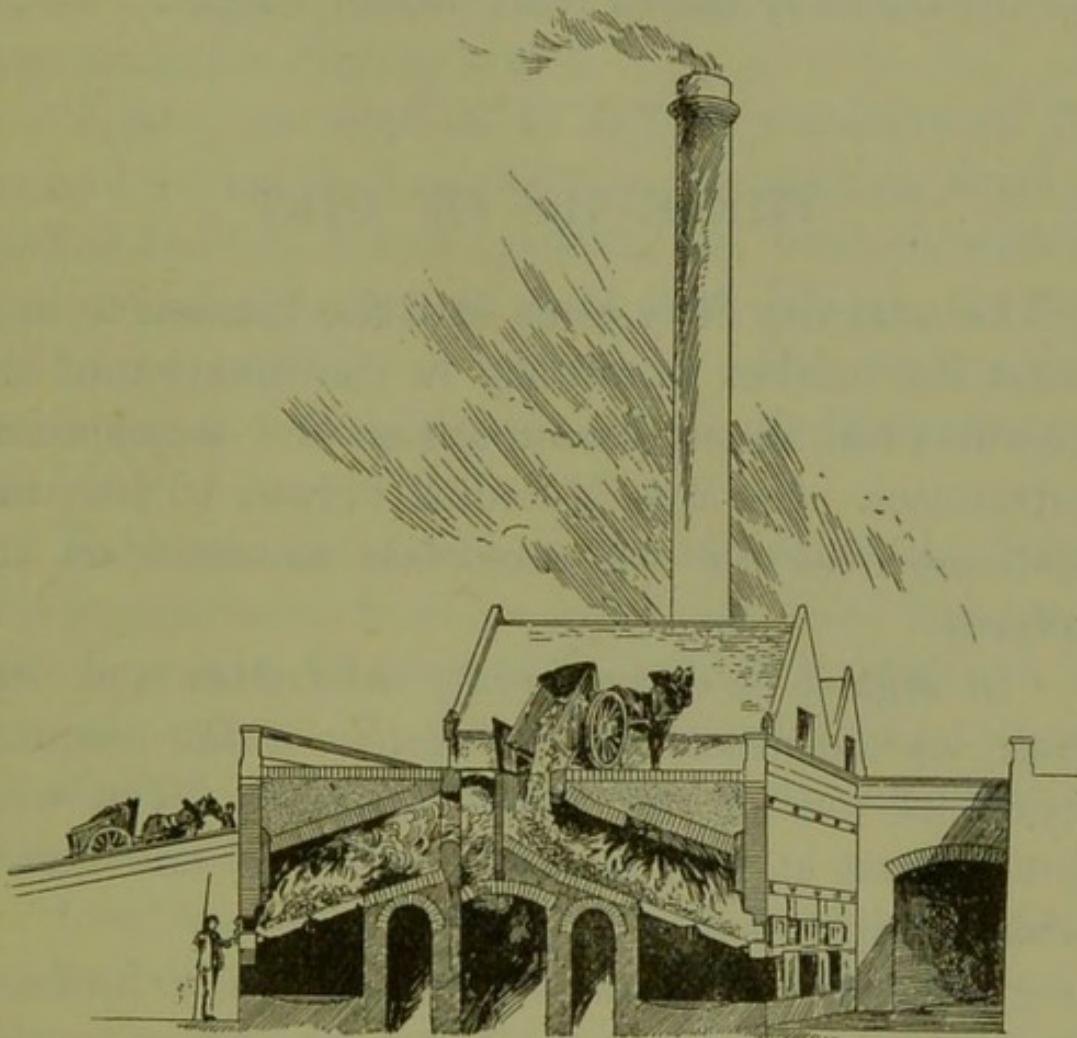
“This is, of course, specially true in the case of the contents of ash-bins, and other receptacles of waste organic matters, which are always a source of danger to the health of a household, unless they are frequently emptied. It would, therefore, be much better for us to put the refuse into covered pails, made for the purpose, and which can be removed daily, rather than to let it fester and ferment in the dust-bins.

“But, even if we cannot depend upon the dust-cart to remove such waste daily, or at frequent intervals—as is too often the case, especially in the country—we should at least see that the ash-pit is well ventilated at the top. This is necessary in order that the foul smells arising from the decomposition beneath may escape.

“In many of our large towns a still better means of getting rid of decomposing substances, and of thus escaping the dangers of decomposition, may now be had. In these towns the foul contents of the ash-pits are no longer left to accumulate for weeks. Nor are they merely removed to waste ground in the suburbs, and allowed to sow there the seeds of future disease when such made-ground is subsequently built upon.

“Instead, they are frequently removed to be at once burnt up in a destructor. This is a furnace of a particular construction, and furnished with a very

tall chimney. In this furnace the very refuse destroyed serves as the fuel to supply the heat employed in its own destruction. That is to say, the furnace, having at first been made intensely



Section of a Refuse Destructor.

hot, will afterwards burn up the refuse, just as a kitchen fire in an economical household is made to consume its own ashes and cinders.

“And that last remark reminds me, May, that even this same kitchen fire in the country, where no destructor is to be had, can do the same work as is done by the destructor in the town. All vegetable

refuse, such as cabbage leaves, potato parings, and other decomposing substances, can be burnt at the back of the fire. In this way the danger of decomposition may be prevented, and foul smells sent up the chimney out of reach of our lungs."

THE EVILS OF DIRT.

The next day May came into the kitchen to hear what her mother would say in continuation of the previous talk about decomposition and decomposing substances. So Mrs. Meredith turned to her, and addressed her for the next few moments on the subject.

"In regard to decomposing substances and dirt, May, let me repeat the substance of the eloquent words of one of our recent lecturers. You were not present at this lecture, but I was; and this is what he said:—

"Dirt, in one or another of its many forms, is perhaps the greatest of all the dangers connected with dwellings. You can readily understand the bad influence of dirt. Not only does its presence interfere with a man's or a woman's self-respect, and lower them in the social scale, but it often leads to loss of health.'

"The lecturer went on to say that the presence of dead organic matter was, of course, necessary for putrefaction, or the fermentation of decay. But he

told us that in addition, air, warmth, and moisture were necessary.

“‘Keep out the *air*,’ he said, ‘as we do in tinned meats, preserved lobster, &c., and you may keep these foods for years: and this proves that *air* is necessary for decomposition.

“‘Again,’ he went on to say, ‘if we drive off the moisture from food, as people do in making dried or jerked beef in South America, the food, as seen in the case of the strips of beef thus dried in the sun, will keep good for a long time. This shows that *moisture*, as well as air, is necessary for putrefaction or decay.’

“Moreover, as he told us, the success of the freezing process used, in ships conveying beef and mutton from New Zealand and America to England, to prevent putrefaction, shows that a certain degree of *warmth* is also necessary to set up putrefactive changes in food.

“Now we must have air, warmth, and a certain amount of moisture around us,” Mrs. Meredith continued. “But we are not obliged to have dead organic matter as well—that is, we need not have dirt.

“All waste matters that are combustible should be burnt up, as I have already told you. That is the very best way of getting rid of them, for fire is a most purifying agent. It leaves nothing behind but dry ashes that will not decay. And it sends off into the upper atmosphere, in the form of harmless

gases, the constituents of such substances as otherwise would putrefy if they were not thus destroyed.

"We have a type of this change brought about by heat and combustion in a burning candle. Here the tallow as it burns decomposes, or splits up, into carbonic acid and other gases.

"The same process goes on in the slower combustion of food that takes place inside our bodies. The food decomposes, and a large part of it is given off as carbonic acid from our lungs.

"But what much more concerns us just now is the decomposition of vegetable refuse and of food, in the form of food-scrap, cabbage leaves, potato parings, &c., outside of our bodies.

"The proper place for these is the back of the kitchen fire. But in summer-time, when no fire is kept up, if we have a garden, they may be slowly destroyed there; and thus these bad food-materials will be made useful to bring forth fresh supplies of food.

"The sum of the whole matter is, we must get rid of waste matters at the very earliest possible moment. Refuse, either animal or vegetable, is like a bad tenant in a good house; it should have early notice to quit.

"But there is one kind of refuse, and that the worst and most disagreeable of all to deal with, that specially requires this early notice to quit. That is the contents of drains, about which I will speak to you one of these days when I have time."

QUEEN OF THE HEART AND THE
HEARTH.

She was a phantom of delight
When first she gleamed upon my sight;
A lovely apparition, sent
To be a moment's ornament;
Her eyes as stars of twilight fair;
Like twilight, too, her dusky hair;
But all things else about her drawn
From May-time and the cheerful dawn;
A dancing shape, an image gay,
To haunt, to startle, and waylay.

I saw her upon nearer view,
A spirit, yet a woman too!
Her household motions light and free,
And steps of virgin liberty;
A countenance in which did meet
Sweet records, promises as sweet;
A creature not too bright or good
For human nature's daily food,
For transient sorrows, simple wiles,
Praise, blame, love, kisses, tears, and smiles.

And now I see with eye serene
The very pulse of the machine;
A being breathing thoughtful breath,
A traveller between life and death;
The reason firm, the temperate will,
Endurance, foresight, strength, and skill,

A perfect woman, nobly planned,
To warn, to comfort, and command;
And yet a spirit still, and bright
With something of an angel light.

—Wordsworth.

ON WATER-SUPPLY.

“There is another thing, May, of which we have still to speak,” said Mrs. Meredith to her daughter the day after she had given her lesson on the *Evils of Dirt*. “It is necessary in all arrangements for cleaning, and is indeed of the first importance for the health of every one in the house. We have mentioned it from time to time already, but we have had no definite lessons upon it. I mean the water-supply.

“You know now how necessary to health is a plentiful supply of fresh air. A sufficient supply of pure water for drinking and washing is of equal importance.

“In our snug little house, we get water so easily, by simply turning on the tap, that it seems as if the water came of itself, and that we need not trouble ourselves about it. And yet it has cost our engineers and the leading men of our cities, towns, and villages much thought, work, and money to devise means of getting into our houses the inestimable blessing of plenty of pure water.

“The water-supply of our town comes from the reservoir which you have often been to see with

father and me. As you know, it lies in the high ground about five miles behind the town. It was made about ten years ago by damming up a little stream that comes down from the hills and by directing into it the outflow of some springs in the neighbourhood. The water is brought to us in large pipes called *mains*, from which small pipes lead into the several houses. You know the saying that 'water always finds its own level'. Well, the water in the pipes will rise to the height of the water in the reservoir, and as that stands much higher than any house in the town, we can get water even in the top flats of the highest houses.

"Before we had this reservoir supply we got all our water from pump-wells or from the river.

"The river-water, you know, is not very clean; and, although it was always carefully filtered before being used for drinking, yet many cases of epidemic disease occurred in those parts of the town that were supplied from the river. For a filter, while it removes all solid impurities in water, cannot remove disease germs that may exist there. The well-water was better, as it came from springs; but sometimes the wells, as is very apt to be the case in villages or towns, became contaminated with foul matter from drains and so forth. And then in hot summers some of the wells used to dry up and we had often great difficulty in procuring water.

"Towns are generally supplied from artificial

reservoirs or from lakes. Manchester draws its water from Lake Thirlmere in the Lake District. Glasgow, in Scotland, is supplied from Loch Katrine, a lovely loch in the Highlands, about which Sir Walter Scott has written his poem 'The Lady of the Lake'. Liverpool obtains its supply from a gigantic artificial lake that has been formed at the upper part of the river Vrynwy in Wales. The water flows in pipes a distance of 67 miles to Liverpool. London is not so well off as these great cities. Part of its supply comes from the river Lea, part from the upper waters of the Thames, and part from wells. But the time may come when a better and more copious supply will be brought to London.

"One of the great advantages of having water brought into our houses, as we now have it, is that we are enabled to have a constant supply of hot water also. A pipe leads to a boiler behind the kitchen fire in which the water is heated. It can then be led to any part of the house by pipes, and drawn off as required.

"In very cold weather, care must be taken to put out the kitchen fire at once, if the water in the pipes freezes. For then there are two dangers. The lesser is that the kitchen boiler, becoming empty, is liable to be cracked by the fire. The other is more serious. It arises from the possibility of a pipe, that lets the steam escape from the boiler, becoming frozen up at night when the fire is out. Then, when the fire is again put on, the steam, being unable to

escape, may cause a serious explosion. This has occurred several times in recent years. I think that is enough about the water-supply for to-day. To-morrow I shall tell you more about it."

HARD AND SOFT WATER-CISTERNS.

Next morning May was again with her mother, who resumed her talk about water and water-supply.

"You will remember," she said, "that at the farmhouse at which we were staying last year the drinking water came from the spring at the foot of the garden, while the water used for washing clothes was rain-water collected in barrels which stood outside all the year round to catch the showers as they fell. Now, do you know what was the reason of this?"

"Mrs. Johnson told me it was because the spring-water was hard," said May, "and would not do for washing."

"That is right," said Mrs. Meredith, "and can you tell me *why* the spring-water would not do for washing?"

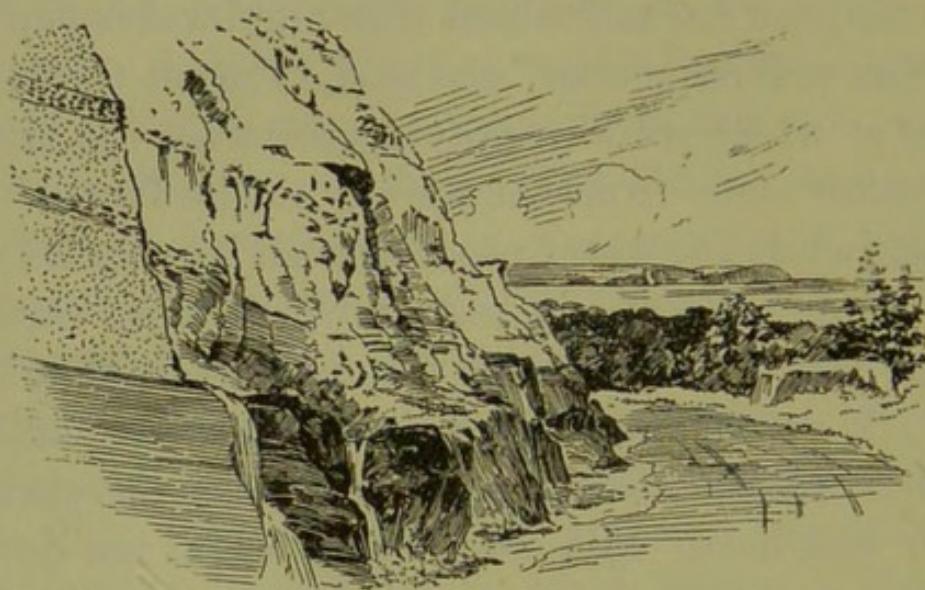
"It would not make soap-suds," said May at once, who seemed to have gone into the question pretty fully with the farmer's wife.

"I see you have learned nearly all about it," said her mother, pleased that May had been so attentive; "but I must tell you what it is that makes the difference between hard and soft water.

"The rain-water was soft and good for washing;

because rain-water is almost perfectly pure. Spring-water is also pure in so far as it is wholesome to drink, or contains nothing hurtful; but it does contain certain mineral substances, such as lime, which are harmless, but which make it what we call *hard*, and prevent it making soap-suds as you say, or *lather* with soap.

“You must have learned in your geography



Section of a Hillside showing Spring issuing at foot.

lessons at school all about springs. You know that the heat of the sun evaporates the water of the sea, and the water vapour rises up and forms clouds. The clouds again condense when they pass into cold parts of the upper air, and the water vapour again becomes water, and falls down to the earth as rain. The earth sucks up the rain-drops as a sponge sucks up the water in your basin, and so the rain soaks down and down through the earth till it comes to clay or impervious rock through which it

cannot pass. It then flows or trickles along the rock till perhaps at last it finds an opening to the surface again, and bubbles out as a spring. *Well-water* is just the same as spring-water. We dig a hole deep into the ground till we come to clay or some impervious rock, and there we reach water which then gathers in our well, and which we can pump up as we require it.

“Now water generally contains a certain amount of carbonic acid gas, which you heard of when we were speaking about the air. Carbonic acid gas has the power of dissolving certain minerals, and so it happens that as water passes through the ground it becomes charged with lime and other mineral substances—becomes, in fact, what we call *hard*.

“When water is not very hard it may be used without much difficulty for washing; but if it is very hard, and if we cannot procure soft water, we have to try to make the hard water soft. As a rule this can be done by boiling the water, which causes the lime—if lime be the cause of the hardness—to fall to the bottom of the boiler. So if you are ever in a place where you can only get hard water for washing you should remember to boil the water. At the same time, I should tell you that the lime forms a crust in the boiler or the kettle, which is then said to be *furred*, and care must be taken to remove the *fur* from time to time.

“We are fortunate in our town, for our water is not too hard, though it is not quite soft, and so it is at

once pleasant for drinking and quite suitable for washing.

“ Even when water is perfectly pure we have still to be very careful that it may not become impure from storing. In some places there is no necessity for storing water at all, as the supply is so good that we can always be sure of getting water direct from the ‘main’. But here, and in most places, the service of water is not constant, that is, the water in the main is turned off for a part of every day to prevent people wasting the water. For, our supply, good as it is, is not sufficient to allow of waste, and there are many careless people who would let the water-pipes run all day and so waste a great deal of water. That is a thing you should always be careful to avoid.

“ Well, in order that we may have water when it is turned off at the main, we have a cistern which is filled up when the water is running, and which keeps us supplied until the water is turned on again. If, then, we were to leave our taps running, we should soon empty the cistern and be without water for some hours, and thus, quite rightly, we should ourselves suffer for our own carelessness.

“ Our cistern is made of slate, which is the best material for the purpose, because it does not become corroded by water, and so the water takes up no impurity from it. Then our cistern is carefully covered over to keep dust out, but it is ventilated to admit plenty of fresh air into it.

“Wood is sometimes used for cisterns, but it is a very bad material for the purpose, as it decays and so fouls the water. Stone or brick-work cisterns cemented inside are good; and galvanized iron also is a suitable material for cisterns. Iron, of course, would not do at all, because it rusts rapidly; though, if lined with zinc, iron cisterns are quite unobjectionable.

“In some places lead is used for lining cisterns, and although water acts upon lead and dissolves a little of it, there is very little risk of the people being poisoned. The reason of this is that the lead soon becomes tarnished by the action of the water, and then it is no longer acted upon. The tarnished surface forms a protective covering. If water has stood long in a lead cistern, as, for instance, when a house has been shut up for a time, the water should be run off and the cistern refilled before any of the water is used for drinking.

“All cisterns should be cleaned out at least once a year, but, if the cistern be made of lead, care should be taken not to rub off the tarnish. A scrub with a hard brush is all that is necessary, and will not do this.

“There, I think I have told you all that you need know just now about water-supply. You must try to remember all about it, for plenty of pure water is almost as important for health as plenty of fresh air.”

THE NEW MAID.—I.

Mrs. Meredith now not only had a new house, but, as we have already stated, she had recently engaged a new maid to help her to keep the house in order. But she knew that Mary would not be of much assistance unless she were properly trained.

So after the new girl had settled down a little into her strange surroundings, Mrs. Meredith resolved to give her some definite instruction in the principles underlying the common details of house-work.

"These instructions", she said to May, "will be of as much use to you as to Mary. For if in days to come you cannot afford to keep a servant to assist you, then you will know how to do the house-work properly yourself. If, on the other hand, you can afford to keep a maid, you will know how to teach her to do her work, just as I am about to try to teach our Mary."

Mary thought it very kind of her new mistress to take so much trouble to instruct her; and she said so.

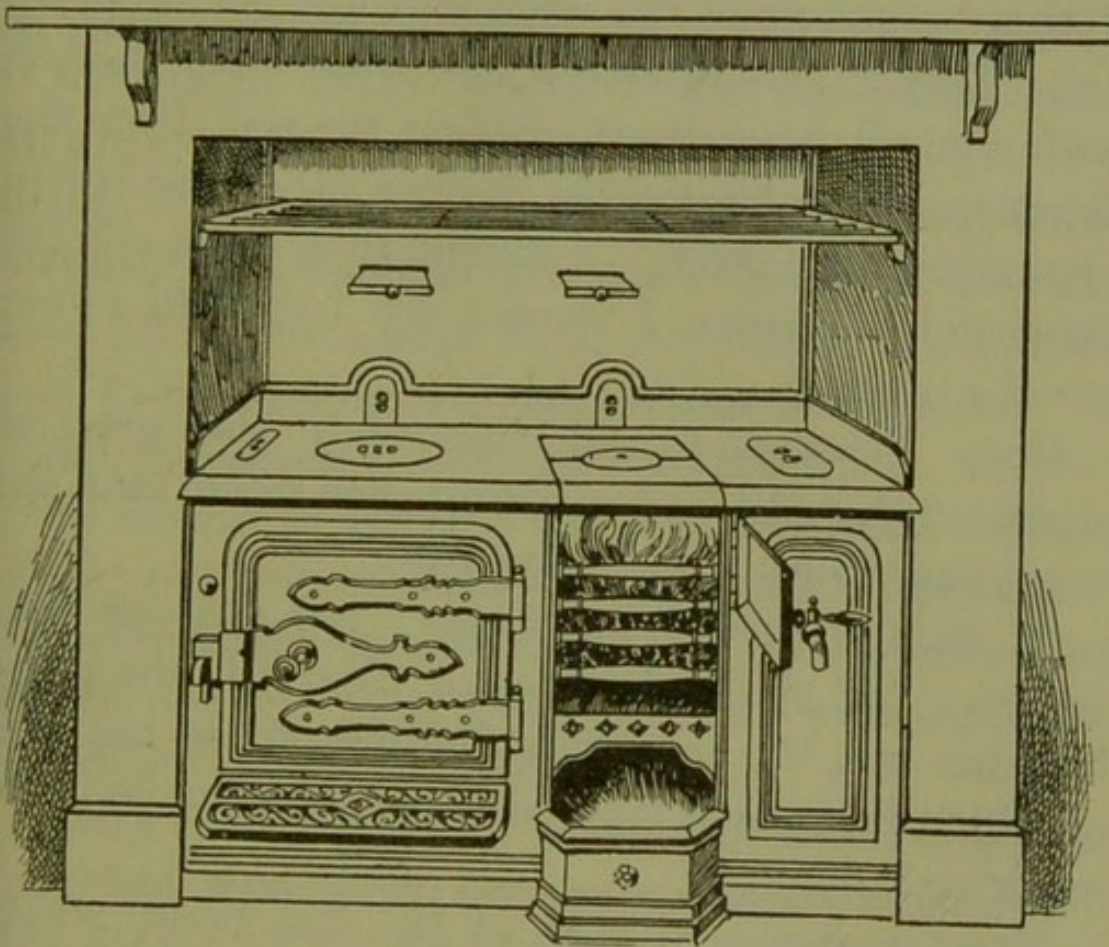
"Let us begin at the beginning," Mrs. Meredith said. "What is the first work that you have to do when you get up in the morning?"

"To clean the grate," said Mary.

"Then I will tell you exactly how I should proceed if I had to clean the grate, and you shall try my way," replied her mistress. "If, after trying

it, you find that it does not succeed, by all means let me know where it fails, and we will try to mend it. Only, be sure you do the work just in the same order as I advise; or else, of course, my way will not had have a fair chance given to it.

“In cleaning a grate I should first take out the



An Ordinary Fire-grate.

ashes. This should be done because an untidy fire-place looks uncomfortable, and because a clear current of air is necessary to make the fire burn up brightly and cheerfully. The current should enter from below, and pass upwards through the body of the fire. This it cannot do if the grate be choked with ashes.

“The large cinders must be put on one side to be used in lighting the fire. The remainder of the ashes must be sifted, the dust put into the ash-pit, and the cinders used for burning.

“I should pull out the damper from under the oven, and remove the ashes that have collected there; if this be not done the oven will not get properly hot. Then I should sweep the grate from the top with a small hand-brush; collect the soot from the chimney, and take it away at once, otherwise it will blow about the room. I should then clean out the flues, and, of course, I should not forget to sweep out the oven.”

Mary listened to all this with the greatest attention, for she had made up her mind that she was going to be a tidy housewife.

“I should then fill the boiler,” her mistress continued. “If the boiler be not filled till the grate becomes hot, the cold water falling on the hot iron of which it is made may perhaps cause the boiler to crack or burst.”

Mary remembered that, at the last house where she had lived, neglect of this precaution had been the cause of a dangerous boiler explosion.

THE NEW MAID.—II.

Mrs. Meredith next day proceeded with her instructions to Mary:—

“To polish the grate, I should mix some powdered black-lead with enough cold water to make it as thick as batter. This, beginning at the top and working downwards, I should put on the grate with a small round brush. But you must be careful, Mary, not to put your fingers or brush on the paint by the side of the fireplace, as that would make it black and dirty.

“I should then brush off the black-lead with another brush, and polish the grate with a dry brush. It is true that I should thus use three brushes; but brushes are not expensive, and will keep a long time with care. Of course I should be sure to brush well into the corners of the grate.”

All this seemed fairly easy to Mary.

“I should then begin to clean the brass handles of the oven doors with a paste made of powdered bath-brick and linseed-oil, putting on the paste with a piece of rag. Then I should polish with dry, powdered bath-brick and a dry rag.

“Dry materials should always be used for polishing; and remember this as a golden rule, Mary. The reason why some girls never have clean glasses for the table, or clean window-panes, is because their polishing materials are not quite dry.”

To this Mary replied that, if there was one thing she disliked more than another, it was to see “smeary” glasses at table.

“To clean the hearth-stone I should wash it with clean water, using a brush and flannel, scrubbing

with the brush and drying with the flannel. I should remove any spots of grease on it with a little dry bath-brick. While the hearth was still moist, I should rub it with hearth-stone, or with pipe-clay which had first been dipped into water.

“Next I should wring out the flannel till it was nearly dry, and rub the hearth, backwards and forwards, to make it evenly white. Then I should empty the water, wash out the brush and flannel, and put them in the air to dry.”

“If they were left wet they would become mouldy and decay,” said Mary, who was evidently giving all her mind to the business in hand.

“To clean the kitchen fender,” continued her mistress, “which has, as you see, a steel top and black sides, I should proceed as follows: First, I should clean the top with powdered bath-brick and linseed-oil, polishing with dry bath-brick and a dry rag, just as was done with the oven handles.

“The black outside and inside of the fender must be cleaned with black-lead in the same way as the grate was done. The steel tops of the fire-irons should be cleaned like the steel top of the fender, the black part polished with black-lead.

“Now comes the finishing stroke, and that is what I call a work of art! Every girl thinks she can light a fire; and so she can in one fashion or another. But the important thing is to do it in the shortest possible time, and without making any dirt.”

“Mother used to tell me I was the best fire-

lighter in the family," said Mary, with a little pride in this bit of family history.

"Then I am sure you will agree with me," replied Mrs. Meredith, "that the way I am going to advise is at least one good way of lighting a fire. You will see that I take the greatest care from the first to let the fire have plenty of air. A fire requires air just as much as a human being.

"In laying the fire, then, I put a few large cinders at the bottom of the grate. Over these I place pieces of dry crumpled paper, upon which I lay sticks crossways, and on the top of all some small pieces of coal. The paper is crumpled, and the sticks are laid crossways, in order that the air may come between, and so cause a draught, to make the fire burn up.

"And now, Mary," continued her mistress, "let me ask you a question or two to see whether you have understood what I have been trying to teach you. Why should the grate be cleaned out before laying the fire?"

"I should think, because it would make me so hot to do it with the fire burning in the grate," said Mary.

"That is one reason, certainly," said Mrs. Meredith with a smile. "Well, what is the principal thing to be attended to in laying a fire?"

"To build it up so that plenty of air may come in underneath," replied Mary.

"Then I hope," said Mrs. Meredith, "that you will try to carry out these instructions, and so save my time as well as your own in doing so."

WASHING UP.

The next day that Mrs. Meredith could spare time to give Mary and her daughter another little "kitchen lecture", she chose the subject of "Washing Up".

It was evening; and the tea-things had just been taken into the kitchen to be washed.

"You must take great care of my tea-service," Mary," she said. "It is our best service, and I should be very sorry to have any of the cups or saucers broken.

"Perhaps to-day I had better wash the tea-things myself, to show you how to do it properly, and May will assist you to wipe them."

The maid said she would be much obliged if Mrs. Meredith would do so.

"You see this tea-service has gilt on it," Mrs. Meredith began; "and we always wash such china in warm water, and dry it, of course, with a clean cloth.

"China without gold may be washed with a little soda in the water; the soda gives it a polish and removes the grease. You see we wash the handles of the cups carefully, drawing the dish-cloth through them to remove any stains of tea or coffee, and then dry with a clean cloth. Lastly, we wash out the bowl with hot water and soda. The dish-cloth must also be washed, and hung out in the air to make it dry and sweet."

The last operation Mary performed for her mistress.

“Now I will tell you how to keep your sink clean,” Mrs. Meredith continued.

“Collect all pieces of food left about the sink.



The Kitchen Lecture.

Put all bits of green vegetables into the swill-tub; never throw them on the ash-heap, where they would decay, give out a bad smell, and perhaps cause a fever. Also, never empty cabbage-water down the sink, as this would cause a foul smell all over the house.

“Scrub the sink with hot water and soda. Pour down the pipe a quantity of hot water to remove the grease in it; then pour down large quantities of cold water to freshen and purify the pipe. Do not take out the sink grating, as that would let large pieces of refuse go down, which would stop up the pipe.”

All this seemed quite well known already to Mary, as she had done that kind of work before.

But the next part of the performance was new work to her. So she listened very attentively whilst Mrs. Meredith continued:

“Pasteboards should be scrubbed with sand. First, we wash the board, then sprinkle it with sand, and scrub it with a brush the same way as the grain of the wood, as that gets out the dirt and does not make the board rough. Then we rinse off the sand, wipe the board with a dry flannel, and dry it with a clean cloth, setting the board on end to dry thoroughly.

“We scrub tables and floors with warm water and soap; but do not use soda, which would make the boards a bad colour. First, we wet the table or floor a little, soak the brush, scrub the way of the grain of the wood, and dry with a flannel. Remember to scrub the edges of the table.

“Wash out the bucket; wash the brush and flannel, and put them out in the air to dry.

“And now, to end this kitchen lecture,” concluded Mrs. Meredith, “why should you be careful to remove vegetable refuse?”

“To stop bad smells and fevers,” said Mary, who has not a great choice of words, but has good strong arms, and is willing to learn how to use them.

POTS AND PANS.

