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THOUGHTS
ON
POPULATION FOOD
ETC



Presented to Miss Manning

By the Author

J. C. C.

Political

THOUGHTS
ON
POPULATION
AND THE
MEANS OF COMFORTABLE SUBSISTENCE ;

WITH
Suggestions

REGARDING AN INCREASED SUPPLY AND LESSENERD
COST OF FOOD FOR CHILDHOOD AND THE
INDUSTRIAL CLASSES.

BY
AGRESTIS. (Pseud.)

“ Food constitutes not only the greatest part of the riches of the world ; but it is the abundance of food which gives the principal value to many other sorts of riches.”

SMITH'S WEALTH OF NATIONS.

LONDON :
LONGMAN, GREEN, LONGMAN, ROBERTS, & GREEN.

1863.

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LONDON:
RICHARD BARRETT, PRINTER,
MARK LANE.

To the Memory

OF A

REVERED AND MUCH LOVED PARENT,

AN ISRAELITE INDEED, IN WHOM WAS NO GUILDE ;

AND WHO

WALKING IN THE FOOTSTEPS OF HIS MASTER,

WENT ABOUT DOING GOOD,

THIS LITTLE VOLUME IS AFFECTIONATELY

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P R E F A C E .

THE branch of Economical Science which forms the subject of the following suggestions, is one on which the members of the Upper Classes are but little accustomed to reflect. It may, indeed, be readily conceded, that, in comparison with mental and moral improvement, the supply of physical wants should occupy a subordinate place ; it has, however, its own peculiar value and importance, and is entitled to more attention than is generally bestowed on it.

In public usefulness, two excellent noblemen of the present day—Lord Brougham and the Earl of Shaftesbury—occupy the foremost rank. Their efforts, in somewhat different roads, but all tending to the same goal—the promotion of knowledge consecrated to the pursuit of virtue and happiness—have been directed with unwearied zeal, and produced blessed results in much diminished ignorance and crime.

The laborious and splendid efforts of Lord Brougham, for the mental improvement of our middle-class youths in particular, have naturally placed him at the head of our Educational Societies. They were beautifully foreshadowed in his justly-celebrated "Discourse on the Objects, Advantages, and Pleasures of Science."

The devotedness of Lord Shaftesbury would seem to require almost a religious zeal—such as he elsewhere evinces—to induce the earnest application of his energies and time to our Reformatories, Industrial, and Ragged Schools. There can be no doubt that such stooping to win is calculated to exercise a more powerful influence over the obdurate, and yet controllable, mind, and the almost lost, but recoverable, soul of the youthful outcast, than can be expected from the unsupported zeal of teachers from the ranks. How many of the hundreds of thousands who have passed through these schools have been saved themselves; how many of them have become Home Missionaries destined to reclaim their vicious parents!

Most thankful is the writer, then, in common with

an admiring world, that such devoted philanthropists are found as Lord Brougham, the Earl of Shaftesbury, Frederic Auguste Demetz of Mettrai, Matthew Davenport Hill, Recorder of Birmingham, Mary Carpenter, of Bristol, and other excellent persons following in their steps, and constituting a noble army of ardent lovers of their kind. How can we sufficiently admire — or adequately praise — those efforts of her entire soul, employed by the amiable lady just named, in one particular branch of philanthropy, and which have given her an insight unsurpassed into this portion of human nature !

The present writer's age, his habits, and capacity, render him unequal to such efforts. His individual aspirations are restricted to the object of increasing the home comforts of the labouring class, and invigorating the often sickly and under-fed corporeal frames of our youthful population in particular ; believing, indeed, that a sound body is, in a measure, the condition of the prompt and enduring growth of the sound mind.

Happy would he be, if thought to labour in the

same field with such Exemplars, by the simple preparation of the material soil for the reception of the moral seed ; imbued as he is with a sense of the truth and beauty of Lord Shaftesbury's own sentiment :—
“ The greatest honour to which a man can aspire is that of being the instrument, under God, of conferring benefit on his fellow-man.”

E R R A T A.

Page 3, line 22, for "Haydn's History of Dates," read "Haydn's
Dictionary of Dates."

„ 27, „ 27, for "all-sufficient," read "important."

„ 56, „ 19, for "delightful," read "gratifying."

„ 194, „ 19, the reference should be to page 45, not 70.

„ 195, „ 1, for "American," read "Canadian."

THOUGHTS
ON
POPULATION, FOOD,
ETC.

THE published report of a late "numbering of the people" invites attention to the relation likely to exist between the extent of Population and the amount of Food; although the last decennial census, and the three immediately preceding it, exhibit a gradual diminution in the per centage of increase. This feature, coupled with the gigantic strides of science and art in production, may assist in dispelling the remaining fears of those who believe in "the constant pressure of population on the means of subsistence."

It may without fear of contradiction be asserted, that, although acres cannot increase and multiply like men, they may be so enlarged in productive capacity as, virtually, to extend the surface of the earth; and we have no means by which to limit the powers of nature, or the intelligence of man.

I have no desire to revive discussion on a theory which enjoined the "keeping down population to a

level with the means of subsistence," but to present the more pleasing converse of production kept up to the level of population.

I trust that generations without number will come and go, before mankind may have occasion to bewail the difference between the geometrical increase of mouths and a simple addition to the means of filling them.

It may be supposed that a pro-ratâ augmentation of the supply of food will follow close upon increased demand; but, it is certain that in some important respects, supply has never yet been commensurate with the wants of certain classes.

In the following pages I propose to consider, in the first place, the past, present, and probable future of those supplies which may be reasonably required; and, secondly, the means which we may have of efficiently meeting those requirements.

The population of the British Isles has in the last sixty years increased by 126 per cent. It consisted, in January 1861, of 14,007,208 males and 14,930,300 females, making together 29,036,508 souls. The annual births of males almost everywhere exceed those of females; but the greater vitality of the latter, more than neutralizes such excess, and gives them a preponderance in the tables of existing populations. Our own surplus of 842,098 females may be thus accounted for. Taking the three kingdoms separately, the English and Welsh increase has been 12 per cent. in the last ten years—(the six decennial

periods of the present century giving respectively an increase of 14, 16, 15, 14, 13, 12 per cent.)—while the increase of population in Scotland has been but 6 per cent.; and Ireland has sustained an actual diminution of as much as 12 per cent. from its population of 1851. No doubt, the Irish decrement has been mainly caused by the diseases resulting from famine, and by emigration, it having been calculated that 1,231,000 individuals left the shores of Ireland within the last decennial period. During the same period, 641,000 persons are said to have emigrated from England; and Scotland is alleged to have parted with 183,600.

The population of the entire world would appear to present a much smaller proportionate increase than that of England, it being conjectured to have risen from about 900,000,000 of a century ago, to about 1,300,000,000 at the present time.

In reference to our own nation, I have given above the estimated population of Her Majesty's European dominions only; but, according to statistics furnished in the tenth edition of "Haydn's History of Dates," those more distant territories which acknowledge Her supremacy, would appear to raise the amount to 223,000,000. This aggregate, taking the entire population of the globe at 1,300 millions, would nearly correspond with the extent of country so occupied, forming a sixth part of the habitable globe; yet, this prodigious mass presents no more than twenty-seven individuals to the square mile (of 640 acres).

It might be thought irrelevant to the subjects suggested in the title-page, were I to travel beyond our home circle, or that of our colonial suburbs at the most, to treat of population generally; but, some of my readers may not be unwilling to be furnished with the following particulars.

In Black's Atlas of 1856 it is stated, upon the authority of the Weimar Almanack of 1840, that the extent of the terra firma of the globe may be thus estimated in square miles, viz. :—

	Square Miles.
Europe	3,750,000
Asia	16,045,000
Africa.....	11,254,000
America.....	14,730,000
Oceanica	4,105,000
	<hr/>
	49,884,000
	<hr/> <hr/>

This area, multiplied by the same average figure of 27, would give a round total of 1,350 millions.

The sea is supposed to cover a much larger surface,—in round numbers,—

	Square Miles.
The Atlantic Ocean	25,000,000
The Antarctic	30,000,000
The Arctic.....	8,400,000
The Pacific.....	50,000,000
The Indian.....	17,000,000
The Mediterranean Sea	1,106,000
The Caspian	160,000
The Black Sea	950,000
The Baltic	175,000
	<hr/>
	132,791,000
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And, including inland bays and seas, the ocean is supposed to cover, altogether, 147,800,000 square miles ; being nearly three times the surface of dry land.

It is obvious that the multiplication of the British race, and that of the world at large, is steadily, though not alarmingly, progressing ; but we may surely regard with satisfaction the evidence derived from ages past, and look tranquilly forward to those which are to come.

“ The true greatness of a nation,” says a writer in the *Daily Telegraph*, “ must be measured by the number and health of its people. Thus, England, which, chiefly within the last ten years, has sent enough of her children to Australia to constitute a great state, is still so far from losing strength, that her population is steadily increasing. When we remember that the quality of that increase is as remarkable as its quantity, and that every year witnesses an improvement in the public health and the physical condition of the people, as well as in their numbers, we may surely look forward, without an overweening confidence, to a long and prosperous future for our race. Our greatness is not of yesterday, and we need scarcely fear that it will wither to-morrow. Broad and deep are its foundations ; and the hands that guard it, are both strong and pure.”

