An essay on food and particularly on feeding the poor : exhibiting the science of nutrition, and the art of providing wholesome and palatable food at a small expense / by Count Rumford. Edited by Sir Richard Musgrave.

AN

ESSAY ON FOOD

AND PARTICULARLY

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SCIENCE OF NUTRITION, AND THE ART OF PROVIDING WHOLESOME AND PALATABLE FOOD AT A SMALL EXPENSE.

BY COUNT RUMFORD.

NEW EDITION.

EDITED BY

SIR RICHARD MUSGRAVE, BART.

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WILLIAM AND GEORGE ROBERTSON,
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INTRODUCTION.

It is a common saying, that necessity is the mother of invention; and nothing is more strictly or more generally true. It may even be shown, that most of the successive improvements in the affairs of men in a state of civil society, of which we have any authentic records, have been made under the pressure of necessity; and it is no small consolation, in times of general alarm, to reflect upon the probability that, upon such occasions, useful discoveries will result from the united exertions of those who, either from motives of fear, or sentiments of benevolence, labour to avert the impending evil.

The alarm in this country at the present period,* on account of the high price of corn, and the danger of a scarcity, has turned the attention of the public to a very important subject, the investigation of the science of nutrition; a subject so curious in itself, and so highly interesting to mankind, that it seems truly astonishing it should have been so long neglected: but in the manner in which it is now taken up, both by the House of Commons and the Board of Agriculture, there is great reason to hope that it will receive a thorough scientific examination; and if this should be the case, I will venture to predict, that the important discoveries and improvements which must result from these inquiries, will render the alarms which gave rise to them for ever famous in the annals of civil society.

* This work was first published in November, 1795.

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ESSAY ON FOOD,

&c., &c.

CHAPTER I.

THERE is, perhaps, no operation of Nature, which falls under the cognizance of our senses, more surprising, or more curious, than the nourishment and growth of plants and animals; and there is certainly no subject of investigation more interesting to mankind. As providing subsistence is, and ever must be, an object of the first concern in all countries, any discovery or improvement by which the procuring of good and wholesome food can be facilitated, must contribute very powerfully to increase the comforts, and promote the happiness of society.

That our knowledge in regard to the science of nutrition is still very imperfect is certain; but, I think, there is reason to believe that we are upon the eve of some very important discoveries relative to that mysterious operation.

Since it has been known that water is not a simple element, but a *compound*, and capable of being decomposed, much light has been thrown upon many operations of nature which formerly were wrapped up in obscurity. In vegetation, for instance, it has been rendered extremely probable, that water acts a much more important part than was formerly assigned to it by philosophers. That it serves not merely as the *vehicle* of nourishment, but constitutes at least one part and probably an essential part, of the *food* of plants. That it is decomposed by them, and contributes *materially* to their growth;—and that manure serves rather to prepare the water for decomposition, than to form of themselves—substantially, and directly—the nourishment of the vegetables.

Now a very clear analogy may be traced, between the vegetation and growth of plants, and the digestion and nourishment of animals; and as water is indispensably necessary in both processes, and as in one of them, (vegetation) it appears evidently to serve as *food*;—why should we not suppose it may serve as food in the other?—There is, in my opinion, abundant reason to suspect that this is really the case; and I shall now briefly state the grounds upon which this opinion is founded. Having been engaged for a considerable length of time in providing food for the poor at Munich, I was naturally led, as well by curiosity as motives of economy, to make a great

variety of experiments upon that subject; and I had not proceeded far in my operations, before I began to perceive that they were very important;—even much more so than I had imagined.

The difference in the apparent goodness, or the palatableness, and apparent nutritiousness of the same kinds of food, when prepared or cooked in different ways, struck me very forcibly and I constantly found that the richness or *quality* of a soup depended more upon a proper choice of the ingredients and a proper management of the fire in the combination of those ingredients, than upon the quantity of solid nutritious matter employed;—much more upon the art and skill of the cook, than upon the amount of the sums laid out in the market.

I found, likewise, that the nutritiousness of a soup, or its power of satisfying hunger, and affording nourishment, appeared always to be in proportion to its apparent richness or palatableness.

But what surprised me not a little, was a discovery of the very small quantity of *solid food*, which, when properly prepared, will suffice to satisfy hunger, and support life and health; and the very trifling expense at which the stoutest and most laborious man may, in any country, be fed.

After an experience of more than five years in feeding the poor at Munich, during which time every experiment was made that could be devised, not only with regard to the choice of the articles used as food, but also in respect to their different combinations and proportions; and to the various ways in which they could be prepared or cooked; it was found that the *cheapest*, most *savoury*, and most *nourishing* food that could be provided, was a soup composed of *pearl-barley*, *peas*, *potatoes*, *cuttings of fine wheaten bread*, vinegar, —salt and water in certain proportions.

The method of preparing this soup is as follows: The water and the pearl barley are first put together into the boiler and made to boil; the peas are then added, and the boiling is continued over a gentle fire about two hours;—the potatoes are then added, (having been previously peeled with a knife, or having been boiled, in order to their being more easily deprived of their skins,) and the boiling is continued for about one hour more, during which time the contents of the boiler are frequently stirred about with a large wooden spoon or ladle, in order to destroy the texture of the potatoes, and to reduce the soup into one uniform mass. When this is done, the vinegar and salt are added; and last of all, at the moment it is to be served up, the cuttings of bread.

The soup should never be suffered to boil, or even to stand long before it is served up, after the cuttings of bread are put to it. It will, indeed, for reasons which will hereafter be explained, be best never to put the cuttings of bread into the boiler at all, but, (as is always done at Munich,) to put them into the tubs in which the soup is carried from the kitchen into the dining hall; pouring the soup hot from the boiler upon them, and stirring the whole well together with the iron ladles used for measuring out the soup for the poor in the hall.

It is of more importance than can well be imagined, that this bread, which is mixed with the soup, should not be boiled. It is likewise of use that it should be cut as fine or thin as possible; and if it be dry and hard it will be so much the better.

The bread we use at Munich is what is called *semel* bread, being small loaves, weighing from two to three ounces; and as we receive this bread in donations from the bakers, it is commonly dry and hard, being that which, not being sold in time, remains on hand, and becomes stale and unsalable; and we have found by experience that this hard and stale bread answers for our purpose much better than any other, for it renders mastication necessary; and mastication seems very powerfully to assist in promoting digestion: it likewise prolongs the duration of the enjoyment of eating, a matter of very great importance indeed, and which has not hitherto been sufficiently attended to.

The quantity of this soup furnished to each person, at each meal, or one portion of it, (the cuttings of bread included,) is just one Bavarian pound in weight; and as the Bavarian pound is to the pound Avoirdupois as 1.123842 to 1,—it is equal to about nineteen ounces and nine-tenths avoirdupois. Now, to those who know that a full pint of soup weighs no more than about sixteen ounces avoirdupois, it will not, perhaps, at the first view, appear very extraordinary that a portion weighing near twenty ounces, and consequently making near one pint and a quarter of this rich, strong, savoury soup should be found sufficient to satisfy the hunger of a grown person; but when the matter is examined narrowly, and properly analyzed, and it is found that the whole quantity of solid food which enters into the composition of one of these portions of soup does not amount to quite six ounces, it will then appear to be almost impossible that this allowance should be sufficient.

That it is quite sufficient, however, to make a good meal for a strong healthy person, has been abundantly proved by long experience. I have even found that a soup composed of nearly the same ingredients, except the potatoes, but in different proportions, was sufficiently nutritive, and very palatable, in which only about four ounces and three quarters of solid food entered into the composition of a portion weighing twenty ounces.

But this will not appear incredible to those who know that one single spoonful of salope weighing less than one quarter of an ounce put into a pint of boiling water, forms the thickest and most nourishing soup that can be taken, and that the quantity of solid matter which enters into the composition of another very nutritive food, hartshorn jelly, is not much more considerable.

The barley in my soup seems to act much the same part as the salope in this famous restorative; and no substitute that I could ever find for it, among all the variety of corn and pulse of the growth of Europe, ever produced half the effect; that is to say, half the nourishment at the same expense. Barley may therefore be considered as the rice of Great Britain. It requires, it is true, a great deal of boiling; but, when it is properly managed, it thickens a vast quantity of water, and, as I suppose, prepares it for decomposition. It also gives the soup into which it enters as an ingredient a degree of richness which nothing else can give. It has little or no taste in itself, but when mixed with other ingredients which are savoury, it renders them peculiarly grateful to the palate. It is a maxim as ancient, I believe, as the time of Hippo-

crates, that "whatever pleases the palate, nourishes;" and I have often had reason to think it perfectly just. Could it be clearly ascertained and demonstrated, it would tend to place cookery in a much more respectable situation among the arts than it now holds.

That the manner in which food is prepared is a matter of real importance, and that the water used in that process acts a much more important part than has hitherto been generally imagined, is, I think, quite evident; for it seems to me to be impossible, upon any other supposition to account for the appearances. If the very small quantity of solid food which enters into the composition of a portion of some very nutritive soup were to be prepared differently, and taken under some other form—that of bread, for instance, so far from being sufficient to satisfy hunger and afford a comfortable and nutritive meal, a person would absolutely starve upon such a slender allowance; and no great relief would be derived from drinking crude water to fill up the void in the stomach.

But it is not merely from an observation of the apparent effects of cookery upon those articles which are used as food for man that we are led to discover the importance of these culinary processes. Their utility is proved in a manner equally conclusive and satisfactory by the effects which have been produced by employing the same process in preparing food for brute animals.

It is well known, that boiling the potatoes with which hogs are fed renders them much more nutritive; and since the introduction of the new system of feeding horned cattle, that of keeping them confined in the stables all the year round—(a method which is now coming fast into common use in many parts of Germany)—great improvements have been made in the art of providing nourishment for those animals, and particularly by preparing their food by operations similar to those of cookery; and to these improvements it is most probably owing that stall feeding has in that country been so universally successful.

It has long been a practice in Germany, for those who fatten bullocks for the butcher or feed milch-cows, to give them frequently what is called a drank or drink, which is a kind of pottage, prepared differently in different parts of the country, and in the different seasons, according to the greater facility with which one or other of the articles occasionally employed in the composition of it may be procured, and according to the particular fancies of individuals. Many feeders make a great secret of the composition of their drinks, and some have, to my knowledge, carried their refinement so far as actually to mix brandy in them in small quantities, and pretend to have found their advantage in adding this costly ingredient.

The articles most commonly used are bran, oatmeal, brewer's grains, mashed potatoes, mashed turnips, rye meal, and barley meal, with a large portion of water; sometimes two or three or more of these articles are united in forming a drink; and of whatever ingredients the drink is composed, a large proportion of salt is always added to it.

There is, perhaps, nothing new in this method of feeding cattle with liquid mixtures, but the manner in which these drinks are now

prepared in Germany is, I believe, quite new, and shews what I wish to prove—that cooking renders food really more nutritive.

These drinks were formerly given cold, but it was afterwards discovered that they were more nourishing when given warm, and of late their preparation is in many places become a very regular culinary process. Kitchens have been built, and large boilers provided and fitted up, merely for cooking for the cattle in the stables; and I have been assured by many very intelligent farmers, who have adopted this new mode of feeding, and have also found by my own experience, that it is very advantageous indeed—that the drinks are evidently rendered much more nourishing and wholesome by being boiled, and that the expense of fuel and the trouble attending this process are amply compensated by the advantages derived from the improvement of the food. We even find it advantageous to continue the boiling a considerable time—two or three hours, for instance, as the food goes on to be still farther improved, the longer the boiling is continued.

These facts seem evidently to shew that there is some very important secret with regard to nutrition which has not yet been properly investigated; and it seems to me to be more than probable that the number of inhabitants who may be supported in any country upon its internal produce, depends almost as much upon the state of the art of cookery as upon that of agriculture. The Chinese, perhaps, understand both these arts better than any other nation. Savages understand neither of them.

But if cookery be of so much importance, it certainly deserves to be studied with the greatest care, and it ought particularly to be attended to in times of general alarm on account of a scarcity of provisions; for the relief which may in such cases be derived from it is immediate and effectual, while all other resources are distant and uncertain.

I am aware of the difficulties which always attend the introduction of measures calculated to produce any remarkable change in the customs and habits of mankind; and there is, perhaps no change more difficult to effect than that which would be necessary in order to make any considerable saving in the consumption of those articles commonly used as food; but still, I am of opinion that such a change might, with proper management, be brought about.

There was a time, no doubt, when an aversion to potatoes was as general and as strong in Great Britain, and even in Ireland, as it is now in some parts of Bavaria; but this prejudice has been got over; and I am persuaded that any national prejudice, however deeply rooted, may be overcome, provided proper means may be used for that purpose, and time allowed for their operation.

But notwithstanding the difficulty of introducing a general use of soups throughout the country, or of any other kind of food, however palatable, cheap, and nourishing, to which people have not been accustomed, yet these improvements might certainly be made, with great facility, in all public hospitals and work-houses, where the poor are fed at the public expense; and the saving of provisions (not to mention the diminution of expense) which

might be derived from this improvement would be very important at all times, and more especially in times of general scarcity.

Another measure, still more important, and which might, I am persuaded, be easily carried into execution, is the establishment of public kitchens in all towns and large villages throughout the kingdom, whence not only the poor might be fed gratis, but also all the industrious inhabitants of the neighbourhood might be furnished with food at so cheap a rate as to be a very great relief to them at all times; and, in times of general scarcity, this arrangement would alone be sufficient to prevent those public and private calamities which never fail to accompany the most dreadful of all visitations, a famine.