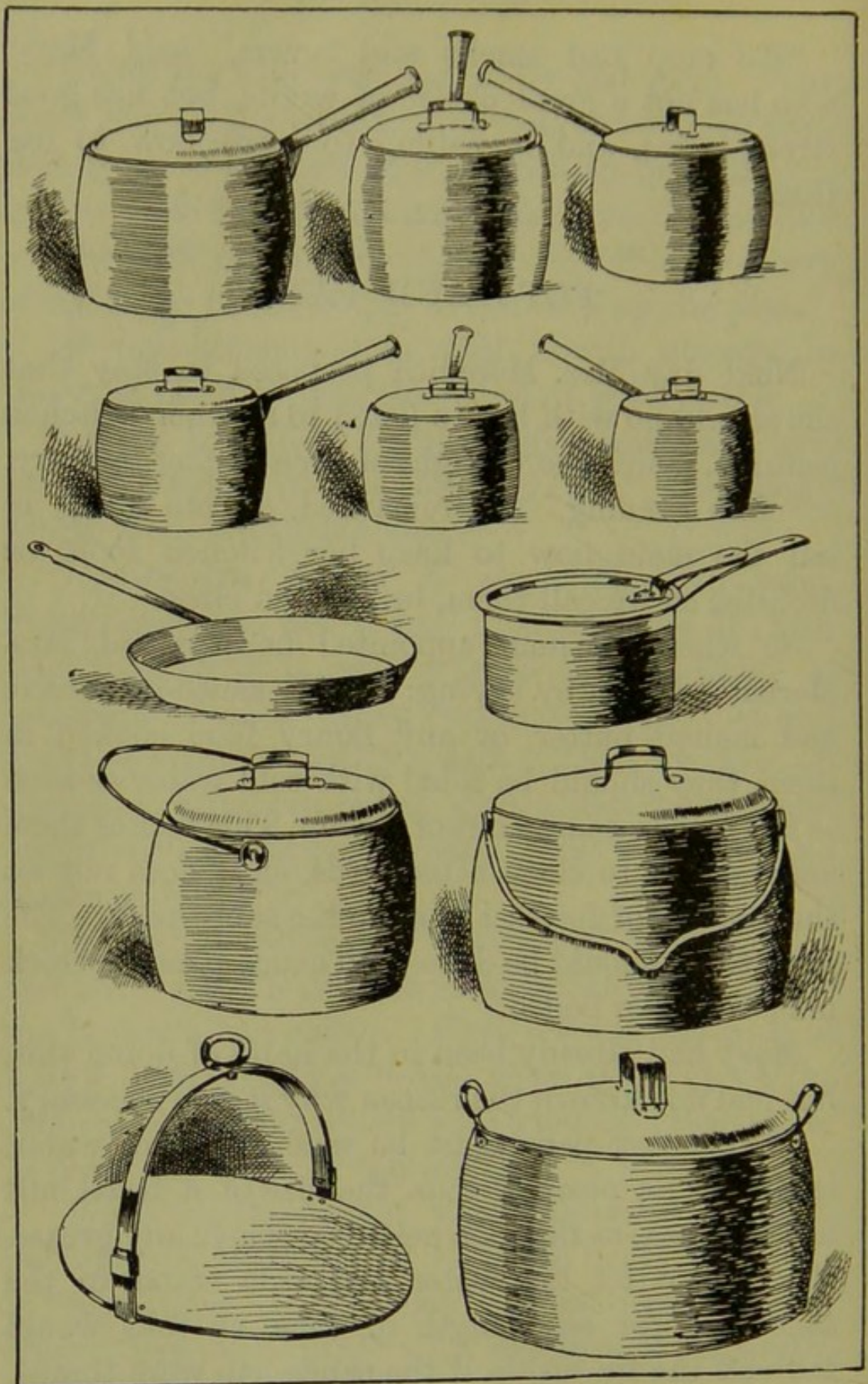
Next day Mrs. Meredith proposed to May that she should go with her to listen to another “kitchen lecture”, which she thought of then giving to Mary.

“This evening,” she remarked, “I am going to tell the maid how to keep her kitchen tools, or utensils, as we call them, bright and clean.”

So when the hour appointed had arrived, Mrs. Meredith began by saying: “After sauce-pans have had melted butter, or any floury food cooked in them, they should be filled with cold water as soon as the food is poured out of them. This makes them much easier to clean afterwards, as it does not let the remains of food set hard in the sauce-pans. The same thing should be done with sauce-pans in which milk has been boiled.”

Mary had already been in the habit of doing this, but had not known the reason why it was necessary.

“Iron sauce-pans must be washed in hot water, into which a piece of soda the size of a hazel nut has been put, as the soda helps to remove any grease. We do not let the water and soda stand in the sauce-pan for any length of time, as that would take off the tin inside, if the sauce-pan were tinned.



A Set of Pots and Pans for Ordinary Purposes.

“The reason why we put soda into the hot water is that it enables us to get rid of the grease; the grease has an affinity for the soda, and so unites with it, and leaves the utensil. When a substance has a tendency to unite or combine with another substance, it is said to have an affinity for it.

“We wash the outside of the sauce-pan as well as the inside; the outside, to take off the soot, which is a non-conductor of heat, and which if left upon the sauce-pan would prevent it from becoming hot as soon as it would if it were clean. The inside we wipe with a dry dish-cloth; then we set the sauce-pan near the fire to dry thoroughly that it may not become rusty; we then put it away on a shelf with the bottom upwards.”

Here Mary asked why sauce-pans were always placed bottoms upwards upon the shelves.

“To prevent the insides getting dusty,” replied Mrs. Meredith. “We do not put them altogether on the shelf, but leave a little space, where the sauce-pan overhangs the shelf, to let in the air; this will keep the sauce-pans fresh and sweet.

“To clean tin sauce-pans we mix a little whiting with water to a smooth paste, rub it on the sauce-pan with a rag, and polish with dry whiting and a dry rag. We should be careful to rub the whiting completely off. Sauce-pans should never be cleaned with soap, as that would give a disagreeable taste to food cooked in them.

“Copper and brass pans must be cleaned with

powdered bath-brick and linseed-oil, put on with a rag. They should be polished with dry bath-brick and a dry rag, just as are the oven handles.

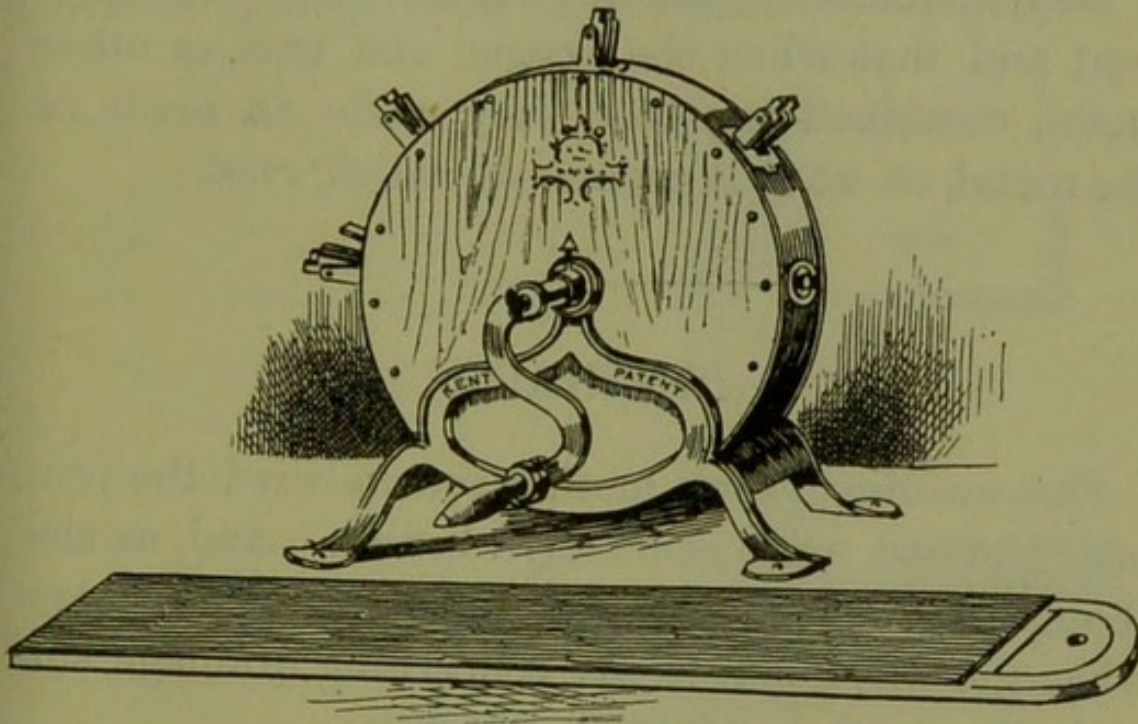
“To clean knives and forks, we set up the knives and forks in an old jug which contains hot water. We must be careful not to wet the handles, as the hot water would loosen them, and it would also make them greasy. We should dry the knives and forks with a cloth.

“Then the knives must be polished upon a knife-board. The board is sprinkled with emery powder, or powdered bath-brick. This is to produce a surface rough with gritty material that will rub off the particles of dirt and rust on the knives, and so make them bright. We rub the knives backwards and forwards on the knife-board till all stains are removed, and until they look bright; we then dust them well with a cloth. We rub the forks with a piece of rag, or wash-leather, which is still better; using a little emery or powdered bath-brick to produce a polish. We must take care to rub well between the prongs of the forks to remove all dirt.

“For those who can afford it, the knife-cleaning machine is far more economical than the knife-board. It is a rotatory machine, that is, one that is worked by turning a handle, like a churn. The blades of the knives are put into openings in the circumference of the machine. When the handle is turned the knives are polished between rotating brushes, on which is a little emery powder. The

machine thus not only cleans the knives but also helps to keep the blades sharp.

“In cleaning frying-pans, we must always be careful to pour the fat that remains in them into a basin, and keep it for future use. We first wash



Knife-board and Knife-cleaning Machine.

the frying-pan in very hot water, using a piece of soda the size of a hazel nut.”

From what she had already been told of the action of soda on fat and grease, Mary understood that it was used here in order to remove grease from the pan.

“We then dry the pan with a dish-cloth, and put it in front of the fire to prevent it from getting rusty. All iron utensils put away damp are sure to become rusty, and the rust will then eat into the iron and destroy it.”

Here Mrs. Meredith explained that all metals except gold become rusty when left in water, or exposed to the air, especially to damp air. There was something in the air, she told Mary, which joined with the metal to make it rust.

May understood that this "something" was oxygen; and that when the oxygen and iron, or other metal, combined together, they made an *oxide* of the metal, or, as it is commonly called, *rust*.

DRAINAGE.

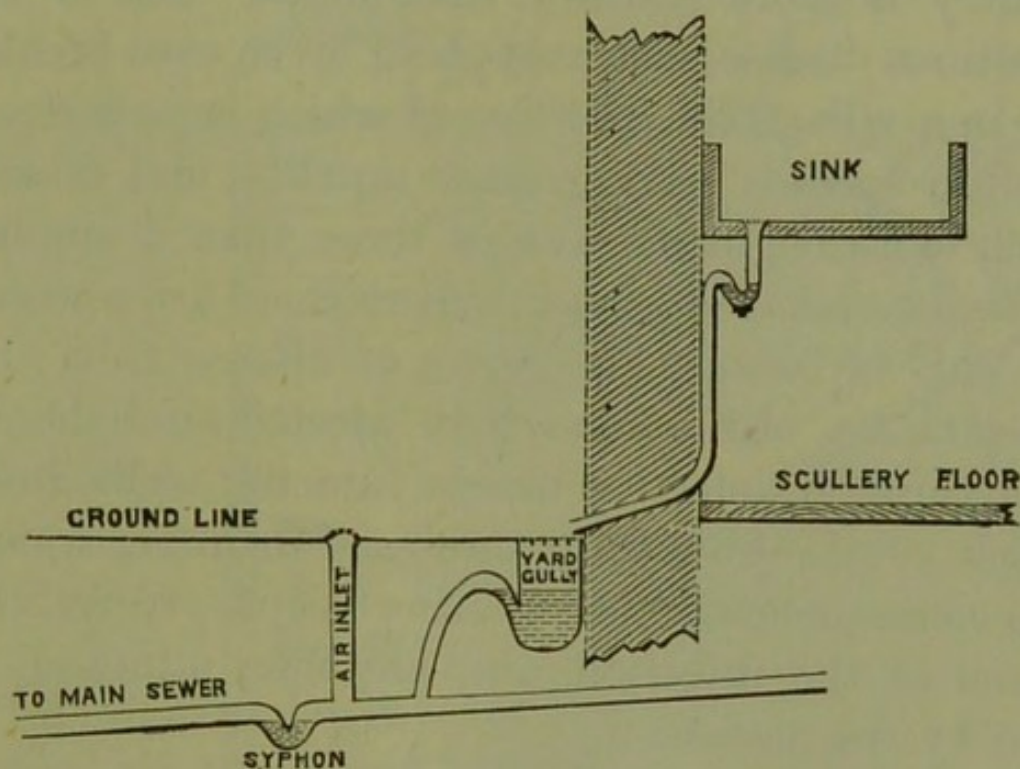
One evening, May's mother remembered the promise she had made some days before. And, as she thought it would be useful for Mary also to hear what she was about to say concerning drainage, she took May with her into the kitchen.

"I wish you to give me all your attention," she said to her when the house-work had been all done, and both had an hour's leisure in the evening.

"Just come out into the yard for a moment, Mary, and notice that the drain-pipe from your sink does not go straight down into the ground, and so direct into the sewer. It only projects for a couple of inches from the house wall, and then opens over a grid. So you see there is a clear air-space between the drain-pipe and the sewer. That clear space allows of the free ventilation of the pipe. The air passes between, and so prevents the sewer venti-

lating into the house, and bringing into it sewer-gas."

After a little thought, Mary, who had never before asked herself whether or not the sink-drain went direct into the sewer, understood the necessity of this open air-space between the two pipes.



Arrangement of Waste-pipe from Scullery Sink.

"This is a very important matter," her mistress went on to say. "It would be a very bad kind of drainage to connect the house pipes directly with the sewer, as many forms of disease arise from bad drainage. Among these are such dreadful diseases as typhoid fever, dysentery, and bad forms of sore-throat which always make us suspect that the drains are defective."

So Mrs. Meredith, going back into the house,

turned to May, and went on to explain to her the bad consequences that frequently follow from imperfect drainage, or from none at all.

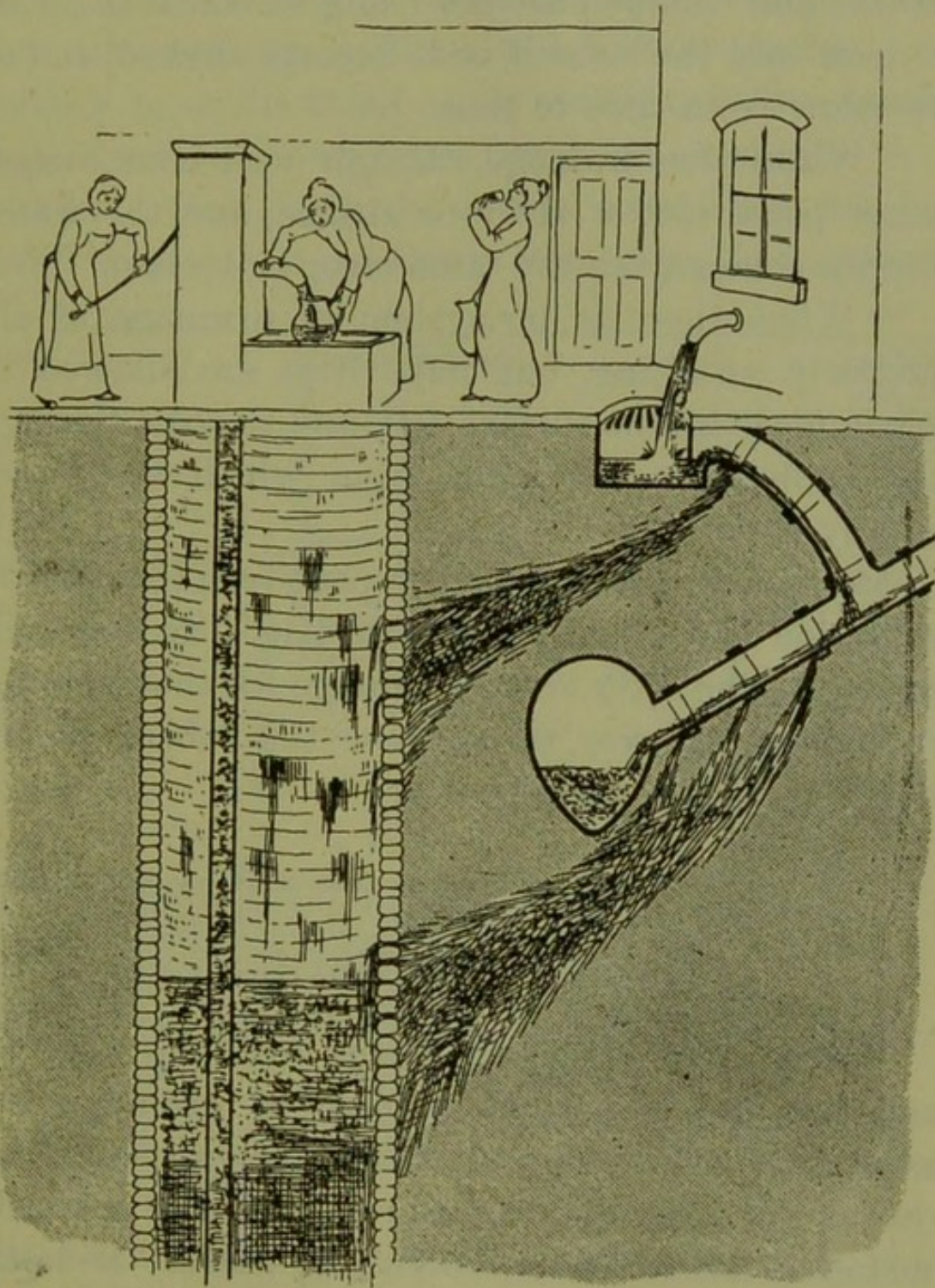
“You often,” she said, “hear people speak about the better health of villages as compared with towns. And, generally speaking, it is true that the country is more healthy than cities. But if an infectious disease, such as typhoid fever, once breaks out in a village the drainage of which is imperfect, it often spreads with greater rapidity, and makes much more frightful ravages there, than a similar outbreak makes in a town where there are sewers.

“This is because the germs of disease from the ash-pits, &c., of the house first infected are liable to pass through defective drains into the wells from which people draw their supply of drinking water. The consequence is that healthy people receive the germs of the infection, and are then attacked in turn by the disease.

“I know one case,” Mrs. Meredith continued, “in which, within only two months after the first case of fever, one-third of all the people in the village suffered from the infection. It had spread through defective drainage, the sewage contaminating the supply of drinking water.

“But I will give you the words of one of the most eminent physicians of Scotland:—

“Water becomes dangerously impure chiefly under the following conditions: When some localities in a town or village are at a lower level than others,



How People Drink Sewage: Drain Leaking into a Well. (By permission, from a diagram in "Dangers to Health", by E. P. Teale.)

and so situated as to receive the drainage of those other localities.

"When the drainage is radically defective, the

drains and common sewers being so constructed as to leak into the subsoil, or to become choked, and to overflow from time to time.

“When the drainage, though well constructed, takes place into a river or stream, and the water supply comes from the same river or stream.

“When there is no system of drainage at all, properly speaking, but impurities are allowed to accumulate on the surface soil, and to soak through the ground to the wells from which the water supply is derived.”

At this point Mrs. Meredith perceived that Mary's attention had already begun to flag. So she made an end of the Talk about Drainage for that evening, intending, however, to continue the subject at the next favourable opportunity.

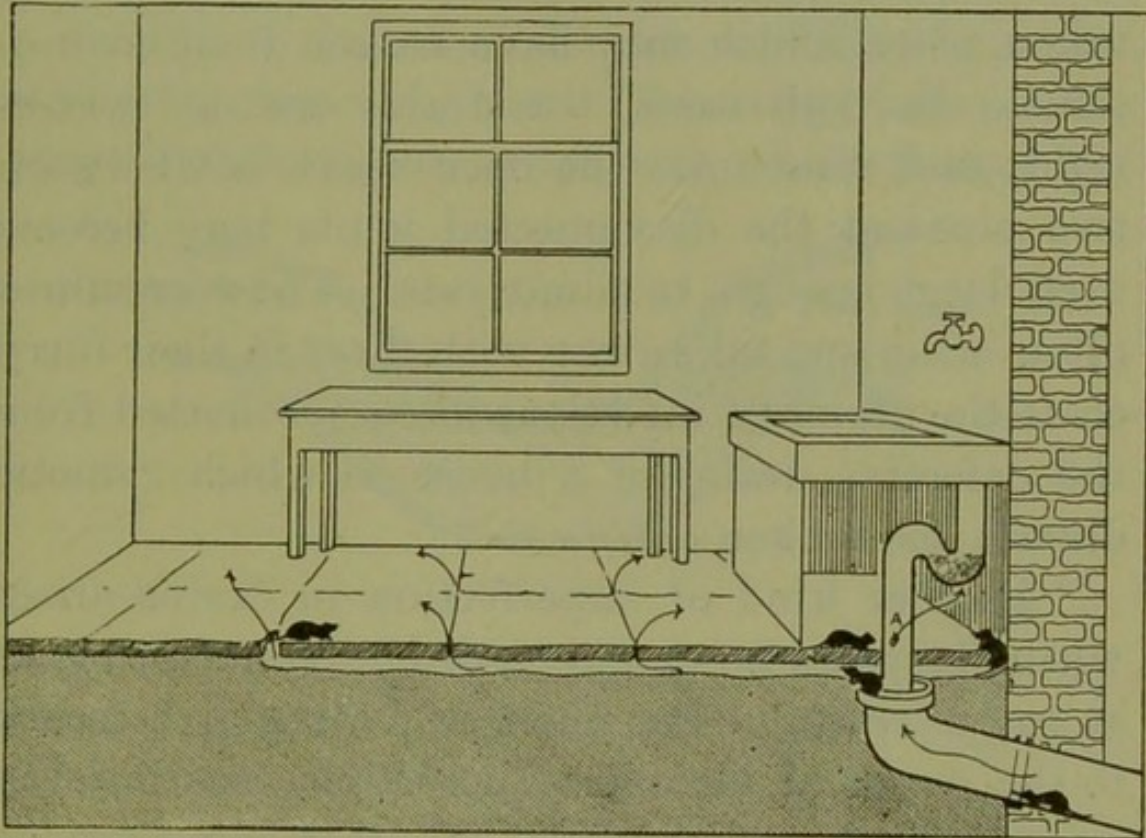
MORE DRAINAGE.

When Mrs. Meredith again took up the un-savoury but important subject of drainage, she said: “Of course you see what the purpose of all drains must be; they are to remove waste products, which, if left to themselves, would putrefy or decay. Whilst decaying they would not only give off foul smells, but germs of disease would settle down on the waste matters, which would thus become dangerous centres of further infection.

“Drains,” she continued, “are used to wash away

many different forms of refuse and dirt by means of water-carriage. Thus, the water 'flushes' the sewers, or swills them, as we should call it in speaking of washing away dirt from a back yard.

"In a sink-drain, however, we do not let the solid substances go down the pipe, because the



Rats and the Tale they Tell.

A, Hole gnawed by rats in drain-pipe. The arrows show the cracks and crevices through which sewage-gas finds entrance. (After a diagram in "Dangers to Health", by E. P. Teale.)

diameter of this is so small that the waste matters would block it up. We use a trap over the drain-pipe to keep the solid matters from going down the pipe. Moreover, to prevent ill smells from the pipe entering the house, we also use a bent tube called a siphon trap.

“As the greatest dangers to health in the household arise from imperfect drains, it will be well for us to understand clearly in what these imperfections may consist.

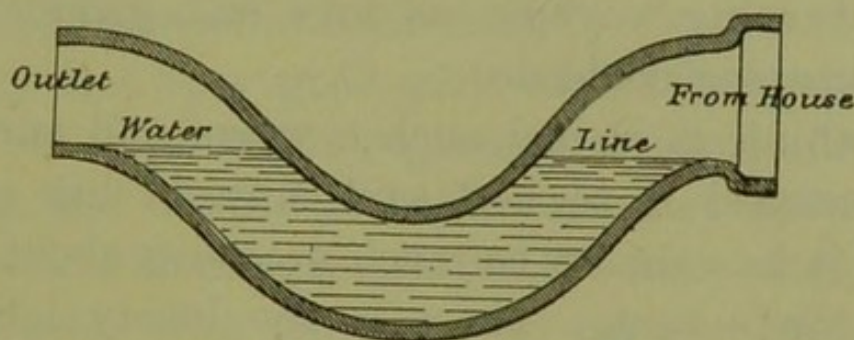
“In the first place, the drains may have been imperfectly jointed when they were first laid down. Or a subsidence of the soil may have subsequently taken place, which may have broken their connections. In both cases, the drains are not watertight; and sometimes the open space left between two pipes at the disconnected joints may become even large enough to admit rats. These creatures often bring and take away with them in their furry coats the germs of infectious disease, collected from the defective drains of a house in which zymotic disease has broken out.

“Another kind of imperfection in drains arises when the pipes become corroded, or eaten away, so as to be leaky. They then, as before, give escape to the germs of disease. These thus pass into the neighbouring sewage-logged soil, if it be a pervious one, to rise afterwards into the house, especially if the drains were originally laid down under the house, instead of outside of it, as they should have been.

“Again, drains are imperfect if they have so slight a fall that the sewage matter cannot readily pass down them. Whenever possible, there should be a fall of three inches to the foot. To increase the flow, the drains themselves should not be less

than five inches in diameter. They should also be made of glazed stone-ware, not of brick-and-mortar which is porous and leaky. Iron may be used inside the house, and in loose shifty soils such as sand and made ground.

“But there is still something more to be thought of. There should be proper traps; of these the best is the siphon trap alluded to above, with an air inlet at the side next the house. This is put between the house drain and the sewer with which it connects.



Syphon Trap.

There should be an open break for ventilation between the house pipes and the siphon trap into which they empty themselves.

“Improper traps are such as allow the filth to accumulate in them, or which allow sewer gas to pass through them into the house, or into the air near it, and which are thus properly no ‘traps’ at all.”

THE NEW HOUSE.

The Captain had asked for six months in which to build the new house, and to complete his voyage.

The six months had passed by rapidly; his return was now daily expected; and, meanwhile, the builders had long finished their work. The weather had been very hot, and the walls were thoroughly dry before Mrs. Meredith had taken up her residence in the house. She had completely furnished the "New House", as it was now called, and it stood ready to give a pleasant greeting to its owner on his return.

Mrs. Meredith and May, during the last week, had made everything as tempting and inviting for the returning voyager as love and good skill in housekeeping could do.

"I think it is just such a warm and snug nest as I wished it to be," said May to her mother. "And it has almost as much greenery about it, too, as a bird's nest. There is the lovely laburnum 'dropping gold', of which father is so fond, in front. And there's the beautiful rose-tree which was planted for you on one side of the house. And I must not forget the sweet May-blossom that father ordered to be planted expressly for me at the other side. Isn't he a good father?"

"He is the best father in all the wide world," said her mother. "And shall we not both be glad to welcome him home to New House? I hope he will think it is as bright and clean as his own snug little cabin! How neat and tidy, as well as clean and handy, all sailors are!"

"Ours is, at any rate!" replied May in her own old-fashioned way. "I remember once when I

went with you and father on board the *Seagull*, that even the decks where we walked, and where the ropes and other things were lying about, were scrubbed as white and clean as your pasteboard."

"That is just how I mean to have our own floors kept," replied her mother. "And I do think that in Mary we have just the right sort of girl to take a pride in doing it. If not, I shall get the Captain to let me take her down to the new ship to show her what sailors can do. That would be a good lesson for her, if she should need one."

"Mary is a very good girl; and I hope she will remain so. And she is beginning to learn all about cleaning, and how to do housework very cleverly."

"I think I shall never forget her face," said May, "when, soon after she came to us, she asked for some more soft soap for cleaning the floor, and some more black-lead for the grates."

"Where are the soap and the black-lead I gave you only a week ago?' you asked, looking the very picture of surprise! 'Why, Mary! you should have made them last a month.'

"A month!' Mary gasped, as if she could not have heard aright, or correctly understood you.

"Yes, Mary; a full month,' you replied. 'Do you not know it is not soap and black-lead you want most; but elbow-grease?'

"Elbow-grease, ma'am!' she said, with a face as blank as a sheet of writing paper.

"Oh! oh! I see what you mean,' she stammered

out after a moment, as light began to dawn upon her mind. 'It is plenty of rubbing that you mean!'

"'That is it,' you replied smiling. 'Now you can go and try, like a good girl, and see if I am not right. If you find, after trying, that I am not right, you may come and tell me.' But she never did, did she?" said May smiling.

"No," replied Mrs. Meredith. "At first she used to put more black-lead on her face and arms than on the stove. But she does not turn herself into a sweep with it now. I believe she can be as clean over the work as any one.

"I am sure she is very proud of her way of doing her work," said May. "I heard her one day, when the window was open, talking to Susan next door. 'That's the proper way to do it,' she was saying. 'That's the way I've learnt; and I wouldn't mind cleaning a stove with any girl in the street.'

"'Oh! oh! I dare say!' was all Susan said.

"But I have no doubt Susan would think about what Mary said, and be thankful for it, too, some day."

THE CAPTAIN'S RETURN.

You may be quite sure there were great rejoicings at the good news that the Captain's ship had at last been sighted off the North Foreland. She would be in the mouth of the Thames at six o'clock next morning.

It was an early hour, but not a minute too early for three persons at least. It may have been a little too early for Mary. For, instead of getting up as usual at seven o'clock in the morning, she had been told to be downstairs this morning at five. And at seven o'clock the mistress and May were downstairs in the breakfast-room, preparing for the returning wanderer.

"But will not father have had breakfast before he arrives?" asked May of her mother.

"You may be quite sure that the first meal he will take in England will be at home. And he will be anxious to see the new house, as well as to see us. He will want to know how it all looks, and how it suits us, and whether his plans have been carried out by the builders to our perfect satisfaction during his absence."

Yes, they were quite right to be early! For there, while they were speaking, the Captain was crunching the gravel under his heels at the front door.

May flew to let her father in, and he must have been abundantly satisfied with the warmth of his welcome to his new home.

"And how do you like your nest now it is built?" asked the Captain of May, as he sat down to the delicious repast which loving hands had prepared.

"I did not think you would remember my chatter about birds' nests and such nonsense all the time you have been away," replied May. "But you

never forget us, or anything we say or do, do you?"

"My dear, I cannot say that I remember *everything* you say. But while I was in the heat of India, and in the still hotter furnace of the Red Sea, I consoled myself with the thought that I should soon have a cooler time under the shade of our own trees, and your words about the nest came to my mind."

"And so you shall," said May, taking her father's hand as if to lead him to the garden there and then.

"Not quite so fast, little girl," said the Captain. "I wish to see all inside the house before I turn outside. How did they arrange about the bath? I have come from the East, where they think so much about bathing, washing, and personal cleanliness that they make these things a part of their religion."

So the Captain was taken up into the bath-room, where he found the fittings arranged exactly as he had instructed, and the workmanship good. Half an hour afterwards, all glowing from his bath, he came downstairs to breakfast. "To have such a reviver as that," he exclaimed, "is almost worth coming all the way from India, even through the Red-hot Sea, as I call it."

Of course, the Captain's dog Rover came home with his master. He too likes a change from the ship, and loves to have a romp with May.

"Now, Rover," said May when her father and mother had gone out for a walk. "We two have been left to take care of the house and of each other. So let us have a talk together; and mind you behave yourself properly when a lady speaks to you."

To this little speech Rover replied by wagging his tail in a very knowing and sensible way, as much as to say, "Oh yes, I can be the true and perfect gentleman."

"I am going to show you," May continued, lifting up her forefinger to fix Rover's attention, "that you have a very nice and proper *dwelling*. That is your dog-kennel, of course."

And here the dog nodded his head as if to say, "Of course," too.

"In the first place it is dry. Dry above, with a sloping roof to throw off the rain; and dry below, on the blue bricks, which will not allow moisture to pass up through them."

And again Rover nodded his wise head to say that this also was all quite true.

"Then your house has a good aspect—in the sunny corner of the yard, facing the south-west; and catching the sun all day till it sets in the west.

"And I am quite sure it is well ventilated; for the door is always open, or rather the doorway is so. And your house is also quite warm, for the kennel is placed against the wall that has the kitchen fire on the other side.

“So now, Mr. Rover, I am going to ask you the same question which the poet asked his pet lamb:

‘Is it not well with thee,
Well both for bed and board?’

Here Rover yawned, opened his mouth wide, and wagged his tail, as if he fully understood all that was said to him.

So having had his lesson on the dwelling, his chain was unfastened, and he was soon afterwards scampering over the fields with May Meredith.

PART II.
FOOD AND ITS PREPARATION.

VICTORIA HAVEN.

No one can say Victoria Haven is not a charming and lovely spot, from the lawn and gardens below, to the crooked, ivy-clad chimneys above. It is beautiful, from the Willow Brook in front, to the tall old windy elms in the rear.

This indeed was the reason why Mrs. Meredith chose the house to live in after her husband, the Captain, had been lost at sea. But I must tell you about that sad story another time.

It is the matron's own house, built for her by the Captain; to which, after her great loss, she added the long, low working-room at the side.

She said then, that she must have something to do to keep her heart from constantly dwelling on her calamity; and that for the future she must seek her own happiness in making other people happy.

And if she is as happy as she makes us,—and I think she is,—she still has her share of happiness in this world, notwithstanding her great trouble. And then, too, she has her daughter, of whom we say a dozen times a day that, like Lucy Gray, she is

“The sweetest thing that ever grew
Beside a human door”.