The record of the census, however, suggests the expediency of considering the best mode of providing sufficiently for present and future generations ; and,

more particularly, since the labouring class are leaving, in such numbers, the field of food production, in search of higher wages and other advantages, in the great centres of commerce and manufactures. The population of the London districts has increased by 440,798 in the last ten years ; while that of rural Devon appears to have fallen off, by sixteen thousand, within the same period. And, although farmers may wish that it were otherwise, industrial employers in our towns, mines, and railways, will encourage the migration so long as they want hands, and until a slackening shall occur in the profits of occupations not directly connected with the cultivation of the soil.

The age is too far advanced to allow of a one-sided view being taken of any particular branch of national industry ; yet the landed interest would surely do well to promote, rather than discourage as formerly, the natural and healthy increase of a population that might be attached to the soil by domestic ties. The augmentation of a people such as this, would be best promoted, by early marriages among the healthy, careful, and industrious,—by comfortable dwellings, and considerate employers. The most profitable cultivation requires more and more hands in giving efficiency to scientific improvements ; and there can be no inducements so powerful as those I have mentioned, for securing a willing and active co-operation of labour with capital and science.

To the short-sighted and suicidal policy of the

owners and occupiers of land, as a party in the state, much of the decrease of rural labourers—threatening evil to themselves and to this class of England's wealth—may be imputed. Strong healthy men, because they had large families, have been induced, nay, bribed, to emigrate—no matter where—in order to prevent the possibility of their families becoming burdens on the parish rates. Their cottages have been pulled down, that others might not be housed there and obtain a legal settlement. A vast number of these people have gone to assist the United, or Dis-united States of America, in their progress, by the capital of their hands and sinews; and others have been attracted to our towns and elsewhere, in the hope of better usage. A step in the right direction was taken last year by Sir Lawrence Palk, one of the members for South Devon, in his "Labourers' Cottage Bill," which received the approval of the people's representatives, but was defeated by a majority of sixteen to thirteen in the Upper House.

It is, in a general sense, important, that we should have men to sow and reap, or to put in motion machinery for these purposes; inasmuch as the want of them might render us dependent upon other countries for too large a portion of the staff of life; yet bread is far from being the only important article of food that demands attention for an increasing population. There are many others wanted that are raised more easily at home.

Abundant and cheap food makes manufacturing

labour cheap, and its remuneration satisfying ; while, on the other hand, the demand of the manufacturing class for agricultural produce, gives its value to land. An attempt, however, to encourage native industry under the name of "protection," by impeding importation, is unnatural, and, in the main, impolitic. A recurrence to a system which would check, if not prevent, the free interchange of commodities between the nations of the earth, would impose an intolerable tax upon the people. The eloquent and enlightened Gladstone thus lately expressed himself on the subject, at Leith :—" I cherish the hope, that, by gradual and silent influences, the constant increase of kindly and friendly intercourse, mutually beneficial in the operations of trade, is calculated to be an auxiliary to the great principles, not only of an enlightened civilization, but even of our holy religion itself, which contemplates, as a practical result, peace, union, and harmony among the nations of the earth. *At any rate, our country has contributed its offering upon this great altar. We have done what could be done to destroy those strange barriers which the caprice of men had erected, no doubt under the view—though we think a mistaken one—of doing good, of doing particular and local good.*"

Beautifully did Cowper, in the last century, render the same idea in his mellow verse, as if anticipating the blessings resulting naturally from the sound commercial policy now extending itself through the civilised world :—

“ The band of commerce was designed
To associate all the branches of mankind ;
And, if a boundless plenty be the Robe,
Trade is the Golden Girdle of the Globe.
Wise to promote whatever end He means,
God opens fruitful Nature’s various scenes ;
Each climate needs what other climes produce,
And offers something to the general use ;
No land but answers to the general call,
And, in return, receives supplies from all.
This genial intercourse and mutual aid
Cheers what were else a universal shade ;
Calls Nature from her ivy-mantled den,
And softens human rock-work into men.”

The repeal of the Corn Laws in 1846, long vehemently opposed, was finally achieved by those resolute men who stood in the breach between a powerful few and the dependent many. “ Honour to whom honour is due,” however : and it should be remembered that the great Conservative Minister, Sir Robert Peel, who declared that he was more proud of being the leader of the gentlemen of England than of possessing the confidence of princes ; when at length convinced of England’s real policy, and her duty among the nations, sacrificed his high office, and with it immense power, upon the shrine of principle. On the eve of the resignation of his ministry (the 26th of July, 1846), this magnanimous and highly-gifted Premier gave utterance to these touching and prophetic words :—“ *It may be that I shall leave a name sometimes remembered with expressions of good will in the abodes of those whose lot it is to labour, and to eat their bread in the sweat of their brow ; when they*

shall recruit their exhausted strength with abundant and untaxed food—the sweeter, because it is no longer leavened by a sense of injustice.”

I believe this result contributed most powerfully to the causing an alienation to cease which had subsisted between the higher and the lower classes; and that the individuals now constituting the British population are becoming, more and more, the community of a single family; class feelings are indulged among us, but not often offensively demonstrated,—and party feelings ever will exist, without political or social detriment; but there is lying underneath them both a common ground of fellowship.

At a meeting held at Manchester, in the autumn of last year, for the relief of the suffering cotton-workers, Lord Derby expressed a fervent hope, that “*this occasion may, with God’s blessing, be a link to bind together more closely than ever the various classes in this great community; to satisfy the wealthy that the poor have a claim upon their sympathy as well as on their money; to satisfy the poor that the rich are not overbearing, grinding tyrants, but men like themselves, who have a heart to feel for suffering, and prompt to use the means which God had given them for its relief.*”

It may be hoped that Lord Shaftesbury also expressed, at a late “*Congrès International de Bienfaisance,*” a well-grounded belief that “*the rich were every day recognising the fact of their being the instruments of Providence in distributing the bounties intrusted to them.*”

We may believe that the rational liberty of action

and of thought, the mutual kindness, and expansion of mind, through education of the most useful character now spreading everywhere, have a powerful tendency to extend the moral good and estimation of those heaven-directed bounties, both to recipient and distributor. Happiness, indeed, is more evenly bestowed than we are apt to think. The legal owner of a beautiful domain may be, and often is, full of anxiety and care as he surveys it; whilst a right-minded casual observer, without envy, without intrusion, and without offence, may thoroughly enjoy the scene, in perfect freedom from attendant subjects of vexation. He may, in a sense, appropriate what he sees:—

“He looks abroad into the varied field
Of Nature, and, though poor, perhaps, compared
With those whose mansions glitter in his sight,
Calls the delightful scenery all his own.
His are the mountains, and the valleys his,
And the resplendent rivers. His to enjoy,—
With a propriety which none can feel,
But who, with filial confidence inspired,
Can lift to heaven an unpresumptuous eye,
And, smiling, say, “My Father made them all.”

In dealing with the subjects indicated in my title-page, I would invite attention to the apparent interests of our own people, and, more particularly, that of such of them as may be willing or compelled to remain at home, and share in the products of the British soil, rather than withdraw to one or other of our colonial suburbs—now encircling the globe.

It scarcely falls within the scope of my purpose to allude, otherwise than incidentally, to the growth of bread-stuffs ; but, rather, to ventilate the subject of a larger supply of such other nourishing and palatable food as is less adequately provided than I think it should be.

The domestic and commercial policy of England would seem, at first sight, to be in antagonism with that of other countries. Geographically small, and numerically weak at home, its manufacturing energies and prodigious capital suggest the expediency of extending our material power and influence, by encouraging the reliance of other nations on those productions which we are peculiarly qualified to furnish.

It is most important for us to be in a condition to defend our altars and our hearths by a sufficient, yet not redundant, population, against the daily increasing strength and warlike restlessness of our neighbours. As a great commercial nation, it is essential also to the interests of all classes, that we should maintain the freedom of the seas, on which we depend for the diffusion of our manufactured wealth, and the introduction of foreign corn. We need not offer bounties upon native industry or home production. Adam Smith, in his celebrated work on the "Wealth of Nations," objected to them, wisely, on the ground of their forcing some part of the industry of the country into a channel less advantageous than that in which it would run of its own accord. We should not waste our strength in working against nature by cul-

tivating inferior soils for bread. Better would it be, I think, if all such, for centuries to come, were devoted to the breeding of cattle and the grazing of sheep; to aristocratic parks for the few, and pleasure grounds for the many.

So long as the numbers of the labouring class at home do not exceed the demand for their employment, we need not fear an onerous increase of our race. Its moral and physical health can be safely tested by education and remunerative labour, insuring a sufficiency of well-earned food, and so rendering lawful the delights and solace and tranquillity of married life. I can take no other than a cheerful view of the character of feelings implanted in our nature, in their bearing on the means of healthful and plentiful subsistence. Our operatives need not wait till they become capitalists, by realising sufficient means, while unmarried, to make them independent of the accidents of life. Their increase would be greatly slackened, and the continuance of their order threatened, by such a requirement being submitted to; and I think it would be straining fancied social obligations too severely against the many who are born to labour for the general good, and whose enjoyments are comparatively few. Moreover, it is obvious, that enjoining an indefinitely prolonged celibacy on the healthy and adult labourer would deprive the public at large of the benefit of a powerful stimulus to exertion in a husband and a father.