The saving of food that would result from feeding a large proportion of the inhabitants of any country from public kitchens. would be immense, and that saving would tend. immediately and most powerfully, to render provisions more plentiful and cheap—diminish the general alarm on account of the danger of a scarcity, and prevent the hoarding up of provisions by individuals, which is often alone sufficient, without anything else, to bring on a famine, even when there is no real scarcity; for it is not merely the fears of individuals which operate in these cases and induce them to lay in a larger store of provisions than they otherwise would do; and which naturally increases the scarcity of provisions in the market, and raises their prices; but there are persons who are so lost to all the feelings of humanity as often to speculate upon the distress of the public, and all their operations effectually tend to increase the scarcity in the markets and augment the general alarm.

But without enlarging further in this place upon these public kitchens, and the numerous and important advantages which may in all countries be derived from them, I shall return to the interesting subjects which I have undertaken to investigate,—the science of nutrition and the art of providing wholesome and palatable food at a small expense.

CHAPTER II.

What has been already said upon this subject will, I flatter myself, be thought sufficient to shew that for all the purposes of nourishment, a much smaller quantity of solid food will suffice than has hitherto been thought necessary; but there is another circumstance to be taken into the account, and that is the pleasure of eating; an enjoyment of which no person will consent to be deprived.

The pleasure enjoyed in eating depends first on the agreeableness of the taste of the food; and secondly upon its power to affect the palate. Now there are many substances extremely cheap, by which very agreeable tastes may be given to food; particularly when the basis or nutritive substance of the food is tasteless: and the effects of any kind of palatable solid food; (of meat for instance) upon the organs of taste, may be increased, almost indefinitely, by reducing the size of the particles of such food, and causing it to act upon the palate by a larger surface. And if means be used to prevent its

being swallowed too soon, which may be easily done by mixing with it some hard and tasteless substance, such as crumbs of bread, rendered hard by toasting, or anything else of that kind, by which a long mastication is rendered necessary, the enjoyment of eating may be greatly increased and prolonged.

The idea of occupying a person a great while, and affording him much pleasure at the same time, in eating a small quantity of food, may, perhaps, appear ridiculous to some; but those who consider the matter attentively will perceive that it is very important. It is, perhaps, as much so as any thing that can employ the attention of the philosopher.

The enjoyments which fall to the lot of the bulk of mankind are not so numerous as to render an attempt to increase them superfluous. And even in regard to those who have it in their power to gratify their appetites to the utmost extent of their wishes, it is surely rendering them a very important service to show them how they may increase their pleasures without destroying their health.

If a glutton can be made to gormandize two hours upon two ounces of meat it is certainly much better for him, than to give himself an indigestion by eating two pounds in the same time.

I was led to meditate upon this subject by mere accident. I had long been at a loss to understand how the Bavarian soldiers, who are uncommonly stout, strong, and healthy men, and who, in common with all other Germans, are remarkably fond of eating, could contrive to live upon the very small sums they expend for food; but a more careful examination of the economy of their tables cleared up the point and let me into a secret which awakened all my curiosity. These soldiers, instead of being starved upon their scanty allowance, as might have been suspected, I found actually living in a most comfortable and even luxurious manner. I found that they had contrived not only to render their food savoury and nourishing, but, what appeared to me still more extraordinary, had found out the means of increasing its action upon the organs of taste, so as actually to augment, and even prolong to a most surprising degree, the enjoyment of eating.

This accidental discovery made a deep impression upon my mind and gave a new turn to all my ideas on the subject of food. It opened to me a new and very interesting field for investigation and experimental inquiry, of which I had never before had a distinct view, and henceforward my diligence in making experiments and in collecting information relative to the manner in which food is prepared in different countries, was redoubled.

In the following chapter may be seen the general results of all my experiments and inquiries relative to this subject. A desire to render this account as concise and short as possible has induced me to omit much interesting speculation which the subject naturally suggested: but the ingenuity of the reader will supply the defect, and enable him to discover the objects particularly aimed at in the experiments, even where they are not mentioned, and to compare the results of practice with the assumed theory.

CHAPTER III.

Before the introduction of potatoes as food in the House of Industry at Munich, (which was not done till last August,) the poor were fed with a soup composed in the following manner:

SOUP, No. I.

Ingredients.	Weight Avoirdupois. lb.	oz.	Cost in stering money. £	s.	d.
4 viertls of pearl barley, equal to about 20⅓ gallons	141	2	0	11	7½
4 viertls of peas	131	4	0	7	3¼
Cuttings of fine wheaten bread	69	10	0	10	2¼
Salt	19	13	0	1	2½
24 maas, very weak beer—vinegar, or rather small beer turned sour, about 24 quarts	46	13	0	1	5½
Water, about 560 quarts	1077	0			
	1485	10	1	11	8½
Fuel, 88lb. of dry pine wood, the Bavarian clafter, (weighing 3961lb. avoirdupois,) at 8s. 2¼d. sterling,			0	0	2¼
Wages of three cookmaids at twenty florins (1*l.* 17*s.* 7½*d.*) a-year each, makes daily,			0	0	3⅗
Daily expense for feeding the three cook-maids, at ten creutzers (3⅗pence sterling,) each, according to an agreement made with them,			0	0	11
Daily wages of two men-servants, employed in going to market, collecting donations of bread, &c., helping in the kitchen, and assisting in serving out the soup to the poor,			0	1	7¼
Repairs of the kitchen and of the kitchen furniture, about 90 florins (8*l.* 3*s.* 7*d.* sterling) a-year, makes daily,			0	0	5½
Total daily expense when dinnner is provided for 1200 persons,			1	15	2¼

This sum (1*l.* 15*s.* 2¼*d.*) divided by 1200, the number of portions of soup furnished, gives for each portion a mere trifle more than one-third of a penny, or exactly $\frac{422}{1200}$ of a penny; the weight of each portion being about 20 ounces.

But moderate as these expenses are, which have attended the feeding of the poor in Munich, they have lately been reduced still farther by introducing the use of potatoes. These most valuable vegetables were hardly known in Bavaria till very lately; and so strong was the aversion of the public, and particularly of the poor against them at the time when we began to make use of them in the public kitchen of the House of Industry in Munich, that we were absolutely obliged, at first, to introduce them by stealth. A private room in a retired corner was fitted up as a kitchen for cooking

them, and it was necessary to disguise them by boiling them down entirely, and destroying their form and texture, to prevent their being detected: but the poor soon found that their soup was improved in its qualities; and they testified their approbation of the change that had been made in it so generally and loudly, that it was at last thought to be no longer necessary to conceal from them the secret of its composition, and they are now grown so fond of potatoes that they would not be easily satisfied without them.

The employing of potatoes as an ingredient in the soup has enabled us to make a considerable saving in the other more costly materials, as may be seen by comparing the following receipt with that already given.

SOUP, No. II.

Ingredients.	Weight Avoirdupois. lb	oz.		Cost in sterling money. £	s.	d.
2 viertls of pearl barley, .	70	9	——	0	5	$9\frac{13}{22}$
2 viertls of peas, . . .	65	10	——	0	3	$7\frac{5}{8}$
8 viertls of potatoes, . .	230	4	——	0	1	$9\frac{9}{11}$
Cuttings of bread, . .	69	10	——	0	10	$2\frac{1}{4}$
Salt, ...	19	13	——	0	1	$2\frac{1}{2}$
Vinegar, ...	46	13	——	0	1	$5\frac{1}{3}$
Water, ...	982	15				
Total weight, .	1485	10				
Expenses for fuel, servants, repairs, &c., as before,				0	3	$5\frac{5}{12}$
Total daily expense when dinner is provided for 1200 persons, ...				1	7	$6\frac{2}{3}$

This sum (1*l.* 7*s.* $6\frac{2}{3}$*d.*) divided by 1200, the number of portions of soup, gives for each portion one farthing very nearly; or accurately $1\frac{1}{40}$ farthing.

The quantity of each of the ingredients contained in one portion of soup is as follows:

Ingredients.	In avoirdupois weight. Soup, No. 1. oz.		Soup, No. 2. oz.
Of pearl barley, . .	$1\frac{1058}{1200}$	——	$0\frac{1129}{1200}$
Of peas, . . .	$1\frac{960}{1200}$	——	$0\frac{1050}{1200}$
Of potatoes, . . .	——	——	$3\frac{84}{1200}$
Of bread, . . .	$0\frac{1114}{1200}$	——	$0\frac{1114}{1200}$
Total solids, .	$4\frac{772}{1200}$	——	$5\frac{977}{1200}$
Of salt, . . .	$0\frac{316}{1200}$	——	$0\frac{316}{1200}$
Of weak vinegar, . .	$0\frac{748}{1200}$	——	$0\frac{748}{1200}$
Of water, . . .	$14\frac{432}{1200}$	——	$13\frac{127}{1200}$
Total,	$19\frac{968}{1200}$	——	$19\frac{968}{1200}$

The expense of preparing these soups will vary with the prices of the articles of which they are composed; but as the quantities of the ingredients determined by weight are here given, it will be easy to ascertain exactly what they will cost in any case whatever.

Suppose, for instance, it were required to determine how much 1200 portions of the soup, No. 1. would cost in London at this

present moment, (the 12th of November, 1795,) when all kinds of provisions are uncommonly dear.

I see by a printed report of the Board of Agriculture, of the day before yesterday, (November 10,) that the prices of the articles necessary for preparing these soups were as follows:—

Barley, per bushel weighing 46lb. at 5s. 6d. which gives for each pound about $1\frac{1}{2}$d.; but prepared as pearl barley, it will cost at least two pence per lb.

Boiling peas per bushel, weighing $61\frac{3}{4}$lb. (at 10s.) which gives for each pound nearly $1\frac{1}{4}$d.

Potatoes, per bushel, weighing $58\frac{1}{2}$lb. at 2s. 6d. which gives nearly one halfpenny for each pound.

And I find that a quartern loaf of wheaten *bread*, weighing 4lb. 5oz. costs now in London 1s. $0\frac{1}{4}$d.; this bread must therefore be reckoned at $11\frac{25}{69}$ farthings per pound.

Salt cost $1\frac{1}{2}$d. per pound; and vinegar, (which is probably six times as strong as that stuff called vinegar, which is used in the kitchen of the House of Industry at Munich,) costs 1s. 8d. per gallon.

This being premised, the computations may be made as follows:

Expense of preparing in London, in the month of November, 1795, 1200 portions of the Soup No. 1.

lb.	oz.		s.	d.		£.	s.	d.
141	2	pearl barley,	at 0	2	per lb.	1	2	6
131	4	peas,	at 0	$1\frac{1}{2}$	per lb.	0	16	4
69	10	wheaten bread,	at 0	$2\frac{58}{69}$	per lb.	0	16	6
19	13	salt,	at 0	$1\frac{1}{2}$	per lb.	0	2	$5\frac{1}{2}$
Vinegar, one gallon,			at 1	8	.....	0	1	8
Expenses for fuel, servants, kitchen, furniture, &c., reckoning three times as much as those articles of expense amount to daily at Munich, ...						0	10	$4\frac{1}{4}$
					Total, ...	3	9	$9\frac{3}{4}$

Which sum. (£3. 9s. $9\frac{3}{4}$d.) divided by 1200, the number of portions of soup, gives $2\frac{951}{1200}$ farthings, or nearly $2\frac{3}{4}$ farthings for each portion.

For the Soup No. 2. it will be

lb.	oz			d.		£.	s.	d.
70	9	pearl barley,	at	2	per lb.	0	11	9
65	10	peas,	at	$1\frac{1}{2}$		0	8	2
230	4	potatoes,	at	$0\frac{1}{2}$		0	13	9
69	10	bread,	at	$2\frac{58}{69}$		0	16	6
19	13	salt,	at	$1\frac{1}{2}$		0	2	$5\frac{1}{2}$
Vinegar, one gallon, ...						0	1	8
Expenses for fuel, servants, &c., ...						0	10	$4\frac{1}{4}$
					Total.....	3	4	$7\frac{3}{4}$

This sum (£3. 4s. $7\frac{3}{4}$d.) divided by 1200 the number of portions, gives for each $2\frac{1}{2}$ farthings very nearly.

This soup comes much higher here in London, than it would do in most other parts of Great Britain, on account of the very high price of potatoes in this city; but in most parts of the kingdom,

and certainly in every part of Ireland, it may be furnished, even at this present moment, notwithstanding the uncommonly high prices of provisions, at less than one halfpenny the portion of 20 ounces.

Though the object most attended to in composing these soups was to render them wholesome and nourishing, yet they are very far from being unpalatable. The basis of the soups, which is water prepared and thickened by barley, is well calculated to receive, and to convey to the palate, in an agreeable manner, every thing that is savoury in the other ingredients; and the dry bread rendering mastication necessary, prolongs the action of the food upon the organs of taste, and by that means increases and prolongs the enjoyment of eating.

But though these soups are very good and nourishing, yet they certainly are capable of a variety of improvements. The most obvious means of improving them is to mix with them a small quantity of salted meat, boiled, and cut into very small pieces, (the smaller the better,) and to fry the bread that is put into them in butter, or in the fat of salted pork or bacon.

The bread by being fried, is not only rendered much harder, but being impregnated with a fat or oily substance it remains hard after it is put into the soup, the water not being able to penetrate and soften it.

All good cooks put fried bread, cut into small square pieces, in pea soup; but I much doubt whether they are aware of the very great importance of that practice, or that they have any just idea of the manner in which the bread improves the soup.

The best kind of meat for mixing with these soups is salted pork, or bacon, or smoked beef.

Whatever meat is used, it ought to be boiled either in clear water or in the soup; and after it is boiled, it ought to be cut into very small pieces, as small, perhaps, as barley-corns. The bread may be cut in pieces of the size of large peas, or in thin slices; and after it is fried, it may be mixed with the meat and put into the soup dishes, and the soup poured on them when it is served out.