Indeed we all think so much of May that she ought to have a chapter to herself. I think that she knows that I am writing this part of the book. And she is quite sure that she is to be mentioned in it, as part and parcel of the new establishment.

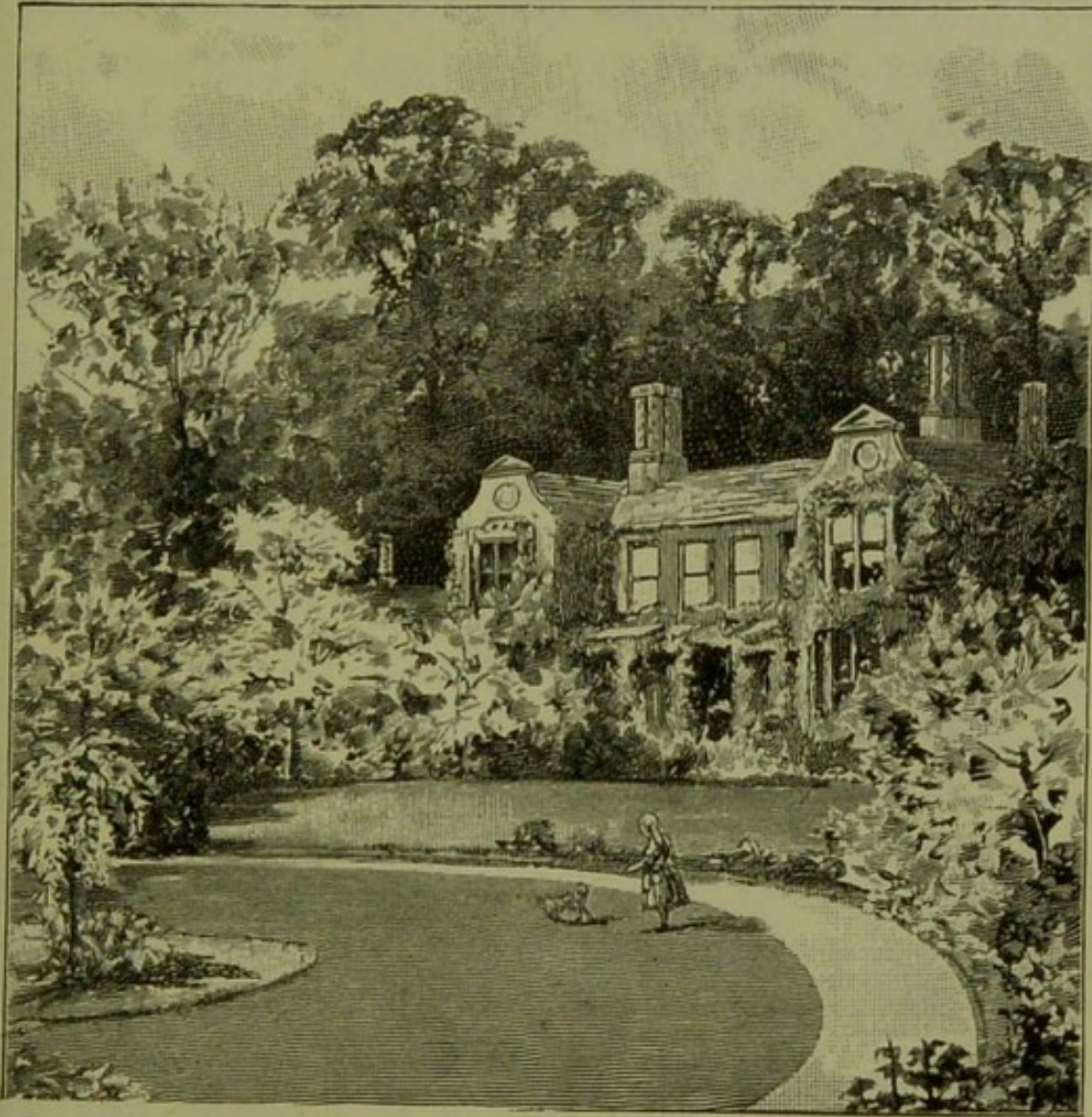
I am certain of this, for she has just peeped in through the open window, and called out, “Now, Ida Morton, be sure you do not put me off with a little, skimping bit of a page! Give me a whole chapter to myself.” To which I replied, “If you are not off this instant, I will give you something else besides a page, for yourself”.

As I looked out of the open window, my eyes still followed May's white dress, and the golden curls trying to escape from beneath her hat. The whole garden in front of the house lay beneath me. This was because Victoria Haven is built on the edge of a little “table-land”, as the geography books say. The ground in front slopes down from this to the Willow Brook, about a hundred yards distant.

Let me try to describe the front as it lies pictured before me.

The first thing to notice is that the part of the garden nearest the house is full of flowers. The next is, that these are nearly all what the matron calls “old-fashioned posies”. They were the favourites of Captain Meredith in the happy days gone by; and they have remained favourites with

the matron ever since. She told me quietly yesterday, as I was sitting with her on yonder garden-seat, that she felt as if the flowers still belonged to *him* as well as to her.



Victoria Haven.

Among these old-fashioned garden-tenants, who will never receive any notice to quit, there is a bush of southernwood, or "lad's-love", as some of our girls call it. There is also in the corner at the bottom a bed of marigolds. Then there is

another corner where, in the rock-work, there are snapdragons, or "lions'-mouths", as I call them. Sometimes we open the lion's mouth, and put a fly into his cage. But we always open the prison doors after the fly has had a walk round inside, wondering where he is. We think it rare fun to see the fussy, buzzing prisoner escape at last, as glad as a boy let loose from school.

Oh! that is the dinner-bell ringing, and I must leave off writing. But what a giddy gossip and chatter there will be when the girls know that Ida Morton has begun to write this part of the "Helping Hands", and that it is going to be about The Preparation of Food and Cooking.

MORE OF VICTORIA HAVEN—THE CAPTAIN.

When I was yesterday called away from my task by the dinner-bell, I had only just begun to draw the picture of the front of Victoria Haven. But, really, I have no time to add more to it, as there is also the back garden to describe, and so much to tell you about all the folks in the house.

There is the kitchen-garden; and beyond it the lawn, where we play croquet, tennis, and bat-and-trap.

The flower and kitchen-gardens are separated by a privet hedge. But this is so low that we can look

out of the back windows of our working-room, right over the hedge, and see all there is beyond it.

First, there are the fruit-trees, quite a little orchard altogether, to which May often makes her way with an eye to a closer acquaintance with the Keswick apples and the Victoria plums. In a good season we are obliged to prop up the heavily laden branches to support their great weight.

Besides our fruit-trees in the back garden, there are the bushes, raspberry canes, and currants—white, red, and black.

But, above all, as I am the junior cook of this establishment, I must not forget the vegetables in the kitchen-garden.

We have all come together to Victoria Haven to learn how to do household work. My department is to assist the matron in cooking, work of which I am very fond; and I am not only to help in it, but also to take down notes of what we do. Mrs. Meredith will, of course, look over my notes, and prevent the most absurd of my mistakes from coming before a laughing world.

There is a round dozen of girls here altogether; and they all know very well what sort of a captain they have in Mrs. Meredith. I mentioned that Mrs. Meredith had had a great trouble, and had suffered a great loss. It is now some time since this occurred.

Captain Meredith was on board the *Victoria* on a voyage to India when she was wrecked

in a storm. The last time the Captain was seen, he was standing on the ship's bulwark, just about to plunge head first into the sea, before she sank. Even at that fearful moment, before he took the fatal plunge, he must have thought of his dear ones, for he stopped an instant to take out of his pocket a portrait to kiss.

After some months Mrs. Meredith built our Working Room, and made it a part of Victoria Haven. A haven is a harbour of refuge and a port of safety. And she has made this place a true haven to us.

Our dear matron then said she would take charge of us. She gives the rest of her life to rearing her own daughter, and teaching orphans how to do all kinds of household work, so that they may afterwards become good housewives. She is going to teach us how to cook; and afterwards how to attend to cleaning and other domestic work.

To assist her, and to do some of the harder and rougher parts of the work, she has Sarah Jane for the bed-rooms, and Mary for the general work of the Haven. But we girls also do as much of this work as we can. The matron says, that there is no better way to learn any occupation than to begin at the bottom.

Well! she is Mrs. Captain now; and we aboard the good ship *Victoria Haven* are going to obey her orders!

And now I must briefly describe the Working

Room. It is provided with an open grate, and a small cooking-range which we use for cooking in winter-time. This is used because the fuel then serves for cooking, and serves also the purpose of warming the room. But in summer-time, when we do not require a fire for warmth, we use a gas stove for boiling the water required for cleaning.

WHY WE COOK AT ALL.

I once heard the matron say, that before a ship's crew engage in battle with the enemy, they "clear the deck for action", as the sailors call it.

What I have previously written down was "to clear the deck". That is, it is meant to make everything more easily understood, when I come to the real hard work of the lessons.

We have just had the first of our little lectures on Cooking, in which the matron began by telling us, "Why we Cook at All".

According to her account, there is a good deal of fashion and custom in this matter. Thus, among the most barbarous tribes, she said, little or no cooking at all is done; whilst amongst the most civilized there is perhaps *too much* attention given to the preparation of costly dishes.

"But the tribes would not eat their herrings raw?" said May, shuddering as she thought of such a dreadful thing.

"Oh, yes!" replied her mother, laughing at May's little shiver; "they would do so if they had any herrings to eat. Indeed, they actually say that we spoil our fish by cooking it; and that only by eating the fish raw can its real flavour be enjoyed. But I do not think they are right when they say so."

"I am sure they are not!" replied one of the older girls. "I know that even only half-cooking herrings or haddocks, by smoking and drying them, very much improves their flavour."

The matron agreed with this; and said one of the very strongest reasons why we cook food at all is to improve its flavour.

Then she told us a laughable story written by that funny writer, Charles Lamb, about the "invention", as he called it, of roast pork.

This story made out that once upon a time the hut of a Chinese swine-herd caught fire and was burned down, and a whole litter of poor little pigs perished in the flames. The herd, in raking about in the ashes, burnt his fingers on the hot body of a roasted piggie. Instinctively, he put his fingers into his mouth to cool them. Some of the scorched skin had come away with his fingers, and, for the first time in his life, and in the history of cooking, he tasted roast pork! He found it so delicious that he set fire to another house to roast more pig; and soon his friends began to follow his example; and every night houses were set on fire to roast more pigs; till at last a wise man arose, who showed the

people that they could roast pigs without burning down their houses.

Of course this made all the girls laugh; for they knew that it was only make-believe, and a funny story; and that there was really no pig burnt at all.

Then the matron said, "We must not forget, when we shudder at the doings of savages, that we ourselves often do a great many of the same things. We are too apt to forget our own strange doings, and to think of their oddities only."

"But we do not eat raw fish," said May.

"Yet we eat raw oysters," replied her mother, "and though these are not really fish, they are 'shell-fish'. Besides, many vegetables are eaten raw, such as lettuces, spring-onions, and water-cress."

"But it is not so necessary that vegetables should be cooked, is it," one of the girls asked, "as that meat and fish should be so?"

"Nay, it is of a great deal more consequence, as a rule," said the matron. "And that brings me to the second reason why we cook food, namely, to soften it, and make it the more easily digested. Vegetables are much more difficult to digest than meat or fish. They therefore, apart from the improvement produced in their flavour, have even more need of being cooked than meat or fish."

When she had said this, she rang the kitchen bell, upon which Mary came into the Working Room to see what was wanted.

"Bring in the rice-pudding from the kitchen oven," the mistress said.

"Please, ma'am, it is not done," said Mary, surprised at the order she received.

"Well, what does that matter?" asked the mistress smiling.

"It will give us all *indigestion*," said Mary promptly.

"So you see, Mary knows why we cook our food," remarked Mrs. Meredith.

MORE REASONS FOR COOKING.

Our lessons in Cooking were continued the next day to the great delight of us all.

We noticed as we sat down at our desks in front of the table in the Working Room, that Mary had brought in two potatoes. One was raw; the other was hot from the oven, and still puffing out steam like a baby volcano.

There was also on the table a rice-pudding quite raw, and one that had been just baked ready for dinner. And in a basin there was a bit of raw dough from the batch of bread we had assisted to bake that morning.

But, above all, there was in a baking-tin a plum-cake, which May had herself helped to mix. And in a saucer at its side was some of the raw paste from which the plum-cake had been made.

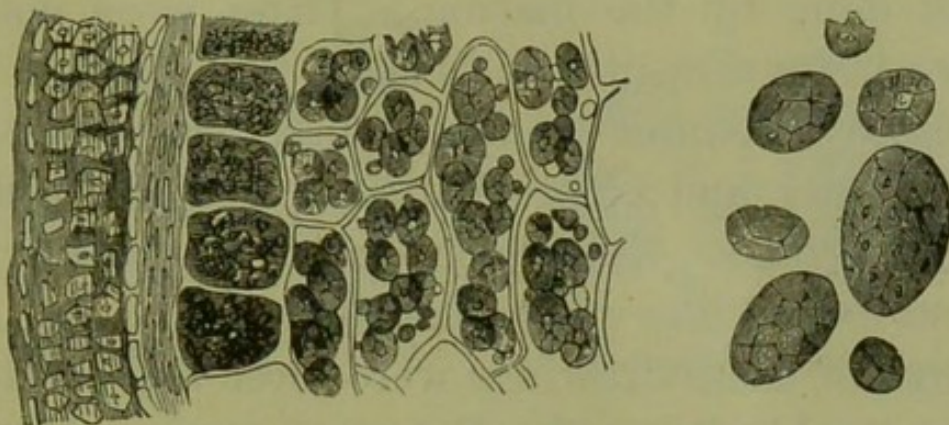


Fig. 1.—Section of Oat Grain—highly magnified.

To the right of the fig. are shown some of the granules of starch from the interior, more highly magnified.

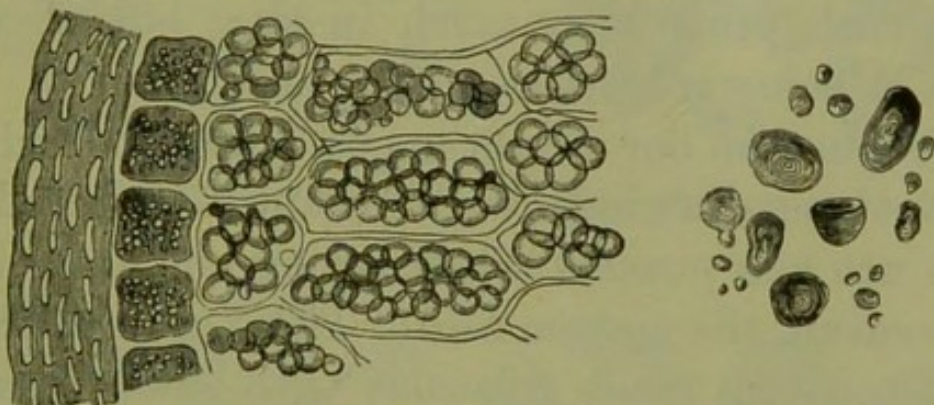


Fig. 2.—Section of Wheat Grain—highly magnified.

To the right the granules of wheat starch are shown more highly magnified.

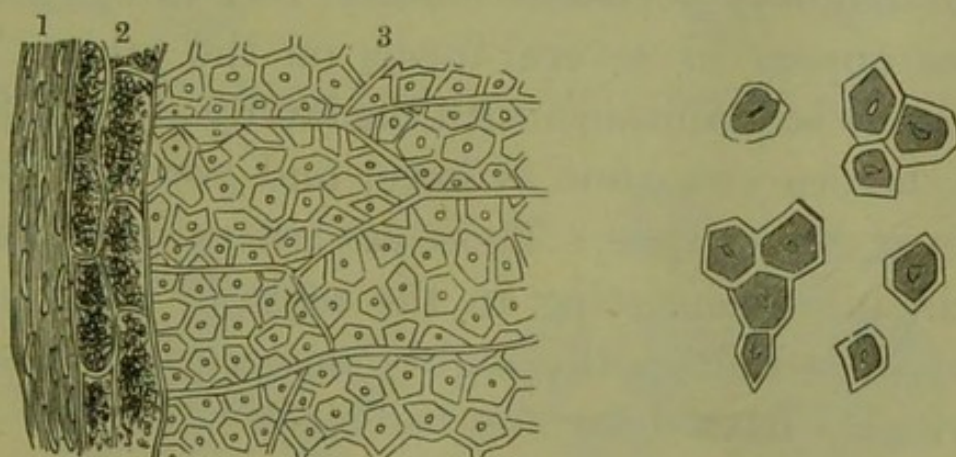


Fig. 3.—Section of Rice Grain—magnified.

1 and 2, Outer coats; 3, Starchy kernel. To the right are seen granules of rice starch, more highly magnified.

On the black-board there appeared drawings in chalk done by the matron. These were not all alike; but sufficiently so to show that they all had a "family likeness" to each other. Some of them were round, and others flat-sided, like the cells of a honey-comb. Many more were egg-shaped: and others looked like oyster shells.

Most of these drawings were loose and scattered about the black-board. But some were enclosed in rounded compartments, "like sheep in a pen", as one of the girls whispered to me. They also differed from each other very much in size; but all were alike in being colourless.

We puzzled our heads a good deal to find out what these drawings were meant for. And we were not less puzzled when, seeing our look of bewilderment, the matron said: "These are old friends of yours, with many relations with whom you are well acquainted. There is not only a black-board full of their family portraits, but the real things themselves appear in several forms on the table. You last made acquaintance with the family at breakfast-time, before you came in here; and you will do so again at dinner-time. There are two articles of food on the table, consisting in the main of millions of these little things, the highly magnified likenesses of which I have drawn on the black-board."

Just as she said this, her eyes glanced at that corner of the table where the raw and baked potatoes had been placed.



Fig. 1.—Starch Grain—Bean Flour.

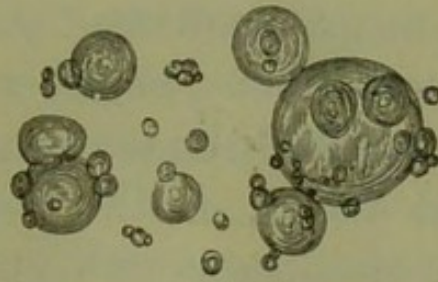


Fig. 2.—Starch Grain—Wheat.

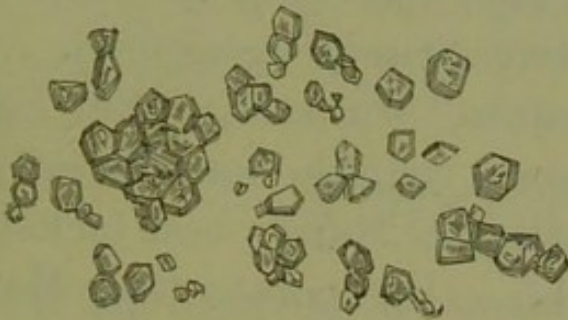


Fig. 3.—Starch Grain—Rice.



Fig. 4.—Potato Starch Granules.



Fig. 5.—Bermuda Arrow-root.



Fig. 6.—Port Natal Arrow-root.

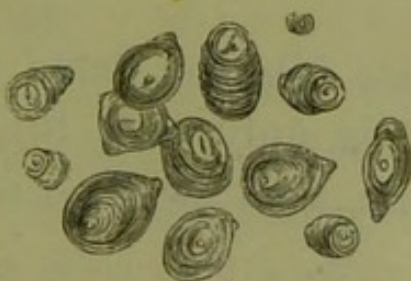


Fig. 7.—St. Vincent Arrow-root.

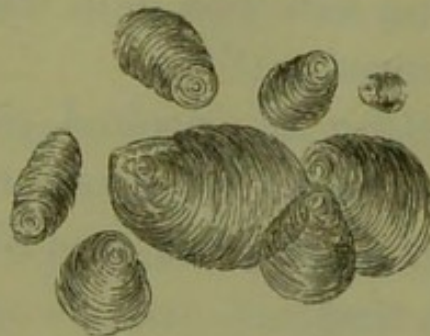


Fig. 8.—Tous-les-mois.

I saw her look; and immediately thought of people calling cooked potatoes "mealy" and "floury", and of people making "potato starch". I also remembered about "starch-cells" and "starch-granules". So I asked the matron if they were starch-cells she had drawn on the black-board; and she said that the riddle was now guessed.

She also told us that this morning we were to continue to find out further reasons why we cook food at all, besides the two already discovered.

"Look at this raw potato," she said. "See how nicely its jacket fits it, not a wrinkle nor a crease in it; as tight and close-fitting as Mary's best jacket.

"And now look at this other potato that Mary has baked in the oven. You see the heat has burst the starch-cells of which it is made; and what does the potato now look like?"

"It looks like Mary's jacket which she had made so tight that it burst out at the seams," May replied.

"Now, look at the rice-pudding that has been baked. It contains the same quantity of material as the raw one, but what is the difference in their appearance?"

"Why, the cooked rice quite fills the dish," said May, "while the other dish is only half-full. I suppose that it was the oven that swelled it up like that."

"Yes, it was the heat of the oven that did so," said the matron. "And that was why it was put

into the oven. You see each grain of rice is now swollen up to twice its former size. We can easily digest it now. The rice grains were before as hard as parched peas; whereas now they have become so soft and jelly-like that we can mash them all up with a spoon.

“This is the third reason why we cook our food, when it is starchy food. That is, in order to break up and soften the starch-cells, so that we may readily digest them.”

A TOUGH JOINT.

When next day we went into the Working Room to hear the third and last little lecture on the reasons why we cook food, we saw that the gas stove had been lit. There was a stew-pan simmering on the top of it in one place, and a sauce-pan in another.

The sauce-pan was bubbling away at a fine rate. Every now and then the steam lifted up the lid, and puffed out in a jet.

But the stew-pan was much more sedate. It did not condescend to boil over; in fact, it did not boil at all.

“Do you know what I have in the sauce-pan?” inquired the matron.

“Something nice,” said May, “for the smell tickles my nose and makes me feel quite hungry again, though it is only an hour since I had my breakfast.”

“There is a beef-steak inside the sauce-pan,” continued the matron, “and a slice of shin of beef in the stew-pan. But I will make the shin of beef as tender, as nourishing, and as easy to digest, as the beef-steak. This all depends on the cooking. I am simmering, or stewing, the shin of beef. And I must tell you, that it has been cooking three times as long as the steak. In the end, the coarse joint will be in every way just as nice as the more expensive one.

“And that is the fourth and last reason why we cook food, when it is meat—that is, to make it tender. Even the hardest parts of meat, such as gristle, sinews, the tougher fibres, and the stringy parts of shins of beef and bullocks’ heads,—if they be only properly cooked,—can be made nearly as appetizing and nice as the best joints.

“This is where the French people excel; and why their cooking is much better than that of the English. Very often an Englishwoman thinks that all she has to do, to cook the dinner, is to put the meat, tough or tender, into a sauce-pan and make it boil as hard as she can. And then there is something else that becomes hard besides the boiling; and that is the meat.

“In this way she turns the tenderest rump-steak into tough, stringy meat, as hard as elephant’s flesh. But a French woman starts with a bit of shin of beef or other coarse joint, and ends with a nice juicy dish. And she does this by simmering the meat instead of boiling it. But Ida shall show

us the difference in the two methods by cooking three eggs in three different ways."

On hearing this, I went out of the class to the cooking-stove, and did as I was instructed. First, I boiled one egg as hard as I could for two minutes, whilst May measured the time by the egg-boiler.

When this egg was taken up, the white on the outside was done; but the yellow yolk inside was nearly raw. I offered it to my timekeeper; but she drew away from it, and turned up her nose at it, in disgust.

Then I boiled the second egg hard for three minutes, and found that the yolk was now done; but the white was as hard and flaky as pie-crust.

The matron here told us, that when Mary first came to Victoria Haven, she said she knew how to cook a plain dinner. But the very first morning, before beginning to do so, she first came to ask the mistress a very funny question.

"Please, ma'am, do you like the meat too much done, or not done enough?" She only meant, perhaps, "Do you like the meat done well, or underdone?"

But that question made the matron see to the cooking herself, until she had taught Mary that meat should be served up neither half-raw nor burnt up.

"And now," continued the matron, "we will cook another egg, so as not to have it 'too much done' on the outside, nor 'not done enough' in the inside. We will simmer instead of boil it."

"Let me do it this time," pleaded May.

"Very well, it is a simple little dish; so perhaps you can cook it," replied her mother. "Put the egg into cold water in the sauce-pan, and bring it to the boil gradually."

Directly the water boiled, May was told to move the sauce-pan back from the fire, and let it simmer at the side for five minutes more. When the five minutes had expired, her mother told the young cook to take the egg out with a spoon, and then to eat it. This she did with great delight, declaring that the egg was done exactly as she liked it, both white and yolk being nicely set.

"Very well!" said the matron. "Now you and the other girls have all learned, that the last reason why we cook food is to make hard parts of meat tender by long simmering, and not tough by hard boiling; and that this prolonged treatment is also employed in cooking eggs."

AN OLD STORY.

When we next met together for another lesson, Mrs. Meredith told us she was going to speak again about what we do with food before eating it.

"Among the many good definitions of man," she said, "hardly any one is better than that which says, Man is a cooking animal."

"We have already asked the question why we



Cookery in Primitive Times : Roasting Fowls and Eels.

cook food at all, and partly answered it. Let us look at the subject again.

“Why should we not eat our dinner raw as the ancient savages did, and as some of our uncivilized tribes in the dark places of the earth still do at the present time? Was it from choice that man first took to cooking his food? Or did some lucky accident first lead him to discover the improvement which cookery produces in food?”

“The earliest hint we get of the art of cooking is found in the remains of the ‘cave-dwellers’ in this and in other countries. At any rate the ancient savages of Britain had discovered the means of making a fire; and that, of course, is the first step towards cooking. We find in some of these caves rings of burnt ashes, which remind us of similar rings left on our country roadsides by gipsies.

“What a glorious moment must that have been when the savage first made fire his servant! No wonder that the Greeks exalted the discovery of fire, and set up a household deity of the hearth!

“So there is something which makes us full of thought when looking on those rings of ashes in the caves of savage man. How many thousands of years it is since those ashes were glowing embers! And how strange, that while the men themselves have passed away, the ashes of their hearths have remained to speak of them to us to-day!

“That these fire-rings had something to do with

cooking is proved by the fragments of burnt bones that are found along with them.

“How savoury to their sense of smell must have been the first roasting joint, though most probably this was not altogether free from a taste of the ashes in which it was cooked.

“As that first dish, fit to set before a king, frizzled in the ashes, and sent out tiny puffs of fragrance to tickle the nostrils of the savage crouching over it, what a new sense must have been added to his life! How his teeth must have lovingly crunched the brown outside of the joint! What delight must have filled him as his teeth penetrated to the rich juicy inside! Our savage dweller in caves was then taking his first lesson in cooking, and what a royal road to learning it was!

“From this time forward the native oyster or river mussel might be eaten raw as a whet to the appetite. But the real dinner must henceforward be from the cooked joint; and flesh was no longer to be eaten raw as it came from the animal.”

The girls all agreed that this was a nice little lecture, and were not slow to thank the matron for it.

THE STOMACH AND THE MEMBERS.

“True is it, my incorporate friends,” quoth he,

“That I receive the general food at first,

Which you do live upon; and fit it is,
 Because I am the store-house and the shop
 Of the whole body: but, if you do remember,
 I send it through the rivers of your blood,
 Even to the court, the heart, to the seat o' the brain;
 And, through the cranks and offices of man,
 The strongest nerves and small inferior veins
 From me receive that natural competency
 Whereby they live:
 And though that all at once can not
 See what I do deliver out to each,
 Yet I can make my audit up, that all
 From me do back receive the flour of all,
 And leave me but the bran."

—Shakespeare's *Coriolanus*, Act I., Scene i.

MAY PROTESTS.

The next day the matron continued the lessons in Cooking.

"I am going to tell you this morning," she said, "how people gradually took to cooking.

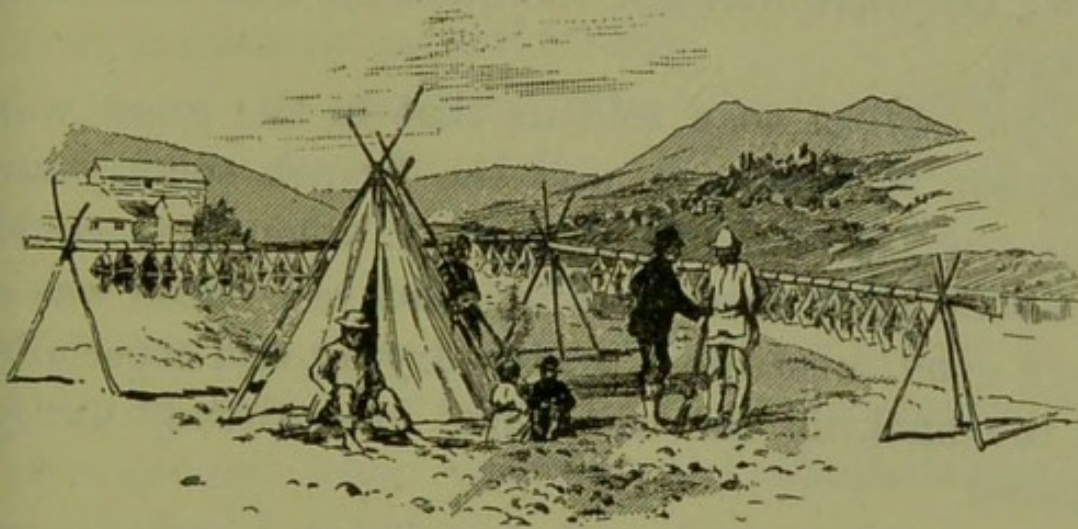
"The first cook was the sun."

At this we all stared; it seemed such an odd thing to say.

"Yes, what I say is quite true," she continued. "Cooking is preparing food for the nourishment of the human body, and the sun does that, when, by its heat, it ripens fruits as they grow. Just think

of the difference between a sour apple which makes your lips screw themselves up into puckers in the eating of it, and the nice ripe one that almost melts in your mouth. And then think of the unripe pear, woody and tough; and what it becomes after the sun has shone on it, and warmed it through and through.

“And this is not all the work the sun still does in this first natural cooking; and which it did



North American Indians drying Fish on Poles.

formerly, before artificial cooking by fires was invented.

“When savage tribes hung up raw fish to dry in the wind and sun, they soon found out that their flavour was improved by this treatment. And when we ourselves serve haddocks and herrings in the same way, there is a kind of cooking done.

“If I tell Mary to boil a fresh haddock, she will give it much longer time to cook than if I tell her to put a dried one into a frying-pan with hot water,

and boil it over the gas stove. In fact, the haddock in drying has been by this means partly cooked already."

"But we do not dry meat in the same way," objected one of the girls.

"Which would you rather eat," replied Mrs. Meredith, "a piece of raw pork, or a piece of raw bacon?"

The girl said she would not like either of them raw; but that was not the question that had been asked.

The matron then told us that in the great war between the Germans and the French some years ago, the German soldiers found, when they could not cook their food in camp, that raw bacon was a very good substitute. In the drying, and especially in the smoking, the bacon had been already partly cooked.

She also informed us that in South America there are hunters who spend almost the whole of their lives on horseback, hunting down wild horses and oxen for their hides. These men cut off long strips of the flesh of oxen, and dry them in the sun. They thus half-cook them, and then call this sun-dried meat "jerked beef". In fact, this drying is the only cooking the meat receives from them.

But it is not only flesh and fish, we were told, that the sun dries and partially cooks. It also partially cooks fruits as well; as, for instance, dried grapes or raisins, figs, currants, and even dried

apples, peaches, and apricots. And to make the girls the better remember this, the matron gave each of them a bunch of raisins to eat.

EARLY ARTIFICIAL COOKING.

When we all met together in the Working Room next day, the matron said, "This morning I shall take you with me to pay, in imagination, a visit to some rather wild folks."

One of our youngest girls, who is a timid little creature, always afraid for her skin, crept up close to me, and said, "Oh, Ida, I don't want to go! Perhaps they will be cannibals, and eat me."

"Oh, you are not such a tempting morsel as all that!" I replied. "Wait till your turn comes; and then cry out when you hear the cannibals rattling the knives and forks."