There is a particular class, said to be the largest

of her Majesty's British subjects in the lower ranks, by whom the promptings of our nature are more or less frequently indulged, to the surprise of many ; these are exhibited in female domestic servants living in the families of the upper classes, and who really seem to have restraints of no ordinary kind to break through in venturing upon marriage. They possess the necessaries, and even the comforts, of life. Their work is easy, compared with that of other classes of labourers ; and yet, I think, the greater part of them are in the habit, sooner or later, of bartering their ease for participation in the uncertain prospects of a fellow-servant, a rustic labourer, or a journeyman artisan. Providence has ordered, apparently, that to such propensity society is indebted, mainly, for the continuous existence of some of those social grades which render life harmonious ; it is the practical expression of a willingness to perpetuate the race of comfortable and most useful dependants on a higher class in social and intellectual rank, whose time and energies, thus freed from the necessity of providing for many of their own material and constantly recurring wants, have more leisure for labouring to promote the general happiness in social and intellectual progress.

I think it was justly averred by the author of a work entitled "Political and Social Economy in its Practical Applications" — "*We have no reason to presume that the earth will ever be over-populated by human beings fulfilling the conditions of industrial pro-*

ductiveness." It seems to me, that the creature-comforts, and the prosperity of the British race, have generally increased, are still increasing, and will, probably for a period of incalculable duration, continue to increase, in an equal ratio with an increasing population at home and abroad.

The hands or brains of every man in health may enable him to support a family; and those who abound may well take care of such as Providence disables. The rich would be thus placed in the august position of being "instruments under God of conferring benefits on their fellow-men." Existence is, in most cases, of itself a blessing, as evidenced in some measure, by our unwillingness to part with it, and, under the guidance of moral and religious influences, it might be so in all. We need only assure ourselves, that "*The great end proposed by our common Father in the production of man is the communication of happiness.*"

In the second number of "Chambers's Social Tracts," it is observed, "If there be anything to lament, it is not the superabundance of people, but the enormous loss to the community from the number of preventible deaths, that is to be deplored." The term preventible may be construed to imply more ample means of procuring a sufficiency of wholesome food, better lodging, and precautions for promoting health. Much has been done of late, indeed, but more remains to be effected, by the central government, municipal authorities, and individuals of every

grade, in the way of sanitary improvements. I read, however, with no slight amount of satisfaction, in the *Standard*, of September 1861, the fact stated, that, while less than a century ago, in the Lying-in Hospital of Dublin, the mortality of infants during the first fortnight was 17 per cent., it is now little more than $1\frac{1}{2}$. I hope that much of this amendment may be attributed to the improved condition of the mother at the time of giving birth to her infant, and during pregnancy, as well as to the greater healthiness of the locality she inhabits. We have more light and air let into the dwellings of the lower orders, their courts and lanes are better drained, and water for personal and domestic use is more abundantly supplied.

Few could contemplate without pain, the stolid contentment—if, indeed, it could be called contentment—with a very little, that contentment being accompanied by the hopelessness of obtaining more, which conditions were the usual concomitants of the occupation of an Irish hovel. It should, however, be conceded, that, the charities and endearments of a husband and father were too commonly the only ones in which an Irish cottier could indulge, while so many insolvent landlords—mere nominal owners of the soil,—could no longer revel in, or occupy, their dilapidated mansions by other means than the minutest subdivision of their lands; and the potato conacre system was the only course open to their wretched tenants for supporting mere existence. The benign

influence of the Encumbered Estates' Court, following upon emigration, has much improved the prospects of this long prostrate people, by removing the incubus of insolvent landlords, and introducing British capital and enterprise. With us in England, the rescue from disease and death, whilst gradual, has been most cheering. Looking at the London Bills of Mortality for the last century, we find, that, "of the children of the metropolis under five years of age, the deaths, of the twenty years following 1730, were no less than 74 per cent.; for the twenty years following 1750, 63 per cent.; for the twenty years following 1770, 51 per cent.; for the twenty years following 1790, 41 per cent.; and, finally, for the twenty years following 1810, 31 per cent. Taking all England, at the present time, we are assured that the average mortality of children in the first year is now about 14 per cent.; and the average of the first five years, 26 per cent., being a gain of 5 per cent. on the returns for the twenty years following 1810.

These results would seem to warrant an encouragement of the legitimate increase of our race by moderately early marriages, productive of healthy offspring. Regarding such unions in the lower walks of life, I apprehend, that a well-conducted and willingly laborious healthy couple, of full age and strength, who have for a while entertained a genuine fondness for each other, and have means enough between them to furnish a cottage or a decent lodging, and to buy some weeks' supply of food without credit from the general

shop, have an unquestionable right to marry. I lay much stress upon their being so far removed from want as to be independent of shop credit. I believe that hardly one individual of a thousand among the lower twenty millions, has a just notion of its baneful influence. The facility afforded by the general, or the tally-shop, strikes at the root of the poor man's independence. No little tradesman, giving credit to families dependent upon health and wages, can be satisfied with moderate gains, and the hard-working and honest—unprovided—operative is made to pay for the dishonesty and recklessness of others, either by measure, quality, or price. The industrious man's expenses are thus imperceptibly increased; and he becomes less and less able to meet the necessary calls of a family.

“To enjoy—(thankfully)—is to obey;” and I think the seeking to withhold from a young, healthy, and industrious labourer, in town or country, who is able to comply with the conditions I have mentioned, those creature-comforts of wife, children, house, and home, which fair wages can support, would be as unreasonable as the table-treatment of Sancho Panza, the illusory Governor of Barataria, whose every dish was removed, one after another, with absolute prohibition of its use. I believe that individuals of the working class—the strength and stamina of a nation, and instrumental means of happiness to all,—not being enslaved by conventional and artificial wants, may claim a right for themselves and families

to enjoy a convenient and modest portion of those simple necessities which their labour—the source of all wealth—is able to supply ; and producing, for a pittance, a redundant surplus to meet the wants of others. The creation of this surplus, too, would seem to give to the family of an industrious operative, whose arm may become paralysed by an afflictive visitation, an ample title to support, at the public expense, out of that addition which the father had been unconsciously making to the industrial riches of his employer and his country. The class the multiplication of which is not so directly essential to the general good, can lay less claim to this indulgence. Of such I think it has been justly said, in the *Cornhill Magazine*, that, “ Each individual should be responsible for the maintenance of his children, and subjected to the natural inconveniences and difficulties arising from the indulgence of his inclinations.” Apart from any superior claims on the part of those who may be said to labour for the good of all, an unnecessary subtraction from the common store of food, by parties who are comparatively indifferent to the prices which they pay, is often created by the extravagant waste attending the use of it. At all events, those who are but poorly fed, do not press so heavily upon the public stock as the richly and full-fed.

I earnestly wish, however, that individuals of both sexes, and of all ranks, before they think of settling, should be enabled through education, and induced, to form just notions of the duties of a married life.

Would that to all the ignorant amongst us as much knowledge were given as they can profitably imbibe without inspiring a contempt for the useful occupations of hewing wood and drawing water. Gladly would I see every English child and youth as well and cheaply educated as they may be, and generally are, in Scotland. They should be taught the love of God and of their neighbour, and their duty towards both. They should be made to read well, and understand what they read, to write well and cipher well; and females should be instructed in common needlework, as well as in reading, writing, and the first four rules of arithmetic.

At the opening of the Winchester Diocesan Training Schools in October last, Lord Palmerston observed:—"Objections are urged against any system of education which endeavours to teach the lower classes things far beyond what they can have reason to practise in the relations of life. But, *if a young man cannot read, he is unable to instruct himself; if he cannot write, he is unable to carry on the communications which it may be his business to make; if clumsy at arithmetic, he may be apt to be over-reached by a more skilful and unscrupulous person. In proportion as individuals in the lower walks of life are taught the rudiments of knowledge, so, in proportion, are they better able to perform the duties of those industrial occupations which belong to their class.*"

Were all kindly and disinterestedly taught to this extent, without depressing ardent temperaments, or

minds soberly inclined to self-improvement and advancement, they might generally be satisfied, while occupying the background of society, from the language of inspiration:—"Shall the thing formed say to Him who formed it, Why hast thou made me so?"—"The potter hath power over his clay," to make from the same lump one vessel to noble purposes, and others for inferior ones, but all for usefulness, and none to be cast aside or broken; nor does he expect from either vessel any other service than that which he assigned to it. And so, the humble and industrious labourer may learn, that the Almighty expects to reap only in proportion to the seed sown; and that He will regulate his demands hereafter by what a man had, and not by what he had not, and never could obtain. We are not to choose for ourselves the parts which we shall act upon the stage of life, but to perform well the parts allotted to us. Some men are born to cultivate and improve the mind, and others to "subdue the earth." Our relative qualifications being understood, we need have little fear of the poor being dissatisfied with the position in which Providence has placed them; or of their regarding others who are more favoured than themselves with this world's goods as their natural enemies, prone only to use their labour as a stepping-stone to wealth, and to discountenance a sober wish to raise themselves from a low condition by good conduct, industry, and common sense. Education to this extent may be "a necessity to all, while the higher walks of science"—

as well observed in a late periodical, *The Friend of the People*—"might be left as luxuries for those who can afford to tread them."*

That education has already produced most beneficial effects, no one will be found to doubt; and, to this, as much as to the repeal of the Corn-laws—which it has enabled the people to appreciate generally,—may be referred the peaceful attitude of the Lancashire and Cheshire operatives.