Another method of providing this soup, is to mix with it small dumplins or meat balls, made of bread, flour, and smoked beef, ham, or any other kind of salted meat, or of liver cut into small pieces, or rather minced, as it is called. These dumplins may be boiled either in the soup or in clear water, and put into the soup when it is served out.

As the meat in these compositions is designed rather to please the palate than for any thing else, the soup being sufficiently nourishing without it, it is of much importance that it be reduced to very small pieces, in order that it be brought into contact with the organs of taste by a large surface; and that it be mixed with some hard substance, (fried bread, for instance, crumbs, or hard duplins) which will necessarily prolong the time employed in mastication.

When this is done, and where the meat employed has much flavour, a very small quantity of it will be found sufficient to answer the purpose required.

One ounce of bacon, or of smoked beef, and one ounce of fried bread, added to eighteen ounces of the Soup No. 1, would afford

an excellent meal, in which the taste of animal food would decidedly predominate.

Dried salt fish or smoked fish, boiled and then minced and made into dumplins with mashed potatoes, bread, and flour, and boiled again, would be very good, eaten with either of the Soups No. 1, or No. 2.

These soups may likewise be improved, by mixing with them various kinds of cheap roots and green vegetables, as turnips, carrots, parsnips, celery, cabbages, sour-crout, &c.; as also by seasoning them with fine herbs and black pepper. Onions and leek may likewise be used with great advantage, as they not only serve to render the food in which they enter as ingredients peculiarly savoury, but are really very wholesome.

With regard to the barley made use of in preparing these soups, though I always have used pearl barley, or rolled (as it is called in Germany,) yet I have no doubt but common barley-meal would answer nearly as well; particularly if care be taken to boil it gently for a sufficient length of time over a slow fire before the peas are added.

Till the last year, we used to cook the barley-soup and the pea-soup separate, and not to mix them till the moment when they were poured into the tubs upon the cut bread, in order to be carried into the dining-hall; but I do not know that any advantages were derived from that practice; the soup being, to all appearance, quite as good since the barley and peas have been cooked together as before.

As soon as the soup is done, and the boilers emptied, they are immediately refilled with water, and the barley for the soup for the next day is put into it, and left to steep over night; and at six o'clock the next morning the fires are lighted under the boilers.

The peas, however, are never suffered to remain in the water over-night, as we have found by repeated trials, that they never boil soft if the water in which they are boiled is not boiling hot when they are put into it. Whether this is peculiar to the peas which grow in Bavaria I know not.

When I began to feed the poor of Munich, there was also a quantity of meat boiled in their soup; but as the quantity was small, and the quality of it but very indifferent, I never thought it contributed much to rendering the victuals more nourishing: but as soon as means were found for rendering the soup palatable without meat, the quantity of it used was gradually diminished, and it was at length entirely omitted. I never heard that the poor complained of the want of it; and much doubt whether they took notice of it.

The management of the fire in cooking is, in all cases, a matter of great importance; but in no case, is it so necessary to be attended to as in preparing the cheap and nutritive soups here recommended. Not only the palatableness, but even the strength or richness of the soup, seems to depend very much upon the management of the heat employed in cooking it.

From the beginning of the process to the end of it, the boiling should be as gentle as possible; and if it were possible to keep the soup always just boiling hot, without actually boiling, it would be so much the better.

Causing any thing to boil violently in any culinary process is very ill judged; for it not only does not expedite, even in the smallest degree, the process of cooking, but it occasions a most enormous waste of fuel; and by driving away with the steam many of the more volatile and the most savoury particles of the ingredients, renders the victuals less good and less palatable. To those who are acquainted with the experimental philosophy of heat, and who know that water once brought to be boiling hot, however gently it may boil in fact, cannot be made any hotter, however large and intense the fire under it may be made, and who know that it is by the heat—that is to say, the degree or intensity of it, and the time of its being continued, and not by the bubbling up or boiling (as it is called) of the water that culinary operations are performed—this will be evident, and those who know that more than five times as much heat is required to send off in steam any given quantity of water already boiling hot as would be necessary to heat the same quantity of ice-cold water to the boiling point—will see the enormous waste of heat, and consequently of fuel, which, in all cases must result from violent boiling in culinary process.

To prevent the soup from burning to the boiler, the bottom of the boiler should be made double; the false bottom, (which may be very thin) being fixed on the inside of the boiler, the two sheets of copper being every where in contact with each other, but they ought not to be attached to each other with solder, except only at the edge of the false bottom where it is joined to the sides of the boiler. The false bottom should have a rim about an inch and a half wide, projecting upwards, by which it should be rivited to the sides of the boiler, but only few rivets, or nails, should be used for fixing the two bottoms together below, and those used should be very small; otherwise, where large nails are employed at the bottom of the boiler, where the fire is most intense, the soup will be apt to burn to; at least on the heads of those large nails.

The two sheets of metal may be made to touch each other every where, by hammering them together after the false bottom is fixed in its place; and they may be tacked together by a few small rivets placed here and there, at considerable distances from each other; and after this is done, the boiler may be tinned.

In tinning the boiler, if proper care be taken, the edge of the false bottom may be soldered by the tin to the sides of the boiler, and this will prevent the water, or other liquids put into the boiler, from getting between the two bottoms.

In this manner double bottoms may be made to sauce-pans and kettles of all kinds used in cooking; and this contrivance will, in all cases, most effectually prevent what is called by the cooks, burning to.

The heat is so much obstructed in its passage through the thin sheet of air, which notwithstanding all the care that is taken to bring the two bottoms into actual contact, will still remain there, the second has time to give its heat as fast as it receives it, to the fluid in the boiler, and consequently never acquires a degree of heat sufficient for burning any thing that may be upon it.

Perhaps it would be better to double copper sauce-pans and small

kettles throughout; and as this may and ought to be done with a very thin sheet of metal, it could not cost much, even if this lining were to be made of silver.

But I must not enlarge here upon a subject I shall have occasion to treat more fully in another place. To return, therefore, to the subject more immediately under consideration—food.

CHAPTER IV.

It has often been matter of surprise to many, and even to those who are most conversant in military affairs, that soldiers can find means to live upon the very small allowance granted them for their subsistence; and I have often wondered that nobody has undertaken to investigate that matter, and to explain a mystery at the same time curious and interesting, in a high degree.

The pay of private soldiers is in all countries very small, much less than the wages of a day-labourer; and in some countries it is so mere a pittance that it is quite astonishing how it can be made to support life.

The pay of a private foot-soldier in the service of His Most Serene Highness, the Elector Palatine, (and it is the same for a private grenadier in the regiment of guards,) is five creutzers a-day, and no more. Formerly the pay of a private foot-soldier was only four creutzers and a half a-day, but lately, upon the introduction of the new military arrangements in the country, his pay has been raised to five creutzers; and with this he receives one pound thirteen ounces and a half Avoirdupois weight of rye-bread, which, at the medium price of grain in Bavaria and the Palatinate, costs something less than three creutzers, or just about one penny sterling.

The pay which the soldier receives in money,—five creutzers a-day, equal to one penny three farthings sterling, added to his daily allowance of bread, valued at one penny, make two pence three farthings a day, for the sum total of his allowance.

That it is possible, in any country, to procure food sufficient to support life with so small a sum, will doubtless appear extraordinary to an English reader; but what would be his surprise upon seeing a whole army, composed of the finest, stoutest, and strongest men in the world, who are fed upon that allowance, and whose countenance show the most evident marks of ruddy health and perfect contentment.

I have already observed, how much I was struck with the domestic economy of the Bavarian soldiers. I think the subject much too interesting, not to be laid before the public, even in all its details; and as I think it will be more satisfactory to hear from their own mouths an account of the manner in which these soldiers live, I shall transcribe the reports of two sensible non-commissioned officers, whom I employed to give me the information I wanted.

These non-commissioned officers, who belong to two different regiments of grenadiers in garrison at Munich, were recommended to me by their colonels as being very steady, careful men, are each, at the head of a mess consisting of twelve soldiers, themselves

reckoned in the number. The following accounts, which they gave me of their house-keeping, and of the expenses of their tables, were all the genuine results of actual experiments made at my particular desire, and at my cost.

I do not believe that useful information was ever purchased cheaper than upon this occasion; and I fancy my reader will be of the same opinion when he has perused the following reports which are literally translated from the original German.

"In obedience to the orders of Lieut. General Count Rumford, the following experiments were made by Serjeant Wickenhof's mess, in the first company of the first (or Electors own) regiment of grenadiers, at Munich, on the 10th and 11th of June, 1795.

"June 10th, 1795.

"Bill of Fare.

"Boiled beef, with soup and bread dumplins.

"Details of the expense, &c.

"For the boiled beef and the soup.

lb.	loths.		Creutzers.
2	0	beef, ...	16
0	1	sweet herbs, ...	1
0	0½	pepper, ...	0½
0	6	salt, ...	0½
1	14½	ammunition bread, cut fine,	2⅞
9	20	water, ...	0
Total 13	10		Cost 20⅞

"All these articles were put together into an earthen pot, and boiled two hours and a quarter. The meat was then taken out of the soup and weighed, and found to weigh 1lb. 30 loths; which divided into twelve equal portions, gave five loths for the weight of each.

"The soup, with the bread, &c., weighed 9lb. 30½ loths; which divided into twelve equal portions, gave for each 26$\frac{7}{12}$ loths.

"The cost of the meat and soup together, 20⅞ creutzers, divided by twelve, gives 1¾ creutzers, very nearly for the cost of each portion.

"For the bread dumplins.

lb.	loths.		Creutzers.
1	13	of fine semel bread	10
1	0	of fine flour	4½
0	6	salt	0½
3	0	of water	0
Total 5	19		Cost 15

"This mass was made into dumplins, and these dumplins were boiled half an hour in clear water. Upon taking them out of the water, they were found to weigh 5lb. 24 loths; and divided into twelve equal portions, each portion weighing 15⅓ loths; and the cost of the whole (15 creutzers,) divided by twelve, gives 1¼ creutzers for the cost of each portion.

The meat, soup, and dumplins were served all at once in the same dish, and were all eaten together, and with this meal, (which was their dinner, and was eaten at twelve o'clock,) each person belonging to the mess was furnished with a piece of rye-bread, weighing ten loths, and which cost $\frac{5}{16}$ of a creutzer. Each person was likewise furnished with a piece of this bread, weighing ten loths, for his breakfast; another piece of equal weight, in the afternoon at four o'clock, and another in the evening.

Analysis of this Day's Fare.

		Each person received in the course of the day. In solids. lb.	loths	In fluids. lb.	loths.	Account of cost in Bavarian Money. Creutzers.
	Boiled beef,	0	5 ...			..... $1\frac{1}{6}$
In the Soup.	Rye-bread,	0	$3\frac{7}{8}$ ..			.....
	Sweet-herbs,	0	$0\frac{1}{12}$ ...			.....
	Salt,	0	$0\frac{1}{24}$ ...			.....
	Pepper,	0	$0\frac{1}{24}$ ..			..... $0\frac{7}{16}$
	Water,			0	$23\frac{1}{2}$	
	Total	0	$4\frac{5}{24}$	0	$23\frac{1}{2}$	
In dumplins.	Wheaten-bread,	0	$3\frac{3}{4}$ ...			
	Ditto flour,	0	$2\frac{2}{3}$ ...			
	Salt,	0	$0\frac{1}{24}$ ..			
	Water, ...	...		0	$7\frac{1}{12}$	..... $1\frac{1}{4}$
	Total	0	$6\frac{11}{24}$	0	$7\frac{1}{12}$	
Dry bread.	For breakfast,	0	10 ...			
	At dinner,	0	10 ..			
	In the Afternoon,	0	10 ...			
	At supper,	0	10 ...			..... $2\frac{1}{2}$
	Total,	1	8			
General Total,		2	$24\frac{13}{24}$	0	$31\frac{1}{2}$	which cost $5\frac{17}{48}$

The ammunition bread is reckoned in this estimate at two creutzers the Bavarian pound, which is about what it costs at a medium; and as the daily allowance of the soldiers is $1\frac{1}{2}$ Bavarian pounds of this bread, this reckoned in money amounts to three creutzers a day, and this added to his pay at five creutzers a day, makes eight creutzers a day, which is the whole of his allowance from the sovereign for his subsistence.

But it appears from the foregoing account that he expends for food no more than $5\frac{17}{48}$ creutzers a day, there is therefore a surplus amounting to $2\frac{31}{48}$ creutzers a day, or very near one third of his whole allowance, which remains; and which he can dispose of just as he thinks proper.

This surplus is commonly employed in purchasing beer, brandy, tobacco, &c. Beer in Bavaria costs two creutzers a pint; brandy, or rather malt spirits, from fifteen to eighteen creutzers; and tobacco is very cheap.

To enable the English reader to form, without the trouble of computation, a complete and satisfactory idea of the manner in which these Bavarian soldiers are fed, I have added the following analysis of their fare; in which the quantity of each article is expressed in avoirdupois weight, and its cost in English money.

Analysis.

Each person belonging to the mess received in the course of the day, June 11th, 1795.	lb.	oz.	Cost in English Money. s.	d.
Dry Ammunition bread, ...	1	$8\frac{76}{100}$	0	$0\frac{10}{11}$
Ammunition bread cooked in the soup,	0	$2\frac{4}{10}$	0	$0\frac{23}{264}$
Fine wheaten (semel) bread in the dumplins, ...	0	$2\frac{3}{10}$	0	$0\frac{10}{33}$
Total bread.....	1	$13\frac{46}{100}$		
Fine flour in the dumplins, ...	0	$1\frac{65}{100}$	0	$0\frac{13}{33}$
Boiled Beef..., ...	0	$3\frac{1}{10}$	0	$0\frac{72}{198}$
In seasoning; fine herbs, salt & pepper,	0	$0\frac{13}{100}$	0	$0\frac{2}{33}$
Total solids, ...	2	$2\frac{34}{100}$		
Water prepared by cooking				
In the Soup, ...	0	$14\frac{52}{209}$		
In the dumplins, ...	0	$4\frac{32}{100}$		
Total prepared water,	1	$2\frac{84}{100}$		
Total solids and fluids,	3	$5\frac{18}{100}$		

Total expense for each person $5\frac{17}{48}$ creutzers, equal to two pence sterling, very nearly.