"These people have not given us an invitation to dinner," continued Mrs. Meredith; "but we will just drop in on them unawares, as folks say, and see what pot-luck they have to offer us."

"What is pot-luck?" asked one of the girls. "I hope it is something nice."

"It is the luck of the pot," answered the matron, "or whatever there may be in the pot, and that you are lucky enough to get. As for its being nice, that depends on your taste, as well as on what the dish consists of. Sometimes, if it is a Chinese house you

are visiting, pot-luck is a dish of chopped worms, or sharks' fins; but for all that the Chinese are not really savages."

"If Chinese people eat such things I should think they are very nasty savages," replied the girl.

"But it is not to China I am to take you," said the matron, "but to a less civilized part, where there will be found neither pot nor other cooking utensil. These savages have not yet all reached that state of civilization where pots and pans come into use."

"That would be where Mary would like to live," May remarked. "She very much dislikes cleaning sauce-pans; and there would be none there for her to clean."

"Well," answered her mother, "let us suppose you have crossed the seas, and then you will not have to be sea-sick.

"Here is the ring of natives seated round the fire, watching the cooking as eagerly as you girls watch your chestnuts roasting on the bars of the grate on a cold winter's night.

"They have not many clothes on; but it is a hot climate. The head-man, who is also acting as chief cook, looks warm enough.

"You see he is attending to two things at once; and he knows that he has to be quick to satisfy such a lot of hungry diners as he has around him.

"Here is the first joint, or rather it is not a joint, but the whole animal. It is a kid, or young



SAVAGE...  ...COOKING

goat. The cook has made a large wooden spit, and stuck it through the kid, and then into the ground just outside of the circle of wood ashes. He has inclined the spit a little over the fire, so that the meat may cook itself."

"But where will he put the baking-tin to catch the gravy?" asked May.

"They do not catch gravy in those benighted regions," said her mother smiling. "And you must not call that way of cooking, *baking*, for there is no oven. It is roasting, or cooking before an open fire.

"As the spit is stuck in the ground, and cannot turn round with the joint on it, as our roasting-jack does, the cook has to pull up the spit every now and then, and turn every side of the joint to the fire.

"That is one kind of cooking; and I have seen something like it in the navy. There the cook has a large steel spit, which he runs through the whole side of a bullock. He puts this down before a large fire six feet long, and quite hot enough to 'roast a bullock whole', as the saying is. At least Captain Meredith always used to roast half a bullock at a time. And there would have been fire enough to roast a whole one, if the ship's cook could have got it on the spit."

"That would be the sort of fire to toast your toes and roast your chestnuts at," said one of the girls.

"If the joint was all cooked alike, as it must

have been," said a third girl, "I should like a slice off the thick part of the leg; not one from the shin, which would be too hard and tough for my teeth."

"Or a bit of the under-cut off the sirloin, with the suet taken out," said another.

"Oh, they are not so particular as all that aboard ship!" said the matron. "They keep their appetites keen and sharp with plenty of work and fresh air. They do not even often ask whether the meat is 'too much done' or 'not done enough'. It is very soon *done* when they get it between their teeth at the mess-table."

ANOTHER JOINT.

When we again assembled to hear the next lecture on Cooking, one of the girls reminded the matron that the dinner mentioned yesterday had consisted of only one joint. Yet the matron had told us that the savage cook had another joint in the fire.

"That is just where it was," replied she; "*in* the fire, baking in the hot ashes."

"But I thought you said we did not bake without an oven!" said May.

"Neither do we," replied her mother; "but these people do so; and so do our gipsies. Gipsies cook hedgehogs, and chickens, ducks and geese, by putting them into a mould or jacket of wet clay, which they make for the purpose.

“This ‘toad-in-the-hole’ they put into the ashes of their wood fire: and when it is cooked, they break away the outside clay-mould. The baked clay takes away with it the feathers of the poultry, and the prickles of the hedgehog; and there is their joint ready dressed before them!

“And now, perhaps, you will see that this is a kind of baking after all; and that in it also there is an oven employed.”

“Oh, yes! their clay-mould takes the place of an oven,” said one of the girls.

“It will do for those that like it,” interrupted May. “But I do not wish to dine with the gipsies, though I am very fond of looking at them,—when they do not come too close to me.”

“And this kind of baking,” continued her mother, “is done even by ourselves. At least it is done by some confectioners, when they cook hams for a tea-party. They often make, out of flour and water, a mould or covering of paste, which they put all over the ham to keep in the juices; they then bake the whole in an oven. When the ham is done, they break away the baked dough from the outside; and find the juice or gravy is all left in the ham inside.

“But let us get back to our savage cook’s second dish. This was a hare, and it was baked inside and outside in the following clever way:—

“Before the fire was made, a hole was dug in the ground, about a foot deep and two feet square.

This was lined, bottom and sides, with pebbles found ready to hand. It thus formed, as you will understand, a kind of baker's oven. The fire was then lit at the side of it, and some more pebbles were put into the ashes of the fire, and made red-hot. These red-hot pebbles were then thrust inside the hare, which was now put into the hole in the ground. On the top of it were placed some more hot pebbles; and then the hot ashes of the fire were strewed over the whole.

“There was a splendid ready-made ‘hot-chamber’, or primitive stove! And there the hare was left baking till the diners had finished the kid, and were ready for the second course.”

“I should be afraid to have any of the hare, lest it should be gritty,” said one of the girls.

“Oh, you could easily pick out the stones with your fork!” said May.

“You would have to carry your own fork there to do so,” said her mother. “These primitive people use only Nature's knives and forks—I mean their fingers.”

A PRIMITIVE SAUCE-PAN.

“Did you all notice, that though the savages we spoke about in the last cookery lecture made a spit, they had as yet no sauce-pans, nor other cooking vessels?”

This question was asked by Mrs. Meredith the next time the cookery class assembled.

“But in time they would find out that vessels for storing and carrying water are quite necessary for comfort. Then, by some happy accident, they would also discover that these same clay vessels, dried in the sun, or baked in the fire, would do to boil water in. And thus they would have their first sauce-pan!”

“And to show you how easily a sauce-pan can be made, I will cut off the top of this egg with this knife. I pour out the contents from the other part of the shell. I then put into it these pieces of raw potato and some water; and lastly I boil the bits of potato in my simple sauce-pan!”

The girls thought this great fun. They afterwards devoured the dish cooked in this primitive fashion as greedily as if they had never eaten boiled potatoes before.

“But why does not the egg-shell crack and burn up, as it does when you throw it into the fire?” asked one of the girls.

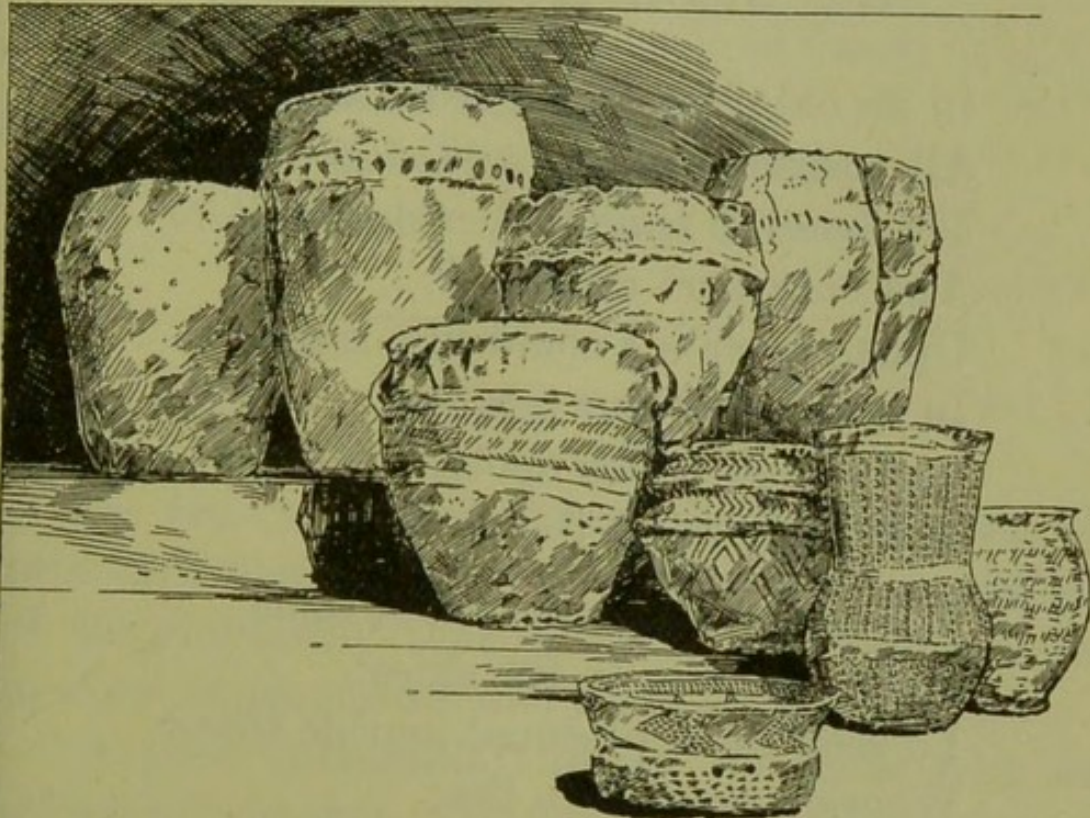
“Ah! there is indeed a great lesson to be learned there!” replied the matron. “The reason is that it does not get hot enough to burn!”

“But it is put right over the top of the fire, and in a red-hot place too, where the dry egg-shell would crackle and shrivel up in a minute,” said the girl.

“Yes! but this one has water inside to keep it cool,” said the lecturer.

“But the water is not cool; it is boiling and bubbling up at a great rate,” remarked the girl.

“Yes! but the shell never gets hotter than the boiling water. And in cooking, boiling-heat is not very great compared with the heat we get either in



Clay Vessels of Ancient Britons, comprising Urns, Food and Drinking Cups, &c.

an oven in baking, or before the open fire in roasting,” said Mrs. Meredith.

Then she told me to look at the school thermometer to see what number of degrees were marked upon it for the “boiling point of water”. I did so, and told her it was 212 degrees, or 212°, as it was marked on the side of the thermometer.

“That is not half, nor even one-third, of the number of degrees of heat we get in front of an open fire,”

said the matron. "But try to remember these figures, 212 degrees. With one exception, they are the only figures that I shall ask you to remember."

SHE MADE HOME HAPPY.

In an old churchyard stood a stone,
All weather-marked and stained,
The hand of time had crumbled it,
And only part remained;
Upon one side I could just trace
"In memory of our mother";
An epitaph which spoke of "home"
Was chiselled on the other.

I'd gazed on monuments of fame
High towering to the skies;
I'd seen the sculptured marble tower
Where a great hero lies;
But by this epitaph I paused
And read it o'er and o'er,
For I had never seen inscribed
Such words as these before.

"She always made home happy",
What noble record left!
A legacy of memory sweet,
To those she left bereft.
And what a testimony given
By those who knew her best,

Engraven on this plain, rude stone
That marked their mother's rest!
A noble life, but written not
In any book of fame;
Among the list of noted ones
None ever saw her name;
For only her own household knew
The victories she had won,
And none but they could testify
How well her work was done.

SOME SOUP.

The next day Mrs. Meredith, in describing the primitive methods of the less civilized inhabitants of the globe, said that we must not forget our own modern requirements and modes of cooking.

“A good substantial dinner for those who can afford it,” she said, “begins with soup, and goes on to fish, and after that to roasted joints, pastry, and so forth. So we shall follow the same order in our future cookery lessons. I will show you, therefore, how to make some simple kinds of soups and broths, and will begin with lentil soup.

“For this we require half a pound of lentils, one onion, three pints of water, and pepper and salt *to taste*, as the cookery books say. We soak the lentils all night in cold water; and next morning pour off the water. We then put the lentils into a sauce-pan

with the onion and three pints of cold water, and simmer till the contents become quite soft. This will be in one and a half or two hours. We then pass the soup through a wire sieve, return it to the sauce-pan, let it come to the boil, add pepper and salt, and serve.



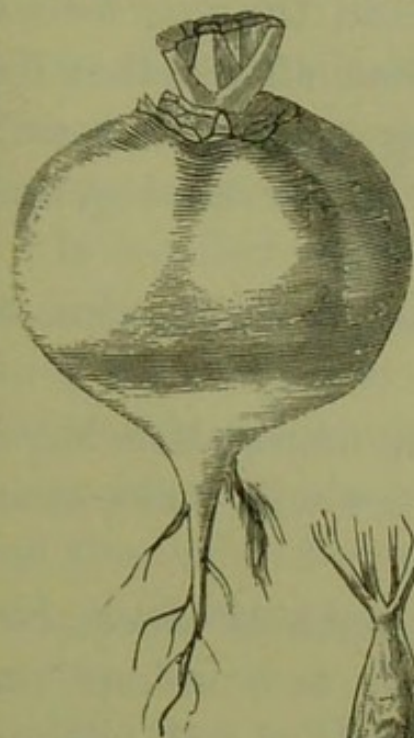
Lentil Plant.

“Egyptian lentils, which are best for soup, may be bought at a flour-dealer’s for about threepence a pound. They are very nourishing. Lentil soup is excellent, and gives more nourishment at less cost than any other soup.”

Mrs. Meredith gave May a little of the lentil soup which she had made for dinner, and May declared it was very nice indeed.

“Then, as the judge pronounces a favourable verdict,” the matron next remarked, “we will proceed to make a dish of **Scotch** broth.

“This requires two pounds of the scrag-end of the neck of mutton, four carrots, four turnips, one stick of celery, two onions, one teacupful of Scotch barley, and seven pints of water. First, we put the barley into the cold water over the stove-fire, and, when it boils, put in the mutton. When the mutton



White Turnip.



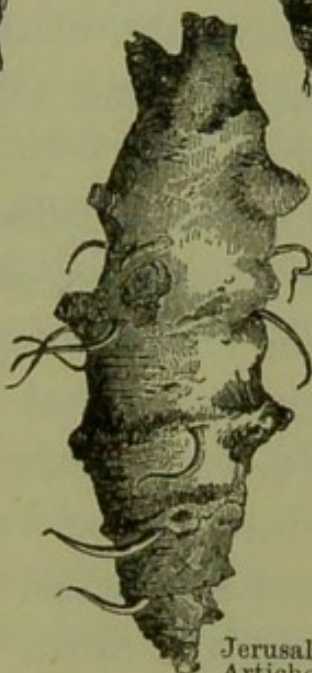
Carrot.



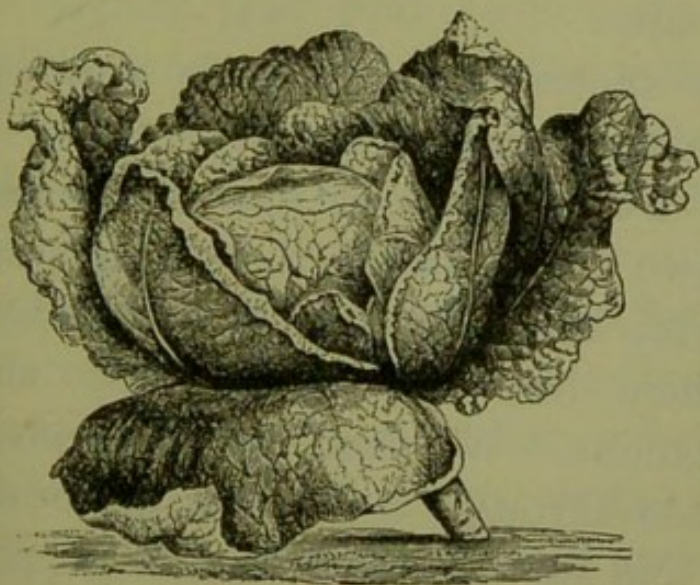
Parsnip



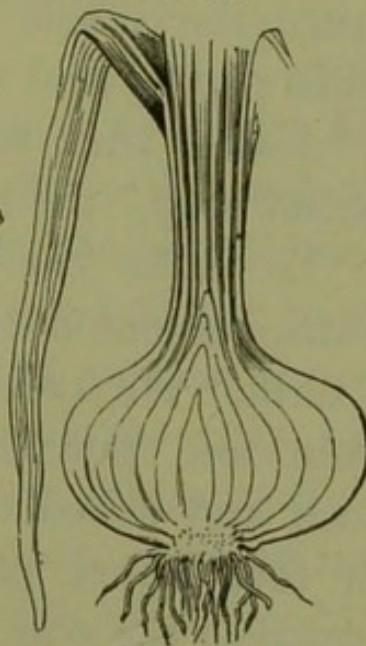
Radish.



Jerusalem
Artichoke.



The Cabbage.



The Onion.

has simmered half an hour, we add the vegetables, which should be sliced, and simmer all together for one hour and a quarter, adding pepper and salt. The meat and broth will then be served together in a tureen."

This the judge also pronounced at dinner-time to be very nice indeed.

"I will ring the changes once more," Mrs. Meredith continued, "and this time we will make some **Palestine soup.**

"For this we require two quarts of stock, two pounds of Jerusalem artichokes, two onions, one stick of celery, and one pint of milk. I will tell you some other time what the 'stock' is, and how it is made. We wash, pare, and cut up the vegetables, put them into the cold stock, and let all simmer for an hour and a quarter, or till tender. We then pass them through a sieve or colander, add the milk, return the whole to the pan, and season it with white pepper and salt.

"I now turn to another kind of soup, namely, **haricot soup,**" the matron continued.

"To make this we require one pint of haricot beans, one onion, two quarts of stock, and one pint of milk. We soak the beans all night in cold water, drain and put them into a sauce-pan with the stock and sliced onions. We then let all simmer for four hours, pass through a sieve or colander, return to the pan, add the milk, season with pepper and salt, let it simmer for five minutes, then serve.

“There is still another kind of soup which I think some of you, at least, will like,” said Mrs. Meredith. “Even if you do not like it, you ought to know how to make it for others who may do so.

“It is called **vegetable soup**; it requires two quarts of stock, three carrots, two turnips, two onions, one stick of celery, and two table-spoonfuls of oatmeal. We wash and cut up the vegetables, put them into a sauce-pan with the cold stock, let all come to the boil, and then add the oatmeal (which should be mixed with cold water to a smooth paste). We let all simmer for about an hour, or until the vegetables are tender; then add pepper and salt, and our soup is made.

“I have only one other kind of soup,” said Mrs. Meredith.

“And quite enough too,” replied May.

“It has a good name,” said her mother, “for it is named after one of the best of women.

“**Jenny Lind soup** requires two quarts of stock, half a teacupful of sago, the yolks of two eggs, half a teacupful of milk, and two cloves. We soak the sago in cold water; we then put the stock into a sauce-pan, and when it comes to the boil stir in the sago and add the cloves, and let it simmer for one hour. We then beat the yolks of the eggs in a tureen, make the milk hot and add it gradually to the eggs, then pour this on the soup, stirring well all the time, and add pepper and salt, and serve.”

TEMPERANCE IN DIET.

“Many shapes
Has Death, and many are the ways that lead
To his grim cave.

Some by violent stroke shall die;
. . . . By intemperance more
In meats and drinks, which on earth shall bring
Diseases dire, of which a monstrous crew
Before thee shall appear.”

“I yield it just,” said Adam, “and submit:
But is there yet no other way, besides
These painful passages, how we may come
To death, and mix with our connatural dust?”
“There is,” said Michael, “if thou wilt observe
The rule of ‘not too much’ by temperance taught,
In what thou eat’st and drink’st, seeking from thence
Due nourishment, not gluttonous delight,
Till many years over thy head return;
So may’st thou live till, like ripe fruit, thou drop
Into thy mother’s lap, or be with ease
Gathered, not harshly plucked, for death mature.”

—Milton’s *Paradise Lost* (Book xi.).

SOMETHING NICE.

May could not make out what I meant when
this morning I told her, that if she were a good girl
she should have something that was very nice.

So I teased her by asking her whether she would prefer it thick or thin, cold or hot.

“How can I tell,” she very properly inquired, “when I do not know what it is you are talking about?”

The matron had given us all our lesson on Soups, and I was told off this morning to put her teaching into practice.

“Give me that basin of bones to put into this sauce-pan of hot water that I may bring them to the boil,” I said, for we do not waste anything in Victoria Haven. “You may give me, too, the scraps in that dish on the table. It is all fish that comes into my net this morning, as you will soon see.

“Some day,” I continued, “you may read about the ugly old witches that made soup for a very wicked Scotch king. They put some very strange things into the soup; and danced round the kettle, or caldron, while they sang together,—as they put each fresh morsel into the pot,—‘Put in that! Put in that!’

“But I dare say you wonder why I put these bones and scraps into cold, instead of into hot water. It is to draw out the goodness.”

“I should think there is not much goodness in them,” said the unbelieving May. “We cannot eat bones.”

“No!” I replied. “And yet there must be some nourishment in bones, for dogs eat them, and they do more running about than even you. When I

have made stock out of these bones, and turned it into the basin and let it cool, you shall then tell me whether or not there is any strength in the liquor. Do you remember the nice calves-feet jelly your mother made for you last winter when you were ill?"

"That jelly was the only nice thing about my illness," said May. "But I should not like to be ill again, not even to get calves-feet jelly."

"Very well; my stock will be as good, and almost as stiff, as calves-feet jelly," said I.

"But whilst we are talking the scum is rising on the stock. Give me that wooden spoon, and I will soon skim it off. But I must keep on the lid of the sauce-pan, too, or the strength and nice flavour of the soup will go up the chimney. And I mean them to go down the girls' throats instead."

Just then the bell rang for the girls to go to work in the garden.

After dinner May and I went into the Working Room again, to talk once more about stock and soups.

By that time the stock had been simmering,—not boiling, of course,—for four hours. So I strained it into a basin; and when it was cold, I took off the fat, which was then solid and had risen to the top.

"Now," I said, "let us begin to make some pea-soup."

We had some split peas, a turnip, a carrot, a sprig of celery, a little brown sugar, some dried mint, an onion, some pepper and salt, and some water.

When my companion saw me put the sugar into

the soup, she said that she should have made toffee of it, and that it would have been nicer so. But then she had not at that time tasted the soup. Well, the sum of the whole matter is, we boiled up together all the things, as the Scotch witches did the contents of their caldron. But we made a much nicer broth out of our materials than they did out of theirs.

“You have not boiled all the ingredients together yet, Ida,” said May, very proud to use the word ‘ingredients’ which she had heard me use. “You have not yet put in the pepper and salt, and the mint.”

“That is quite right,” I said. “I had not forgotten them, but they go in last, so as not to lose their flavour by long boiling. And I will take care not to forget to give you a nice basinful of the soup for your supper.”

FISH.

“We said that whilst we began our ‘good substantial dinner’ with soup, it was to be followed by fish,” Mrs. Meredith remarked at our next Cookery lesson. “This subject will therefore be the next one to which we shall give our attention.”

As most of our girls are fond of fish, they were quite willing to “lend their ears” to the different ways of cooking the second course.

Mrs. Meredith began by saying, "We will first fry fresh haddock.

"For this we require one haddock, egg, bread-crumbs, and two ounces of dripping. We wash the haddock, cut it from the bones, and make it into fillets, or moderately sized slices. We next make egg and bread-crumbs for the fillets, and fry them in the dripping. We put the haddock bones and head into a sauce-pan with three quarters of a pint of cold water, and then let them simmer for three-quarters of an hour, or for an hour. We use the stock thus made to put in butter sauce for the haddock."

This was declared to be a very appetizing dish!

Whilst the haddock was cooking, Mrs. Meredith set May to prepare some **fresh herrings** for baking. For this dish she gave her six fresh herrings, one dessert-spoonful of chopped onions, thyme, and marjoram, one dessert-spoonful of chopped parsley and another of bread-crumbs, and two ounces of dripping. May was first shown how to wash the herrings, and cut off their heads, fins, and tails, and to take out the backbones. She then proceeded to grease an oval baking-tin with dripping, and to lay in the open herrings, each sprinkled with one part of the mixture of bread-crumbs, parsley, onions, and herbs. A seasoning of pepper and salt, with dripping in little pieces, was put over them. Then May baked them for half an hour. When they were served, she laid one herring on the other, in pairs.



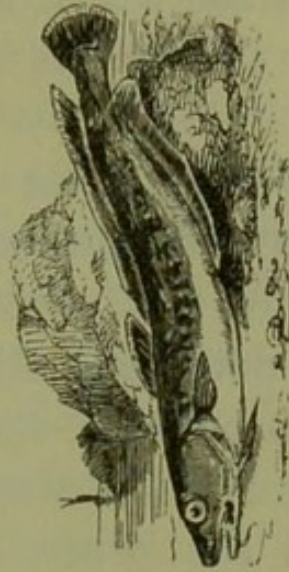
Herring.



Salmon



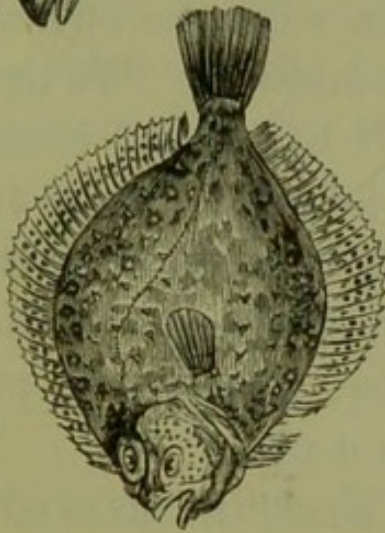
Mackerel.



Ling.



Sole.



Turbot.



Pilchard.



Cod.



Halibut or Holibut



Haddock.

Some Common Edible British Fishes.

On the whole May appeared to be quite satisfied with the success of her handiwork in cooking this dish.

Then, to give a little variety, Mrs. Meredith taught us how to make a **fish pudding**.

“For this,” she said, “we shall require three or four potatoes, half a pound of cold boiled fish, two or three table-spoonfuls of milk, and a piece of butter of the size of a walnut. We pick the fish from the bones, boil and mash the potatoes, and add them to the fish, with the butter and milk, and seasoning of pepper and salt. We next put the mixture into a buttered basin, and bake it for twenty minutes or half an hour; and then turn it out.”

Some of the girls had never tasted fish pudding before, and at the first mention of it, had wondered whether the fish were going to be put into a crust, like a beef-steak in a pie.

After this Mrs. Meredith showed the class how to **scallop** some fish.

“We shall require,” she said, “half a pound of cold boiled fish, four ounces of bread-crumbs, sauce, and butter. We pick the fish from the bones, add to it three ounces of bread-crumbs, and moisten it with any melted butter or sauce that may be left from the previous day. We season this highly, and add a little anchovy sauce if we like it. We butter a pie-dish, line it with bread-crumbs, put in the mixture, cover it with the rest of the bread-crumbs, and place on the top a few small pieces of butter.

We let it bake for twenty minutes or half an hour; or brown it in a Dutch oven before the fire.

“We have yet another way of using up any remains of cold fish,” Mrs. Meredith said. “We have had a fish pudding; now let us make a **fish cake**. For this we can use up the remains of any cold fish, with bread-crumbs, one or two eggs, cold potatoes, a sprig of parsley, and two ounces of dripping. We pick the fish from the bones as before, mix it well with equal quantities of bread-crumbs and cold potatoes, and season it highly. We make the mixture into cakes (using an egg to bind them) with egg and bread-crumbs, and fry them a light golden brown in two ounces of dripping.”

There was a difference of opinion expressed here, as to which was the nicer of the two—fish pudding or fish cake.

A DINNER AND A KISS.

“I’ve brought your dinner, father,”

The blacksmith’s daughter said,

As she took from her arm the kettle,

And lifted its shining lid.

“There is no pie nor pudding,

So I will give you this!”

And upon his toil-worn forehead

She left a childish kiss.

The blacksmith took off his apron,

And dined in happy mood,

Wondering much at the savour
Hid in his humble food;
While all about him were visions,
Full of prophetic bliss;
But he never thought of the magic
In his little daughter's kiss.

While she with her kettle swinging,
Merrily trudged away,
Stopping at sight of a squirrel,
Catching some wild bird's lay.
And I thought how many a shadow,
Of life and fate we would miss,
If always our frugal dinners
Were seasoned with a kiss.

ROASTING.

The matron told us that she should follow the proper order in dealing with the various civilized modes of cooking the joint, by beginning with roasting meat, since uncivilized man appeared to have taken this as his first step in artificial cooking.

So this morning, as I was assistant cook, I put on a long cooking apron reaching all round me, with a large bib and tucker coming right up to my chin. The matron had on a similar apron.

On the table was a leg of mutton, which we were going to roast for dinner. We were, at the same

time, to learn something of the art of roasting in general.

“First,” said the matron, “we will put down the leg of mutton pretty close to the fire, and keep it there for ten minutes. That is to set the albumen on the outside. But at present you do not know what albumen is — or, rather, you know very well what it is, but do not know it under that name.

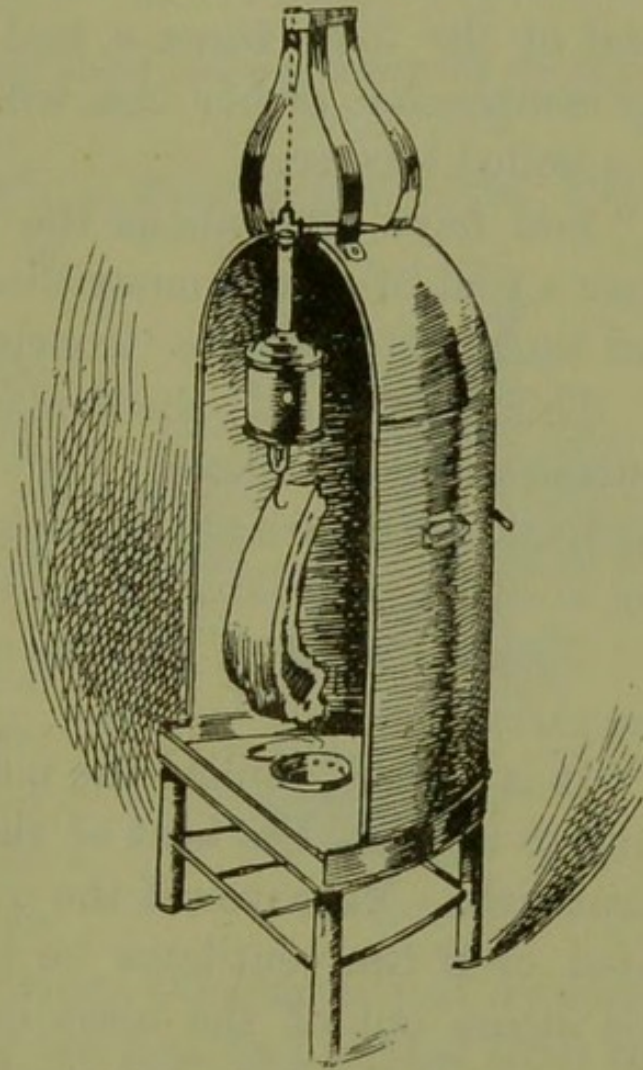
“But you have already seen albumen in the contents of an egg, and specially in the white of it, which is nearly pure albumen.

“And as May has already cooked an egg, she too knows what albumen is, and what happens to it when it is boiled.

“Now you can remember, that when we boil water, it becomes as hot as 212° . But when we merely simmer it, we make the water only 185°

(M 68)

K



Roasting Jack and Screen (Kitchener).

in temperature; and albumen will set, or become hard, even at a still lower temperature.

“But, as I said, we are going to put our leg of mutton close to the fire, since roasting is cooking before an open fire. And there the heat will be as much as a thousand degrees. And Ida Morton, in front of the fiery furnace, had better take care of her complexion, or her face will soon become as red as a boiled lobster.

“You have read about the warrior of old, who wore a coat of iron armour that covered him, front and back. He was the ‘ironclad’ of his day.

“This kitchener”, she continued, “is the leg of mutton’s coat of armour. Only it is used to keep in the heat of the fire at the back, and to reflect it on the meat turning slowly round whilst cooking.”

“That is almost as good as an oven,” said one of the girls.