It was well observed, in a *Daily Telegraph* of the 9th January last, that, "Men have been taught to value nothing so much as independence and equality before the law. For such to become paupers, and to take their food from the hand of charity, and put on cast-off clothes, must be hard indeed; but these men have borne all this, and more, without complaint, simply because they were enlightened enough to understand their necessity and its origin; and because they suffered in the full light and warmth of public knowledge and sympathy."

Mr. Hutt, Vice-president of the Board of Trade, wrote lately to the *Times*:—"In traversing the distressed districts, I had placed palpably before my eyes the most touching evidence of the blessed results of popular education and enlightenment. *We cannot doubt what would have been the condition of that population if the present calamity had befallen it before schools*

* I witnessed, with much regret, the discontinuance of this publication. It was conducted with a degree of talent well calculated to give effect to the benevolent purpose of the noble Lord with whom it originated.

and mechanics' institutes had been established among them. No one can believe that a vast and ignorant population would have passed through the hour of trial and of agony with such respect for the laws, with such a patient and peaceful constancy under suffering, as now challenges our sympathy and admiration."

Early education, fittingly conducted, will tend to create impressions favourable to virtue and religion, at a period of life when they are most easily received. "Train up a child in the way he should go; and when he is old he will not depart from it." The healthy instruction of the labouring poor will impart a dignity to work. It might conduce to the acquisition of a nobility which no one can inherit,—a self-respect derived from a moral and a Christian sense of usefulness and sterling manhood.

There is a peculiar branch of useful education in which I wish that females of the lower order could be instructed, namely, the ability to prepare invigorating and appetising meals for their hard-working husbands, out of cheap and scanty elements. How many grateful and encouraging smiles would be lavished that are now withheld! On this subject, I believe the lower orders of the English are less informed than those of any other country. While strongly advocating soup-kitchens in times of hardship,—not tendering food as charity, but selling it at prices somewhat under wholesale and prime cost,—I am sure that the most acceptable of all bounties would

be—the helping others to help themselves. Considerate aid is sweeter far than alms. As yet, however, I have not heard by what means the poor can be thus instructed in preparing economic cottage meals. It may seem derogatory to the dignity of our nature, that so much more time is given, in one way or another, to the engrossing subject of eating and drinking than to any other ; but, while it is the one thing needful to our physical—it is not foreign to our moral existence ; because, food is given for our enjoyment as well as for our nourishment. We find it much more easy to prepare cheap meals for thousands than for one or two ; and I think some female philanthropic life could hardly be better spent than in studying this subject, and instructing others. The cost of fuel seems the main obstacle to be overcome. So regardless, seemingly, are labouring women of the importance of this subject, while looking forward to be wives and mothers and mistresses of modest homes, that scarcely one housemaid in a hundred brought up in good families, has ever paid sufficient attention to the labours of the cook to know how to dress a small joint of meat as it should be ; or by what process, and with what ingredients, a cheap broth or vegetable savoury soup can be made agreeable.

To what cause the falling-off in the per-centage of increase in our population is mainly attributable, I cannot say, but would be inclined to seek it in the increase of luxury and artificial requirements accom-

panying and giving strength to a contracting love of the individual self in young men among the upper and middle classes, rather than the influence of moral or prudential restraint. I have heard more than one intelligent observer of our national statistics express their belief, that the census of the next ten years will exhibit a still greater relaxation in the rate of increase.

From the published extracts of returns under the Population Act we learn, that the annual marriages in England and Wales are, to the population generally, as one in 123; a smaller proportion, it is said, than is to be found in any other countries that have been examined, except Sweden and Norway.

The extent of moral evil caused by the obstructive principle and anti-nuptial practice, is shown by statistics. In 1831, the illegitimate births in Protestant England were as one in seventeen, and in Protestant Prussia one in thirteen, in Austria they were one in five, in Sweden one in four, and in Paris one in three!

And what do we discern in this? The parents of such children, in the middle class particularly, bring social discredit on themselves, and can feel no honest pride in regarding their offspring; while upon their children they entail mortification and disregard, instead of insuring a return of love and of respect. To these the Fifth Commandment must be a dead letter, since they cannot honour parents whom they do not respect. Their existence does not often follow

the indulgence of a sudden and uncontrolled passion, but, generally, deliberate sin, and a sordid estimate of the comparative expense of a low and half concealed establishment, with an acknowledged and an honourable one. Moreover, it is certain that the full measure of conjoint bliss can never be obtained, unless the intercourse be sanctioned by a due regard to social order, moral obligation, and the law of God.

On the "great social evil," I shall not descant. It is the consequence, and, not unfrequently, the cause, I fear, of the disregard of a state "honourable to all." And, for such misery-creating shifts how many men forego the chaste and sweet felicities of home!

Circumstances, it is true, are often stronger than man; but, generally speaking, there seems to be, among the upper and the middle classes, an excess of the seemingly prudential element, and very little of the moral one of real self-restraint.

It is observed in a late number of *The Times*, that, "*In the upper ranks of life, there exists an almost universal desire to keep up an appearance, and which, too generally, makes the marriageable of both sexes expect to begin where their parents ended.*" To what extent the complaint is applicable, I will express no opinion; but how few there are who comprehend the value of a true connubial affection, entertained from early life!

Although the number of useful single females of the educated class preponderates greatly over that of useful single men,—being more domestic and self-sacrificing, and evincing more kindly energy in their

homes and in the circle that surrounds them,—yet it can hardly be disputed, that the condition of maidenhood is a non-natural one to such as would be wooed suitably and won.

The writer of a pleasing novel entitled “Agony Point, or the Groans of Gentility,” replete with well-drawn moral pictures of our social life, observes: “One single sister out of four may, perhaps, exercise her tenderness and love on nephews and nieces, and may pass her life, as we often see, conscious of dignity, benevolence, and love, as the family friend; her pence and prudence ever at command; with meal that never wastes, and a cruse of kindness that never fails. But, very different will it be when the single form a large and increasing majority! The prospect of marriage is daily becoming less, and, with numbers, the chance is almost desperate.”

Long ere this acme of social discomfort shall be reached, let us hope that the young and marriageable of both sexes, and their parents also, will reflect and become wiser; attaching less value to superfluities in the early stages of conjoint existence, and more to the all-sufficient recommendations of a good repute, steady and domestic habits, and a warm and rational devotion. It seems to me a bitter satire upon marriageable men, that so many border flowers and fruits in the garden of life, should bloom, perfume, and ripen, and remain ungathered! And how shall we describe them? They are—woman’s affections—woman’s love—to be cultivated, plucked tenderly,

and harvested, by men of sense, good taste and feeling! And what are these affections? Replying in the words of a late attorney-general, Whiteside, let me say, "They are implanted in our nature by an Almighty hand; they have survived the fall, and repaired the ravages of sin and death; they dignify and exalt and inspire our existence, which, else, were cold, monotonous and dull. Nor, may we believe their uses will terminate with the dissolution of the mysterious union of soul and body; rather may we hope, that, the same high affections, purified, spiritualized and immortalized, become a portion of the bliss unutterable reserved for the spirits of the just made perfect."

This beautiful apostrophe formed part of the peroration of Counsel in a case first tried in Dublin a year ago. The splendid eloquence and gallantry in language poured forth by him were worthy of an Edmund Burke, and such as few display so well as perfect Irish gentlemen engaged in the defence of woman. It matters little, whether the language of the advocate on this occasion be thought applicable throughout to the particular lady whose brief he held. He, doubtless, eulogised the tender and accomplished portion of the sex in general, although a sudden inspiration may have come with the contemplation of an engaging ill-starred client of the day. Her instructions may have touched a chord that vibrated within himself, where, I am assured, it would be found attuned to an approved and most congenial

union. Evidence of the high estimation in which Mr. Whiteside was held, was afforded by a number of the well-bred gentlemen of England, on his first appearance in the House of Commons, after he had obtained a verdict. Members rose to greet and to do him honour as he entered the House.

It is indeed refreshing to quit, sometimes, the field of the dull prose of life, and draw a fresh existence from the powers of imagination. The class of persons Thomson pictured in his "Seasons" are now looked upon as myths amongst us:—

"What is the world to them—
Its pomps, its pleasures, and its nonsense all—
Who, in each other, clasp whatever fair,
High fancy forms or lavish hearts can wish?"

This variety of the human species is become rare indeed, but it is not yet quite extinct.