But as the Bavarian soldiers have not the same fare every day, the expenses of their tables cannot be ascertained from one single experiment. I shall therefore return to Serjeant Wickenhof's report.

"11th of June, 1795.

"Bill of Fare.

"Bread, dumplins, and soup.

"Details of expenses, &c.

"For the dumplins.

lb.	loths.		Creutzers.
2	13	wheaten bread, ...	... 14
0	16	butter, ...	... 9
1	0	fine flour, ...	... $4\frac{1}{2}$
0	11	eggs, ...	... 3
0	6	salt, ...	... $0\frac{1}{2}$
0	$0\frac{1}{2}$	pepper, ...	... $0\frac{1}{2}$
3	16	water, ...	...
7	$30\frac{1}{2}$		Cost $31\frac{1}{2}$ creutzers.

"This made into dumplins; the dumplins, after being boiled were found to weigh eight pounds eight loths, which divided among

twelve persons, gave for each twenty-two loths. And the cost of whole ($31\frac{1}{2}$ creutzers) divided by 12, gives $2\frac{1}{4}\frac{5}{4}$ creutzers for each portion.

lb.	loths.	"For the soup."	Creutzers.
1	$14\frac{1}{2}$	ammunition bread, ...	$2\frac{7}{8}$
0	6	salt, ...	$0\frac{1}{2}$
0	1	sweet herbs, ...	1
12	0	water, ...	0
13	$21\frac{1}{2}$	Cost,	$4\frac{3}{8}$ creutzers

"This soup, when cooked, weighed 11lb. 26 loths, which, divided among the twelve persons belonging to the mess, gave for each $31\frac{1}{2}$ loths; and the cost ($4\frac{3}{8}$ creutzers) divided by twelve, gives nearly three-ninths of a creutzer for each portion.

"For bread."

"Four pieces ammunition bread, weighing each ten loths, for each person—namely, one piece for breakfast, one at dinner, one in the afternoon, and one at supper; in all, 40 loths, or one pound and a quarter, costs two creutzers and a half."

Detail of expenses, &c., for each person.

	lb.	loths.		Creutzers.
For	1	8	dry bread, ...	$2\frac{1}{2}$
For	0	22	bread dumplins, ...	$2\frac{1}{2}\frac{5}{4}$
For	0	$31\frac{1}{2}$	bread soup, ...	$0\frac{3}{8}$
	2	$30\frac{1}{2}$	of food	Cost $5\frac{1}{2}$ creutzers.

The same details expressed in avoirdupois weight and English money:—

For each person

lb.	oz.		Pence.
1	$8\frac{76}{100}$	dry ammunition bread, ...	$0\frac{10}{11}$
0	$13\frac{6}{10}$	bread dumplins, ...	$0\frac{693}{792}$
1	$3\frac{1}{2}$	bread soup, ...	$0\frac{36}{264}$
3	$9\frac{86}{100}$	of food	Cost 2 pence.

"June 20th, 1795.

"Serjeant Kein's mess, second regiment of grenadiers.

"Bill of Fare.

"Boiled beef—bread soup—and liver dumplins.

"Details of expenses, &c.

"For the boiled beef and soup.—

lb.	loths.		Creutzers.
2	0	beef, ...	15
0	$6\frac{1}{2}$	salt, ...	$0\frac{1}{2}$
0	$0\frac{1}{2}$	pepper, ...	$0\frac{1}{2}$
0	2	sweet herbs, ...	$0\frac{1}{2}$
2	24	ammunition bread, ...	$3\frac{1}{4}$
17	0	water, ...	0
22	1	Cost	$19\frac{3}{4}$ creutzers.

These ingredients are all boiled together two hours and five

minutes ; after which the beef was taken out of the soup and weighed, and was found to weigh 1 lb. 22 loths ; the soup weighed 15 lb. ; and these divided equally among the twelve persons belonging to the mess gave for each portion $4\frac{1}{3}$ loths of beef and 1lb. 8 loths of soup ; and the cost of the whole ($19\frac{3}{4}$ creutzers,) divided by 18, gives $1\frac{31}{48}$ creutzers for the cost of each portion.

" Details of expenses, &c., for the liver dumplins.

lb.	loths.		Creutzers.
2	28	of fine semel bread, ...	15
1	0	of beef liver, ...	5
0	18	of fine flour, ...	$2\frac{1}{2}$
0	6	of salt, ...	$0\frac{1}{2}$
2	24	of water, ...	0
Total 7	12		Cost 23 creutzers.

" These ingredients being made into dumplins, the dumplins after being properly boiled were found to weigh 8 lb. This gave for each portion $22\frac{1}{3}$ loths ; and the amount of the cost (23 creutzers,) divided by 12, the number of portions, gives for each $1\frac{11}{12}$ creutzers.

" The quantity of dry ammunition bread furnished to each person was 1 lb. 8 loths ; and this at two creutzers a pound, amounts to $2\frac{1}{2}$ creutzers.

Recapitulation.

For each person—

lb.	loths.		Creutzers.
0	$4\frac{1}{2}$	of boiled beef and	
1	8	of bread soup.....	$1\frac{31}{48}$
0	$21\frac{1}{4}$	of liver dumplins, ...	$1\frac{11}{12}$
1	8	of dry bread, ...	$2\frac{1}{2}$
3	$9\frac{5}{6}$	of Food.	Cost $6\frac{3}{48}$ Creutzers.

" In Avoirdupois weight and English money, it is for each person,

lb.	oz.		Pence.
0	$2\frac{78}{100}$	of boiled beef, and	
1	$8\frac{91}{100}$	of bread soup.. ...	$0\frac{948}{1584}$
0	$13\frac{19}{100}$	of liver dumplins, ...	$0\frac{276}{306}$
1	$8\frac{76}{100}$	of dry bread, ...	$0\frac{10}{11}$
4	$1\frac{54}{100}$	of Food.	Cost $2\frac{1}{5}$ pence.

" June 21st, 1795.—Bill of Fare.

" Boiled beef, and bread soup, with bread dumplins.

" Details of expenses, &c., for the boiled beef and bread soup, the same as yesterday :—

" For the dumplins.

lb.	loths.		Creutzers.
2	30	semel bread, ...	$15\frac{1}{2}$
0	18	fine flour, ...	3
0	6	salt, ...	$0\frac{1}{2}$
3	0	water, ...	
6	22		Cost, 19 creutzers.

" These dumplins being boiled, were found to weigh 7 lb. which gave for each person $18\frac{2}{3}$ loths and each portion cost $1\frac{7}{12}$ creutzers.

" Dry ammunition bread furnished to each person 1 lb. 8 loths, which cost $2\frac{1}{2}$ creutzers.

Recapitulation.

" Each person belonging to the mess received this day:

lb.	loths.		Creutzers.
0	$4\frac{1}{2}$	of boiled beef, and	
1	8	of bread soup.....	$1\frac{31}{48}$
0	$18\frac{2}{3}$	of bread dumplins, ...	$1\frac{7}{12}$
1	8	of dry bread, ...	$2\frac{1}{2}$
3	$7\frac{1}{6}$	of food,	Cost $5\frac{35}{42}$

" In avoirdupois weight, and English money, it is,

lb.	oz.		Pence.
0	$2\frac{78}{100}$	of boiled beef, and	
1	$8\frac{70}{100}$	of bread soup.....	$0\frac{948}{1584}$
0	$11\frac{54}{100}$	of bread dumplins, ...	$0\frac{228}{396}$
1	$8\frac{76}{100}$	of dry bread, ...	$0\frac{10}{11}$
4	0	of food,	Cost $2\frac{1}{12}$ pence.

" June 22d, 1795.—Bill of fare.

" Bread soup and meat dumplins.

" Details of expenses, &c.

lb.	loths.		Creutzers.
2	0	of beef, ...	15
2	30	of semel bread, ...	$15\frac{1}{2}$
0	18	of fine flour, ...	3
0	1	of pepper, ...	1
0	12	of salt, ...	1
0	2	of sweet herbs, ...	$0\frac{1}{2}$
2	24	of ammunition bread, ...	$3\frac{1}{4}$
2	16	of water to the dumplins, ...	
			Cost $39\frac{1}{4}$ creutzers.

" The meat being cut fine, or minced, was mixed with the semel or wheaten bread, and these with the flour, and a due proportion of salt, were made into dumplins, and boiled in the soup. These dumplins when boiled, weighed 10lb which divided into twelve equal portions, gave $20\frac{2}{3}$ loths for each.

" The soup weighed 15lb. which gave 1lb 8 loths for each portion. Of dry ammunition bread each person received 1lb 8 loths, which cost $2\frac{1}{2}$ creutzers.

" *Recapitulation.*

Each person received this day.

lb.	loths		Creutzers.
0	$20\frac{2}{3}$	of meat dumplins, and	
1	8	of bread soup.....	$3\frac{13}{48}$
1	8	of ammunition bread, ...	$2\frac{1}{2}$
3	$4\frac{2}{3}$	of food,	Cost $5\frac{37}{48}$ creutzers.

"In avoirdupois weight, and English money, it is,

lb.	oz.			Pence.
0	$12\frac{77}{100}$	of meat dumplins, and	...	$1\frac{300}{1584}$
1	$8\frac{76}{100}$	of bread soup,		
1	$8\frac{76}{100}$	of ammunition bread,	...	$0\frac{10}{11}$
3	$14\frac{29}{100}$	of food,		$2\frac{1}{10}$ pence.

The results of all these experiments (and of many more which I could add) show that the Bavarian soldier can live—and the fact is that he actually does live—upon a little more than two-thirds of his allowance. Of the five creutzers a-day which he receives in money, he seldom puts more than two creutzers and a half, and never more than three creutzers into the mess; so that at least two-fifths of his pay remains after he has defrayed all the expenses of his subsistence; and as he is furnished with every article of his clothing by the sovereign, and no stoppage is ever permitted to be made of any part of his pay, on any pretence whatever, there is no soldier in Europe whose situation is more comfortable.

Though the ammunition bread with which he is furnished is rather coarse and brown, being made of rye-meal, with only a small quantity of the coarser part of the bran separated from it, yet it is not only wholesome, but very nourishing; and for making soup it is even more palatable than wheaten bread. Most of the soldiers, however, in the Elector's service, and particularly those belonging to the Bavarian regiments, make a practice of selling a great part of their allowance of ammunition bread, and, with the money they get for it, buy the best wheaten bread that is to be had; and many of them never taste brown bread but in their soup.

The ammunition bread is delivered to the soldiers every fourth day in loaves, each loaf being equal to two rations; and it is a rule generally established in the messes for each soldier to furnish one loaf for the use of the mess every twelfth day, so that he has five-sixths of his allowance of bread which remains at his disposal.

The foregoing account of the manner in which the Bavarian soldiers are fed, will, I think, show most clearly the great importance of making soldiers live together in messes. It may likewise furnish some useful hints to those who may be engaged in feeding the poor, or in providing food for ships' companies, or other bodies of men who are fed in common.

With regard to the expense of fuel in these experiments, as the victuals were cooked in earthen pots, over an open fire, the consumption of fire-wood was very great.

On the 10th of June, when 9lb. $30\frac{1}{2}$ loths of soup, 1lb. 28 loths of meat, and 5lb. 24 loths of bread dumplins, in all 17lb. $18\frac{1}{2}$ loths of food were prepared, and the process of cooking, from the time the fire was lighted till the victuals were done, lasted two hours and forty-five minutes, and twenty-nine pounds, Bavarian weight, of fire-wood were consumed.

On the 11th of June, when 11lb. 26 loths of bread soup, and 8lb. 8 loths of bread dumplins, in all 20lb 2 loths of food were prepared, the process of cooking lasted one hour and thirty minutes; and seventeen pounds of wood were consumed.

On the 20th of June, in sergeant Kein's mess, 15lb. of soup, 11b. 22 loths of meat, and 8lb of liver dumplins, in all 24lb. 22 loths of food were prepared, and, though the process of cooking lasted two hours and forty-five minutes, only 27½lb. of fire-wood were consumed.

On the 21st of June the same quantity of soup and meat, and 7lb. of bread dumplins, in all 23lb. 22 loths of food were prepared in two hours and thirty minutes, with the consumption of 18½lb. of wood.

On the 22d of June 15lb. of soup, and 10lb. of meat dumplins, in all 25lb. of food, were cooked in two hours and forty-five minutes, and the wood consumed was 18lb. 10 loths.

The following table will show, in a striking and satisfactory manner, the expense of fuel in these experiments.

Date of the Experiments.	Time employed in cooking.	Quantity of food prepared.	Quantity of Wood consumed.	Quantity of Wood to 1lb. of food.
June, 1795.	hours min.	lb. loths	lb.	
10th	2 45	17 18½	29	
11th	1 30	20 2	17	
20th	2 45	24 22	17½	
21st	2 30	23 22	18½	
22d	2 45	25 0	18¼	
Sums 5	12 15	111 0½	100¼	
Means	2 23	22 0⅕	20 1/20	10/11lb.

The mean quantity of food prepared daily in five days being 22lb. very nearly, and the mean quantity of fire-wood consumed being 20 1/20lb.; this gives 10/11lb. of wood for each pound of food.