“It is better,” replied the matron. “For it is not easy to regulate the heat of the oven so as to bake meat well. Moreover, if the oven be not well ventilated, or if the ventilator be left shut by mistake, the steam out of the meat cannot escape, and so the joint is liable to become sodden. But here in the kitchener the steam rises up into the air and passes away. This is why the flavour of a ‘roast’ is generally so much nicer than that of a baked joint; and why the roasted joint is also more easily digested.

“But you have now quite set the albumen on the outside of the leg of mutton, Ida. The juice, or

gravy, will not come out very much now, but will keep in and make the whole joint tasty and appetizing. So now please draw back the joint from the fire, and let it go on cooking more slowly; so that there may be time for the meat to get done quite through to the bone."

Then I noticed that there was a basin of dripping on the table.

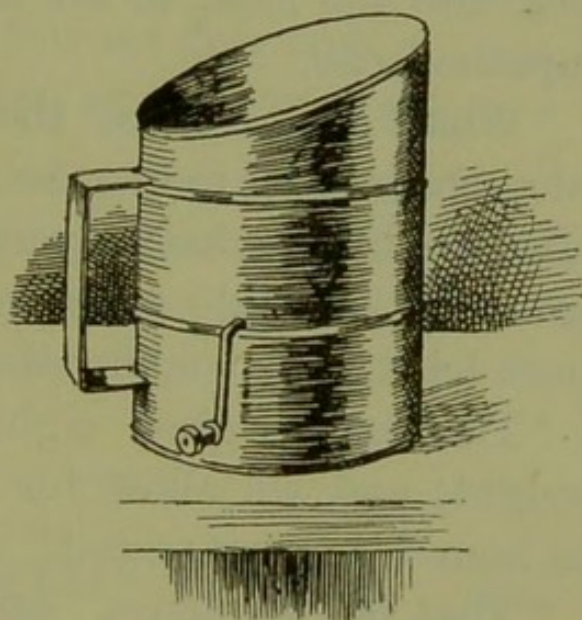
"Yes," said the matron, following my eyes; "that is for the basting of the joint."

So I put three table-spoonfuls of this dripping into the pan at the bottom of the kitchener.

The girls might well believe that there were a thousand degrees of heat in front of the clear, hot fire, when they saw, in the kitchener, the quantity of dripping that, like snow in the hot sun, had melted from the meat before the fire.

Next Mrs. Meredith gave me the flour-dredger, and I sprinkled the fine flour in it over the roasting joint, whilst at the same time I basted it with the hot fat.

I then noticed that small jets of steam, accompanied by little pops and cracklings, burst out of



Flour-dredger.

the meat; and that the fat of the leg of mutton ran down into the pan, and made more dripping. So, here is the reason why there is such a loss of weight in roasting a joint, I thought to myself!

"It looks nicer than the gipsy's dinner would do," said May, as the roasting went on, and the joint began to take on a nice brown and tempting appearance. "I should say it is quite done now! and it is very nearly dinner-time too. Why not run a fork into the meat to see if it is done?" asked the impatient one.

"What! and let out the gravy, after we have taken such pains to keep it inside?" said her mother. "No, we have a better way than that! We know how long it should take to cook the joint, and we must let it hang for just the proper time.

"The leg weighed eight pounds when it was bought; and we allow for roasting it a quarter of an hour for every pound."

"That is two hours," said May, who is quick at figures.

"But we give a quarter of an hour over," said her mother.

"And that just brings us to the dinner-hour," said May. "All but ten minutes in which to wash our hands and faces. And I think I shall just enjoy my dinner to-day, if I never did so before; just a little bit!"

"I believe you will enjoy a big bit. At least I hope you will; and that all the rest of the girls will

have as good an appetite as yourself," said Mrs. Meredith, as we turned from the kitchen to the lavatory.

THE ROAST BEEF OF OLD ENGLAND.

When mighty roast beef was the Englishman's food,
It ennobled our hearts, and enriched our blood;
Our soldiers were brave, and our courtiers were good.

Oh, the roast beef of old England!

And oh, for old England's roast beef!

Our fathers of old were robust, stout and strong,
And kept open house with good cheer all day long,
Which made their plump tenants rejoice in the song

Oh, the roast beef, &c.

BAKING.

When we went the following week into the work-room for our next cookery lesson, we saw that Mrs. Meredith had been getting ready some pastry for what she called her "baking-day".

She told us that formerly there were no public bakings, but that each house had its own oven, as old farmhouses, and even some of the larger houses in villages, still had.

I remember that when I once paid a week's visit to my grandmother at Blackberry Hill Farm, one

day the ploughman was called off from his work to give a helping hand in the back kitchen.

He first put into the oven three great bundles of dried twigs, which he then set alight. When they had burnt down into ashes, the oven was quite hot enough for the bread-baking.

He then brought in some old netting, fastened to one end of a prop to make a "swab". He dipped this in a bucket of water, and washed out the floor of the baking-oven with it.

But our school oven, as you already know, is a gas-oven for summer, and, for winter, one attached to a kitchen range. And it was not bread that the matron was going to bake first this morning, but meat.

"Ida shall give us a start," she said, "by putting the ribs of beef, we are about to cook, into that 'baking-tin', as Mary very properly calls it.

"Put the tin on the top shelf of the oven; that is, in the hottest part of it."

"I know why it is put there," said one of the girls; "it is to set the albumen, just as Ida did with the leg of mutton when she put it close to the fire at first."

"But it must be removed to a cooler part of the oven in a quarter of an hour," the mistress continued. "How long would you keep the meat in the oven altogether?"

"About the same time as Ida did her joint in front of the fire," answered another girl.

“That was about fifteen minutes for every pound, and a quarter of an hour over,” said May, looking up at the school clock as if she meant to be time-keeper again, as she had been when we cooked the eggs.

“That would do for smaller joints, or for roasting in front of the fire, where the heat is greater than in the oven. But this is a large joint, and will therefore require twenty minutes for every pound, and twenty minutes over,” said Mrs. Meredith.

“But how is Ida going to baste the meat when it is shut up in the oven?” inquired one of the girls.

“First,” replied the Head Cook, “she will put some dripping on the top of the joint, and the meat will thus partly baste itself. Then every quarter of an hour afterwards she will open the oven-door, and baste the joint with the gravy spoon.”

“Do not let the meat get cold by opening the oven-door too often!” said May, who began to be afraid of mishaps to her dinner.

SOME MORE BAKING.

During the three hours in which, on the day of our last cooking lesson, the meat was baking in the oven, the matron called all the girls to help to prepare the pastry which was to be baked on the lower shelf of the oven, after the joint had been taken out.

I had to make a **meat pie**, and was told to cut a hole in the top to let out the steam. Another girl had to make a **fruit pie**, and she was instructed to give it a thin crust, and *not* to make a hole in the top to let out the steam, as this would make the crust sad.

“And then some of you that have to eat it,” said the matron, “would become a great deal sadder than the pie.” At this there was a laugh from the girls, showing they were not sad yet.

My pie was put with the ribs of beef into the oven, whilst it was still hot, to make the crust rise. And there it remained until the meat in the pie was thoroughly well done.

But I found the oven hotter than I thought it would be; in fact, too hot. So, after all, I should have had my pie too much done, on the top at least, if the matron had not come to my rescue. She put a greased paper on the top, which prevented the crust from burning.

“Whilst you have been baking your dishes in the oven,” said the matron, “I have had another, and a very simple one, cooking for supper to-night. It is a **stuffed sheep’s heart**, and now I shall tell you how it is cooked.

“First you must know what we require. This will be a sheep’s heart, two ounces of bread, a few table-spoonfuls of milk, a dessert-spoonful of chopped suet, one of chopped parsley, a little thyme, pepper and salt, and an ounce of dripping for basting.

“ We first clean the heart well by removing the blood from the vessels; we do this by pressing it with our fingers. We then put the heart into a sauce-pan of boiling water, and let it simmer for half an hour.

“ In the meantime we prepare the stuffing in the following manner. We soak the bread in the milk till it is soft, and then chop the suet very fine, having first freed it from skin. We next wash the parsley and thyme well, dry them by squeezing them in the corner of a cloth, and chop them fine. We then mix together the bread, suet, and herbs, and add pepper and salt.

“ When the heart has simmered for half an hour, we take it out of the water, let it cool, and put in the stuffing with a wooden spoon. Lastly, we place it in a baking-tin with the dripping, bake it for half an hour, and baste it very often to prevent it from becoming dry.

“ We have not yet quite done with the oven. There is tea-time to think about as well as the dinner, and I know you all like scones.

“ It is not our usual plan to use the oven in the morning for baking cakes. But to-day I do not want to lose the opportunity, now that the oven is hot; for, as we are going to have tea in the garden this afternoon, we shall let the fire go out.”

“ Let us have buttered scones for tea,” begged May.

“ Very well,” replied her mother; “ buttered scones if you like! But you must help to make and bake

them. We shall want half a pound of flour, one ounce of butter, one tea-spoonful of moist sugar, two of baking-powder, some milk, and a pinch of salt.

“To make scones, we first mix the salt and baking-powder thoroughly with the flour; then we rub in the butter lightly with the tips of our fingers, and add the sugar, and enough milk to make all into a stiff paste. We next place it on a floured paste-board, roll it out into a round, cut the round in half, and divide each half into three pieces. Lastly, we at once bake these for about a quarter of an hour or twenty minutes.

“The baking-powder just mentioned is made chiefly of carbonate of soda and tartaric acid. When baking-powder is moistened, it gives out carbonic acid gas, which tries to force its way out, and so raises the ingredients with which we have mixed it. This action begins to take place directly the powder is moistened, and it passes off in a little time. It is therefore necessary to bake food in which baking-powder is used as soon as possible after it is mixed.”

Before the end of our lesson the matron said she wished to say something to us about clean hands in cooking.

“We should always wash our hands well before cooking, and carefully clean our nails, especially when we are going to make pastry and cakes, where our hands must often touch the ingredients. We should always use the tips of our fingers in

rubbing butter or dripping into flour. Using the palm of the hand would make what we are cooking very heavy.

“ We must also be careful that no hairs find their way into the dishes that we cook. Dirtiness in cooking is very disgusting; and we may be sure that no one will relish a dinner who has seen it cooked by dirty hands. We must be careful, too, that our utensils are clean; and not use knives and spoons first for one thing, and then for another, without first cleaning them. We should keep a special knife for cutting onions, as onions have a very strong taste which is easily carried to any other food in preparing which the onion-knife is afterwards used.”

BOILING.

When Mrs. Meredith met us again the following week to continue the lessons in Cooking, to which all of us now looked forward with such great pleasure, she reminded us of her egg-shell saucepan.

She did this, she said, because to-day we were to have a talk about Boiling, as the kind of cooking that was probably next invented after roasting on a spit over the fire, and after baking in a hot oven.

We noticed that Mary had brought to the table a leg of mutton, a piece of shoulder of bacon, and a fresh haddock. These were all to be cooked this

morning, but not all eaten for dinner to-day. We were to have the fish, and the boiled leg of mutton with turnips and potatoes, for our mid-day meal. But the shoulder was to be eaten as cold bacon for breakfast, as long as it lasted. And that would not be very long, as we all have pretty good appetites at Victoria Haven.

"We have already done the leg of mutton," said May, as soon as she saw this joint on the table, and remembered what was done on the roasting day.

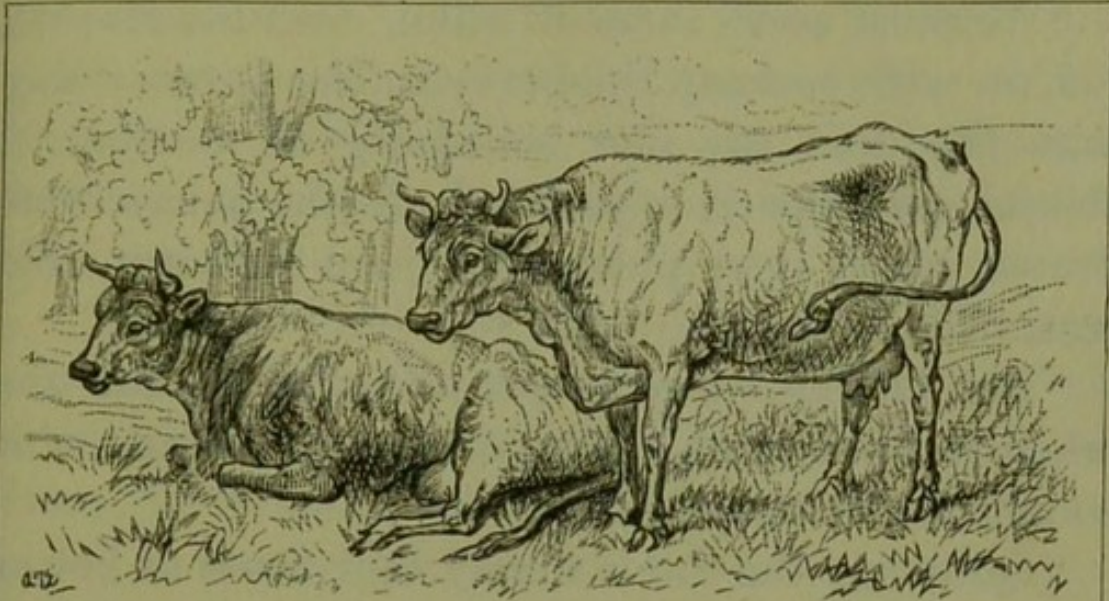
"We have indeed done *one* leg of mutton," replied her mother, "but not done all the legs of mutton in the world. There are some still being used by their rightful owners; and there is another on the table that has not been 'done' yet. Every joint of meat is not roasted, as you have learned already; this one is to be boiled.

"But now, girls, what are we to do with the joint? Is it to go into hot or into cold water?"

"I should say into cold water," said one of the girls. This so tickled Mary's sense of humour that she was about to explode with a laugh, till she saw a warning look come into the matron's face.

"It would do gradually in cold water," continued the unfortunate girl, who did not like Mary to think that she had no reason for her wrong answer.

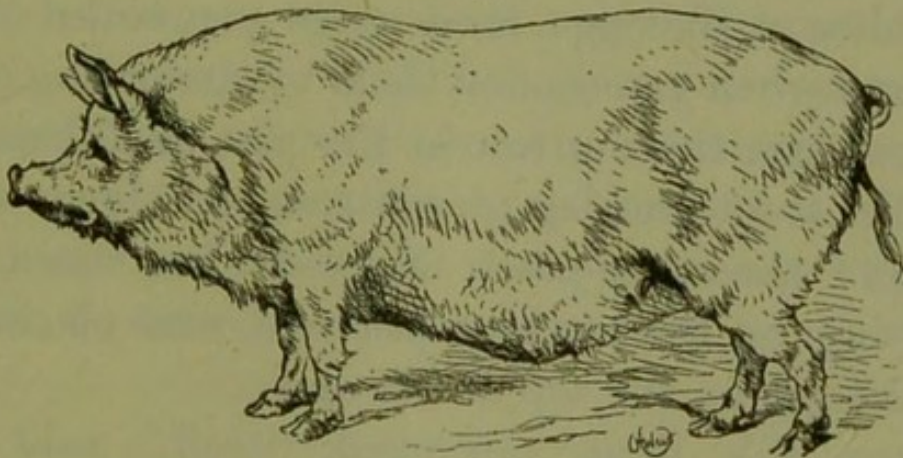
"That would not do!" said another girl. "All that we have cooked yet has been 'case-hardened' by the albumen on the outside being set by the great heat. Cold water would not set it."



Cows.



Sheep.



Pig.

Common Animals used for Human Food.

“We must serve them all alike,” said the matron, “if we wish to keep the gravy in the joints. May says she does not like boiled leg of mutton. I should not like it myself, if all the juices were drawn out of it by putting the joint first into cold water.”

“But boiling water is not so hot as the fire was when you put down the leg of mutton in front of it to be roasted,” a girl remarked.

“Quite so; the fire is nearly four times as hot as boiling water,” replied the lecturer; “but the water is hot enough for our purpose—and enough is as good as a feast. Do you remember what you found to be the boiling point of water on the thermometer?”

“Two hundred and twelve degrees!” the girls replied.

“And this will be enough, and more than enough for our purpose,” said the lecturer. “You remember I showed you that 212° was more than a sufficiently high temperature to set the albumen in the whites of the eggs, both when you boiled them hard, and when you cooked them by simmering only.

“Now, put the mutton in the pan, and close the lid.” In went the leg of mutton, and down went the lid of the sauce-pan! Mary did her share, too, by lifting up the heavy sauce-pan, and placing it over the gas on the top of the stove.

“Now the joint can cook itself,” said the matron. “I shall let it remain in the boiling water for a quarter of an hour, till there is a coat of

set albumen on the outside. Then I shall turn down the gas till the water simmers only. Whilst this joint is cooking, we will put the bacon into another sauce-pan; but we shall put that joint into cold water.

“But you must not think no gravy will come out, either from the leg of mutton, or from the shoulder of bacon. Of course it will do so a little from the outside. And of course, too, we are not going to waste these juices.

“We shall save the pot-liquor in both sauce-pans—to make broth in the one case, that is, from the leg of mutton; and soup in the other, that is, from the shoulder of bacon.”

“There will not be much strength or nourishment in either case, will there?” inquired one of the girls.

“Not so very much,” replied the mistress; “a threepenny bit is not so large as a crown, but it is valuable money all the same. We can make our stock stronger, by adding vegetables to it. Our broth will be nice with some pearl barley; and the soup will be rendered more nourishing if we add some corn-flour and Liebig’s extract to it. But we have not yet cooked, or even got ready our vegetables, to eat with the leg of mutton.”

BROILING.

The next time we met to go on with our lessons in Cooking, it was what one of the girls called a broiling day.

"Yes!" said Mrs. Meredith, who had overheard the exclamation, "it is a 'Broiling Day' in a double sense. For it is very hot, and it is 'broiling' that we shall do this morning; and that is the reason why you see me armed with a gridiron.

"But that poor fire will never do for our task. Mary, you know what is required!"

It appeared that she did so, for she immediately cleared out the ashes at the bottom, thrust the poker into the body of the fire to let in a draught, and took off from the top some of the coals which were smoking.

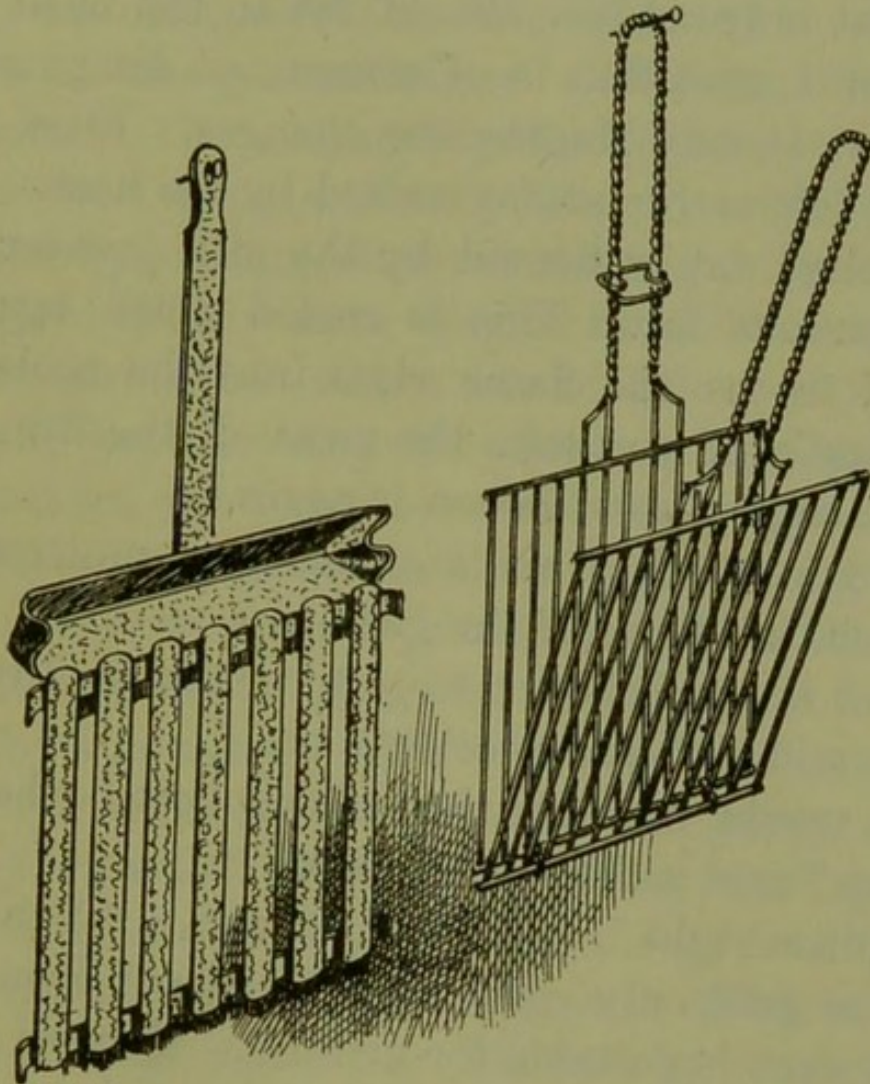
In about five minutes the fire had burnt up clear, with a red-hot glow through it from bottom to top; and the matron continued her lecture.

"We must be very particular about the fire in broiling: there must be no smoke, for a sooty taste in meat is most objectionable. And there must be no flame from the coal, either; as that would make the meat taste almost as sooty as smoke would."

Just then Mrs. Meredith told me to put the meat on the grill on the top of the clear fire. It was a nice thick slice of rump-steak. This was to be followed by mutton chops cut from the chump end

of the loin; and both alike had a nice lot of fat on them.

The steak had not been many minutes over the hot fire before the fat began to melt, and some of it to drop into the fire beneath.



Gridirons.

When the "fat is in the fire", as the old saying is, there is soon a blaze.

"Take the gridiron off the fire!" said one of the girls. "Did you not hear the matron say there was to be no flame?"

"I did not say quite as much as that," said the mistress smiling. "I said there ought to be no flame from the coal! That is not by any means the same thing as no flame at all. Coal flame is smoky, and gives a disagreeable taste to meat. But the flame from fat only adds a film of fat to the meat as it cools on it; and that is, of course, not disagreeable.

"That is only ringing the changes. First, there is solid fat; and next, fat melted by the heat. Then the melted fat is turned by the still greater heat into gaseous fat. This is cooled down again to melted fat as the flame rises into the cooler air. And, lastly, if you take the meat off the fire, there is a coating of solid fat on it again."

"But you could not cook a leg of mutton on a gridiron," said one of the girls.

"No! it would be too large to be thoroughly done in the middle," said another.

"It would burn on the outside before the time was up," said a third little cook.

"Quite right," said the matron. "You must broil, or grill, only small joints; and not even every small joint is suitable for grilling. You see I have chosen **rump-steak** and **mutton chops** to broil.

"But we ought not to broil slices of shin of beef. I wonder whether there is any one in the room clever enough to tell me why not?"

"Does meat, in broiling, stand close to the fire? Yes! Well then, what will be the effect of that?"

"I know!" said one of the girls; "the albumen on the outside will be set by the heat."

"But it is all outside in such thin joints as are broiled," said another girl.

"Put these two facts together, and you will get over your difficulty," said Mrs. Meredith.

"I see!" one girl exclaimed. "We can only broil thin joints! The broiling hardens the outside; but raw shin of beef is hard already, and we wish to make it tender by cooking. Instead of doing so, by broiling we should make it even tougher than it was before."

We noticed that whilst the matron was talking, she still kept turning the steak on the gridiron, and that she did this either with two knives, or with a knife and spoon, but used no fork in doing so.

"A steak or chop requires turning on the grill every two minutes," she said. "I need not now tell you why I do not use a fork in turning the joint, as you know what that would do to the gravy."

"But we must be quick about our work to-day! You see by the clock that I began very late. I did so to show you that broiling is a quick way of cooking. And it must be followed by a quick way of dishing up, and for the same reason. Just as a small joint is soon cooked, it soon gets cold. But a joint kept quite hot, whether it is small or large, has a very much nicer flavour than one that has been allowed partially to cool."

"But we are all this time forgetting our mutton chops. That will never do! therefore I will take this

one, and from it show you how to broil the others, and you will see that we proceed in much the same way as with the rump-steak.

“The proper way of broiling or grilling a chop is on a gridiron. But all coals are not suitable for this manner of cooking. A gridiron should never be used except over a clear fire, without smoke or flame. Before grilling a chop we make the gridiron quite hot, place the chop on it, and let it cook for about ten minutes or a little longer, according to its size. We turn it three or four times, using a knife and spoon, but are careful never to prick it with a fork, as that would let out the gravy.

“We can broil a chop even without using a gridiron. We make a clean frying-pan quite hot, and lay the chop in it. We then let it cook over a clear brisk fire for ten minutes, or a little longer; turn it occasionally with a knife and spoon, and serve it immediately on a very hot dish. A chop for broiling is best cut from the loin; the fat being neatly trimmed off before cooking. The fat may be melted down and clarified, to make dripping; or it may be used as suet.”

A RICH STEW.

Mrs. Meredith told us next day that vegetables are used to give a flavour to meat both in boiling and stewing; and to make the meat go further.

"But why do you want to make the meat go further?" asked one of the girls.

So Mrs. Meredith explained that meat was very much dearer than vegetables; and yet, as food, it did not give us much more nourishment than vegetables.

"But now," she said, "we are to have our lesson on Stewing; and on the gas-stove there is a sauce-pan, and a stew-pan besides. You all remember, I hope, what I told you about simmering eggs instead of boiling them; and the great care French people take to simmer meat and vegetables for the same reason."

Here one of the girls remarked, that she thought they had quite done with soups already. But the matron replied that it was not soup leading up to the joint, they were now going to deal with, but a stew to serve instead of the joint.

"Then you will understand," continued the matron, "that stewing is cooking meat with a moderate degree of heat only: not so much as in boiling, and a great deal less than in baking and roasting. But, to make up for the less heat, we must take longer time in the cooking. We must also have a covered pan, and only a small quantity of water in it. The cover will keep in the flavour. And if we put a large quantity of water or stock into the stew-pan, we shall make broth or soup; but not a stew."

Then Mrs. Meredith told me to put some of the

ox-cheek from the dish on the table into the stew-pan full of cold water.

"You see," she remarked, "for a stew we do not use the best joints, like rump-steaks, or mutton chops. We shall simmer our meat a long time; even the toughest meat will become tender before we have done with it if we simmer it long enough. And we put it into cold water, so that, as the water becomes warmer and warmer, the juices may be drawn out. For, we want the juices to be in the gravy, and not kept in the meat, as we did when we were boiling, roasting, baking, or broiling.

"Now," continued the matron, "I have told you, Ida, what you are to do; can you tell me what you are *not* to do?"

I thought for a moment; and then I remembered the difference between stewing or simmering, and boiling. So I said that I now felt myself half a French cook after all the instructions I had had; and that I would take great care that the stew-pan did not come to the boil.

"That is what I meant," replied Mrs. Meredith "But I have a contrivance here that renders it impossible for you to make a mistake in this matter."

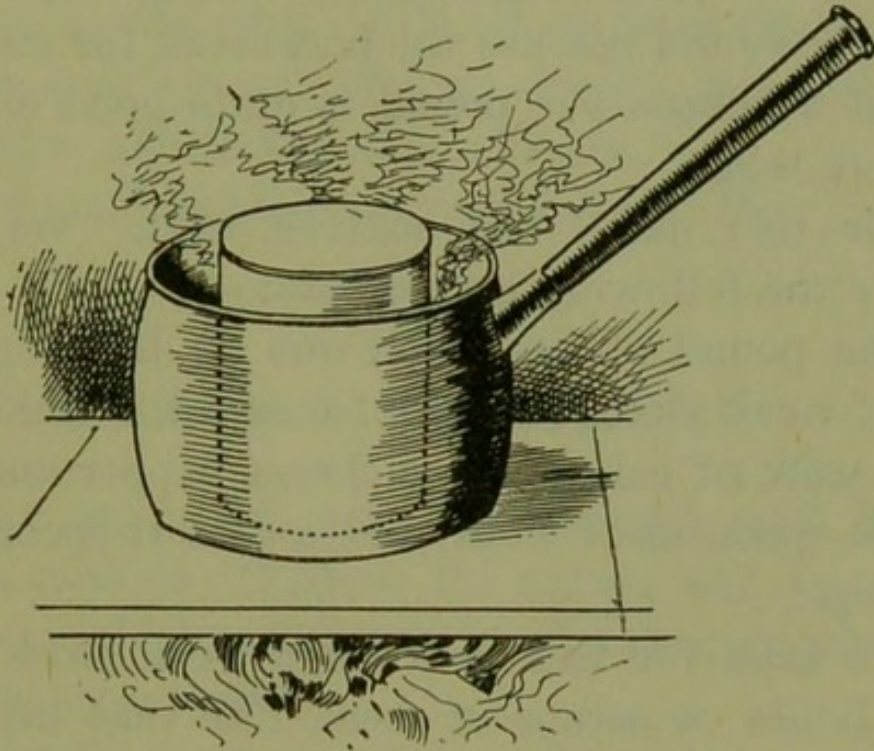
This was an ordinary jar with a lid, which she put into a sauce-pan full of boiling water in such a way that the top of the jar stood above the level of the water boiling in the sauce-pan.

"But it boils!" exclaimed May after peeping into the sauce-pan.

“What boils?” asked her mother, smiling at the keen eyes that had been so quick to discern how the matter stood.

“The water in the sauce-pan,” said May.

“That does not matter a bit,” said I, taking a



A Simple Water Bath (Jar within a Sauce-pan filled with Water).

peep too. “The water in the jar does not boil; and that is where the stew is.

“So set your nimble little fingers to work, and let us see if you are as quick with them as you are with your eyes. Slice up these carrots, turnips, onions, and celery quite small; then, when they and the meat are quite done, you shall have some of them for your dinner. And do not tell anybody you cannot cook; because you really can do so, and very nicely too.”

When we had finished making our rich stew, Mrs. Meredith said she would show us how to make a dish of stewed steak. She told us that this dish does not require so much time as stews usually do. The recipe here given was for only one pound of beef. If we use a larger piece, we must let it stew longer. We did not use the best steak for stewing: beef at tenpence per pound is quite good enough, we were told.

“For this dish,” the matron said, “we shall require the following ingredients:—

“One pound of beef, and one of dripping; one pint of weak stock, an onion, a carrot, a small turnip, a stick of celery, three cloves, pepper and salt, a table-spoonful of flour, and a dessert-spoonful of ketchup.

“We take for this dish some weak stock made from bones or scraps of meat, like that made for pea-soup. If we have no stock, we use water instead. We put the stock into a stew-pan or saucepan, and let it boil. We next mix the flour into a smooth batter with a little water, gradually pour it on to the boiling stock, and return it to the saucepan. We then let it boil up again, draw it to one side of the fire, and let it keep warm, but not boil, and add to it some ketchup.

“We now dredge the beef with flour; place it in a frying-pan with dripping, and let it fry until it is nicely browned. We then add to it the warm stock, put in the onion, which should be washed and

peeled, with the cloves stuck in it; cover the pan with the lid, and let it simmer very gently for half an hour.

“We next wash and prepare the vegetables, cut them into small pieces, and fry them in the same frying-pan in which we fried the steak, and then add them to the beef. We let all simmer gently for three-quarters of an hour longer, then add a little pepper and salt, and it is ready.”

“And I shall be ready for it, too,” said May Meredith.

VEGETABLES AND FRUITS.

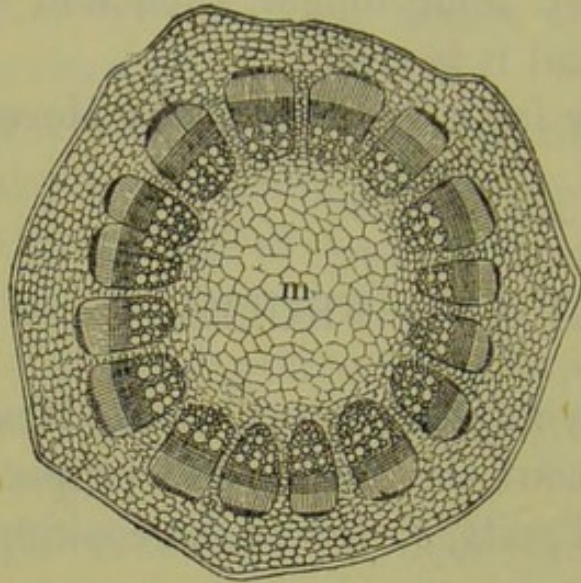
“I must now tell you something,” said Mrs. Meredith next day, “about the nature and properties of Vegetables and Fruits, so far as the cooking of them is concerned.