I cannot help envying the character of thought and feeling of the artist who was capable of conceiving so pleasing an image, and who could paint it so well; nay, more, I think that any man's condition must be the most enviable—or the most pitiable—who cannot find time or inclination to take a half hour's canter now and then upon the greensward of dreamland.

But we must retrace our steps.

I would not insinuate a doubt as to the applicability of Mr. Whiteside's encomium on females of the edu-

cated classes very generally ; yet, there are occasions when we could wish to see more of disinterested unworldliness in their tastes and sensibilities, and a juster estimation of those merits in a husband which alone can give duration to the honeymoon. Perhaps too many of the fair sex have to blame themselves for the habitual indulgence of those tastes which render suitable alliances extremely difficult. I know not how this growing evil is to be arrested by means short of a reconstruction of the prevailing social system, and a reversal of its unnatural rules. "We must look well at the difficulty," as the pleasing novelist I have quoted, says, "and stare the dead lock of society in the face. We must bring up our daughters with habits to marry upon less, and curtail all needless expenses to assist them, or take the consequence of their not marrying at all."

As yet, "the voice from Belgravia" is listened to, but that of reason from within, is stifled. Thousands of young men of the upper-middle class, having enslaved themselves to costly and factitious wants, or dreading their existence in the female sex, while thinking they are not prepared to meet them, wait the arrival of grey hairs ere they venture upon marriage ; and then they often seek, and too frequently obtain, alliance with the young and thoughtless. Spring flowers entwined with the sear and yellow leaves of Autumn ! In such cases, the contracting parties will claim a right to dispose of themselves as they think fit. It is the affair of individuals only ; except that,

in a social point of view, these unions may be deemed objectionable from considering that, in the event of their proving fruitful, the father cannot reasonably expect to be allowed to watch over the moral and material interests of his offspring. Some may regard the engagement as a fair bargain—a person bartered for position—while others may be inclined to think that the greater part of them should not be solemnized at all, but sealed only in the office of the Registrar. Should the parties in the sequel find that they have made a great mistake in forming such engagements, their folly, or that of one of them, will be often swollen into crime; and, surely, the times must be out of joint, since Parliament has found it necessary to constitute a special court of justice for the purpose of dissolving such marriage unions as have led to sin, from having been too hastily or unfittingly contracted.

The wretched consequences of female incontinence in such cases are not limited to the husband. The warmest advocates for moral and prudential restraint, and marriage at middle age or late in life, cannot avoid admitting that corruption here must necessarily weaken parental affection, and thus lessen the united exertions and ardour of parents in the care and education of children. Nevertheless, in a free country like England, marriage among all classes will be regulated in the same way as production or trade when it is unfettered, and will not be influenced by the reasonings of the philosopher in his closet, or

allow itself to be influenced by the executive action of the government.

Occupations moderately pursued by the Class Easy, so long as they are submissive subjects of the will—not tyrants—will give a zest to the enjoyment of domestic intercourse; but if they become unyielding masters, any attempt to soften the rigidity of habits long indulged—from necessity or choice—and to restore the flexibility and coalescing faculty of early age, will but do violence to man's second nature.

With respect to female occupations, I have a reverence for the peculiar qualifications of the married portion of the sex, in stamping virtue, merit, and a promise of future usefulness on the white paper of the infant mind. On their accomplishments for man's softer hours I need not dwell; nor on their obvious value in unbending the overstrained minds of husbands gravely and intensely occupied. I would be most unwilling to endorse the unconsidered sentiment of the reverend and humorous Sidney Smith to this effect, that "a woman's love for her children depends upon her ignorance of Greek; and that she would be likely to desert her infant for a quadrated equation." On the contrary, I can well imagine the union of domestic virtues and appropriate pursuits, with a high degree of mental cultivation; but I would at all times gladly see such cultivation made subservient, and even accessory, to the superior obligations of the wife and mother. Not a few, however, will be inclined to think that, generally, a taste for Greek

would slacken attention to the nursery, and diminish its charms. Not many will hesitate to admit, that the desired qualifications of ladies occupying the distinct positions of an educated mother, an educated childless wife, and an educated single lady, may differ widely from each other. The first may certainly find more or less of leisure for intellectual pursuits and the enjoyment of an enlightened husband's conversation, apart from her children, and without injury to their progress. The second may chiefly devote herself to the intellectual society and solace of her husband, and participation in his pursuits of literature or science; while the third might occupy herself, in all propriety, with the mental improvement, or the material comforts, of those who happen to surround her.

In a *Standard* paper of September, 1861, allusion is made to an unnamed "great authority," (I think it must have been the First Napoleon) who said that "she was the best subject of the state who gave to it the most children." The dogma suited the Emperor's depopulating practice; but, it will now be thought superfluous to laud teeming mothers. Should their means be small, they would be fitter subjects for commiseration; and if enjoying easy or hopeful circumstances, it will generally be found that a numerous progeny brings with it its own grounds for self-gratulation; it being commonly observed that they are the most united, prosperous, and happy. They bring their cares with them, but little of that anxiety which is apt to hover over the

cradle,—and the youth, of a solitary offspring. I apprehend, indeed, that no increase of a population born in wedlock can be too rapid, provided we adopt precautionary and corresponding means for a larger and more general supply of food. Had the theory of “moral and prudential restraint”—promulgated half-a-century ago—been listened to—as a rule of increase, —one-third at least of our one hundred and fifty thousand hale young riflemen would not have sprung into the ranks. “As arrows are in the hand of a mighty man, so are the children of the youth.”

On the other hand, for ages past, the unfruitfulness of marriage has ceased to fix reproach on women among men. Our venerable ancestors were ignorant of Physiology as a Science ; and indeed, this phase of it is a mystery which baffles the research of a more enlightened age. Some there are, I know, who regard occasional instances of unproductiveness, as beneficial drags upon the wheel of increase, an exception to what they regard as the too general rule of compound multiplication.

As distinguished from parental joy in the possession of a numerous family, it is pleasing to observe how very commonly the all-gracious Being, who “tempers the wind to the shorn lamb,” furnishes compensations for the want of offspring. In place of the cares and anxieties,—as well as of the peculiar blessedness that surround a nursery of healthy children, we find individual gratifications,—rational as well as purely personal, very often furnished, in a more concentrated

affection, and an extended sphere of social usefulness.

I am fully sensible of the extreme importance of a prudent choice of a man's companion for life, and a mother for his children ; and to the youthful aspirant for marriage bliss, I might address the language of Ecclesiastes :—

“ Rejoice, O young man, in thy Youth ; and let thy heart cheer thee in the days of thy youth ; and walk in the ways of thy heart, and in the sight of thine eyes ; but, know thou, that for all these things God will bring thee into Judgment.” You contemplate the most important step for good or ill—in the journey of life, and that, not only as regards yourself, but many others whose well-being may be bound up with yours. For this you will be deeply responsible ; therefore, let not the step be lightly taken, nor without the counsel of dispassionate friends. If they are sensible and honest, they will tell you that you seek only the gratification of an untutored passion, unless your fondness be accompanied by esteem, and your choice of a companion founded on a firm belief in her ability and readiness to study your happiness, and the well-being of your children.

It is not easy to over-rate the amount of female influence in forming the character of the future man from infancy. Three children out of four, at least, have a bias given them for good or ill before they are five years old, which cleaves to them through after life. At the Winchester Educational Meeting before noticed, Lord Palmerston impressively ob-

served:—"Mothers are not only the earliest, but, of themselves, the best instructors; and this for many reasons. The lessons of good conduct taught, and the distinction between right and wrong inculcated by the mother, being among the very first ideas implanted in the mind, such lessons and such instructions are likely to take the deepest root. They have also this advantage;—the precepts of a mother must be felt by the child to spring from affection."

The propensity to marriage in early life seems to be beneficial, and at all times natural; so natural indeed as to require no advocate; at the same time, it must be seen, that almost all our temptations assail us in some natural guise; and that the propriety or impropriety of yielding to them will be found, commonly, to depend upon time, place, or other attendant circumstances.

With respect to the proper time, I apprehend that it is not desirable that females of the upper and the middle class should accept offers of marriage until they had obtained, in general society, some two or three years' knowledge of the world. Disastrous unions might be thus avoided.

The article in the *Cornhill Magazine* was entitled "Keeping up an Appearance," as introductory of a reply to the *Times* writer on the subject of marriages among the upper classes. It is very ably written, and contains matter for serious consideration. While agreeing with much that the writer advanced, and considering the narrow line which education

draws between the higher and the upper-middle classes, I cannot help wishing that more value had been attributed by him to a rational self-reliance, in the latter class of marriage aspirants, and to the genuine delight which often accompanies self-sacrifices in a devoted couple. This is frequently elicited—and might be so, I think, more often than it is,—in the readiness to climb the hill of life in company with an object of esteem and love; each giving to the other moral and material aid. To such as these, life may be a succession of duties; but, duties savouring of delights. The hill they have to climb may be steep and rugged; but a strong affection and a strong will may enable them to mount it. Assuming the individuals thus united to be worthy of each other, it seems to me that the wife will seldom think herself a “drudge” if disappointed hopes of moderate success should impose on her the necessity of performing many little domestic offices to which she may have been unaccustomed. But, while acting under the influence of self-reliance, and practising the virtue of a trust in God, we must be careful to avoid the sin of tempting Him. It should be the part of wisdom to keep in view the barrier which separates these impulses, and which a selfish passion only will over-leap.