But it has been found by actual experiment, made with the utmost care in the new kitchen of the House of Industry at Munich, and often repeated, that 600lb of food (of the soup No. 1 given to the poor,) may be cooked with the consumption of only 44lb. of pine-wood.

And hence it appears how very great the waste of fuel must be in all culinary processes, as they are commonly performed; for, though the time taken in cooking the soup for the poor is, at a medium, more than four hours and a half, while that employed by the soldiers in their cooking is less than two hours and a half; yet the quantity of fuel consumed by the latter is near thirteen times greater than that employed by the public kitchen of the House of Industry.

But I must not anticipate here a matter which is to be the subject of a separate essay; and which, from its great importance, certainly deserves to be carefully and thoroughly investigated.

CHAPTER V.

All those who have been conversant in military affairs must have had frequent opportunities of observing the striking difference there

is, even in the appearance of the men, between regiments in which messes are established, and food is regularly provided under the care and inspection of the officers; and others, in which the soldiers are left individually to shift for themselves. And the difference which may be observed between soldiers who live in messes, and are regularly fed, and others who are not, is not confined merely to their external appearance; the influence of these causes extend much farther, and even the moral character of the man is affected by them.

Peace of mind, which is as essential to contentment and happiness as it is to virtue, depends much upon order and regularity in the common affairs of life; and in no case are order and method more necessary to happiness, (and consequently to virtue,) than in that, where the preservation of health is connected with the satisfying of hunger; an appetite whose cravings are sometimes as inordinate as they are insatiable.

Peace of mind depends likewise much upon economy, or the means used for preventing pecuniary embarrassments; and the savings to soldiers in providing food, which arise from housekeeping in messes of ten or twelve persons who live together, is very great indeed.

But great as these savings now are, I think they might be made still more considerable; and I shall give my reasons for this opinion.

Though the Bavarian soldiers live at a very small expense, little more than two pence sterling a day, yet when I compare this sum, small as it is, with the expense of feeding the poor in the House of Industry at Munich, which does not amount to more than two farthings a day, even including the cost of the piece of rye bread, weighing seven ounces avoirdupois, which is given them in their hands at dinner, but which they seldom eat at dinner, but commonly carry home in their pockets for their suppers; when I compare, I say, this small sum with the daily expense of the soldiers for their subsistence, I find reason to conclude, either that the soldier might be fed cheaper, or that the poor must be absolutely starved upon their allowance.

That the latter is not the case, the healthy countenances of the poor, and the air of placid contentment which always accompanies them, as well in the dining hall as in their working rooms, affords at the same time the most interesting and most satisfactory proof possible.

Were they to go home in the course of the day, it might be suspected that they got something at home to eat, in addition to what they received from the public kitchen of the establishment: but this they seldom or ever do, and they come to the house so early in the morning, and leave it so late at night, that it does not seem probable that they could find time to cook anything at their own lodgings.

Some of them, I know, make a constant practice of giving themselves a treat of a pint of beer at night, after they have finished their work, but I do not believe they have anything else for their suppers, except it be the bread which they carry home from the House of Industry.

I must confess, however, very fairly, that it always appeared to me quite surprising, and that it is still a mystery which I do not clearly understand, how it is possible for these poor people to be so comfortably fed upon the small allowances which they receive. The facts, however, are not only certain, but they are notorious. Many persons of the most respectable character in this country, (Great Britain,) as well as on the Continent, who have visited the House of Industry at Munich, can bear witness to their authenticity; and they are surely not the less interesting for being extraordinary.

It must, however, be remembered, that what formerly cost two farthings in Bavaria, at the mean price of provisions in that country, cost three farthings at this present moment; and would probably cost six in London, and in most other parts of Great Britain; but still, it will doubtless appear almost incredible that a comfortable and nourishing meal, sufficient for satisfying the hunger of a strong man, may be furnished in London, and at this very moment, when provisions of all kinds are so remarkably dear, at less than three farthings. The fact, however, is most certain, and may easily be demonstrated by making the experiment. Supposing that it should be necessary, in feeding the poor in this country, to furnish them with three meals a day, even that might be done, at a very small expense, were the system of feeding them adopted which is here proposed. The amount of that expense would be as follows:—

	Pence.	Farthings.
For breakfast, 20 ounces of the soup No 2, composed of pearl barley, peas, potatoes, and fine wheaten bread. (See page 13,)	0	2½
For dinner, 20 ounces of the same soup, and 7 ounces of rye-bread, . . .	1	2
For supper, 20 ounces of the same soup, .	0	2½
In all, 4lb. 3oz. of food, which would cost, .	2	3

Should it be thought necessary to give a little meat at dinner, this may best be done by mixing it, cut fine, or minced, in bread dumplins; or when bacon or any kind of salted or smoked meat is given, to cut it fine and mix it with the bread which is eaten in the soup. If the bread be fried, the food will he much improved. but this will be attended with some additional expense. Rye-bread is as good, if not better, for frying, than bread made of wheat-flour, and it is commonly not half so dear. Perhaps rye-bread fried might be furnished almost as cheap as wheaten bread not fried; and if this could be done, it would certainly be a very great improvement.

There is another way by which these cheap soups may be made exceedingly palatable and savoury; which is, by mixing with them a very small quantity of red herrings, minced very fine or pounded in a mortar. There is no kind of cheap food, I believe, that has so much taste as red herrings, or that communicates its flavour with so much liberality to other eatables, and to most palates it is remarkably agreeable.

Cheese may likewise be made use of for giving an agreeable relish to these soups, and a very small quantity of it will be suffi-

cient for that purpose, provided it has a strong taste and is properly applied.

It should be grated to powder with a grater, and a small quantity of this powder thrown over the soup after it is dished out. This is frequently done at the sumptuous tables of the rich, and is thought a great delicacy, while the poor, who have so few enjoyments, have not been taught to avail themselves of this, which is so much within their reach.

Those whose avocations call them to visit different countries, and those whose fortune enables them to travel for their amusement or improvement, have many opportunities for acquiring useful information; and in consequence of this intercourse with strangers, many improvements and more refinements have been introduced into this country; but the most important advantages that might be derived from an intimate knowledge of the manners and customs of different nations,—the introduction of improvements tending to facilitate the means of subsistence, and to increase the comforts and conveniences of the most necessitous and most numerous classes of society—have been, alas! little attended to. Our extensive commerce enables us to procure, and we do actually import most of the valuable commodities which are the produce either of the soil of the ocean or of the industry of man in all the various regions of the habitable globe; but the result of the experience of ages respecting the use that can be made of those commodities has seldom been thought worth importing. I never see maccaroni in England or polenta in Germany on the tables of the rich, without lamenting that those cheap and wholesome luxuries should be monopolized by those who stand least in need of them; while the poor, who, one would think, ought to be considered as having almost an exclusive right to them, (as they were both invented by the poor of a neighbouring nation,) are kept in perfect ignorance of them.

But these two kinds of food are so palatable, wholesome and nourishing, and may be provided so easily and at so very cheap a rate in all countries, and particularly in Great Britain, that I think I cannot do better than to devote a few pages to the examination of them; and I shall begin with polenta or Indian corn, as it is called in this country.

CHAPTER VI.

I CANNOT help increasing the length of this essay much beyond the bounds I originally assigned to it, in order to have an opportunity of recommending a kind of food which I believe to be, beyond comparison, the most nourishing, cheapest and most wholesome that can be procured for feeding the poor. This is Indian corn, a most valuable production, and which grows in almost all climates; and though it does not succeed remarkably well in Great Britain and in some parts of Germany, yet it may easily be had in great abundance from other countries, and commonly at a very low rate.

The common people in the northern parts of Italy live almost

entirely upon it, and throughout the whole continent of America it makes a principal article of food. In Italy it is called polenta, where it is prepared or cooked in a variety of ways, and forms the basis of a number of very nourishing dishes. The most common way, however, of using it in that country is to grind it into meal, and with water to make it into a thick kind of pudding, like what in this country is called a hasty pudding, which is eaten with various kinds of sauce, and sometimes without any sauce.

In the northern parts of North America the common household bread throughout the country is composed of one part of Indian meal and one part of rye meal; and I much doubt whether a more wholesome or more nourishing bread can be made.

Rice is universally allowed to be very nourishing—much more so even than wheat; but there is a circumstance well known to all those who are acquainted with the details of feeding the negro slaves in the southern states of North America and in the West Indies, that would seem to prove, in a very decisive and satisfactory manner, that Indian corn is even more nourishing than rice. In those countries, where rice and Indian corn are both produced in the greatest abundance, the negroes have frequently had their option between these two kinds of food, and have invariably preferred the latter. The reason they give for this preference they express in strong, though not in very delicate terms. They say that "Rice turns to water in their bellies and runs off," but "Indian corn stays with them and makes strong to work."

This account of the preference which negroes give to Indian corn for food, and of their reasons for this preference, was communicated to me by two gentlemen of most respectable character, well known in England and now resident in London, who were formerly planters—one in Georgia and another in Jamaica.

The nutritive quality which Indian corn possesses, in a most eminent degree, when employed in fattening hogs and poultry, and for giving strength to working oxen, has long been universally known and acknowledged in every part of North America, and nobody in that country thinks of employing any other grain for those purposes.

All these facts prove to a demonstration that Indian corn possesses very extraordinary nutritive powers, and it is well known that there is no species of grain that can be had so cheap or in so great abundance; it is therefore well worthy the attention of those who are engaged in providing cheap and wholesome food for the poor, or in taking measures for warding off the evils which commonly attend a general scarcity of provisions, to consider in time how this useful article of food may be procured in large quantities, and how the introduction of it into common use can most easily be effected. In regard to the manner of using Indian corn, there are a vast variety of different ways in which it may be prepared or cooked, in order to its being used for food. One simple and obvious way of using it is, to mix it with wheat, rye, or barley meal in making bread; but when it is used for making bread, and particularly when it is mixed with wheat flour, it will greatly improve the quality of the bread, if the Indian meal, the coarser part of the bran being first separated from it by sifting, be previously mixed with

water and boiled for a considerable length of time—two or three hours, for instance, over a slow fire, before the other meal or flour is added to it. This boiling, which, if the proper quantity of water be employed, will bring the mass to the consistency of a thin pudding, will effectually remove a certain disagreeable raw taste in the Indian corn which simple baking will not entirely take away; and the wheat flour being mixed with this pudding after it has been taken from the fire and cooled, and the whole well kneaded together, may be made to rise and be formed in loaves and baked into bread, with the same facility that bread is made of wheat flour alone, or of any mixtures of different kinds of meal.

When the Indian meal is previously prepared by boiling, in the manner here described, a most excellent and very palatable kind of bread, not inferior to wheaten bread, may be made of equal parts of this meal and of common wheat flour.

But the most simple, and, I believe, the best and most economical way of employing Indian corn as food is to make it into puddings. There is, as I have already observed, a certain rawness in the taste of it, which nothing but long boiling can remove, but when that disagreeable taste is removed, it becomes extremely palatable, and that it is remarkably wholesome has been proved by so much experience, that no doubts can possibly be entertained of the fact.

The culture of it requires more labour than most other kinds of grain; but, on the other hand, the produce is very abundant, and it is always much cheaper than either wheat or rye. The price of it in the Carolinas and in Georgia has often been as low as eighteen pence and sometimes as one shilling sterling per bushel; but the Indian corn which is grown in those southern states is much inferior, both in weight and in its qualities, to that which is the produce of colder climates. Indian corn of the growth of Canada and the New England States, which is generally thought to be worth twenty per cent more per bushel than that which is grown in the southern states, may commonly be bought for two and sixpence or three shillings a bushel.

It is now three shillings and sixpence a bushel in Boston; but the prices of provisions of all kinds have been much raised of late in all parts of America owing to the uncommonly high prices which are paid for them in the European markets since the commencement of the present war.

Indian corn and rye are very nearly of the same weight, but the former gives rather more flour, when ground and sifted, than the latter. I find by a report of the Board of Agriculture, of the 10th of November, 1795, that three bushels of Indian corn weighed 1cwt. 1qr. 18lb., (or 53lb. each bushel) and gave 1cwt. 20lb. of flour, and 26lb of bran; while three bushels of rye, weighing 1cwt. 1qr. 22lb. (or 54lb. the bushel) gave only 1cwt. 17lb. of flour, and 28lb. of bran. But I much suspect that the Indian corn used in these experiments was not of the best quality.

I saw some of it, and it appeared to me to be of that kind which is commonly grown in the southern states of North America. Indian corn of the growth of colder climates is, probably, at least as

heavy as wheat, which weighs at a medium about 58lb. per bushel, and I imagine it will give nearly as much flour.

In regard to the most advantageous method of using Indian corn as food, I would strongly recommend, particularly when it is employed for feeding the poor, a dish made of it that is in the highest estimation throughout America, and which is really very good and very nourishing. This is called hasty-pudding, and it is made in the following manner: a quantity of water, proportioned to the quantity of hasty-pudding intended to be made, is put over the fire in an open iron pot or kettle, and a proper quantity of salt for seasoning the pudding being previously dissolved in the water, Indian meal is stirred into it by little and little, with a wooden spoon with a long handle, while the water goes on to be heated and made to boil; great care being taken to put in the meal by very small quantities, and by sifting it slowly through the fingers of the left hand, and stirring the water about very briskly at the same time with the wooden spoon, with the right hand, to mix the meal with the water in such a manner as to prevent lumps being formed. The meal should be added so slowly that, when the water is brought to boil, the mass should not be thicker than water gruel, and half an hour more, at least, should be employed to add the additional quantity of meal necessary for bringing the pudding to be of the proper consistency, during which time it should be stirred about continually, and kept constantly boiling. The method of determining when the pudding has acquired the proper consistency is this:—the wooden spoon used for stirring it being placed upright in the middle of the kettle. if it falls down more meal must be added. but, if the pudding is sufficiently thick and adhesive to support it in a vertical position, it is declared to be proof, and no more meal is added; if the boiling, instead of being continued only half an hour, be prolonged to three quarters of an hour, or an hour, the pudding will be considerably improved by this prolongation.