“In animals the walls of the cells, and the framework of the tissues, are largely composed of gelatine, or what, after cooking, becomes gelatine. We find something like this substance in vegetables also.

“If we put a very small piece of any succulent, juicy, or pulpy vegetable or fruit, under the microscope,” she continued, “such as a carrot, grape, or cherry, we find that it consists of a lot of loose, spongy, rounded, or egg-shaped cells. Each of these cells has on the outside a cell-wall like the skin of a grape.”

To make this quite plain to us, the matron had

brought into the room a microscope that formerly belonged to the Captain. On a glass slide she now put the tiniest bit of pith from the inside of an elder twig. May declared there was not enough of it to be seen, until she had peeped through the magnifying-glass. Then she was delighted with the cells she saw, and found, too, that there was plenty of it to look at.



Transverse Section of Elder Stem. m, Pith.

“We cannot eat any vegetable, without at the same time eating a large amount of cell-wall,” the matron continued. “So we must take care to make this cell-wall, which is often woody, and not easily digested in the raw

state, soft by boiling, since it forms far more than half of the substance of many vegetables.

“Cells form the groundwork of every plant. When obtained in a pure state, their structure and composition are nearly the same, whatever the nature of the plants that furnished them. That is, they all alike have a cell-wall on the outside; and mostly consist inside of starchy matters, or different kinds of pectose, or vegetable matter of very similar character. In addition, they have a smaller quantity of other constituents, which give a special character

to the cells, such as acidity, sweetness, &c. But the cells themselves may differ very greatly in appearance and size. Thus they are loose and spongy in the succulent shoots of germinating seeds, and in such vegetables as the turnip and the potato; but hard in the woody stems of trees and bushes.

“Besides the cell-wall, we must remember that another of the substances found most abundantly in vegetable foods is starch.

“Without counting the water in it, starch makes about three-quarters of our ‘staff of life’, a still larger part of rice, and nearly the whole of arrow-root, sago, and tapioca. In cold water, starch grains remain whole and undissolved. When heated to rather more than 140° F. they take in water through the cell-walls, as I showed you before in our lesson on a baked rice-pudding.

“It is supposed that in its original state the cell-wall of starch grains is much wrinkled and folded. It is these folds, or creases, that form the curious markings, or rings, seen when starch granules are looked at under the microscope. When the cell-wall swells out, the rings disappear; and, when the granules burst in baking, the starch may be said to be cooked.”

The girls saw these folds of the starch cell-wall in grains of starch shown under the microscope; and they thought them very pretty. They also noticed how very much the starch grains in different plants differed in size.

“Flour is largely made up of little cells of starch,” the matron said. “In cooking flour we burst these; and this can only be done by raising the heat to boiling point. The starch cells then swell and burst. Then the contents mix with the water or milk, which in consequence becomes quite thick, as you see in making ‘melted butter’, gruel, and porridge.

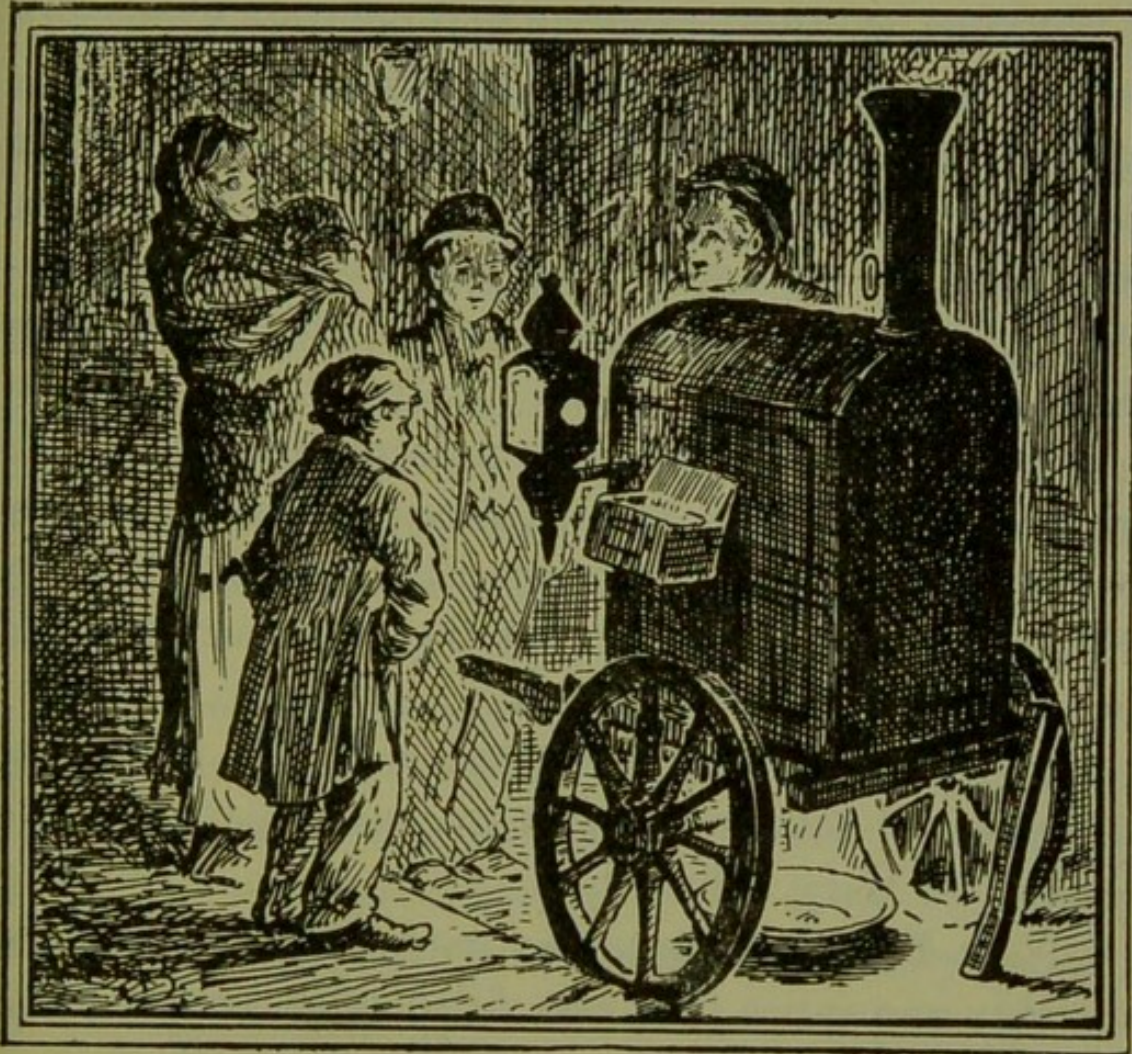
“If we make these with cold water, they would not only be disagreeable to eat, but hard to digest. For then the little starch-cells could not burst and give out their starchy contents; and the heat of our bodies would not be sufficient to make them do so.

“The real object in cooking vegetables, therefore, is to soften the cells and cause them to burst.”

As the lesson had been rather hard, we were allowed to have our tea out on the lawn in front of the house, as a reward for our attention to what had been said. And we were provided, too, with some crisp, short rice-cakes, as specimens of starchy foods. We also had cherries plucked from our own trees, to represent pulpy fruits; and some lettuce, mustard, and cress out of the kitchen-garden, to stand for “green meat”, as the people in our neighbourhood call salads.

ALL HOT! ALL HOT!

“I have just seen the most lovely steam-engine you ever saw in all your life! And the most beautiful potatoes!” It was May who was speaking.



“I did not know that potatoes were such beautiful objects,” I replied, to tease her in a good-humoured fashion.

“But these are! and all smoking, piping hot! If there is anything that is delicious, it is a hot baked potato on a cold winter’s day,” continued May.

“But it is now summer-time,” I remarked.

“Well, it does not matter! they are nice at any time.”

Just then Mary came in with a basket of raw potatoes—some peeled, and some still in their skins. Her mistress was close behind her.

“Every one thinks she can boil potatoes properly,” said the mistress, tucking up the sleeves of her gown. “I remember I once asked a new maid if she could manage to cook the potatoes for dinner by herself. She very rudely, and very unnecessarily, as I soon found out, went out of the room in a temper.

“First, we shall bake two potatoes for May.” So saying, she selected two potatoes of the same size, which would occupy the same time in the baking. She kept their skins on; but they had been washed very clean.

So these potatoes were first put into the oven; they would take two hours to cook in a “moderate oven”, as Mary called it.

Then I got the potatoes ready that were to be boiled; one sauce-pan was filled with peeled potatoes, and one with potatoes in their jackets.

Then the matron said she would show us both ways of cooking them, for some people laid much store by the nourishing material lying just under the skin in potatoes, and which was lost by peeling them raw, while others objected to the trouble of peeling the potatoes at table.

She next took the potatoes I had prepared and put them on to boil gently with sufficient cold water to cover them. When they had boiled for twenty minutes, Mary tried them with a fork to see if they were quite soft through, but not waxy. She then drained off the water, and removed the sauce-pan a little from the fire, just as we did when cooking eggs. That the potatoes might be dry and mealy, she left the lid off now, to allow the steam to escape.

But as the potatoes would not be wanted for ten minutes yet, the question arose how were they to be kept warm and yet not spoil during the interval. This Mrs. Meredith answered by putting a folded cloth on the top of the potatoes in the sauce-pan to keep them hot; and to keep them dry as well as hot, so that they might not become waxy from standing.

She then told us, that at one time the Irish depended almost entirely for breakfast, dinner, and tea on the potato. And when the potato crop failed there was a dreadful famine in the land. She also said that in Ireland potatoes are generally cooked with their skins on.

“The potato,” she said, “which is now one of our commonest foods, has only been known in Europe since the beginning of the sixteenth century, when it was brought over from S. America, of which continent it is a native. At first the potato was considered a great delicacy, and cost as much as two shillings a pound. It was not very much grown and

eaten till about a hundred and fifty years after it was first brought to England.

“Potatoes have not great flesh-forming properties, like peas and beans. Indeed, they are the least flesh-forming of any vegetable that we use for food except cabbage, as they consist very largely of water. They are, however, useful as food, on account of the starch they contain, which helps to support life by warming the body.

“We must cook potatoes well, so that the little starch cells of which they are made may burst, that the potatoes may become mealy and digestible. If potatoes are not cooked enough, they become hard and indigestible. There is a way of eating the potato, once common enough, but not much in favour nowadays, namely, in a salad. Fashions in food change as well as those in dress, but you will note the mention of the potato in the following directions for making a salad, given by the witty Sidney Smith in days gone by:

“Two large potatoes, passed through kitchen sieve,
Smoothness and softness to the salad give:
Of mordant mustard add a single spoon,
Distrust the condiment that bites too soon;
But deem it not, thou man of herbs, a fault,
To add a double quantity of salt.
Four times the spoon with oil of Lucca crown,
And twice with vinegar procured from ‘town’;
True flavour needs it, and your poet begs
The pounded yellow of two well-boiled eggs.

Let onion's atoms lurk within the bowl,
And, scarce suspected, animate the whole;
And, lastly, in the flavoured compound toss
A magic spoonful of anchovy sauce.
Oh! great and glorious, and herbaceous treat,
'Twould tempt the dying anchorite to eat.
Back to the world he'd turn his weary soul,
And plunge his fingers in the salad-bowl.'"

A DISH OF FRY.

"I should think there are not many more ways of cooking," said one of the girls, when we next met in the Working Room. "It seems to me, that we have already had as many different ways of cooking as there are different things to cook."

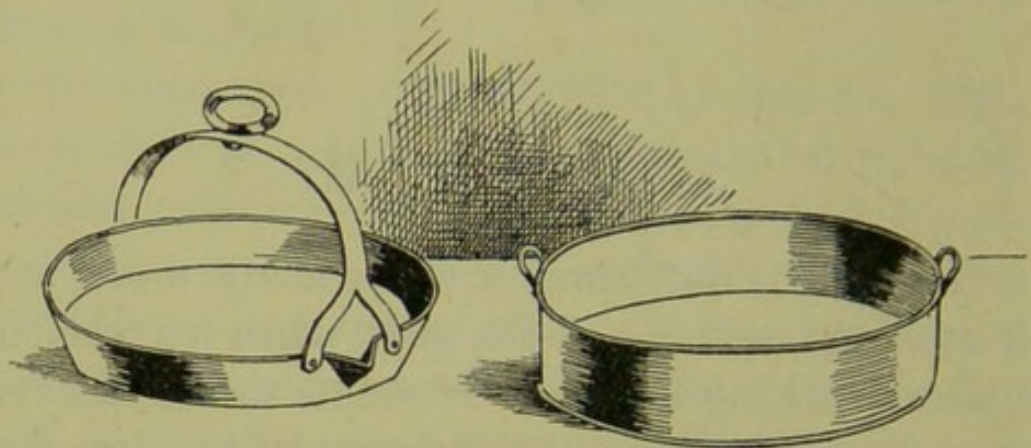
"Not quite," said the matron, just then coming into the room, and hearing what Jane Wilkins had said. "We must not forget to have a dish of fry."

"Now, Ida," said the matron, "this morning we must be as brisk at our work as when we had a broiling day, and for the same reason. Our joints must be as small in frying as in broiling; and small joints are soon cooked, and soon get cold. And we must also have only the tenderest, as well as the smallest of joints, since frying, like broiling, makes the outside hard; and a small joint, as you already know, is nearly all outside."

“The frying appears to be altogether a second kind of broiling,” said one of the girls.

“Only in frying the fat does not go into the fire,” said another girl.

“And we put fat into the pan before we begin to fry,” said the matron. “Not boiling fat, as some people say, for it takes very great heat indeed to



Frying-pans (Shallow and Deep).

make fat boil. And, long before it does so, our small joint is put into it, and taken out again cooked.

“But you must go to your desk this morning, May. I cannot let you stand near the frying-pan; for as the water in the fat turns to steam it will splutter, and might spurt over you.”

So saying, her mother put into the frying-pan a nice slice of ham, nearly large enough to fill it. Soon the ham frizzled at a very lively rate, bubbling and squeaking as it did so.

One of the girls said the matron had forgotten



THE GIANT FRYING-PAN.

to put the fat into the frying-pan. But the ham was fat enough in itself to fry without any dripping or lard.

“The amount of fat which we use in frying,” said the matron, “depends on circumstances. In frying fat meat, such as fat ham or bacon, we use none at all. In *dry-frying*, as we call it, we use just a little, only as much fat as will cover the bottom of the pan. In *wet-frying* we use a larger quantity, the joint being quite covered over with hot fat, as a stew is with water in the stew-pan.

“I once went into the kitchen of a large hotel at which we were staying, and saw that they had there a frying-pan as large as this round table. I should say it was nearly a yard across.

“I asked the cook, who was a Frenchman, why he used such a large frying-pan. He told me it was not a bit too large, and often hardly large enough at breakfast-times. There were, of course, at this large hotel a great many people to cook breakfasts for.

“He said some of the guests would order a steak, others hot ham or bacon, and some mutton chops, sheep’s kidneys, or sweetbreads. There would be no time to cook all these separately. So he always started the day’s work in the kitchen by getting ready a frying-pan. Into this he plunged the different small breakfast tit-bits as they were ordered. He served out with them to each of the guests a little ladleful of the common

gravy that had come out of them all. That was frying on the largest scale I have ever seen in my life, either before or since."

Then the matron went on with her own frying and presently turned out the slice of ham, hot and tempting to the appetite.

AN UNEXPECTED VISITOR.

We have had quite an exciting time at the Haven, for Mr. Tom Meredith, the matron's brother-in-law, has suddenly returned to England, arriving before the letter announcing his intention of coming home.

Now the mate of the *Seagull* had brought back with him a keen-edged appetite, as well as curious presents for his two relatives. And May would not be satisfied without helping her mother to prepare dinner for her uncle.

So whilst Mr. Meredith looked round the "new ship", as he called the Victoria Haven, the matron and I set about getting the dinner ready, with May to put in an oar and imagine that she was doing all the rowing.

"We must have a plain, but nice little dinner for Mr. Meredith," the matron said to me. "I expect he often has to make shift aboard ship. We will give him a little soup and fish; and for the joint we will have a roast leg of mutton. As for pastry, there are fortunately a cold apple-pie and a plum-

tart in the pantry. If he prefers hot pastry, he will be pleased with some mince-pies and plum-pudding, especially when he knows that May here has had a hand in the making of them.

“You have some stock, Ida, from the leg of mutton which was boiled yesterday. Add to that the beef bones that the butcher’s boy brought this morning, and see what you can do with the help of some carrots, onions, and a turnip.”

“I can make a good carrot soup with them,” I replied, and I at once set to work, whilst May assisted—in her own imagination at least—by handing me the salt and pepper when I required them.

When I had finished this part of the preparation for dinner, I turned to the second course, which was to consist of boiled cod-fish. I did not know how to prepare cod, as well as I knew how to prepare soup, but luckily the matron came to my rescue, sparing a few moments from her own tasks of roasting the leg of mutton, and boiling the potatoes and cauliflower, to devote to me.

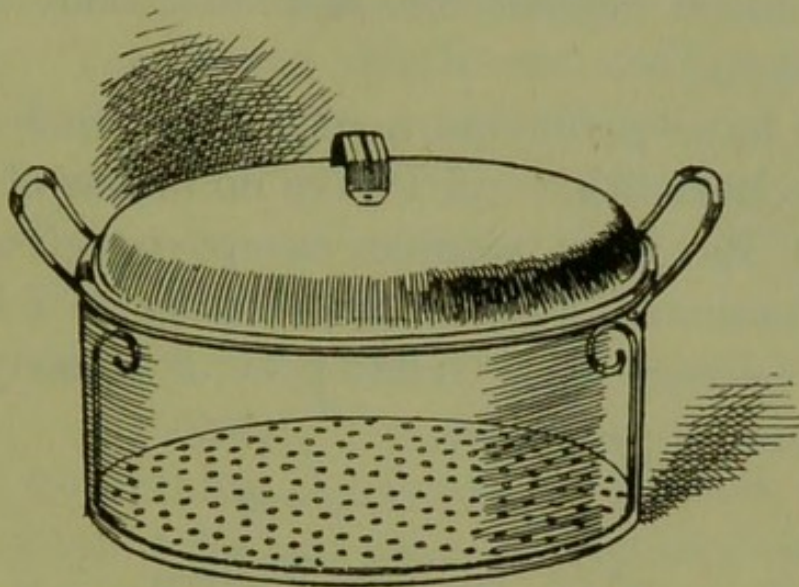
“This fish is already cleaned,” she said. “So you can put it at once into the fish-kettle, with just enough cold water to cover it, and with a teaspoonful of salt. Bring it gradually to the boil, letting it simmer only, of course, after it has come to the boil. Then take off the scum as it rises.”

I was soon too busy with my own dish to give an eye to what the matron was doing with hers.

But I supposed she would just roast the leg of mutton as we had done at our lesson on roasting.

Whilst we were thus as busy as we could be, May was stirring together the ingredients for a plain plum-pudding.

The mince-pies were taken from those already in



Fish-kettle, showing Strainer inside and Arrangement for Lifting Fish out of Pot.

the larder; and had merely to be heated again in the oven.

So there was what the matron called her plain, family dinner. And a happy family of three they were that sat down to it! I think Mr. Meredith must have enjoyed his dinner, for when I was called into the dining-room to put the dessert on the table, he looked as cosy and contented as if he had never dined better in his life. "There!" said he to May, "that meal is better than the roast kid and baked hare I once had with the South Sea Islanders.

Yet I was then hungry enough to think that I should never again enjoy a meal so much."

The matron looked pleased at his praise of our labours, and as a reward for my share in them, she gave me an orange from the dessert, and told me to take it with me into the garden to eat.

So it seems to me that we were all alike pleased at the sudden descent Mr. Meredith made on Victoria Haven.

"You have given me a nice little dinner," said Mr. Tom Meredith, "and I have no means of thanking you for your trouble, except to give you a rather humorous account of a dinner at a festival. It was written by a Greek poet of comedy above two thousand years ago.

THE GREEK POEM.

Cook. O slaves! ye boys and women! Heard ye
not

The summons of the herald? Hasten forth,
With quick despatch, to boil, to roast, to fry;
Hacking and cutting, plucking and flaying;
Hashing and slashing, mincing and fricas-
seeing.

And bring me here

Those, the least skewers of all, to truss the
quails!

Chorus. Your designs and public ends
First attracted us as friends;

But the present boiled and roast
Surprises and delights us most!

Cook. Wait awhile, if nothing fails,
You shall see a dish of quails.

Chorus. We depend upon your care!

Cook. Rouse the fire and mend it there!

Chorus. See, with what a gait and air,
What a magisterial look,
Like a cool, determined cook,
He conducts the whole affair!

Mess. You're summoned
To go without a moment's loss of time,
With your whole cookery;
The company are arrived; you keep them
waiting,
Everything else is ready—couches, tables,
Plum cake and plain, comfits and caraways,
Confectionery, fruits preserved and fresh,
Relishes of all sorts, hot things and bitter,
Savouries and sweets, broiled biscuits and
what not;
Flowers and perfumes and garlands, every-
thing.

Cook. Then, shut the door and serve the dishes
here.

Guest. Give me my bunch of leeks, the soldier's
fare.

Cook. I'm partial to veal cutlets; bring them here.

Guest. Let's see the salt fish.

Cook. I take fresh fish, and broil it on the spit.

Bring doves and quails; I scarce know which
is best.

Behold the roasted dove, a savoury sight.
And the hare pie for me—bring it in paste.
Bring here the spit and show the roasted
joint,

Bring bread, ah! that's your sort.

With this full-orb'd pancake I proceed,
Is it not exquisite and rare!

Pour honey on the pancake.

Boy, strap the basket with my feasting
mess;

Whilst I just step within to change my
dress.

—*Aristophanes.*

A NICE NEW LOAF.

Mrs. Meredith told us next day, that, as we had now learned something about the general principles of cooking, we might proceed to put these principles into practice ourselves.

This was why May appeared that morning in the Working Room decked out in a new cooking apron nearly all bib, with her sleeves tucked up to her elbows.

She was humming to herself snatches of the verse,

“Will you tell me how bread is made?
For you know all about the trade.”

“Have you got all the articles we shall require, Ida?” asked the matron.

“I think so,” I replied. “There is the flour-tub full of ‘seconds’, the little brown jug of fresh-brewed barm, a can of cold water, and some more water boiling in the kettle on the gas stove. I think that is all that is needed.”

The mistress began by telling us that in former times people did not use barm, or yeast, in making bread.

She remarked that the use of leaven was said to have been found out by accident; and in the following manner:

“It is said that at Athens, the capital of Greece, a slave, after making the bread, had once left a little dough in a pancheon and forgotten it. The next baking day he was about to throw away this old dough as being hard and sour. But his master, who disliked waste, told him to work it up with the fresh batch of dough he was then making.

“This batch of bread was so nice, compared with the sad, heavy, and unleavened bread that the household had always eaten before, that to satisfy the many inquiries on the subject, the slave was compelled to tell the secret of the improvement.

“The news of the discovery at once spread all over Athens. So great grew the demand for this new bread, that public bakers and public bakehouses were set up for the first time; and from that day

'Athenian bread' became known all over Greece as the 'superior article'.

"To understand why sour dough was then used as leaven you must know that there were in those days no breweries at which barm could be procured.



Gold-digger's Hut in the Australian Bush.

"In one sense they did not go without yeast," said the matron. "The bit of sour dough they used from the last bread-making would really have yeast in it. They thrust this old dough into the middle of the new batch. Then the 'little leaven leavened the whole lump', as the New Testament says, when speaking of the rapid spread of bad example.

“Sometimes bread is made without barm, in places where people cannot get any. But the bread thus made is heavy. If you lived up in the bush in Australia, miles away from shops, you would not have loaves to eat, as we have. You would have to put up with ‘damper’, as the people call their thin cakes of unleavened flour and water, baked in the ashes of their wood fires. But as we have yeast here we may as well use it.”

Just then the school bell rang, and some of the girls had to leave Cooking for their other lessons.

MAY HELPS AT THE BREAD-MAKING.

When the other girls who were not to assist in bread-making had retired, May brought me the jug of barm and the other things necessary, since I was to make the bread that morning, as a kind of object-lesson to the rest of the class.

First, I poured into my pancheon the peck of flour which it just holds. Then I made a hole in the middle of it, banking up the flour all round the hole, as children do with their spades when playing on the sands at the seaside.

Then I mixed the contents of the brown jug with a little water from the kettle. This was about as warm as new milk, or a little warmer.

Next I poured the half-pint jug of barm and the

water through the sieve into the bed I had made for it in the flour.

Of course at this stage May had to put her finger into the pie; that is, she put a wooden spoon into the yeast! She stirred it round and round, drawing a little flour from the sides as she did so, and mixing it up with the barm until the whole was about as thick as treacle.

When I had finished "setting the sponge", as the baker calls it, I threw a clean coarse cloth over the top of the pancheon. The yeast was now left to "work" in the warmth in front of the fire, and in the darkness under the cloth.

Whilst we were thus all waiting for the yeast to work, or ferment, I got the bread-tins ready. Some of the dough was to be made into "cottage loaves", and some of it into "tin-bread". For the latter, tins of course were necessary, and these I had to grease inside with dripping, so that the dough might not stick to them in the baking.

I did not forget the "pinch of salt". This I had not at first put into the barm, since it would have killed the yeast, if I had done so.

Next, on my knees, I began to work up the water, yeast, and flour together. Then after letting the whole stand for an hour to rise, there was the moulding and baking to be done. So I cut the dough into pieces of the right size, each large enough to fill three-quarters of a tin. I let May put these into the warm baking-tins whilst I worked up, with two

hands, the tops and bottoms of the cottage loaves. I let the tins stand near the fire for twenty minutes, then put them into a brisk but steady oven to bake for an hour or an hour and a quarter, according as the heat of the oven might be moderate or great.

Whilst I was putting the tins into the oven, May's face and hands became plastered all over with flour and wet dough. She could not possibly have presented a more ridiculous, or laughable, figure if she had meant to do so. Her face was one mass! As fast as she rubbed off one patch with her sticky fingers, she stuck on two or three others on other parts of her face. All the while she looked so much in earnest; so pleased, and yet so troubled; so red with vexation, and so obstinate in still "helping", as she called it, that every girl in the room except herself was shaking her sides with laughter.

A CAKE.

The next time the cooking lessons were taken up, Mrs. Meredith said she would teach us how to make and bake a cake, as we had already made and baked bread.

"You can begin this morning's work, Ida," she said, "by breaking the eggs. Break one at a time only, so that, if one of them should be bad, you may be able to put it aside at once and not mix it up with several good ones, and so spoil them all. Put

the white into this cup, and the yellow into that one."

When enough eggs had been broken, and fortunately no bad ones found, I took the egg-whisk and beat them up in a basin. They were to be used in the cake instead of yeast, to make it rise.

Whilst I was doing this—and it took me a long time to do it thoroughly, and make it all light, frothy, and full of air-bubbles—another girl was called out to pound the lump sugar, and sift it through a fine sieve.

Whilst one girl was getting the sugar ready, another was called out of the class to the front, to do the same with the currants. She was taught how to wash and pick them, how to dry them by rubbing them in a cloth, and told to be careful, above all, to pick out any grit, or little bits of stone, there might be in them. The currants were then put in front of the fire to dry.

As I had beaten up the eggs, I was now told to beat up the butter into a soft cream-like mixture. When this was done the materials were all ready, so we proceeded to build up our cake.

It contained three pounds of flour, and six ounces each of butter, sugar, and currants; with half-an-ounce of powdered allspice and a pint of new milk. There was also an ounce of yeast added, mixed with a little of the milk.

We first warmed the milk, then mixed together the flour and butter, adding the sugar, currants, all-

spice, and milk, and mixed the whole into a dough, which one of the girls and myself then took turns at kneading. Finally, we put it into a large buttered baking-tin, which we placed near the fire to make the contents rise. After it had baked in the oven for an hour and a quarter I put a skewer into it, to test whether the cake was sufficiently done. As the skewer came out quite clean, without any dough sticking to it, I knew it was baked just right; and so our cake was ready.

LIGHT AND SHORT.

“Now what is there,” I asked of May the next Cooking morning, “what is there which you like very much, that is ‘light and short’?”

“Get out your little patty-pans,” I continued, without waiting for an answer. “I will show you how to make it.

“Show me first your fingers, that I may see whether they are quite clean in the nails, and all right. Yes! they will do!

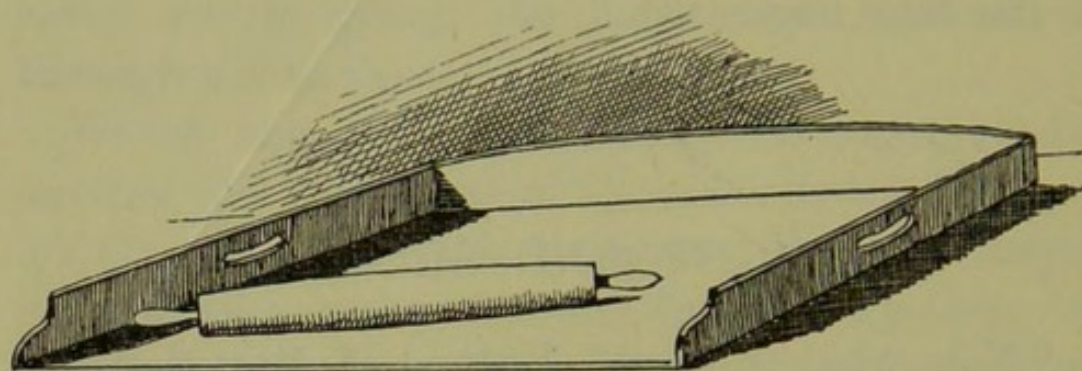
“Now you are to use the tips of your fingers as nimbly and lightly as you do the tips of your toes in the morning, when you are late, and steal into my bed-room to see what o’clock it is.

“If you rub the butter into the flour with a heavy hand, of course you will make the paste

heavy. Then it will not be short and light, will it?

“And see, too, that all the tools you use are as clean as your hands, and do not use a knife to cut the paste with after it has been already used for spreading out jam, as you are now doing.

“And, pray, do not use that other knife in the paste at all; it has already served to cut up a raw onion. Run out with it into the scullery; and get



Baking Board and Rolling-pin.

it out of the way, for fear you make a mistake and spoil all the day's pastry with it.

“Now here is some flour for you to make a crust for a little meat-pie. Rub the dripping lightly into the flour with those nimble fingers of yours. Now put in a pinch of salt, and a little baking-powder to make the paste rise; and give it enough cold water to make it stiff.

“There is a board floured for you, so that the paste will not stick to it. Now roll out the paste with the rolling-pin! That's capital!

“I will wet the edge of the pie-dish, to prevent the paste from sticking to it in the baking. And

you shall yourself put on the rim of the pie, and neatly trim round the edges.

"You had better let me fill the pie, and put the counterpane on the bed: that is the top crust on the pie, of course! But you may make a hole in the top of the crust to let out the steam, as I know you are fond of using a knife. Now it is ready for the oven, and the oven is ready for it. These two are not always ready together, are they, Mary?"

But Mary did not answer! She turned as red as a peony. She remembered that one day her pie had come out quite black in the crust, and that another day the meat inside her pie came out almost raw.

"Oh, please, Ida," interrupted May, "let us make some pancakes; that is the kind of paste I like best."

I had thought she would ask for these; and so had prepared a basinful of the raw material ready to hand.

"Yes, and very much indeed like paste it looks," said I, pouring out a cupful into the frying-pan of hot fat. "Now get your little bread-basket ready, for I am going to give you one of these hot from the pan, and not wait till dinner-time before doing so. It will not spoil your dinner, will it?" I asked, pretending to be very anxious on this point.

"Not at all," replied she. And indeed, judging from what she ate of the pancakes for her dinner afterwards, I could not think that she had lost her appetite.

THE COOKING OF STARCH FOODS.