It was justly said in the *St. James' Magazine* of October 1861, in a paper entitled a “Plea for Hymen,” that “no honourable man would seek to draw a lady into an alliance in which she must resort to menial pur-

suits; yet, it by no means follows that she loses caste in having to undertake the charge of a household where every shilling is of importance, and when rigid economy must be practised to enable her to be useful to the man whom she has sworn to aid. But, of the many couples who enter married life with their way to make, it will happen that some may fail to attain the same standing which their parents reached at the time of their marriage; and, so far, their children will have to be brought up in a position a shade lower than they themselves held when unmarried. This is a misfortune to the specific family, but none to society generally. Indeed, it is but the consequence of a necessary Social Law which demands that, as some mount in the scale, others must descend, in order to maintain the equilibrium. If, throughout society, every individual advanced a step beyond his immediate ancestor, and none receded, we should come to the state of a regiment without common soldiers, or to that of a commonwealth in which everybody had as much as might be wanted. None would work for others; and the community might as well be without a farthing among them."

It has been said, that,

"Avarice wants all things;
Luxury wants many things,
Poverty wants few things."

But, happily, there are many stages between the two last. The philosophic Paley stated his belief, that the highest degree of solid enjoyment in the

disposal of pecuniary means—in middle life—may be reached, by making the two ends meet, or, only exceeded by the annual addition of one little domestic comfort after another. We may, at least, believe that unions based on a well-grounded mutual preference, and a confidence in the permanency of a strong affection ; with capacity to enjoy, and even strengthen, by mutual exercise, the intelligence of each other, may, under almost any outward circumstances, be twice blessed ; while marriages from mere interest, or transient feelings, without mutual esteem and respect, never can be happy.

There is one phase of the subject in which I am disposed fully to agree with the writer in the *Cornhill Magazine* ; I mean, that of an aspiring student in a learned Profession, who feels more or less confident of reaching the goal of personal ambition, or great public usefulness. Not only might an early marriage without regard to fortune, obstruct his progress, but, in contracting it, he might be deserting a post of apprehended duty to himself,—to his connections by reflected credit, or the public ;—and expose to imminent danger the happiness of a wife, who, not having his ambition or consciousness of the necessity of an absorbing study, would find herself painfully restricted to the smallest imaginable portion of his society and regards. If then, his self-estimation should be justified by the result of such a measure of restraint as celibacy, the public might gain more than the individual would lose, and, if, on

the contrary, it should not reward him, in a public or a private sense, and the light ahead have proved an *ignis-fatuus*, the lady whom he would have wished to marry—but for his more-engrossing passion,—would have reason to congratulate herself on her escape from a connexion with the prey to disappointed self-esteem, and the possession of a divided empire. It is much better that a man should not marry, than be an indifferent husband or a careless father.

I should, however, be disposed to limit the concession I have just made, to forensic and senatorial aspirants. Unmarried members of the medical profession rarely attain eminence, except as writers; and the clergy, in the interest of religion and society, should be prominent examples in domestic life, exhibiting, in their own persons, the conjugal and parental virtues. It seems to me, that, individuals of the class last named may prudently marry, though in the possession of only slender means—placing them, indeed, above want or dependence,—while compelled to submit to some privations. The wife and family of an exemplary and amiable pastor, earnest in his calling, and possessing quiet social qualifications, will rarely be looked down upon or lose caste.

The world's obligations to the monasticism of the middle ages, for letters, moral advancement and civilization, cannot be denied; and, perhaps, the casuist will be satisfied with my claiming particular indulgence only towards that class of persons in whom the

moral faculties are more conspicuous than the intellectual.

“The Plea for Hymen” is subscribed “Res publica,” a character, I think, very justly assumed from its advocacy of early marriages in general, considering them to be advisable in a country that would keep its own against neighbouring and advancing nations. Wives and children, as a rule, are hostages for a demeanour which entitles every moral and industrious husband and father to the inestimable privilege of being a respected Briton. He is a valuable unit in the integral sum of his country’s wealth and importance. We have all, social and political blessings to defend, which are unequalled in any other portion of the globe. All the joints of our national fabric are admirably knitted together, from the benign occupant of the palace and the throne, to the humblest labourer in his cottage; from those who wisely govern—to those who willingly obey.

I will here take occasion to suggest, that, seeing the restless state of parts of Europe and the world, it would seem wise to establish prizes in our rural as well as in our urban districts, for expertness in rifle practice, as generally as for ploughing and drilling in the field. It would encourage a beneficial amount of self-respect in our rustic youths, and prepare them for usefulness in war as well as peace. Thus trained—not for defiance but defence,—“the bold peasantry, our country’s pride” of yore, might be so still, and few would regret their multiplication. On the con-

trary, might we not congratulate their parents in the language of the ancient Roman?—"It must be to you a source of grateful satisfaction, that you have so reared your offspring as to make him a good citizen, of service to his country and useful to her fields."*

"That early marriages are beneficial individually, Nature shows us in the affinity which young hearts have for each other. *Society benefits by the contentment, and interest in order, pervading married life.* Professions themselves are generally best off with comfortable, steady, purposeful workers in them; and individuals are certainly happier in conjugal love—sharing joys and sorrows—than in solitary labour, where the man strives, and the woman pines, for the sympathetic companionship which God destined for all." *

Contemplating the marriage state with reference to its influence on the character and conduct of young men before they are demoralized or corrupted in feelings and habits by the world, we can hardly fail to acknowledge the truth of the benevolent and genial Arnold's familiar sentiment:—"The most certain softeners of a man's moral skin, and sweeteners of his blood are, I am sure, domestic intercourse, in a happy marriage, and intercourse with the poor."

By this time, my readers will have come to the conclusion, that I am, myself, friendly to early mar-

* "Gratum est quod patriæ civem populoque dedisti
Si facias ut patriæ sit idoneus, utilis agris."

JUVENAL, Sat. xiv., line 17.

riage—in the abstract. I plead guilty to the soft impeachment, regarding it, indeed, as the sweetest bond of youth (*gratissimum juventutis vinculum*). Moreover, at the risk of being thought a partial witness in the cause I advocate, I will confidently say, “*Experto crede.*” My inspirations rise from the domestic hearth.

“What we admire we praise, and when we praise
Advance it into notice, that, its worth
Acknowledged, others may admire it too.”

An anonymous writer, who has no pretension to address the public *ex cathedrâ*, can only clothe himself with the authority of borrowed names, and be content, generally, to enforce his views by the simple logic of facts. In that character, I have presented a few statistics connected with marriage and population; and, now, propose the bringing forward others regarding the means of comfortable subsistence generally, from the products of our soil, and the boundless facilities afforded by emigration, before proceeding to my ulterior object,—that of increasing the comfort of the masses at home, by very simple though hitherto neglected means. The natural effect of such a purpose, successfully carried out, will be, to lessen, virtually, the cost of labour, by augmenting its strength and diminishing the outgoings of the working class.

Regarding the capacity of land for producing food for human sustenance, directly and indirectly, our great Pioneer in agricultural improvement, Mr.

Alderman Mechi, says in his amusing and very useful Treatise upon "Profitable Farming,"—"What each acre might produce by application of more drainage, more manure, more labour, more live stock, and better buildings, may be inferred from facts coming constantly under notice. As extreme cases, we may instance the production of six to nine quarters of wheat per acre; eighty tons of mangold per acre; and of large quantities of garden vegetables—worth £100 to £150 per acre."

Great Britain and the world present surfaces, in different degrees productive; but, industry and science, luxury and need, may clothe the mountain side with fruitfulness in time; as, on a small scale, the traveller on the Rhine, or the Moselle, regards the fruit-clad lofty brows with wonder and delight. In these regions, the most light-hearted of God's creatures are seen to carry on their backs the surplus soil of the valleys, and therewith cultivate the vine. On the subject of the agriculture of our own country, an eminent Professor of Political Economy, writing in the beginning of the present century—under feelings of alarm for the prospect of over-population, said, that, in his time, farmers were growing rich through an over-supply of labour. I am inclined rather to the belief, that farmers were then prospering from the receipt of war prices for their produce during the reign of Protection. The cheapness of labour availed of by them was, in a great degree, merely nominal, being counter-balanced by extra burdens on the land in poor-rates, when wheat was at

15s. to 20s. the bushel. Farmers, generally, I hope, are thriving still, (having got out of their free-trade troubles,)—but, from widely different causes than those imputed. Success is now attainable through a larger judicious expenditure of an interest-paying capital, and the application of more science and skill; they employ a bare sufficiency of labour more beneficially for the public, and with equal profit to themselves; being stimulated to a liberal use of other means by the competition created through the removal of Protection. “*Free trade*” is justly said by Mr. Gladstone, “*to have done more than revolutionize the food-market—it has revolutionized the food-maker,—changing him from the sleepy old gentleman chiefly familiar to our memory for his top-boots, to the intelligent gentleman who studies Liebig, and is acquainted with twenty top-dressings for his roots. Every one knows that one of the effects of the great commercial reform has been to make two blades grow where one grew before.*”

Simultaneously with improved culture of the land, and the reduced price of bread, the per centage of our poor rates has diminished greatly, by their being rarely called for, save by the improvident, aged, and infirm.