This hasty pudding, when done, may be eaten in various ways. It may be put, while hot. by spoonfuls into a bowl of milk, and eaten with the milk with a spoon in lieu of bread; and used in this way it is remarkably palatable. It may likewise be eaten, while hot, with a sauce composed of butter and brown sugar, or butter and molasses, with or without a few drops of vinegar; and however people who have not been accustomed to this American cookery may be prejudiced against it, they will find upon trial that it makes a most excellent dish, and one which never fails to be much liked by those who are accustomed to it. The universal fondness of Americans for it proves that it must have some merit; for in a country which produces all the delicacies of the table in the greatest abundance. it is not to be supposed that a whole nation should have a taste so depraved as to give a decided preference to any particular species of food which has not something to recommend it.

The manner in which hasty-pudding is eaten with butter and sugar, or butter and molasses, in America, is as follows; The hasty-pudding being spread out equally upon a plate, while hot, an excavation is made in the middle of it with a spoon, into which excavation a piece of butter, as large as a nutmeg, is put, and, upon it, a

spoonful of brown sugar, or more commonly of molasses. The butter being soon melted by the heat of the pudding mixes with the sugar or molasses, and forms a sauce, which, being confined in the excavation made for it, occupies the middle of the plate. The puddding is then eaten with a spoon, each spoonful of it being dipt into the sauce before it is carried to the mouth; care being had in taking it up to begin at the outside, or near the brim of the plate, and to approach the centre by regular advances, in order not to demolish too soon the excavation which forms the reservoir for the sauce.

If I am prolix in these descriptions, my reader must excuse me, for persuaded as I am that the action of food upon the palate and consequently the pleasure of eating, depends very much indeed upon the manner in which the food is applied to the organs of taste, I have thought it necessary to mention, and even to illustrate in the clearest manner, every circumstance which appeared to me to have influence in producing those important effects.

In the case in question as it is the sauce alone which gives taste and palatableness to the food, and consequently is the cause of the pleasure enjoyed in eating it, the importance of applying or using it in such a manner as to produce the greatest and most durable effect possible in the organs of taste, is quite evident; and in the manner of eating this food which has here been described and recommended, the small quantity of sauce used, (and the quantity must be small as it is the expensive article) is certainly applied to the palate more immediately, by a greater surface, and in a state of greater condensation, and consequently acts upon it more powerfully, and continues to act upon it for a greater length of time than it could well be made to do when used in any other way. Were it more intimately mixed with the pudding, for instance, instead of being merely applied to its external surface, its action would certainly be much less powerful, and were it poured over the pudding, or were proper care not taken to keep it confined in the little excavation or reservoir made in the midst of the pudding to contain it, much of it would attach itself and adhere to the surface of the plate, and be lost.

Hasty-pudding has this in particular to recommend it, and which renders it singularly useful as food for poor families, that when more of it is made at once than is immediately wanted, what remains may be preserved good for several days, and a number of very palatable dishes may be made of it. It may be cut in thin slices and toasted before the fire, or on a gridiron, and eaten instead of bread, either in milk or in any kind of soup or pottage; or with any other kind of food with which bread is commonly eaten; or it may be eaten cold, without any preparation, with a warm soup made of butter, molasses or sugar, and a little vinegar. In this last-mentioned way of eating it, it is quite as palatable, and I believe more wholesome, than when eaten warm; that is to say, when it is first made. It may likewise be put cold, without any preparation, into hot milk; and this mixture is by no means unpalatable, particularly if it be suffered to remain in the milk till it is warmed throughout, or if it be boiled in the milk for a few moments.

A favourite dish in America, and a very good one, is made of cold boiled cabbage, chopped fine, with a small quantity of cold boiled beef, and slices of cold hasty-pudding, all fried together in butter or hog's lard.

Though hasty-puddings are commonly made of Indian meal, yet it is by no means uncommon to make them of equal parts of Indian and of rye-meal; and they are sometimes made of rye-meal alone, or of rye-meal and wheaten flour mixed.

To give a satisfactory idea of the expense of preparing hasty-puddings in this country, (England) and of feeding the poor with them, I made the following experiment: About two pints of water, which weighed just 2lb. avoirdupois, were put over the fire in a saucepan of a proper size, and 58 grains in weight, or $\frac{1}{120}$ of a pound of salt being added, the water was made to boil. During the time that it was heating, small quantities of Indian meal were stirred into it, and care was taken, by moving the water briskly about with a wooden spoon, to prevent the meal being formed into lumps; and as often as any lumps were observed, they were carefully broken by the spoon; the boiling was then continued half an hour, and during this time the pudding was continually stirred about with the wooden spoon, and so much more meal was added as was found necessary to bring the pudding to be of the proper consistency

This being done, it was taken from the fire and weighed, and was found to weigh just 1lb. 11½oz. Upon weighing the meal which remained, (the quantity first provided having been exactly determined by weight in the beginning of the experiment) it was found that just half a pound of meal had been used.

From the result of this experiment it appears, that for each pound of Indian meal employed in making hasty-puddings, we may reckon 3lb. 9oz. of the pudding. And the expense of providing this kind of food, or the cost of it by the pound, at the present high price of grain in this country, may be seen by the following computation.

Half a pound of Indian meal, (the quantity used in the foregoing experiment) at 2d. a pound, or 7s. 6d. a bushel for the corn, (the price stated in the report of the Board of Agriculture of 10th of November, 1795, so often referred to, costs	1d.
58 grains, or $\frac{1}{120}$ of a pound of salt, at 2d. per pound.....	$0\frac{1}{60}$
Total,	$1\frac{1}{60}$

Now, as the quantity of pudding prepared with these ingredients was 1lb. 11½oz. and the cost of the ingredients amounted to one penny and one-sixtieth of a penny, this gives for the cost of one pound of hasty-pudding $\frac{71}{120}$ of a penny, or $2\frac{1}{3}$ farthings very nearly. It must, however, be remembered that the Indian corn is here reckoned at a very exorbitant price indeed.

But before it can be determined what the expense will be of feeding the poor with this kind of food, it will be necessary to ascertain how much of it will be required to give a comfortable meal to one person; and how much the expense will be of providing the sauce for that quantity of pudding. To determine these two points with some degree of precision, I made the following experiment. Having taken my breakfast, consisting of two dishes of coffee, with cream, and a dry toast, at my usual hour of breakfasting, (nine o'clock in the morning,) and having fasted from that time till five o'clock in the afternoon, I then dined upon my hasty-pudding, with the American sauce already described, and I found, after my appetite for food was perfectly satisfied, and I felt that I had made a comfortable dinner, that I had eaten just 1lb. $1\frac{1}{2}$ oz. of the pudding; and the ingredients, of which the sauce which was eaten with it was composed, were half an ounce of butter; three quarters of an ounce of molasses, and 21 grains or $\frac{1}{3}\frac{1}{4}\frac{1}{2}$ of a pint of vinegar.

The cost of this dinner may be seen by the following computation:

FOR THE PUDDING.

	Farthings.
1lb. $1\frac{1}{2}$ oz. of hasty pudding at $2\frac{1}{3}$ farthings.....	$2\frac{1}{2}$

FOR THE SAUCE.

Half an oz. of butter, at 10d. per pound.....	$1\frac{1}{4}$
Three quarters of an ounce of molasses, at 6d. per pound,	1
$\frac{1}{3}\frac{1}{5}$ of a pint of vinegar, at 2s. 8d. the gallon..	$0\frac{1}{16}$
Total for the Sance,	$2\frac{5}{16}$
Sum total of expenses for this dinner, for the pudding and its sauce, ...	$4\frac{13}{16}$

Or something less than one penny farthing.

I believe it would not be easy to provide a dinner in London, at this time, when provisions of all kinds are so dear, equally grateful to the palate, and satisfying to the cravings of hunger, at a smaller expense. And that this meal was sufficient for all the purposes of nourishment appears from hence, that though I took my usual exercise, and did not sup after it, I neither felt any particular faintness, nor any unusual degree of appetite for my breakfast the next morning. I have been the more particular in my account of this experiment, to show in what manner experiments of this kind ought, in my opinion, to be conducted; and also to induce others to engage in those most useful investigations.

It will not escape the observation of the reader, that small as the expense was of providing this dinner, yet very near one half of that sum was laid out in the purchasing the ingredients for the sauce. But it is probable that a considerable part of the expense might be saved. In Italy, polenta, which is nothing more than hasty-pudding made with Indian meal and water, is very frequently, and I believe, commonly eaten without any sauce, and when on holidays or other extraordinary occasions they indulge themselves by adding a sauce to it, this sauce is far more expensive. It is commonly nothing more than a very small quantity of butter spread over the flat surface of

the hot polenta which is spread out thin in a large platter; with a Parmezan or other strong cheese, reduced to a coarse powder by grating it with a grater, strewed over it.

Perhaps this Italian sauce might be more agreeable to an English palate than that commonly used in America. It would certainly be less expensive, as much less butter would be required, and as cheese in this country is plenty and cheap. But whatever may be the sauce used with food prepared of Indian corn, I cannot too strongly recommend the use of that grain.

While I was employed in making my experiment upon hasty-pudding, I learnt from my servant, (a Bavarian,) who assisted me, a fact which gave me great pleasure, as it served to confirm me in the opinion I have long entertained of the great merit of Indian corn. He assured me that polenta is much esteemed by the peasantry in Bavaria, and that it makes a very considerable article of their food; that it comes from Italy through the Tyrol; and that it is commonly sold in Bavaria at the same price as wheat flour! can there be stronger proofs of its merit?

The negroes in America prefer it to rice; and the Bavarian peasants to wheat. Why, then, should not the inhabitants of this island like it? It will not I hope, be pretended, that it is in this favoured soil alone that prejudices take such deep root that they are never to be eradicated, or that there is any thing peculiar in the construction of the palate of an Englishman.

The objection that may be made to Indian corn, that it does not thrive well in this country, is of no weight. The same objection might, with equal reason, be made to rice, and twenty other articles of food now in common use.

It has ever been considered, by those versed in the science of political economy, as an object of the first importance to keep down the prices of provisions particularly in manufacturing and commercial countries; and if there be a country on earth where this ought to be done, it is surely Great Britain: and there is certainly no country which has the means of doing it so much in its power.

But the progress of national improvements must be very slow, however favourable other circumstances may be, where those citizens, who, by their rank and situation in society, are destined to direct the public opinion, affect to consider the national prejudices as unconquerable. But to return to the subject immediately under consideration.

Though hasty-pudding is, I believe, the cheapest food that can be prepared with Indian corn, yet, several other very cheap dishes may be made of it, which in general are considered as being more palatable, and which, most probably, would be preferred in this country; and among these, what in America is called a plain Indian pudding certainly holds the first place, and can hardly fail to be much liked by those who will be persuaded to try it. It is not only cheap and wholesome, but a great delicacy; and it is principally on account of these puddings that the Americans, who reside in this country, import annually for their own consumption Indian corn from the Continent of America.

In order to be able to give the most particular and satisfactory

information respecting the manner of preparing these Indian puddings, I caused one of them to be made here, (in London,) under my immediate direction, by a person born and brought up in North America, and who understands perfectly the American art of cookery in all its branches.

This pudding, which was allowed by competent judges who tasted it to be as good as they had ever eaten, was composed and prepared in the following manner.

APPROVED RECEIPT FOR MAKING A PLAIN INDIAN PUDDING.

Three pounds of Indian meal (from which the bran had been separated by sifting it in a common hair sieve) were put into a large bowl, and five pints of boiling water were put to it, and the whole well stirred together; three quarters of a pound of molasses and one ounce of salt, were then added to it, and these being well mixed, by stirring them with the other ingredients, the pudding was poured into a fit bag; and the bag being tied up, (an empty space being left in the bag in tying it, equal to about one sixth of its contents, for giving room for the pudding to swell,) this pudding was put into a kettle of boiling water, and was boiled six hours without intermission; the loss of the water in the kettle by evaporation during this time being frequently replaced with boiling water from another kettle.

The pudding upon being taken out of the bag weighed ten pounds and one ounce; and it was found to be perfectly done, not having the smallest remains of that raw taste so disagreeable to all palates, and particularly to those who are not used to it, which always predominates in dishes prepared of Indian meal when they are not sufficiently cooked.

As this raw taste is the only well founded objection that can be made to this most useful grain, and is I am persuaded, the only cause which makes it disliked by those who are not accustomed to it, I would advise those who may attempt to introduce it into common use, where it is not known, to begin with Indian (bag) puddings, such as I have been describing; and that this is a very cheap kind of food will be evident from the following computation.—

EXPENSE OF PREPARING THE INDIAN PUDDING ABOVE MENTIONED.

	Pence.	Pence.
3lb. of Indian meal, at	$1\frac{1}{2}$	$4\frac{1}{2}$
$\frac{3}{4}$lb. molasses, at	6	$4\frac{1}{2}$
1oz. of salt 2d. per lb.	—	$0\frac{1}{8}$
	Total for ingredients	$9\frac{1}{8}$

As this pudding weighed $10\frac{1}{16}$lbs. and the ingredients cost nine pence and a half farthing, this gives three farthings and an half for each pound of pudding.

It will be observed, that in this computation I have reckoned the Indian meal at no more than $1\frac{1}{2}$d. per pound, whereas in the calculation which was given to determine the expense of preparing hasty-pudding it was taken at two pence a pound. I have here reckoned it at $1\frac{1}{2}$d. a pound, because I am persuaded it might be had here in

London for that price, and even for less. That which has lately been imported from Boston has not cost so much; and were it not for the present universal scarcity of provisions in Europe, which has naturally raised the price of grain in North America, I have no doubt but Indian meal might be had in this country for less than one penny farthing per pound.