The next day Mrs. Meredith said, "I mean this morning to show you how to cook some starchy foods beside those you have already had in your previous lessons.

"First, I will show you how to make a dish of **savoury rice**. For this we shall require two ounces of rice, an onion, an ounce of strong cheese (grated), a pint of stock, and a little pepper and salt.

"To make this dish of savoury rice we first wash, peel, and chop the onion. We then wash the rice well in cold water, put it into a sauce-pan with the stock and onion, bring it to the boil, and let it simmer gently for one hour. We next grate the cheese on a coarse grater, add it to the rice and stock, and let all simmer together for another hour. We add lastly the pepper and salt, and serve the rice on a dish or soup plate. This is a very good dish, especially for supper. It costs very little, and contains much nourishment, as the rice has heat-giving, and the cheese flesh-forming properties.

"Next we will make a dish of **macaroni**. Macaroni is a dried paste made of flour and water. It is chiefly manufactured in Italy, where it is a favourite food. As it is made of flour it is, of course, very nourishing; but it is not so much eaten in this country as it should be. It is an excellent variety of food, and can be used both for sweet

and savoury dishes. For our dish we shall require the following ingredients:

“A quarter of a pound of macaroni, one pint of stock, half an ounce of butter, a large dessert-spoonful of flour, and a little pepper, salt, and ketchup. We first wash the macaroni in cold water, but do not let it remain in the water long. Then we put it into a sauce-pan with a pint of nicely flavoured stock, and let it come to the boil, and then simmer for an hour. We mix the flour and butter in a basin with a wooden spoon till they form a firm paste. We then mix them gradually with a little of the boiling stock in which the macaroni is simmering, and add the mixture to the macaroni. Next we bring it to the boil, and let it simmer for a quarter of an hour; then add pepper and salt and a teaspoonful of ketchup. We serve the macaroni with gravy in a dish.

“Another very simple starchy food is made out of **Indian corn** or **maize** prepared and sold under the name of **corn-flour**. This is a starchy food resembling arrow-root. It is chiefly grown in the warmer parts of America, and round the shores of the Mediterranean.

“Maize is a very handsome plant. It grows ordinarily from eight to twelve feet in height, and bears thick ears which are generally several inches long. It grows best in warm countries, where the fields of maize form a striking feature in the landscape; our English summers are too cold for it. Maize is

a plant of the greatest value; its ears yield various kinds of food, both for man and beast; and the dried husks of the corn are used as fodder for cattle; they also make clean, comfortable mattresses. Maize contains more oily or fatty matter than almost any

other vegetable used for food, and is very nourishing.

“We make a corn-flour mould from a batter of the flour and milk, with a little sugar and flavouring added. The whole is boiled for about four minutes, and then poured into a mould to cool and set.

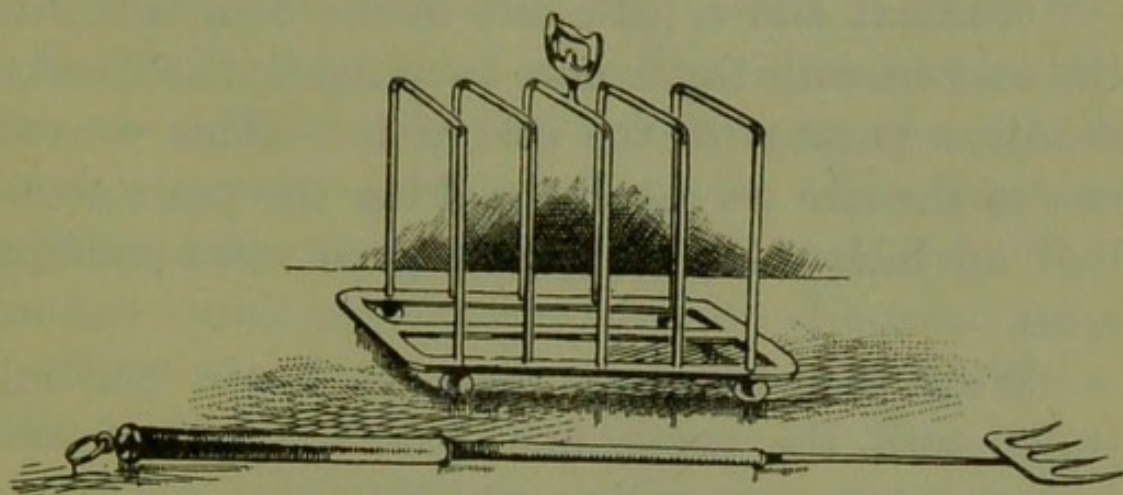
“In addition to the preceding we have a starchy food that is cooked already, but which we cook



Maize or Indian Corn.

a second time. I mean **toast**. Almost every one thinks she can make toast, and yet we rarely find toast really well made. To make it properly we cut some slices from a stale loaf. The slices should not be thick, except when we wish to use them for putting under poached eggs or bacon, in which cases thick toast is the best. We must be careful that the

fire is bright and clear. We put a slice of bread on a toasting fork, and hold it near the fire till it is evenly brown and crisp; then turn it on the other side and do the same. When the toast is done we put it into a toast rack, or lean it against something, or two slices against each other; but we do not



Toasting Fork and Rack.

lay it down flat, or it becomes flabby. Toast should never be made long before it is required, as it spoils if kept standing.”

KIDNEY PUDDING AND COTTAGE PIE.

In her next lecture, Mrs. Meredith returned to meat foods.

“A very appetizing kind of meat pudding,” she began, “under the name of kidney pudding is made from beef kidney and steak. We take three quarters of a pound of the former to half a pound of the latter. For the paste we take half a pound of flour

to a quarter of a pound of suet. I shall have something to tell you about suet before the morning's work is finished. First we remove the skin from the suet, and chop the suet very fine, flouring the knife and board so that the suet may not stick to them.

“ We next add a little salt to the flour, and rub the suet in with the fingers very lightly, and make it into a paste with the cold water. This we roll out to the size we require, making the paste about half an inch thick, to give a good meat-pudding crust.

“ When this has been done we line a pudding basin with the paste, and put in the beef and kidney cut into rather small pieces. This is in order that the meat may be well done in the cooking.

“ We then add a seasoning of pepper and salt, and also a little water to make the gravy.

“ Lastly, we close up the pudding with paste, and let it boil for three hours at least, as all meat puddings require considerable time to cook, that the crust as well as the meat inside may be well done. This nice dish is comparatively cheap.

“ But we must not forget the humble peasant: here is a tit-bit for him in **cottage pie**. This dish may be made either of cold meat or Australian mutton. It is a very good dish in which to serve up warm any kind of cold meat.

“ For its ingredients we require half a pound of

cold meat, some potatoes, an onion, a few sprigs of parsley, some pepper and salt, and a little gravy. This is still less expensive if made of Australian meat. We first free the meat from all skin and gristle, chop it fine, and season it with pepper and salt. We then wash, peel, and chop the onion finely, and wash, dry, and chop the parsley. These are mixed with the cold meat, and the mixture is put into a pie dish. We add a little gravy; or, if we have no gravy, a little cold water. The whole is covered with mashed potatoes and baked for half an hour, until the potatoes are cooked brown.

“That was for the peasant’s dinner,” Mrs. Meredith remarked when she had done. “Now let us make him some porridge, a very nourishing food, which he will be glad of either for breakfast or for supper.

“To make this we require two large table-spoonfuls of oatmeal, half a teaspoonful of salt, and one pint of water. We boil the water in a sauce-pan, and add the salt. When the water is fully boiling we sprinkle the meal into it with the left hand, and with the right stir with a wooden spoon. When all the oatmeal is sprinkled in, we let it simmer for twenty minutes, stirring it often. We lastly pour it into soup plates or basins, and eat it with treacle, or with milk and sugar.

“In making our pastry,” Mrs. Meredith continued, “we have used suet several times as you may have noticed. Let me now tell you something about suet.

“Suet is that part of the fat of oxen, sheep, or calves, which is found in large quantities about the kidneys. Beef suet is chiefly used for cooking; it is richer and better than mutton suet, and less expensive than veal suet.

“We may keep any trimmings of fat from beef or mutton, and use them as suet for puddings or dumplings.

“Suet is a very useful food; it acts as a body-warmer, and as a force-producer. Fat is a food necessary to a healthy person. In cold countries the inhabitants eat a great deal of fat; it warms their bodies, and thus makes them able to bear the cold, and do more work. Some persons do not like fat, and cannot eat it in a simple state; but probably they could eat it in the form of a well-made suet pudding, and be none the worse for it.

“Now, by way of a change, we will finish with a little talk about the difference between the nourishment we get from eggs and that from starchy foods. Then I must show you how to poach an egg.

“An egg consists largely of albumen, which is nitrogenous or flesh-forming; it also contains some fatty matter useful in warming the body. But we do not find any starch in an egg. Starch, as you have learned, is a purely vegetable substance that takes the place in vegetables of the fat in animals, and which, when eaten, gives heat and force to the body. When animals eat starchy foods any part of them not consumed in warming and giving strength to

the body is finally changed into fat. This is why pigs fed on Indian corn meal get fat.

“An egg should not be boiled hard; long boiling hardens the albumen in the egg, and makes it indigestible. In poaching an egg we must be careful that the egg is fresh. We first break it carefully into a cup. We must have ready a shallow pan (a frying-pan or a stew-pan), containing boiling water, into which we slip the egg, taking care not to break the yolk. We let it remain in the boiling water on the fire for about three minutes and a half, until the white is nicely set. We then take it out with a fish-slice, set it on a cloth for a minute to let the water drain from it, and serve it on dry or buttered toast.

“Just to show you we are not thinking more about our appetites than others did in days gone by,” Mrs. Meredith said, “I will now recite a little extract of poetry from Sir Walter Scott—

“The fire, with well-dried logs supplied,
Went roaring up the chimney wide;
The huge hall-table's oaken face,
Scrubbed till it shone, the day to grace,
Bore then upon its massive board
No mark to part the squire and lord.
Then was brought in the lusty baron
By old blue-coated serving-man,
Then the grim boar's head frowned on high,
Crested with bays and rosemary.
Well can the green-garbed ranger tell

How, when, and where the monster fell;
 What dogs before his death he tore,
 And all the baiting of the boar.
 There the huge sirloin reeked; hard by
 Plum-porridge stood, and Christmas pie;
 Nor failed old Scotland to produce,
 At such high tide her savoury goose."

A LECTURE ON COOKING.*

ROASTING, BAKING, AND GRILLING.

For our next lesson Mrs. Meredith read to us a lecture she had herself heard. This, she said, went over much of the ground that had been already covered in her course, but in so clear and systematic a way that it would be useful for us to hear it.

"The perfect method of cooking meat consists, first, in heating strongly the mass until a thin layer of hardened substance is formed on its surface; and secondly, in subsequently lowering the temperature and subjecting the main body of the joint to a heat hardly greater than is needed to coagulate the albumen in it, viz. 160° or 170° F.

"We must proceed to examine in order these various cooking operations.

"ROASTING. By roasting, I understand the exposure of meat before a bright fire until it is

* J. Priestly, Esq. Reprinted by kind permission of Manchester and Salford Sanitary Association.

thoroughly cooked. It is applicable to the largest joints, even to the whole carcase of an ox.

“The skilful cook makes the fire bright and glowing, and sets the joint to hang close to the bars for the first ten or twelve minutes. In this time the outer layer of the meat is hardened sufficiently to retain most of the juices which might otherwise escape. Then the joint is removed to a greater distance, and even protected from the fierce glare by a sheet of greased paper folded about it. Here it is allowed to turn slowly in the lessened heat at a greater distance from the fire until the interior of the mass has been raised to nearly 180° F.

“Not all the juices are retained; some still escape as gravy; but the gravy from roasting meat is mainly the melted fat from the surface of the joint.

“We are roughly guided in fixing the duration of the roasting by reckoning according to the weight of the joint—from fifteen to twenty minutes for every pound.

“It is evident that in the course of roasting the meat must lose weight; as a matter of fact it loses 20 to 35 per cent, the lost substance being chiefly water. A portion of the loss of weight is represented by the gravy which flows from the meat. This consists for the most part of melted fat from the surface of the joint, mixed with some, but a relatively small, proportion of water containing gelatine, saline matters, and certain tasty matters in solution.

“In the roasting of large joints use is made of this dripping or gravy for ‘basting’, which serves an important and interesting purpose. It has been said that the larger the joint, the longer the time which must be devoted to the roasting of it, and the longer the meat must be exposed to the heat of the fire. This must be—in fact, until in the case of very large joints, the exposure would, but for the basting, be so prolonged as to cause absolute charring of the surface. This is prevented by basting, the fierce heat of the fire being in this manner diverted from the meat and absorbed in the evaporation, or in the heating of the constituents of the dripping.

“Whence comes the agreeable flavour of roasted meat? This is not an easy question to answer in detail. The taste of meat cut from the interior of a joint differs from that of the richly browned surface parts. This difference is probably due to differences in the substances produced in the meat by the action of high and low temperatures. All that we can say is, that heat produces such changes in some of the constituents of meat, and that various pleasantly-flavoured and richly-coloured substances are generated.

“BAKING. The greatest change which has been effected in our methods of cooking since the beginning of this century has been the gradual substitution of baking for open roasting in the cooking of meat.

“In both cases the meat is cooked by means of radiant heat, proceeding, on the one hand, from the glowing coal, and on the other from the walls, top, and bottom of the oven.

“It is sometimes maintained that baked meat is inferior in flavour and tenderness to roasted meat; and the inferiority has been ascribed to the confined air and want of ventilation in the oven.

“Some portion of the opinion must be set down to prejudice. The kernel of truth which the opinion does certainly possess depends, not so much on the question of ventilation, as on the temperature and rapidity of cooking. If in these respects the two methods be made equal their results will be the same. The effect of an unventilated oven is to keep the air of the oven moist, and to prevent to some extent the loss of water which the joint would otherwise sustain by evaporation. On the other hand, if ventilation be absolutely free and perfect, the meat will become dry instead of cooked, which, in open roasting, is only prevented by frequent basting.

THE LECTURE.—*Continued.*

“GRILLING. This may be defined as the open roasting of a joint which is so small that the whole mass of it is cooked in the few moments of violent heating needed to coagulate the external albumen. It is the method of cooking which demonstrates

most clearly the value of the preparatory stage of fierce heating for hindering the loss of juices.

“A well-grilled chop or steak is actually puffed out by the expansion of its interior juices and vapours which the outer case of hardened albumen restrains under considerable pressure. To secure this result it is necessary that the meat be held very close to the fire. If the chop or steak has to be raised frequently, to prevent its becoming ‘smoked’,—the usual fate of a chop cooked on a common fire by an unskilled cook—the juices drain away before the protective surface is formed, and the meat becomes shrivelled and dry.”

BOILING.

The lecturer next proceeded to deal with methods of cooking in which water is employed.

“BOILING. In this method of cooking, the heat is applied to the meat by contact with boiling water. Water boils when its temperature reaches 212° F.; and, however much longer it is heated, the temperature in ordinary conditions never goes higher.

“Whether a pot be simmering, or be briskly boiling, the temperature of the water it contains remains the same, viz. 212° F. The only difference between the two from the point of view of the cook, is that of mechanical agitation, which in the briskly boiling water is greater and more destructive of loosely compacted meats (such as fish), than in water which simmers.

“The principles of boiling resemble those of roasting exactly. The temperature of boiling water, 212° F., is far above that which is necessary to coagulate albumen to a hard mass, that result being obtained at a temperature of 170° F. The first step, therefore, should be, to plunge the meat into water already boiling, so that the outer face of the joint may become encased with the often mentioned protective layer.

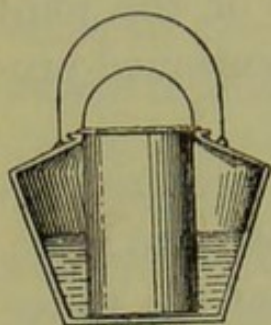
“To secure this result, an obvious provision is necessary. The joint of meat should not be so large, compared with the volume of water, that the water is suddenly cooled below 170° F., by the immersion into it of a large cold mass. Otherwise, before the water can again be brought to the boil, time is given for the solution and loss of valuable meat juices.

“When once the protective coat is formed, the water should be allowed to fall from the boiling point to a degree approaching 170° F., at which temperature the main bulk of the meat should be cooked. This is usually effected by withdrawing the pan from the centre of the fire, and allowing it to stand with a small portion of its side exposed to the heat. Experience alone can teach us where the pot should stand to give the proper degree of heat.

“It will be evident that for all objects of cooking by boiling—except the production of the hardened outer layer—a temperature much below that of boiling water is all that is necessary—indeed, this is all that is permissible. The danger of exceeding the

happy mean temperature at which the fibres soften, and the coagulated albumen remains tender and not shrivelled, has led to the use of the so-called *water-bath* in many operations of cooking.

“The water-bath is best illustrated by the joiner’s glue-pot, where an inner vessel to contain the glue is suspended in an outer vessel containing water. The outer vessel is placed over the fire; and as the water it contains is brought to the boil, it communicates heat to the inner vessel. If the latter contained



Section of Glue-pot.

were made to boil, that in the inner vessel would remain at a temperature below that of boiling water.

“Fragments of meat, and so forth, may therefore be allowed, not, indeed, to ‘boil’, but to cook for an indefinite period without incessant watching.”

THE LECTURE.—*Continued.*

We were all very much pleased when the next day arrived for Mrs. Meredith to continue the lecture on Cookery.

“FRYING. This is the weak point of British cookery. Frying is done—as all the world knows—in a frying-pan, and this is the least adapted to the purpose of all the implements of the kitchen.

“Let us consider the essentials of frying. As in boiling we endeavour to conduct heat to the cooking meat by means of water, so in frying the object is to conduct heat by means of hot oil.

“Why do we desire to have a fluid medium other than water? Why cannot we use water for the purpose of frying? Because we cannot raise water above the temperature of 212° F.; and because we want, in frying, to subject our meat to a temperature more nearly approaching that at which roasting is conducted. Many fixed oils, such as lard, dripping, or butter, may be raised to nearly 400° F. without suffering decomposition. In these hot fluids we have a means of cooking meats in such a manner as to form most perfectly the necessary protective layer, and at the same time to generate the products so pleasant in the taste of roasted meat.

“It is evident, then, that the particular kind of oil is of little or no consequence to the operation of frying, so long as it imparts no flavour of its own to the meats cooked in it. We can, therefore, appreciate the senseless extravagance of insisting on the use of butter, or costly meat fats, in frying.

“Most cooks have a dim notion that the fat for frying is used to impart a flavour, or a quality of richness, to the meat, or fish. Therefore ‘wholesome’ butter, or beef and mutton dripping, is used; and therefore, again, as these are costly, a shallow pan is employed to economize the fat. And so we see the cook placing a fish, or cutlet, in a thin film

of fat, frying one side, and then turning it over in order to cook the other side. Thus time is lost, and not only the escape of the juices of the meat is allowed, but also the supersaturation of the meat with fatty matter.

“The proper frying-pan is a deep metal pan, capable of holding a layer of fat two or three inches thick. The best oil to use is the cheapest of those which are tasteless, and impart no flavour to the substance immersed in them. Several vegetable oils may now be bought, uniting in themselves cheapness and tastelessness; for example, cotton-seed oil and palm oil.

“The same temperature is not equally suited to all meats. Some require a fiercer heat than others; but it is important that, having determined what degree of heat is best, we should see that the oil has reached this temperature, before we immerse in it the substance we wish to cook. A rough test is the following:—Throw into the heated oil a piece of bread-crumbs the size of a filbert nut. If this becomes browned in one minute the oil has a temperature of moderate degree; if in half a minute, it has as high a temperature as any we are likely to require for cooking purposes.

“STEAMING. When we put meat into boiling water, it is of necessity subjected to a great agitation. This is of little consequence in the case of joints of meat. But in the case of the looser flesh of fish, especially when cut into fish steaks, much

damage and loss of nutritive juices may ensue from it.

“To prevent this, we may raise the delicate meat upon a platform stand over a layer of water in a carefully closed vessel. On placing the vessel over the fire, the water is rapidly boiled, and the fish enveloped in an atmosphere of steam, having a temperature sufficient to cook it well.

“**BROTHS, SOUPS.** We must now speak of a totally different mode of cooking, one in which the main object is to extract as much nourishment as possible from meat by means of water. In carrying on this method of cookery we must bear in mind that, once coagulated by heat, albuminous matters are insoluble in water, while much albumen is soluble in cold water.

“Soups, broths, &c., made by prolonged boiling, or ‘simmering’, of finely minced meats, contain the least possible quantity of albuminous matter, and have therefore, so far as nutritive matters are concerned, very small value among foods. They contain, indeed, the saline matters of meat, and stimulating properties like those of tea and coffee. In virtue of these constituents they are most useful and refreshing; but they contain little of the substances from which tissues are built up, or repaired.

“If, however, minced beef, &c., be mixed with cold water, and stirred up from time to time during twelve or twenty-four hours; and if then the fluid portion be poured off and gently warmed until it

is hot enough to be palatable, we obtain a beef-tea, not so pleasantly sapid as that we have been accustomed to, but one containing about as much nutritious albuminous matter, it is said, as milk."

CONCLUSION OF THE LECTURE.

The next day Mrs. Meredith brought the reading of the lecture on Cookery to a conclusion.

"**STEWING.** The last method of cooking that we shall discuss is one the resources of which are not by any means fully understood in England. The object is to cook by the prolonged action of water at a moderate heat. Here the water is allowed to extract what soluble nutritive matters it can, with the intent that they shall be served up along with the solid meat as a gravy or soup, enriched by vegetables, &c.

"The water-bath before described here finds its most important use. The primary object of stewing is to ensure the cooking of meat at a temperature below that at which the albuminous matters are shrivelled and hardened. This method will be intelligible from what has already been said of the water-bath.

"**VEGETABLES.** The cooking of vegetables is a matter far simpler than that of animal food. Let us take a potato as a familiar and typical vegetable food. If you take a thin slice of raw potato you

will find that it has the following visible structure. The interior yellowish-white mass is made up of an immense number of cavities, or cells, like little boxes, packed neatly together, and filled to overflowing with curious oval bodies.

“These oval bodies are granules of starch. If we look at them under a high power of the microscope, we find that they are marked by lines, like the shell of an oyster.

“It is upon starch granules like these that the nutritive value of nearly all vegetables depends. The substance of which the cell walls is composed is called cellulose; and this, in one form or another, is an element present in all vegetables used as food.

“Albuminous matter and fat are only present in small traces. Starch is the important ingredient; and the whole process of the cookery of vegetables has reference to the alteration of starch.

“What is it that occurs when starch is heated in contact with water? If you shred a raw potato into slices, and shake them up in water, you will notice that the water becomes milky. On standing, a layer of white particles is deposited, which on inspection prove to be the granules of starch.

“Before starch can be used as food its granules must be expanded and burst; and the cooking of vegetables has this as its prime object. Besides this object, however, there is the secondary one of making more succulent, and easy to be ruptured, the cellulose walls in which the starch is packed. This

also is effected by moist heat. Boiling water acts better than water less hot; and a higher temperature than the boiling point would be still better.

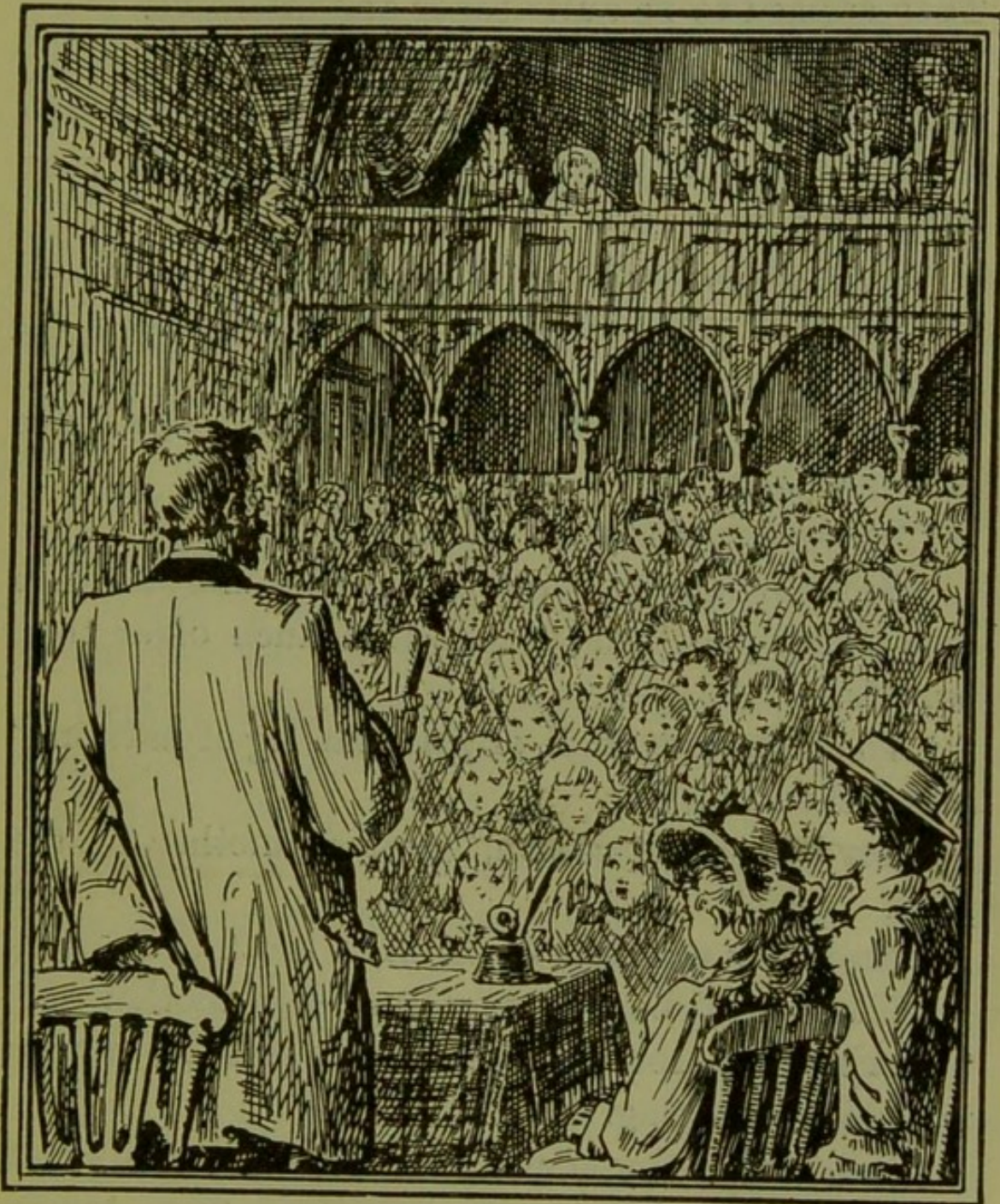
“As in the cooking of animal tissues, so here also, the skilful cook seeks to attain the softening and preparation of the food with the least possible loss in the process. As a matter of practice, potatoes may be cooked in almost as many ways as beef—viz., by roasting, baking, boiling, frying, steaming, and stewing. But other vegetables have a more limited range; and boiling may be said to be the proper method of cooking them. The water in which they are boiled should be salted, in order to prevent, as far as possible, the loss of saline matters, which form a most valuable constituent of many vegetables.

“Potatoes should be cooked in their skins for the same reason; and it is for the same reason, too, that steaming is to be preferred to boiling in the case of this invaluable food. It may be added, that when potatoes are roasted, or fried, much of their starch is converted into a substance named *dextrine*, which gives them in those conditions their pleasant peculiar flavour.”

AN OUTING.

A week ago the matron had asked us whether we would like to hear an examination in Domestic Economy, at the new school facing the common.

The School Inspector was coming down, she said, to see how the girls were getting on with their



Cooking lessons. Perhaps we might pick up for ourselves a few crumbs of knowledge if we attended. Of course we were glad to go, and soon we were all ready to start upon our visit.

On going into the school we found the girls seated, neat and prim, in the desks in front of the Inspector. They seemed to be quite eager and attentive.

Almost before the Inspector could put his questions, the clever ones were ready with answers, and their hands shot up into the air as if they were doing drill.

"Now, girls," he said, "I want you to tell me all the different ways in which you could cook a leg of mutton."

"Boil it! Roast it! Bake it!" cried one voice after another.

"But why not fry it?" he asked.

"Because it would not get done quite through in a frying-pan," said a girl not much older than our May.

"Then why not broil, or grill, the leg of mutton?" asked the Inspector.

"For the same reason," replied another of the girls.

"And why not stew it, or make broth of it?"

"That would be too expensive," said another girl; "cheaper and coarser joints than legs of mutton will do for stewing."

"But how will you make the cheaper and coarser joints tender? Or do you like your meat tough, with something to bite, like leather?" asked the examiner.

"I do not," said one girl with great decision, as if she had fully made up her mind on this im-

portant point. "And when tough meat has simmered for a long time, it becomes tender."

"And of what must you take care when you are simmering meat?" inquired the examiner.

"Not to let the water gallop," said a great round-faced lass, who evidently said what she meant.

The Inspector laughed a little to himself at her bluntness. Then he said, "Yes; we must not boil the water hard, or we shall boil the meat hard too.

"But of all these ways in which you say you could cook a leg of mutton which is the best?"

"I like roasting best," replied a girl, "because roast meat has the nicest flavour."

"I like boiling best," replied another, "because boiled meat is the most tender. But it is not so nice cold next day as roast meat."

"And I like a leg of mutton baked best, because you can have such a nice lot of potatoes baked in the tin under it," said a third girl, with a mouth watering at the thought of such a dainty dish.

"But why not eat the leg of mutton raw, and save all the labour and expense of cooking it?" asked the Inspector.

"Please, sir, teacher has not told us that!" said one girl, looking up into her teacher's face rather shyly and slyly.

"Of course not," cheerily replied the examiner.

“Teacher does not tell you everything! That is a question for you to find out the answer for yourselves. I like to give a question like that now and again, to make you think. I do not want you merely to *remember* everything; but to reason and think out some things for yourselves. Now, who is going to try?”

Then one little hand was timidly put up, and the owner was told to speak aloud as if she were the town-crier, for she was known to be a whisperer.

“Because it would not be nice,” she said.

“Quite right,” replied the Inspector. “Only, perhaps, we might rather say that the flavour is improved by cooking; and that the meat is made more tender, and more easily digested.

“And now you have all done very well. I hope you will do as well at your dinner tables, and find the food there also nicely flavoured, and tender, and easily digested.”

THE END.

To-morrow we all go away to spend our Christmas holidays. None of us has either a father or a mother to welcome her home; but most of us have an uncle or an aunt, and some have both of these to receive them.

Those of us that return here will have very dif-

ferent work to do from what we have done this year. But many of us are now going out to earn our own living, or to help our relations. Those that come back will be taught how to become Young Nurses; and to assist in a sick-room.

I am quite sure we have all been very happy here. I was saying so for myself this morning, when May cried out;—"I think I am the happiest of the lot; for there is my Uncle Tom yonder, with dear Rover close behind at his heels."

On looking up, I saw him coming up the slope towards Victoria Haven. Then I heard him shout out cheerily, "Here I am once more, May! Returned like a bad shilling! I think I shall have to call this ship 'The Sailor's Home'."

"It is your home at any rate," said the matron, coming down the garden walk, to welcome her brother-in-law.

"Can you give me a berth for the Christmas holiday?" the new-comer asked, shaking hands with the matron.

"Yes, and till the next Christmas; and the next after that," she replied.

"Nay, nay," replied the bronzed Uncle Tom, now promoted to be Captain instead of mate,

*"With men
Duty comes first, and pleasure then!"*

And so my task is ended! I, too, Ida Morton,

late of Victoria Haven, in a few hours shall have quitted this haven of rest. But I shall not be happy unless I come back to it again from time to time, if it is only to thank the dear matron for her loving care!

SUMMARY.¹

PART I.—THE DWELLING.

The Site.

The best site for a house is on a **pervious** or **permeable** soil which allows *rain*, *ground-water*, and *drainage* to pass away rapidly. Such sites are obtainable chiefly over hard rocks like granite, sandstone, and limestone; or on gravelly and sandy soils.

Impervious or **impermeable** ground soon becomes waterlogged, and does not form good sites, as it retains moisture.