Our payments for imported bread stuffs for six years, including 1859, were, in round numbers, these—

1854	£21,760,000
1855	17,508,000
1856	23,059,000

1857	£19,380,000
1858	20,157,000
1859	18,052,000 ;

forming an average of twenty millions sterling per annum. The variations observable in our requirements were caused, no doubt, by the changeful character of our own harvests. But, such twenty millions were annually expended, not because of our inability to raise the extra quantity at home, (being about the sixth part of our annual consumption,) but, because even increasing hands obtained higher wages and greater advantages for themselves and the nation, in our manufactures, mines, and railways; and these industrial operations, aided by the repeal of the corn-laws, enabled us to obtain this extra quantity of foreign corn, by barter, at lower prices than we ourselves could grow it. It is worthy of notice, also, that British capital never experienced so great an augmentation as during these years of supposititious dearth, and seeming dependence, or reliance, on the produce of other countries. Our trade, too, with all the world, has more than doubled during ten years. In 1851, it amounted to sixty-five millions, and in 1861, to one hundred and thirty-six millions!

It is observable also, that our need of foreign corn did not rateably increase, but slackened rather with increasing mouths, during the six years quoted; a fact attributable, probably, to the large amount of augmentation in the acreable produce of our own corn-fields, through a more liberal dealing with the

soil, and the benefit derived from the introduction of more fallow or green crops. It is true, indeed, that in 1860-1, the cost of corn imported rose to the unprecedented sum of £31,672,000; but, the causes of this were temporary, the joint influence of an extremely severe winter and of bad harvests at home and abroad, foreign corn having risen from 43s. to 55s. the quarter—equivalent, in itself, to eight millions of the thirty-two, as compared with the preceding season.

In the face of such contingencies, however, I trust that my posterity may never see the day when this kingdom and its people shall render themselves independent of foreign parts for a portion of their bread. A national insanity alone, evinced by a recurrence to a destructive class legislation, can enforce a policy so replete with injury to British interests generally.

Towards replenishing the earth with food-producers, and limiting the number of domestic food-consumers, huge swarms have issued from the British hive to British America, Australia, Tasmania, New Zealand, and the United States, contributing, with their increase, to the general progress of our race, and transmitting, even to the antipodes, the religion, laws, and institutions of their native land; thus promoting human happiness by increasing population of a superior class. Some fifty or sixty years ago, it was declared by a celebrated political economist, that "Emigration, even if it could be freely carried out, is a resource that cannot be of long duration." The

vast continent of Australia, and the adjoining island of Tasmania, had not then been opened out as a relief for over-population. Little was known beyond Botany Bay and Port Jackson, as described by Collins; Canada, Nova Scotia, and the United States, would seem to have been disregarded, or to have been expected to be soon crowded; and India, possibly, supposed to have been already appropriated by a native population which would not part with room. We find that a prodigious increase has taken place in the population of America—in a large measure the product of free migration from all parts of the world, but, chiefly, from the British Isles. These crowds of food-producing mortals, migrating into different quarters of the globe, have, for the most part, simply sought to take advantage of increased facilities for rising in the social scale. It is success abroad, rather than over-crowding or distress at home, that has mainly caused this rush. Many thousands of such emigrants have found happy homes, while laying the foundations of future empires. They taught themselves, by an instinctive reasoning, to do what God enjoined the Patriarch Abram to do,—go forth and colonize and subdue the earth. “Get thee out of thy country, and from thy kindred, and from thy father’s house, into a land that I will give thee; and I will make thee a great nation, and I will bless thee.”

The progress of our Australasian colonies—our penal settlements of yore—is a matter of general notoriety;

but their exact condition, and the evidence of their vast importance as a trans-marine portion of the British empire, is little known to many, and can hardly fail to interest deeply a reflecting public. These colonies alone embrace a territory nearly as large as the whole continent of Europe. Their salubrity is placed beyond a doubt, the deaths being only seventeen yearly in every thousand, while those of generally healthy England are twenty-two. The number of Saxon and Merino sheep in the several colonies exceeds 20 millions; that of horned cattle, 4 millions; and of horses, 320 thousand; that is, in New South Wales there were, in 1859, 6,119,163 sheep; in Victoria, 5,754,129; in Queensland, lately part of New South Wales, now separated from it, 3,449,350; in South Australia, 2,824,811; and in Tasmania, 1,730,130. Of cattle, those of New South Wales were 2,408,586; of Victoria, 683,539; of Queensland, 432,890; of South Australia, 278,265; and of Tasmania, 83,366. Regarding their fine wool, a writer in the *Times* of 22nd August last, observes:—"The regular increase of the consumption of colonial wool—in the face of the well-sustained home production—shows, that the demand for woollen fabrics increases much faster than the population. The British settlements in Australia never made such large deliveries as last year, 68,506,222 lbs. having been received from that quarter during the twelve months, against 59,166,616 lbs. in 1860; 52,152,139 in 1856; and 41,810,117 in 1851." New South

Wales alone (the first settled of the Australian group), contains 323,437 square miles (of 640 acres), being three times the area of Great Britain and Ireland. By the census of 1861, there were 570 acres to each inhabitant. The settled 17 counties have 4 persons to every square mile; the pastoral districts only one to every square mile. This single settlement had, in 1859, 336,572 inhabitants after the separation of Queensland, now an independent colony. It had 247,542 acres under cultivation. The value of its annual imports was £6,772,149; and the exports £5,800,926. The shipments of wool in that year were 17,261,359 lbs. Some of its wines have been declared, by Rhenish judges, equal to their own. In 1861, there were 383 private schools, with 9,318 resident pupils. Besides these, the public treasury supports two systems of primary instruction—the denominational and the national. In 1860, there were 264 denominational schools with 15,267 scholars, receiving from the State a contribution of £20,031, and from other sources, £12,465. In the same year, there were 144 National Schools, educating 9,305 scholars, the contribution from the State being £23,445, and from other sources £7,833. Taking the whole of these establishments together, we find, that, in 1860, 34,760 scholars were receiving an education suitable to their stations in life, towards the expense of which the State contributed £60,587, being at the rate of £1 14s. per scholar, that of England being 11s. 6d. In addition to this, there

were 329 Sunday-schools, with an average attendance of 21,104 children. In the large towns and populous districts of the colony, schools of art, and associations for mutual improvement, exist; and a vote of £25,000 was recently proposed in the Legislature, for the foundation of a free library in Sydney, where there are 92,000 inhabitants,—an institution of this kind being much wanted, and already exercising the most beneficial influence in the sister capital of Melbourne, in Victoria, with 110,000 inhabitants. The climate of Sydney has been, not inaptly, compared with that of Naples; the difference being only 5° less of summer heat and winter cold at Sydney than at Naples.

The newly-constituted colony of Queensland is said to contain 560,000 square miles,—having been extended further north than when it formed part of what may be called the *ancient* colony of New South Wales. At the time of the severance, Queensland numbered only about 26,000 inhabitants, most of whom were shepherds; and yet, the trade returns of the first quarter only of 1860, (the first year after the severance), show a total of exports exceeding £230,000. The public revenue was at the rate of £7 5s. 4½d. per head; in England, not one-third as much. Large portions of this colony are well adapted to the growth of cotton, which might, it is said, be advantageously cultivated by the labour of Europeans, if the rate of wages permitted. Almost every kind of product, proper to temperate as well as to semi-tropical climates, flourishes here. The varied productions of

this new settlement are truly wonderful. Its climate, and its soils, are so diversified as to produce as heavy crops of wheat as the Lothians,—(the bushel sometimes weighing sixty-five pounds;) finer cotton than the American Sea Island; and as rich a sugar as Jamaica grows. Three crops of maize or Indian corn have been harvested in fourteen months. In the garden of Mr. Elridge, of Maryborough, near Brisbane, in Moreton Bay, the capital of the Colony, there were lately thriving, at the same time,—sugarcanes and oranges; pears and potatoes; bananas and grapes; pine-apples and figs; celery and cabbage.

Scarcely one indigenous fruit that is eatable, has been found on the Australian continent, where every one not peculiar to the tropics is now cultivated to perfection. Oranges, that cannot be excelled in any part of the globe, are generally grown in rectilinear lines, in avenues, from the seed, and budded. The trees attain the size of large orchard apple-trees. They are considered to be finer than any to be seen in Southern Italy, and exhibit from first to last the most graceful form and exquisite hue. It may not be generally known that the orange-tree will hold its fruit in a perfect state for the table, for seven, eight, and even nine months.

An eminent geologist, the Rev. J. B. Clarke, of Sydney, has pronounced an opinion, that no country upon earth is occupied to so large an extent by coal formations, America perhaps excepted, as New South Wales and Queensland.