In composing the Indian pudding above mentioned, the molasses is charged at 6d. the pound, but that price is very exorbitant. A gallon of molasses weighing about 10lb. commonly costs in the West Indies from 7d. to 9d. sterling; and allowing sufficiently for the expenses of freight, insurance, and a fair profit for the merchant, it certainly ought not to cost in London more than 1s. 8d. the gallon; and this would bring it to 2d. per pound.

If we take the prices of Indian meal and molasses as they are here ascertained, and compute the expenses of the ingredients for the pudding before mentioned, it will be as follows:

	Pence.		Pence.
3 lb. of Indian meal, at.....	$1\frac{1}{4}$	.....	$3\frac{3}{4}$
$\frac{3}{4}$ lb. of molasses, at.....	2	.....	$1\frac{1}{2}$
1 oz. salt, at 2d. per lb	—	.....	$0\frac{1}{8}$
		Total,	$5\frac{3}{8}$

Now as the pudding weighed $10\frac{1}{16}$lbs. this gives two farthings, very nearly, for each pound of pudding; which is certainly very cheap indeed, particularly when the excellent qualities of the food are considered.

This pudding, which ought to come out of the bag sufficiently hard to retain its form, and even to be cut into slices, is so rich and palatable, that it may very well be eaten without any sauce; but those who can afford it commonly eat it with butter. A slice of the pudding, about half an inch, or three quarters of an inch in thickness, being laid hot upon a plate, an excavation is made in the middle of it with the point of a knife, into which a small piece of butter as large perhaps as a nutmeg, is put, and where it soon melts. To expedite the melting of the butter, the small piece of pudding which is cut out of the middle of the slice to form the excavation for receiving the butter, is frequently laid over the butter for a few moments, and is taken away (and eaten) as soon as the butter is melted. If the butter is not salt enough, a little salt is put in after it is melted. The pudding is to be eaten with a knife and fork, beginning at the circumference of the slice, and approaching regularly towards the centre, each piece of pudding being taken up with the fork, and dipped into the butter, or dipped into it in part only as is commonly the case, before it is carried to the mouth.

To those who are accustomed to view objects upon a great scale, and who are too much employed in directing what ought to be done, to descend to those humble investigations which are necessary to show how it is to be effected these details will doubtless appear trifling and ridiculous; but as my mind is strongly impressed with the importance of giving the most minute and circumstantial information respecting the manner of performing my operation, however simple

it may be to which people have not been accustomed, I must beg the indulgence of those who may not feel themselves particularly interested in these descriptions.

In regard to the amount of the expense for sauce for a plain Indian (bag) pudding, I have found that when butter is used for that purpose, (and no other sauce ought ever to be used with it,) half an ounce of butter will suffice for one pound of the pudding. It is very possible to contrive matters so as to use much more; perhaps twice, or three times as much: but if the directions relative to the manner of eating this food, which have already been given are strictly followed, the allowance of butter here determined will be quite sufficient for the purpose for which it is designed; that is to say, for giving an agreeable relish to the pudding.

Those who are particularly fond of butter may use three quarters of an ounce of it with a pound of the pudding; but I am certain, that to use an ounce would be to waste it to no purpose whatever.

If now we reckon Irish, or other firkin butter, (which as it is salted, is the best that can be used,) at eight pence the pound, the sauce for one pound of pudding, namely, half an ounce of butter, will cost just one farthing; and this, added to the cost of the pudding, two farthings the pound, gives three farthings for the cost by the pound for this kind of food, with its sauce; and as this food is not only very rich and nutritive, but satisfying at the same time in a very remarkable degree, it appears how well calculated it is for feeding the poor.

It should be remembered, that the molasses used as an ingredient in these Indian puddings, does not serve merely to give taste to them,—it acts still a more important part; it gives what, in the language of the kitchen, is called lightness. It is a substitute for eggs, and nothing but eggs can serve as a substitute for it, except it be treacle; which, in fact, is a kind of molasses; or perhaps coarse brown sugar, which has nearly the same properties.

It prevents the pudding from being heavy and clammy; and without communicating to it any disagreeable sweet taste, or any thing of that flavour peculiar to molasses, gives it a richness uncommonly pleasing to the palate. And to this we may add that it is nutritive in a very extraordinary degree. This is a fact well known in all countries where sugar is made.

How far the laws and regulations of trade existing in this country might render it difficult to procure molasses from those places where it may be had at the cheapest rate, I know not; nor can I tell how far the free importation of it might be detrimental to our finances; I cannot however help thinking, that it is so great an object to this country to keep down the prices of provisions, or rather to check the alarming celerity with which they are rising, that means ought to be found to facilitate the importation, and introduction into common use, of an article of food of such extensive utility. It might serve to correct in some measure, the baleful influence of another article of foreign produce, (tea,) which is doing infinite harm in this island.

A point of great importance in preparing an Indian pudding is to boil it properly and sufficiently. The water must be actually boiling

when the pudding is put into it; and it never must be suffered to cease boiling for a moment, till it is done; and if the pudding is not boiled full six hours, it will not be sufficiently cooked. Its hardness, when done, will depend on the space left in the bag for its expansion. The consistency of the pudding ought to be such, that it can be taken out of the bag without falling to pieces; but it is always better on many accounts, to make it too hard than too soft.

The form of the pudding may be that of a cylinder; or rather of a truncated cone, the largest end being towards the mouth of the bag, in order that it may be got out of the bag with greater facility; or it may be made of a globular form, by tying it up in a napkin. But whatever is the form of the pudding, the bag or napkin in which it is to be boiled, must be wet in boiling water, before the pudding, (which is quite liquid before it is boiled,) is poured into it; otherwise it will be apt to run through the cloth.

Though this pudding is so good, perfectly plain, when made according to the directions here given, that I do not think it capable of any real improvements; yet there are various additions that may be made to it, and that frequently are made to it, which may perhaps be thought by some to render it more palatable, or otherwise to improve it. Suet may, for instance, be added, and there is no suet pudding whatever superior to it: and as no sauce is necessary with a suet pudding, the expense for the suet will be nearly balanced by the saving of the butter. To a pudding of the size of that just described, in the composition of which three pounds of Indian meal were used, one pound of suet will be sufficient; and this, in general will not cost more than from five pence to six pence, even in London, and the butter for sauce to a plain pudding of the same size would cost nearly as much. The suet pudding will indeed be rather the cheapest of the two, for the pound of suet will add a pound in weight to the pudding—whereas the butter will only add five ounces.

As the pudding, made plain, weighing $10\frac{1}{16}$ lb. cost $5\frac{3}{8}$ pence, the same pudding with the addition of one pound of suet, would weigh $11\frac{1}{16}$ lb. and would cost $11\frac{3}{8}$ pence,—reckoning the suet at six pence the pound. Hence it appears that Indian suet pudding may be made in London for about one penny a-pound. Wheaten bread, which is by no means so palatable, and certainly not half so nutritive, now costs something more than three pence the pound, and to this may be added, that dry bread can hardly be eaten alone; but of suet pudding a very comfortable meal may be made without any thing else.

A pudding in great repute in all parts of North America, is what is called an apple pudding. This is an Indian pudding, sometimes with, and sometimes without suet, with dried cuttings of sweet apples mixed with it; and when eaten with butter, is a most delicious food. These apples, which are pared as soon as they are gathered from the tree, and being cut into small pieces, are freed from their cores, and thoroughly dried in the sun, may be kept good for several years.

The proportions of the ingredients used in making these apple puddings are various; but, in general, about one pound of dried apples is mixed with three pounds of meal,—three quarters of a pound of molasses,—half an ounce of salt, and five pints of boiling water.

In America, various kinds of berries, found wild in the woods, such as huckle-berries, bel-berries, whortle-berries, &c., are gathered and dried, and afterwards used as ingredients in Indian puddings; and dried cherries and plums may be made use of in the same manner.

All these Indian puddings have these advantages in common, that they are very good warmed up, they will all keep good several days, and when cut into slices and toasted, are an excellent substitute for bread.

It will doubtless be remarked, that in computing the expense of providing these different kinds of puddings, I have taken no notice of the expense which will be necessary for fuel to cook them.

This is an article which ought undoubtedly to be taken into the account. The reason of my not doing it here is this;—having in the course of my experiments on heat found means to perform all the common operations of cookery with a surprisingly small expense of fuel, I find that the expense in question, when the proper arrangements are made for saving fuel, will be very trifling. And farther, as I mean soon to publish my Treatise on the Management of heat, in which I shall give the most ample directions relative to the mechanical arrangements of kitchen fire-places, and the best forms for all kinds of kitchen utensils, I was desirous not to anticipate a subject which will more naturally find its place in another Essay. In the mean time, I would observe, for the satisfaction of those who may have doubts respecting the smallness of the expense necessary for fuel in cooking for the poor, that the result of many experiments, of which I shall hereafter publish a particular account, has proved, in the most satisfactory manner, that when food is prepared in large quantities and cooked in kitchens properly arranged, the expense for fuel ought never to amount to more than two per cent of the cost of food, even where victuals of the cheapest kind are provided, such as is commonly used in feeding the poor. In the public kitchen of the House of Industry at Munich, the expense for fuel is less than one per cent of the cost of the food, as may be seen in the computation, page 13, Chapter III. of this Essay; and it ought not to be greater in many parts of Great Britain.

With regard to the price at which Indian corn can be imported into this country from North America in time of peace, the following information, which I procured through the medium of a friend from Captain Scott, a most worthy man, who has been constantly employed above thirty years as master of a ship in the trade between London and Boston in the state of Massachusetts, will doubtless be considered as authentic.

The following are the questions which were put to him, with his answers to them:—

Q. What is the freight, per ton, of merchandise from Boston in North America to London in time of peace? *A.* Forty shillings sterling.

Q. What is the freight, per barrel, of Indian corn? *A.* Five shillings.

Q. How much per cent is paid for insurance from Boston to London in time of peace? *A.* Two per cent.

Q. What is the medium price of Indian corn, per bushel, in New England? *A.* Two shillings and sixpence.

Q. What is the price of it at this time? *A.* Three shillings and sixpence.

Q. How many bushels of Indian corn are reckoned to a barrel? *A.* Four.

From this account it appears that Indian corn might, in time of peace be imported into this country and sold here for less than four shillings the bushel; and that it ought not to cost at this moment much more than five shillings a bushel.

If it be imported in casks, (which is certainly the best way of packing it,) as the freight of a barrel containing four bushels is five shillings, this gives 1s. 3d. a bushel for freight: and if we add one penny a bushel for insurance, this will make the amount of freight and insurance 1s. 4d., which, added to the prime cost of corn in America, (2s. 6d. per bushel in the time of peace, and 3s. 6d. at this time,) will bring it to 3s. 10d. per bushel in time of peace, and 4s. 10d. at this present moment.

A bushel of Indian corn of the growth of New England was found to weigh 61lb.; but we will suppose it to weigh at a medium only 60lb. per bushel, and we will also suppose that to each bushel of corn when ground there is 9lbs. of bran, which is surely a very large allowance, and 1lb. of waste in grinding and sifting; this will leave 50lb of flour for each bushel of corn, and as it will cost, in time of peace, only 3s. 10d. or 46 pence, this gives for each pound of flour $\frac{46}{50}$ of a penny, or $3\frac{3}{4}$ farthings very nearly.

If the price of Indian corn per bushel be taken at 4*s.* 10*d.*, what ought it cost at this time in London, without any bounty on importation being brought into the account? The price of the flour will be 4*s.* 10*d.*, equal to 58 pence for 50lb in weight, or $1\frac{1}{6}$ penny the pound, which is less than one-third of the present price of wheat flour. Rice is certainly not more nourishing than Indian corn, and costs $4\frac{1}{2}$ pence the pound.

If $\frac{1}{15}$ of the value of Indian corn be added to defray the expense of grinding it, the price of the flour will not even then be greater in London than one penny the pound in time of peace, and about one penny-farthing at the present high price of that grain in North America. Hence it appears, that in stating the mean price in London of the flour of Indian corn at one penny-farthing, I have rather rated it too high than too low.

With regard to the expense of importing it, there may be, and doubtless, there are frequently other expenses besides those of freight and insurance; but, on the other hand, a very considerable part of the expenses attending the importation of it may be reimbursed by the profits arising from the sale of the barrels in which it is imported, as I have been informed by a person who imports it every year and always avails himself of that advantage.

One circumstance much in favour of the introduction of Indian corn into common use in this country is, the facility with which it may be had in any quantity. It grows in all quarters of the globe, and almost in every climate, and in hot countries two or three crops may be raised from the same ground in the course of one year. It succeeds equally well in the cold regions of Canada, in

the temperate climes of the United States of America, and in the burning heats of the tropics: and it might be had from Africa and Asia as well as from America. And were it even true—what I never can be persuaded to believe—that it would be impossible to introduce it as an article of food in this country, it might at least be used as fodder for cattle, whose aversion to it, I will venture to say, would not be found to be unconquerable.

Oats now cost near twopence the pound in this country. Indian corn, which would cost but a little more than half as much, would certainly be much more nourishing, even for horses, as well as for horned cattle; and as for hogs and poultry, they ought never to be fed with any other grain. Those who have tasted the pork and the poultry fattened on Indian corn will readily give their assent to this opinion.

CHAPTER VII.