Equally objectionable, because of the danger of *infection*, are sites on **made-ground**, on which *rubbish* containing *organic refuse* has been deposited.

Foundations.

The foundations of a house should be laid well into the site in *trenches*, the ground being well *drained* to carry off any water from rain-spouts, &c. The bottom layer of the walls should be of **concrete**; and a **damp-proof course** of *blue bricks*, *slate*, or other *impervious* material, should be built in just above the level of the ground.

Aspect.

Wherever possible, the house should face one of the directions in which the sun shines at some part of the day; that is, it should never face the *north*, if it can be avoided. The best aspect is a *south* or a *south-west* one.

Surroundings.

A healthy house must be ventilated *outside* as well as inside. That is, it should be **detached** if possible; if not detached, it should be **semi-detached**; if this too is impossible, it should, at least, not

¹ In addition to a resumé of the subject matter in the text of the reading lessons, such other items have been added in the Summary as will render it sufficient for teaching Domestic Economy as a Class Subject.

be **back-to-back** with another house, with no ventilating space between them.

In the country a house should not be too much shaded from the sun by *trees*, otherwise the walls remain damp after rain.

Fresh Air.

There should be free currents of air about a house. There should be iron grids in the walls to allow of air circulating freely under the floors to prevent dry rot in the timbers.

Artificial Lighting.

Artificial lighting is generally effected by means of **candles**, **lamps**, or **coal gas**. In all these methods the result of the combustion is the production of carbonic acid, a poisonous gas. This gas is also given off by the human lungs in breathing. A good oil lamp, or two sperm candles, or one gas burner, consumes, in a given time, as much air in this way as six men.

One good gas burner is better than several small ones.

Petroleum oil is the cheapest of these illuminants; gas is next; candles are dearest.

Electric light is now sometimes used in large houses and public buildings. It gives a splendid light, does not vitiate the air, but needs special fittings, and is expensive.

Gas escapes are very dangerous, and should be seen to at once. Many cases have occurred of individuals, and even whole families, being suffocated in sleep by an escape of coal gas.

Warming the Dwelling.

The various means of heating the dwelling include the following:—

- | | |
|--|----------------------------------|
| (1) The open fire, heating chiefly by radiation. | |
| (2) The close stove, | } heating chiefly by convection. |
| (3) Hot water pipes, | |
| (4) Hot air pipes, | |
| (5) Gas stove, | |

The **open fire** is the more *pleasant* and cheerful. It also carries off the *products of combustion* up the chimney. It assists ventilation by drawing fresh air from the outside.

But it is *expensive*, because of the rapid consumption of fuel; the incomplete combustion of cinders; and because most of the heat goes at once up the chimney.

The **close stove** does not ventilate the room like an open fire. It even makes the air in it less fitted for respiration than it was before, by drying it, and by giving off a "stuffy smell", due to the gaseous products of combustion escaping from the inside, and to the charring of dust, &c., on the outside of the stove.

The **gas stove** is perhaps the least pleasant, and with it there is some danger of gas escaping into the room. Still, if properly looked after, the danger is slight, and a gas stove can be easily lighted and extinguished, and makes no dirt. It is, however, expensive.

Ventilation.

Reasons for Ventilation.—Human beings require fresh air to maintain them in health. We know that in *breathing* man uses up the *oxygen* of the air, and gives out *carbonic acid*, a poisonous gas; but he also gives out from the lungs, besides carbonic acid, poisonous organic matter, and a certain amount of hurtful organic matter is given off by the skin. We know also that air is consumed by lighted candles, lamps and gas, and by fires. So that if we are to maintain our health it is evident we must provide means for the air in our houses and rooms being renewed.

Now it has been found that 10,000 cubic feet of air are required by a healthy person every hour. Consequently a person living in a room 10 feet long, 10 feet high, and 10 feet broad—that is, containing 10,000 cubic feet of space filled with air—would require to have the whole of the air changed every hour.

Methods of Ventilation of Houses.—Opening windows at suitable times is very important, though it does not do away with the need of having some means of steadily and constantly renewing the air. The chimney, especially if the fire is on, is the best natural ventilator. The hot air flows up the chimney, thus creating a current, and fresh air gets in under the door, and between the window sashes. This takes place to some extent even when there is no fire. To secure thorough ventilation special means should be provided for admission of more fresh air than gets in under the door and between the window sashes; that is to say, a proper *inlet* for air must be provided as well as an *outlet*.

A. Inlet.—Convenient methods of securing a proper inlet are:—

(1) The window sash open at the top. If there are venetian blinds the current of cold air can be directed upwards by turning the slats upwards, thus preventing an unpleasant draught.

(2) A piece of wood, fitted tightly under the lower sash, furnishes an air space between upper and lower sashes (see pp. 37 and 52).

(3) Tobin's tubes (see p. 47).

B. Outlet.

(1) The best outlet is the chimney.

(2) A valve fitted into the chimney flue aids very much in the escape of foul air.

C. Inlet and Outlet Ventilators combined.

(1) Arnott's & Boyle's valve (see p. 45).

(2) M'Kinnell's ventilator (see p. 46).

Some General Rules on Ventilation.—Leave the bed-room window open at night; night air is not hurtful unless in very low-lying districts, but be sure the door is tight-fitting, else there is danger of draughts in the room.

After dressing in the morning, open the window wide, and throw the bed-clothes over the end of the bed so as to air the bed thoroughly.

Never close up the chimney. If there is a damper see that it is kept open.

Never ventilate a room from a *passage*; the air of which is most likely already foul.

Avoid, if possible, living in a house which is back-to-back with another house. In such a house the air cannot sweep freely through. Every house should have windows in both front and back.

A very high roof in a room, while by no means undesirable, does not help ventilation. The foul air, being hot, rises and fills the upper part of the room. The truth of this may be tested by placing a pair of high steps in the room and going to the top, when the higher air will be found to be hotter than the lower air.

Fresh Air in Cities.—The atmosphere of cities is rendered impure by the breath of the inhabitants, the smoke of fires, and smoke and foul gases and fumes from chimney-stalks of factories. Hence open air spaces, such as *squares* and *parks*, are of great importance for the health of the community. Plants absorb carbonic acid, so the more trees and shrubs there are about a city the better.

Water Supply.

Sources of Water Supply:—

- | | | |
|---|---|----------------------|
| 1. <i>Spring</i> water. | } | Generally wholesome. |
| 2. <i>Deep well</i> water. | | |
| 3. <i>Upland surface</i> water. | | |
| 4. <i>Lake</i> water. | | |
| 5. Stored <i>rain</i> water. | } | Doubtful. |
| 6. Surface water from <i>cultivated</i> land. | | |
| 7. <i>River</i> water contaminated with <i>sewage</i> . | } | Dangerous. |
| 8. <i>Shallow well</i> water. | | |

A supply of pure water is necessary to health. We need water as food, and also for the cleaning of our *persons, clothing, and dwellings*. Water forms part of our tissues, and helps the removal of waste from our bodies.

The following are the most common circumstances in which water is contaminated with sewage:—

(1) When drainage from a higher level drains towards a lower lying district, and so into the wells.

(2) When the drainage is imperfect, and the sewage leaks into the subsoil, and thence into the wells.

(3) When drainage (as is too often the case) empties into a river or stream, the water of which is used for drinking.

(4) When there is no proper sewage system, but only a system of cesspools, so that impurities accumulate in the soil, and penetrate into the wells.

Hard and Soft Water.—Spring water is usually *hard* owing to the lime and other mineral substances it contains. Rain water is *soft*. Hard water curdles soap, and does not make soap-suds, and so is not suitable for washing. If lime in the water be the cause of the *hardness*, boiling will get rid of it, and deposit it on the sides of the boiler, which is then said to be *furred*.

Purity of Drinking Water.

Impurities in water may be either animal or vegetable; those of animal origin being the more dangerous. "Pure water should be free from smell and have no definite taste." The presence of organic impurities can be tested with Condyl's Fluid, a pink fluid which loses its colour when poured into water contaminated with organic matter.

When drinking water becomes polluted with **sewage**, and especially with sewage contaminated by the discharges from typhoid or diphtheritic patients, it may give rise to outbreaks of typhoid fever or diphtheria.

In country districts there is much danger of such occurrence:

- (1) Where the soil around wells has become *soaked with sewage*.
- (2) Where the water of *brooks polluted with sewage* has been used for drinking purposes, or for rinsing milk cans.

Waterworks water is generally pure.

Safeguard against Lead Poisoning.—Draw off a bucket of water for scrubbing purposes every morning, before drawing off any for drinking, so that the water drunk may not be that which has remained in the pipes all night.

Storage of Water.

(a) It is sometimes necessary to store water in **cisterns**.

The best material for making cisterns is *slate*; *stone* or *brick* cisterns lined with *cement* are also good; galvanized iron is unobjectionable; wood is bad; zinc is quite suitable; lead cisterns are much used: until the lead becomes tarnished it is soluble by the water, and there is some risk of lead poisoning, but once tarnished there is no more danger, as the tarnished surface protects the lead.

(b) The drinking water cistern should not supply the water-closet, to avoid risk of sewer gas reaching the cistern through the supply-pipe of the closet.

If a house has been shut up the water should be run off from the cistern before being used for drinking. Cisterns should be cleaned out once a year. Lead cisterns should be scrubbed, but not so hard as to remove the tarnish.

Removal of Waste.

The Dust-bin.—Wooden and brick dust-bins are not healthy; they absorb, and subsequently give out objectionable odours. A zinc or galvanized iron box or pail, with a cover, is best. *Position:* The dust-bin should not be placed under the window, nor near the house door.

Animal and vegetable substances, when in a state of decay, give off noxious gases; therefore such waste as vegetable parings, apple peelings, fish bones, &c., should not be put into the dust-bin; neither should waste paper nor old paper boxes.

Cleanliness of the Dwelling.

(a) The two great natural purifiers are pure water and fresh air. These sweep away impurities. The great *artificial* cleansing agent is soap, which renders greasy matters soluble. Rooms should be cleaned regularly by a free application of soap and water.

Carpets should be frequently shaken; *curtains* should not touch the ground; *dust* should be removed from all corners. *Infection is spread by dust; cholera and diarrhœa are nourished by filth; consumption, diphtheria, and typhoid fever are favoured by overcrowding.*

Soiled linen should at once be removed from the bed-room. *Clothes* worn during the day should be hung up at night, and not spread on the bed. All slops should be thrown away immediately, and the drains kept well flushed.

(b) **Disinfectants for Drains.**—Two ounces of chloride of lime to one gallon of water, or one ounce of permanganate of potash to three pints of water (a solution of the same properties as Condyl's Fluid) are useful disinfectants.

(c) **To Keep the Sink Clean.**—Pour down a pailful of boiling water and soda once or twice a week, and flush with cold water.

(d) **To Keep the Water-closet Clean.**—Pull the handle long enough to allow a sufficient rush of water to remove all obstructions at once. Cleanse the pan weekly. Should there be a stoppage, a long bending cane will generally remove obstructions—a stick is of no use. A water-closet should never be placed in the middle of a house, but should always be where it can have a window to the outside.

(e) **Moisture hastens Decay.**—No liquid should be mixed with the contents of the dust-bin, and the cover should be kept on. **Cinders** should either be sifted, or picked out of the ashes, and used again. With dust and ashes only in the bin, a removal once a week is all that is necessary.

Animal and vegetable waste should be burnt. If vegetable waste be burnt on an open fire without drying, it smells disagreeably. Instead of this,

(1) It can be either placed in the hot ashes at night, and left until morning, when it will be dry, so that it will then burn briskly in a quick fire; or,

(2) It may be placed under the grate during the day, and well

covered with ashes. In the evening it will then be ready to burn as fuel without smell.

Refuse bones should be burnt.

Drainage.

Drains are used for the removal of **waste** from the house. The following points should receive attention in building:

(1) No drain pipe should be carried from the inside of the house *direct to the sewer*, but should be *trapped*.

(2) The house drain should be *trapped* by a ventilating trap placed between the house and main sewer. This is very important.

(3) All drains, and the soil pipe, should be carried into the ground *outside* the house.

(4) The *rain-water pipe* should not be used for ventilating the soil pipe.

(5) If the water-closet is inside the house, a long ventilating pipe should run from where the soil pipe ends in the water-closet, to the outside of the house, *above the roof*. Foul air will then go up the pipe instead of entering the house.

(6) All waste pipes—such as the sink pipe, the bath-room pipe, and overflow pipes—should open over a *trapped drain*, and not be connected **directly** with the drains.

Drains must be kept clean, and free from **obstructions**. They should be cleaned weekly, the receptacle emptied of refuse and cleansed, and the covers replaced. Traps should be always filled with clean water, and not with whatever was last put down the drain. When dirty water is emptied, remember to cleanse and sweeten the drain by flushing with water. Shreds of flannel, pieces of soap, and hair getting into the pipes stop them up; the sink pipe is specially liable to obstruction in this way. Care should therefore be taken to avoid putting solid matters down any of the waste pipes.

Drains may Leak.—If a drain leaks the leak may be detected by passing the finger along the outside of the pipe, when a draught of the escaping gas will be felt at the leak; or a lighted candle passed along the outside of the pipe will have the flame blown aside when opposite the leak. If a leak be suspected, pour into the drains, from as high a point as possible—down the water-closet, if it is in the house—some strong-smelling liquid (carbolic acid, or

oil of peppermint). If the smell comes out into the living-rooms, be sure **sewer-gas** will come too, and the sanitary inspector should be sent for.

Rats may come into the house from the drains; if so, there must be a hole in the drain somewhere, which should be discovered and properly stopped. If there is a faint, nasty smell when the house has been shut up, there is probably a leak in the drains. This should be remedied.

Escaping Gas.—Not uncommonly the smell of a gas escape is mistaken for the foul smell from a leak in the drain.

PART II.—PREPARATION OF FOOD.

Cooking.

Cooking is employed to make food fit to **repair** and **strengthen** the body. It in all cases involves the application of heat.

In a certain degree the heat of the sun may be said, in some instances, to cook food, as in the *ripening* of fruits, *drying* of meat, fish, and fruits (jerked beef, dried herrings and haddocks, dried apricots, &c.).

We cook foods for one or more of the following purposes:—

- (1) To *soften* them, and thereby make them more **digestible**; as in the case of starchy foods, coarse joints of meat, &c.
- (2) To improve the *flavour*; as in the case of roasted joints, boiled eggs, &c.

History of Cooking.

(1) The oldest method of cooking is the natural one of drying meats, fish, fruits, &c. in the sun.

(2) Among very primitive tribes *roasting* on a spit before a wood fire was practised.

(3) *Baking* in hot ashes probably next followed.

(4) *Boiling* in crude cooking vessels over a wood fire then succeeded.

(5) Lastly, came the use of less primitive *utensils*; pans for boiling, stewing, and frying; grills for broiling; ovens and stoves for baking, &c.

Methods of Cooking.

Soups.—These are made by stewing meat, fish, or vegetables; or both meat and vegetables together. The foundation of all good

soups is **stock**, made by simmering down meat, bones, scraps of animal food, &c., straining off the solid portions, and using the liquid gelatinous remainder.

Fish.—This is cooked in as many ways: by baking, boiling, frying, broiling; in fish puddings, fish cakes, &c.

The fish is first *washed* in cold water, and well *cleaned* (the scales, entrails, head, tail, fins, &c. being removed).

Fish is generally cooked by **wet frying**, in a large quantity of fat or oil.

Joints.—(a) **Roasting.**—This is done in the *air*, before an open fire, with *great heat*. The oxygen of the air develops certain flavours, making meat thus cooked more palatable than when cooked in any other way. Here the water contained in the roasting joint passes away when converted into steam by heat, and is not left to surround the joint.

Note.—In roasting, baking, frying, and grilling the important thing is to have the initial heat sufficient at once to coagulate the outside albumen of the meat, and thus form a skin to keep the juices of the meat from escaping.

(b) **Baking.**—This is done in a **closed oven**. If the oven is properly ventilated the result is practically the same as in roasting, but if the oven be ill-ventilated steam collects and the joint becomes sodden.

(c) **Boiling.**—This is done by *wet heat*, the joint being wholly covered with water, or else surrounded by water and steam. The meat, or fish, is put into boiling water at first, to **coagulate the albumen** on the outside, and thus make a *hardened coat* to keep in the juices in the rest of the joint. After this, it is **simmered** only, but for a *prolonged time*, to make the meat tender.

(d) **Stewing.**—This is allied to the preceding method; but there is **less water** used in it, and **less heat**. This is so because the liquor is part of the dish. The meat, being usually of coarse texture, requires a longer time to make it tender. Here the juices are *drawn out*, not kept in as in boiling. Stewing is an *economical* mode of cooking, as it requires only inexpensive joints; and all the juices are made use of as food. It also needs little *attention*.

(e) **Broiling, or Grilling.**—This is a kind of roasting; only it is done on a grill, or gridiron, *over* a clear fire, not *before* it.

As in stewing, *small* joints only can be thus cooked; but, unlike stewing, broiling requires *tender* and more expensive joints. Being

small, and the albumen on the outside being immediately set by the great heat employed, the cooking must be done rapidly, otherwise the joints will be rendered tough and indigestible.

One special method of broiling is done in a **Dutch oven** in front of the fire.

(*f*) **Frying**.—This requires **hot fat** as the medium of the *applied heat*. If only a small quantity be used, we call it **dry frying**; if much, **wet frying**. It is, like broiling, a useful method for small and tender joints, when time is an important consideration. But it requires, as in the former method, a *clear fire* and *constant attention* in order to prevent the toughening of the meat.

Vegetables.—These are mostly boiled, as they contain **starchy cells** and **woody fibres**, which require *bursting* with heat in the one case, and *softening* in the other. Unless this is done, the vegetables cannot be easily digested.

Pastry.—This is baked and boiled. The **flour** used in puddings, cakes, bread, tarts, and pies is mostly *starch*; and the heat employed is principally used to *rupture the starch cells* and to break down and soften the *cell walls*.

Kitchen Utensils

WITH THEIR USUAL PRICE.

	<i>s.</i>	<i>d.</i>		<i>s.</i>	<i>d.</i>
2 one-gallon iron sauce-pans	5	0	2 large iron spoons	0	8
1 three-pint sauce-pan	1	5	Scales and weights	15	0
1 quart sauce-pan	1	2	2 scrubbing-brushes	1	6
1 frying-pan (large)	1	2	2 vegetable brushes	0	4
1 <i>small frying-pan</i>	0	9	3 black-lead brushes	0	9
3 small bread tins	1	6	2 galvanized pails	3	8
1 Yorkshire pudding tin	0	10	1 knife-board	1	6
1 oval baking tin	0	8	3 wooden spoons (different sizes)	0	9
1 paste-board	3	0	6 knives	5	0
1 rolling-pin	0	6	2 forks	1	6
1 colander	2	6	3 teaspoons	0	9
1 <i>wire sieve</i>	2	6	3 large basins	2	6
1 dripping-pan	1	0	2 moderate sized basins	1	0
1 grater	0	4	3 small basins	0	9
$\frac{1}{2}$ pint measure	0	6	2 pie-dishes	0	10
1 <i>pint measure</i>	0	9	1 pudding basin	0	9
1 <i>flour dredger</i>	0	9	6 plates	1	0
1 <i>strainer</i>	1	4	3 dishes	1	6
1 <i>small fish-kettle</i>	5	6	2 jugs	0	10

The utensils which are given in italics are useful, but are not *necessary*

EXPLANATIONS OF THE MORE DIFFICULT WORDS AND PHRASES.

Page.

8. *par.* 5. **impervious soil**; clayey soil, soil that does not allow the rain to sink through it.
10. *par.* 1. **pervious soil**; gravelly soil, soil that lets the rain sink through it.
par. 4. **infectious disease**; a disease easily spread from one person to another.
12. *par.* 2. **elbowed in at the sides**; to have buildings coming quite close to your house on each side.
13. *par.* 4. **disheartened partner**; his wife, who was becoming discouraged by the difficulties they met with in house-hunting.
14. *par.* 3. **luring glare**; enticing and dazzling splendour.
Mammon's gilded honours; the showy but unreal respect paid to wealth.
15. *par.* 1. **where the purest thoughts will linger, confidence and love belong**; surroundings suggestive of peace and purity are the natural abode of trust and love.
par. 3. **practicable and reliable**; trustworthy, and able to be carried out.
16. *par.* 4. **decomposing**; separating into the elements of which they are made up.
infected with fever; people living in it, would be likely to take fever.
17. *par.* 1. **frontage towards the sun**; with a front, and therefore with most of the windows of the house, facing the south.
18. *par.* 1. **impervious to gases**; not allowing gases to pass through it.
22. *par.* 1. **fouled water-supply**; a supply of water that had been rendered impure.
par. 2. **a damp-proof course**; a layer through which the damp cannot pass upwards.
par. 4. **various items**; the different points or requirements.
par. 5. **but I shall want six, &c.**; it will take six months to build the house.

Page

24. *par.* 5. **ventilation**; the processes by which the used-up air of a room, &c., is carried off and fresh air introduced.
28. *par.* 4. **radiates**; sends out in all directions as from a centre.
30. *par.* 3. **ultimately**; at last.
par. 4. **illustrate the point**; to make it clear by an example.
31. *par.* 1. **injurious carbonic acid**; the presence of more than a very small amount of carbonic acid in the air renders it unfit for supporting animal life.
par. 2. **make its exit**; pass out.
32. *par.* 2. **products of that combustion**; substances formed when the oxygen of the air combines with the fuel.
33. *par.* 4. **'snuffed out'**; put out of use.
34. *par.* 2. **when gas, &c.**; when the electric light shall have taken the place of gas.
par. 3. **enkindled from above**; lit in the heart by heavenly influences.
par. 4. **in its existence, &c.**; the love of the mother puts the child and its wants before everything else.
35. *par.* 2. **the earliest ray, &c.**; the first look of intelligence the child gives.
par. 5. **realize**; form a clear idea.
36. *par.* 3. **inhaling**; drawing into the lungs.
par. 4. **introduce air currents**; cause currents of air to enter.
38. *par.* 4. **enveloped**; completely surrounded.
congested; having an unnatural accumulation of blood in the part.
39. *par.* 3. **awaken feeling's tenderest cords**; rouse the tenderest emotions.
40. *par.* 1. **sphere**; circuit or range of influence.
par. 3. **though thunder-clouds, &c.**; outside troubles cannot pursue us to our firesides.
par. 4. **heart-soothing sanctuary**; sacred refuge, where the wounds of the heart are healed.
41. *par.* 1. **committed her recollections, &c.**; wrote down what she remembered.
43. *par.* 5. **alter the structure**; make changes in the building itself.
44. *par.* 1. **strong almost as a superstition**; held to as firmly as the belief in witchcraft, &c., is held to by the ignorant.
45. *par.* 1. **artificial**; not natural, but contrived by man.
par. 4. **appliances of**; instruments used to promote.

Page

46. *par.* 2. **sensitive**; easily moved.
47. *par.* 1. **are very effective**; do what is wanted very well.
49. *par.* 1. **perceptibly**; noticeably.
par. 3. **spontaneous ventilation**; ventilation that goes on of itself.
51. *par.* 2. **appreciable**; able to be felt.
54. *par.* 1. **putrefy**; rot with offensive smell.
par. 2. **receptacles**; places into which things are put.
par. 4. **subsequently**; at a later time, afterwards.
57. *par.* 3. **putrefaction**; the rotting or decomposition of animal and vegetable substances, accompanied usually with the escape of fetid gases.
58. *par.* 1. **constituents**; materials of which they are made up.
59. *par.* 1. **a moment's ornament**; what made one moment beautiful.
par. 2. **a countenance, &c.**; a face that told of a happy and well-spent past and promised a happy future.
61. *par.* 1. **reservoir**; an artificial lake or pond from which the water is conveyed in pipes to a town, a village, or a house.
par. 3. **filtered**; purified by being passed through a porous substance.
contaminated; defiled, polluted.
65. *par.* 2. **charged with lime**; holds the lime in solution.
66. *par.* 4. **corroded**; acted upon chemically, so that the portion in contact with the water is gradually changed in composition and at last absorbed by the water.
67. *par.* 2. **protective covering**; a layer which prevents the water from reaching, therefore from acting on, the unchanged lead.
72. *par.* 3. **business in hand**; the common details of housework.
77. *par.* 3. **set hard**; become solid.
79. *par.* 1. **affinity**; a tendency to unite with chemically to form new compounds.
80. *par.* 4. **rotatory**; turning in the same way a wheel does.
83. *par.* 1. **sewer-gas**; the gases that rise from decomposing sewage—marsh-gas, carburetted hydrogen, and sulphuretted hydrogen, &c.
par. 2. **sewer**; an underground channel to carry off superfluous water, &c.
84. *par.* 3. **germs of the infection**; seeds or elements that under favouring circumstances produce the disease.
par. 4. **suffered from the infection**; had the fever.
85. *par.* 2. **radically defective**; formed on a bad system or with bad materials.

Page

88. *par.* 2. **zymotic disease**; diseases the origin and progress of which are due to the presence in the body of living germs received from without.
- par.* 3. **sewage-logged soil**; soil that has become saturated with sewage matter.
90. *par.* 1. **taken up her residence**; gone to live.
- par.* 3. **dropping gold**; this phrase is used as descriptive of the tree on account of its yellow dependent clusters of pea-shaped flowers.
92. *par.* 7. **sighted**; caught sight of, seen and recognized by the people in the lighthouse, who reported the fact.
93. *par.* 6. **repast**; breakfast.
94. *par.* 5. **reviver**; anything that freshens one up.
97. *par.* 4. **dwelling on her calamity**; thinking constantly of the loss of her husband.
98. *par.* 2. **part and parcel, &c.**; an integral portion of the establishment, something which could not be taken away without completely changing the character of the establishment.
99. *par.* 2. **receive any notice to quit**; be displaced or removed.
102. *par.* 3. **rearing**; bring up
105. *par.* 3. **oddities**; peculiar customs, that is, customs differing from our own.
110. *par.* 1. **granules**; little grains.
112. *par.* 2. **appetizing**; causing or increasing the desire for food.
114. *par.* 4. **prolonged**; lengthened.
- par.* 6. **definitions**; brief and precise descriptions of things.
116. *par.* 2. **dark places**; places where men are still in a savage state.
- par.* 3. **cave-dwellers**; a prehistoric race of men, who dwelt in natural caves and lived on shell-fish and wild animals.
- par.* 4. **exalted**; represented it as of the greatest importance.
- set up a household deity of the hearth.** The hearth was the centre of the family or household. There the holy fire was kept perpetually burning, and there stood the lares or household gods.
118. *par.* 1. **through the cranks and offices of man**; through the windings of the blood-vessels, and through the various organs of man.
- natural competency**; sufficient supply.
- make my audit up**; draw up a statement of what I receive and what I spend.
- that all from me, &c.** The account will show, that of what

Page

- I receive the other members get back from me all that is valuable, and leave me only what is worthless.
121. *par.* 3. afraid for her skin; afraid of being hurt.
125. *par.* 3. mess-table; the table at which a certain number of the same persons are in the habit of taking their meals.
127. *par.* 2. primitive; of the earliest form.
129. *par.* 3. thermometer; an instrument used for measuring the temperature of bodies.
130. *par.* 2. epitaph; an inscription on a tombstone.
monuments of fame; famous monuments.
sculptured marble tower; a tower adorned with carved work.
131. *par.* 1. their mother's rest; the place where their mother was buried.
132. *par.* 4. verdict; opinion, decision.
par. 5. scrag-end of the neck; the part nearest to the head, the bonier part.
136. *par.* 1. grim cave; the grave.
par. 2. by intemperance more in meats and drinks; more shall die from gluttony and drunkenness.
dire; dreadful.
monstrous crew; dreadful company.
yield it just; acknowledge it perfectly fair.
connatural dust; the dust out of which man was made, and to which he is by nature closely related.
thy mother's lap; the earth, the common mother of all things.
for death mature; ready or ripe for death.
139. *par.* 2. ingredient; the materials that enter into the composition of a substance.
par. 4. substantial; supplying solid nourishment.
par. 5. lend their ears; listen attentively.
144. *par.* 2. catching some wild bird's lay; imitating the song of some wild bird.
148. *par.* 5. quick at figures; a good counter.
149. *par.* 1. lavatory; a room or place for washing one's self.
156. *par.* 3. their rightful owners; the sheep themselves.
160. *par.* 7. chump end; the thick end of a loin of veal or mutton, the part near the tail.
164. *par.* 3. occasionally; from time to time.
168. *par.* 1. recipe; directions for making any dish or mixture.

- Page
169. *par.* 5. largely composed of gelatine; made up chiefly of a substance which on boiling, &c., yields gelatine.
170. *par.* 1. microscope; an instrument for rendering small objects distinctly visible.
- par.* 3. pectose; a substance thought to be contained in the pulp of unripe fruit and in fleshy roots. It is insoluble in water, but is transformed by acids, &c., into pectin, the substance which imparts to the juice of ripe fruit the property of gelatinizing when boiled.
- cells; the name given to the simplest elements of which the tissues of animals and plants are built up.
171. *par.* 1. succulent shoots; young branches full of juice.
- germinating seeds; seeds in which the *germ* or young plant is just beginning to develop, seeds beginning to grow.
172. *par.* 4. salads; the name given to mixtures of certain herbs cut up, variously dressed, and eaten raw.
174. *par.* 4. unnecessarily; without reason or cause.
- par.* 8. laid much store by; placed a great value upon.
175. *par.* 2. interval; time between being cooked and being used.
- par.* 4. delicacy; thing that is pleasing to the taste.
176. *par.* 2. flesh-forming properties; qualities favourable to the formation of flesh.
- par.* 3. digestible; that can be easily converted into nourishment.
- par.* 4. oil of Lucca; olive-oil.
177. *par.* 1. anchorite; hermit.
181. *par.* 1. make-shift; put up with whatever he can get.
184. *par.* 3. sudden descent; unexpected visit.
- par.* 5. herald; an officer whose business it was to marshal processions and superintend public ceremonies.
- fricasseeing; cutting up and frying in strong sauce some small animal.
185. *par.* 1. quail; the smallest of the partridge family of birds. Its flesh is considered a great delicacy.
- magisterial look; look of authority.
- the soldier's fare; frugal, cheap and easily got. This is an example of irony. The speaker intends to imply the opposite of what the words literally mean.
186. *par.* 1. a savoury sight; a sight that suggests what is pleasing to the taste.
189. *par.* 4. pancheon; a coarse earthenware pan used to contain milk, &c.

Page

202. *par.* 5. **nitrogenous or flesh-forming.** Food-stuffs have been divided into heat-producing and tissue-forming substances; the starches and the fats constitute the former, and the proteids, nitrogen compounds, the latter.
203. *par.* 4. **the day to grace;** in honour of the day.
lustly baron; a baron of beef in cookery means two sirloins not cut apart.
green-garbed ranger; the keeper, dressed in green.
204. *par.* 1. **high tide;** time of festivity.
206. *par.* 2. **in detail; fully.**
par. 3. **the gradual substitution, &c.** People have come by degrees to bake meat instead of roasting it, as they did formerly.
207. *par.* 2. **the inferiority has been ascribed, &c.** The want of a free circulation of air in an oven has been put forward as the reason for baked meat not being so good as roasted.
208. *par.* 2. **restrains under considerable pressure;** keeps in while they exert a strong pressure outwards.
par. 5. **loosely compacted;** not pressed closely or firmly together.
210. *par.* 3. **adapted to the purpose;** suited for the work required from it.
212. *par.* 2. **immersed;** plunged.
par. 4. **subjected to great agitation;** made to move about a good deal.
213. *par.* 3. **coagulated;** set or become solid.
214. *par.* 1. **pleasantly sapid;** having an agreeable relish or flavour.
221. *par.* 7. **bronzed;** tanned by exposure to sun and wind.
organic refuse; waste matter composed of animal or vegetable substances.
convection; the name given to the transference of heat through the change of position of the heated body.
contaminated; made impure.
diphtheritic; of the nature of diphtheria.
carbolic acid; an oily colourless liquid with a burning taste obtained from coal-tar, and largely used as a disinfectant.
allied to the preceding method; closely resembles boiling.
medium of the applied heat; the channel through which the heat is applied.
when time is an important consideration; when they need to be done quickly.
bursting with heat; heating till the contents of the vegetable cells break through the cell walls.