When I began writing the foregoing chapter of this essay, I had hopes of being able to procure satisfactory information respecting the manner in which the maccaroni eaten by the poor in Italy, and particularly in the kingdom of Naples, is prepared; but though I have taken much pains in making these inquiries, my success in them has not been such as I could have wished. The process, I have often been told, is very simple; and from the very low price at which maccaroni is sold, ready-cooked, at the Lazzaroni in the streets of Naples, it cannot be expensive. There is a better kind of maccaroni, which is prepared and sold by the nuns in some of the convents in Italy, which is much dearer; but this sort would in any country be too expensive to be used as food for the poor. It is, however, not dearer than many kinds of food used by the poor in this country, and as it is very palatable and wholesome, and may be used in a variety of ways, a receipt for preparing it may perhaps be not unacceptable to many of my readers.

A RECEIPT FOR MAKING THAT KIND OF MACCARONI CALLED IN ITALY TAGLIATI.

Take any number of fresh laid eggs and break them into a bowl or tray, beat them up with a spoon, but not to a froth; add of the finest wheat flour as much as is necessary to form a dough of the consistency of paste. Work this paste well with a rolling-pin; roll it out into very thin leaves; lay ten or twelve of these leaves one upon the other, and with a sharp knife cut them into very fine threads. These threads (which, if the mass is of a proper consistency, will not adhere to each other,) are to be laid on a clean board or on paper, and dried in the air.

This maccaroni (or cut paste, as it is called in Germany, where it is in great repute,) may be eaten in various ways; but the most common way of using it is to eat it with milk instead of bread, and with chicken broth, and other broths and soups, with which it is boiled. With proper care, it may be kept good for many months.

It is sometimes fried in butter, and in this way of cooking it, it forms a most excellent dish indeed—inferior, I believe, to no dish of flour that can be made. It is not, however, a very cheap dish, as eggs and butter are both expensive articles in most countries.

An inferior kind of cut paste is sometimes prepared by the poor in Germany, which is made simply of water and wheat flour, and this has more resemblance to common maccaroni than that just described, and might in many cases be used instead of it. I do not think, however, that it can be kept long without spoiling; whereas maccaroni, as is well known may be kept good for a great length of time. Though I have not been able to get any satisfactory information relative to the process of making maccaroni, yet I have made some experiments to ascertain the expense of cooking it, and of the cost of the cheese necessary for giving it a relish.

Half a pound of maccaroni, which was purchased at an Italian shop in London, and which cost ten pence, was boiled till it was sufficiently done, namely, about one hour and an half, when being taken out of the boiling water and weighed, it was found to weigh thirty-one ounces and a half, or one pound fifteen ounces and an half. The quantity of cheese employed to give a relish to this dish of boiled maccaroni, (and which was grated over it after it was put into the dish,) was one ounce, and cost two farthings.

Maccaroni is considered as very cheap food in those countries where it is prepared in the greatest perfection, and where it is in common use among the lower classes of society; and as wheat, of which grain it is always made, is a staple commodity in this country, it would certainly be worth while to take some trouble to introduce the manufacture of it, particularly as it is already become an article of luxury upon the tables of the rich, and as great quantities of it are annually imported and sold here at a most exorbitant price:—but maccaroni is by no means the cheapest food that can be provided for feeding the poor in this island; nor do I believe it is so in any country. Polenta, or Indian corn, of which so much has been already said,—and potatoes, of which too much cannot be said,—are both much better adapted, in all respects, for that purpose. Maccaroni would, however, I am persuaded, could it be prepared in this country, be much less expensive than any kinds of food now commonly used by our poor; and consequently might be of considerable use to them.

OF POTATOES.

With regard to potatoes they are now so generally known, and their usefulness is so universally acknowledged, that it would be a waste of time to attempt to recommend them.

OF BARLEY.

I have more than once mentioned the extraordinary nutritive powers of this grain, and the use of it in feeding the poor cannot be too strongly recommended. It is now beginning to be much used in this country, mixed with wheat flour, for making bread; but it is not, I am persuaded, in bread, but in soups, that barley can be employed to the greatest advantage. It is astonishing how much water a small quantity of barley-meal will thicken, and change to the consistency of a jelly; and, if my suspicions with regard to the part which water acts in nutrition are founded, this will enable us to account, not only for the nutritive quality of barley, but also for the same quality in a still higher degree, which sago and salope are

known to possess. Sago and salope thicken, and change to the consistency of a jelly, (and as I suppose, prepare for decomposition,) a greater quantity of water than barley, and both sago and salope are known to be nutritious in a very extraordinary degree.

Barley will thicken and change to a jelly much more water than any other grain with which we are acquainted, rice even not excepted; and I have found reason to conclude from the result of innumerable experiments, which in the course of several years have been made under my directions in the public kitchen of the House of Industry at Munich, that for making soups, barley is by far the best grain that can be employed.

Were I called upon to give an opinion in regard to the comparative nutritiousness of barley-meal and wheat flour, when used in soups, I should not hesitate to say that I think the former at least three or four times as nutritious as the latter.

Scotch broth is known to be one of the most nourishing dishes in common use; and there is no doubt but it owes its extraordinary nutritive quality to the Scotch (or pearl) barley, which is always used in preparing it. If the barley be omitted, the broth will be found to be poor and washy, and will afford little nourishment; but any of the other ingredients may be retrenched; even the meat; without impairing very sensibly the nutritive quality of the food. Its flavour and palatableness may be impaired by such retrenchments: but if the water be well thickened with the barley, the food will still be very nourishing.

In preparing the soup used in feeding the poor in the House of Industry at Munich, pearl barley has hitherto been used; but I have found by some experiments I have lately made in London, that pearl barley is by no means necessary, as common barley-meal will answer, to all intents and purposes, just as well. In one respect it answers better, for it does not require half so much boiling.

In preparing cheap soups for feeding the poor, the following short and plain directions will be found to be useful.

GENERAL DIRECTIONS FOR PREPARING CHEAP SOUP.

First—Each portion of soup should consist of one pint and a quarter, which, if the soup be rich, will afford a good meal to a grown person. Such a portion will in general weigh about one pound and a quarter or twenty ounces avoirdupois.

Secondly—The basis of each portion of soup should consist of one ounce and a quarter of barley-meal, boiled with one pint and a quarter of water till the whole be reduced to the uniform consistency of a thick jelly. All other additions to the soup do little else than serve to make it more palatable; or by rendering a long mastication necessary, to increase and prolong the pleasure of eating; both these objects are, however, of very great importance, and too much attention cannot be paid to them; but both of them may, with proper management, be obtained without much expense.

Were I asked to give a receipt for the cheapest food which, (in my opinion,) it would be possible to provide in this country, it would be the following.

RECEIPT FOR A VERY CHEAP SOUP.

Take of water eight gallons, and mixing with it 5lb. of barley-meal, boil it to the consistency of a thick jelly. Season it with salt, pepper, vinegar, sweet herbs, and four red herrings pounded in a mortar. Instead of bread, add to it 5lb. of Indian corn made into samp, and stirring it together with a ladle, serve it up immediately in portions of 20 ounces.

Samp, which is here recommended, is a dish said to have been invented by the savages of North America, who have no corn mills.

It is Indian corn deprived of its external coat by soaking it ten or twelve hours in a lixivium of water and wood ashes. This coat, or husk, being separated from the kernel, rises to the surface of the water, while the grain, which is specially heavier than water, remains at the bottom of the vessel; which grain, thus deprived of its hard coat of armour, is boiled or rather simmered for a great length of time, two days for instance in a kettle of water placed near the fire. When sufficiently cooked, the kernels will be found to be swelling to a great size and burst open, and this food, which is uncommonly sweet and nourishing, may be used in a great variety of ways; but the way of using it is to mix it with milk, and with soups, and broths, as a substitute for bread. It is even better than bread for these purposes, for besides being quite as palatable as the very best bread, as it is less liable than bread to grow too soft when mixed with these liquids, without being disagreeably hard, it requires more mastication, and consequently tends more to increase and prolong the pleasure of eating.

The soup which may be prepared with the quantities of ingredients mentioned in the foregoing receipt will be sufficient for 64 portions, and the cost of these ingredients will be as follows :—

	Pence.
For 5lb. of barley meal, at 1½ pence, the barley being reckoned at the present very high price of it in this country, viz., 5s. 6d. per bushel, ...	7½
5lb. Indian corn, at 1¼ pence the pound, ...	6¼
4 red herrings, ...	3
Vinegar, ...	1
Salt, ...	1
Pepper and sweet herbs, ...	2
Total	20¾

This sum, (20¾ pence,) divided by 64, the number of portions of soup, gives something less than one thrid of a penny for the cost of each portion.

But at the medium price of barley in Great Britain, and of Indian corn as it may be afforded here, I am persuaded that this soup may be provided at one farthing the portion of twenty ounces.

There is another kind of soup in great repute among the poor people and indeed among the opulent farmers in Germany, which would not come much higher. This is what is called burnt soup, or, as I should rather call it, brown soup, and it is prepared in the following manner:—

RECEIPT FOR MAKING BROWN SOUP.

Take a small piece of butter and put it over the fire in a clean frying-pan made of iron (not copper, for that metal used for this purpose would be poisonous); put to it a few spoonfuls of wheat or rye-meal. Stir the whole about briskly with a broad wooden spoon, or rather knife, wth a broad and thin edge, till the butter has disappeared, and the meal is uniformly of a deep brown colour, great care being taken, by stirring it continually, to prevent the meal from being burned to the pan.

A very small quantity of this roasted meal (perhaps half an ounce in weight would be sufficient) being put into a saucepan and boiled with a pint and a quarter of water, forms a portion of soup, which, when seasoned with salt, pepper, and vinegar, and eaten with bread cut fine, and mixed with it at the moment when it is served up, makes a kind of food by no means unpalatable, and which is said to be very wholesome.

As this soup may be prepared in a very short time, an instant being sufficient for boiling it; and as the ingredients for making it are very cheap, and may be easily transported, this food is much used in Bavaria by our wood-cutters, who go into the mountains far from any habitations to fell wood. Their provisions for a week (the time they commonly remain in the mountains) consist of a large loaf of rye-bread, (which, as it does not so soon grow dry and stale as wheaten bread, is always preferred to it,) a linen bag containing a small quantity of roasted meal, another small bag of salt, and a small wooden box containing some pounded black pepper, with a small frying-pan of hammered iron, about ten or eleven inches in diameter, which serves them both as an utensil for cooking, and as a dish for containing the victuals when cooked. They sometimes, but not often, take with them a small bottle of vinegar, but black pepper is an ingredient in brown soup which is never omitted.

Two table spoonfuls of roasted meal is quite enough to make a good portion of soup for one person, and the quantity of butter necessary to be used in roasting this quantity of meal is very small, and will cost very little. One ounce of butter would be sufficient for roasting eight ounces of meal; and if half an ounce of roasted meal is sufficient for making one portion of soup, the butter will not amount to more than $\frac{1}{16}$ of an ounce, and, at eight pence the pound, will cost only $\frac{1}{32}$ of a penny, or $\frac{1}{8}$ of a farthing. The cost of the meal for a portion of this soup is not much more considerable. If it be rye-meal, (which is said to be quite as good for roasting as the finest wheat flour,) it will not cost in this country, even now, when grain is so dear, more than 1½d per pound; half an ounce, therefore, the quantity required for one portion of the soup, would only cost $\frac{6}{32}$ of a farthing, and the meal and butter together no more than $\frac{1}{8}+\frac{6}{32}=\frac{10}{32}$, or something less than $\frac{1}{3}$ of a farthing. If to this sum we add the cost of the ingredients used to season the soup, namely, for salt, pepper, and vinegar, allowing for them as much as the amount of the cost of the butter and the meal, or $\frac{1}{3}$ of a farthing, this will give $\frac{2}{3}$ of a farthing for the cost of the ingredients used in preparing one portion of this soup, but, as the bread which is eaten with it is an expensive article, this food will not,

upon the whole, be cheaper than the soup just mentioned, and it is certainly neither so nourishing nor so wholesome.

Brown soup might, however, on certain occasions, be found to be useful. As it is so soon cooked, and as the ingredients for making it are so easily prepared, preserved, and transported from place to place, it might be useful to travellers, and to soldiers on a march, and though it can hardly be supposed to be of itself very nourishing, yet it is possible it may render the bread eaten with it not only more nutritive, but also more wholesome, and it certainly renders it more savoury and palatable. It is the common breakfast of the peasants in Bavaria; and it is infinitely preferable, in all respects, to that most pernicious wash, tea, with which the lower classes of the inhabitants of this island drench their stomachs, and ruin their constitutions.

When tea is mixed with a sufficient quantity of sugar and good cream; when it is taken with a large quantity of bread and butter, or with toast and boiled eggs, and, above all, when it is not drank too hot, it is certainly less unwholesome; but a simple infusion of this drug drank boiling hot, as the poor usually take it, is certainly a poison which, though it is sometimes slow in its operation, never fails to produce very fatal effects, even in the strongest constitution, where the free use of it is continued for a considerable length of time.

OF RYE-BREAD.

The prejudice in this island against bread made of rye is the more extraordinary as in many parts of the country no other kind of bread is used, and as the general use of it in many parts of Europe for ages has proved it to be perfectly wholesome. In those countries where it is in common use, many persons prefer it to bread made of the best wheat flour; and though wheaten bread is commonly preferred to it, yet I am persuaded that the general dislike, where it is not much in use, is more owing to its being badly prepared, or not well baked, than to anything else.

I cannot conclude this Essay, without once recommending, in the most earnest manner, to the attention of the public, and more especially to the attention of all those who are engaged in public affairs,—the subject which has here been attempted to be investigated It is certainly of very great importance, in whatever light it is considered; and it is particularly so at the present moment: for however statesmen may differ in opinion with respect to the danger or expediency of making any alterations in the constitution, or established forms of government, in times of popular commotions, no doubt can be entertained with respect to the policy of diminishing as much as possible, at all times, and more especially in times like the present,—the misery of the lower classes of the people.

THE END.