The colony of Victoria may be deemed one of the greatest wonders of civilization. It was founded only twenty-six years since. In December 1858,—when twenty-two years old,—the population had risen from 177 souls to 504,638 : and, it has swollen proportionably since. In this single territory, there were, in 1859, 638 churches, and 772 schools, with 46,263 scholars ; and now, it has 900 places of worship, and above 900 public schools. The post-office revenue, even in 1859, was £112,000. 358,583 acres of land were under cultivation for the crop of 1860. The imports for that year were £15,168,000, and the exports £13,867,860. The value of the gross returns of gold since its discovery in 1851, to October 1861, was £104,669,772, all exported to England. This mass is represented by the gilt pyramid which was lately seen in the International Exhibition, but now removed to the Crystal Palace at Sydenham. It is forty-five feet high, and ten feet square at the base, showing an exact cube of the pure metal sent us. In 1859, there were 581 steam engines at work in raising gold and crushing quartz ; these being of 7,638-horse power together. The finest water, for all purposes, is brought to Melbourne from an artificial lake which is distant twenty-four miles from the city, through an iron tube of large diameter, which forces water, by its own weight, to the upper stories of the houses in the city, and keeps the streets quite clean by a regulated flooding. It cost some £900,000, and is said to give a return of interest at eleven per cent. upon the capital employed.

The question is often asked,—“What has become of all the gold imported from Victoria and New South Wales?” It was, I think, satisfactorily answered in a recent lecture given by Mr. Fawcett:—“It has gone to the East; for, our exports to India and China have increased enormously, while our imports thence show nothing like the same advance. The difference is made up in specie, besides the capital sent out to India, especially, for public works. In consequence of this, the balance of trade is against us, in these quarters, to the extent of twelve millions annually. It is true that this is chiefly sent in silver; but the silver is purchased with gold from France and other countries. To a large extent, therefore, Australia has given to France a golden currency;—to India and China silver; and, to ourselves, the national wealth purchased with the specie. While this goes on, gold can be thus absorbed.”

South Australia exported, in 1859, to the value of £1,655,876. Its mines of copper may soon supply a large portion of the world.

Tasmania, or Van Diemen's Land, contained as long ago as in 1857, 85,968 souls. Its imports were then £1,163,967, and its exports £1,193,838. The acres under cultivation were 208,619. The entire colony containing 14,482,895.

Western Australia exported to the value of £93,037.

New Zealand had an entire white population of 71,568 in 1859, but which has greatly increased since then. Its wool and its native flax promise to

be of great value, and its soil and climate are healthy and agreeable.

The author of the *Popular Guide to the International Exhibition* says, that, the Australian group of settlements covers an area of nearly two-and-a-half millions of square miles, or more than twenty times that of England and Wales, Scotland and Ireland, together; that they have a population of 1,200,000 persons, raising a government revenue exceeding six millions sterling; and that they buy of foreigners twenty-six millions' worth of goods per annum, and sell, in return, twenty-three millions' worth of wool and gold.

The particulars I have given respecting New South Wales are extracted principally from the *Guide* or *Catalogue* before mentioned; and, I cannot refrain from presenting also the following concluding remarks of the author, which, though devoted to New South Wales in particular, may be deemed more or less applicable to the entire group, and to New Zealand also. He says:—

“Under any view of the facts stated, they are calculated to show, that the Colony offers a home of comfort and plenty to the surplus population of the Old World. Millions of acres are open to free selection, even before survey, and with deferred payment, at a uniform price of twenty shillings for the freehold acre. The climate is unequalled; wages are high; food extremely cheap and abundant; taxation light. There is no workhouse in the whole group. The

educational and religious wants of the community are provided for ; the laws are impartially administered ; and the country is governed under a constitution analogous to that which the people of the United Kingdom regard as their indefeasible right.”

For years to come, the American States will not be an attractive home for wanderers from Europe. All the advantages which they once offered have ceased to exist, save their rich wastes, which are equally to be found in Australia. These—with Canada—will supply for centuries to come a home for emigrants and markets for our goods.

On the 3rd September last, an interesting paper was read at a meeting of the British Association, by Mr. Herman Merivale, Under Secretary of State for the Colonies, on the question of their utility to the mother country. This gentleman was formerly Professor of Political Economy at Oxford ; and, certainly, his view of the subject stands out in delightful contrast with the notions of some of the Economists of former times. A writer in the *Daily Telegraph* adverting to it, remarked, that, “the beneficial effects of a regularly sustained and copious emigration on the social condition of the country and the habits of the people, were shown by Mr. Merivale in some interesting comparisons between the tables of population in England and France. Although the comforts of the French have increased in proportion to the large increase of their wealth, there is a marked difference in the rate of births ; which shows the

prudential restrictions which the French people find it necessary to impose on themselves. *That the habit of founding and of peopling colonies has prevented the necessity of such unwholesome and unnatural prudence among the great body of the English people, and has allowed them to marry young and become the parents of large families,—is certainly a social blessing.*"

In the *Saturday Review* of October 22nd, it is also said:—"The prudential check to which Malthusian economists look for the salvation of the world, may, in France, avert the worst evils of an excessive population; but *it is immeasurably more wholesome, that, the natural law of increase should have full play, and that the excess should flow into the unpeopled regions of the earth.*"

The suggestions of moral restraint in marriage regard the interest of society at large; while those of prudence have reference generally to individual safety and convenience. France is far less cosmopolitan than England; and its fear of disturbing the equilibrium between home population and the means of easy subsistence is not unnatural. It cannot be disputed, that population must increase in a geometrical ratio, while the powers of Nature in producing food—will display themselves in a lesser one. None will doubt, however, that provision will have been made to meet the consequences of a system of Divine creation. The order to "increase and multiply and replenish the earth," has never been revoked, and never will be, till the earth is full, and time shall be no more.

It would seem, that the rational and self-satisfying suggestions of ordinary prudence will generally suffice for keeping down over-production. Improvident marriages are pretty sure to bring their own condemnation and punishment—in a disappointed pursuit of conjoint happiness. Moreover, we live under the wardship of an All-sufficient God, who will so, commonly, control the desires, and direct the energies and faculties of man, as to promote individual happiness as well as social harmony in the great concert of human life.

Returning once more to the immediate interests of our mother country, I observe, that, while entertaining no desire to see brought under cultivation, in ordinary times, the obviously inferior soils of England, it should be considered, that a vast extent of moor and moss land contains, in a dormant state, the largest proportionable quantity of the most important elements of agricultural wealth in soil. The greater part of such moss-land in this country, as is capable of drainage by hand or by machinery, may be rendered in the highest degree productive.

Not two years since, I saw near Paisley, on the estate of Mr. Speir of Burnbrae, between thirty and forty imperial acres of bog, under process of a most judicious system of drainage. These were the residue of a tract of three hundred and twenty acres of originally worthless peat bog, from five feet deep to twenty-four, on a sub-soil of clay. Three-fourths of the entire area were cropped with potatoes, turnips, oats,

and clover, when I saw it. The portion of the 320 acres which had been earliest dealt with, had sunk above five feet, and presented a surface soil of rich black mould, valued at £3 the annual rent. It would be difficult to feast the eye with a more luxuriant growth, or more delightful evidence of the triumph of human science, skill, and industry, in the conversion of inert matter into the very best of soils, especially for potatoes, turnips, and other root crops. A portion of personal and moveable property had thus been made real and national. A little over forty pounds sterling per Scotch acre, employed in tile-draining, trenching, claying, limeing, manuring, and road-making, had been rewarded, in the first year, with a good crop of sound potatoes, sold at prices returning more than three-fourths of all the outlay. Upon this large extent of land, for ages before, not one sheep could have been kept alive, and a horse or bullock, straying, would have been engulfed. An estate which will eventually be worth more than twenty thousand pounds to the owner, has been thus created out of nothing, we may say, with interim interest paid. Its sleeping energies have been awakened by the magic touch of science, as manifestly as when fire is seen to be generated by the collision of flint and steel.

Here is an admirable commentary on the text of Adam Smith:—“*The portion of capital which is devoted to domestic agriculture is employed the best for the interest of a nation; it enhances the productive*

power of the land and the labour of a country; it augments, at once, the profits of industry and of real property."

This dictum is, no doubt, generally and obviously true, though less applicable, now, to England, perhaps, than to other countries, as being more manufacturing and commercial, and abundantly provided with the means of advantageous barter for some of the staff of life. Very probably, eight or nine out of every ten solvent proprietors of drainable morass, visiting the field of Mr. Speirs' enterprise, would be induced to go and do likewise; and I am quite sure, that the signal courtesy, as well as patriotism of that gentleman, would heartily welcome all such parties to the spot, and allow his operations to be minutely inquired into and scanned, and to authorize his intelligent and obliging factor, Mr. Wilson, to afford all desired information.

A large dependence on the cotton pod will prove, for a term more or less protracted, as disastrous in its consequences as was formerly the Irish entire abandonment to a tuber. Possibly, a much increased quantity of potato food will be provided in the current year, and help to lessen the export of gold, in the place of manufactured cotton goods,—in barter—indirectly, for bread stuffs, while the cotton plant is rearing for us in regions subject to our own control. Meanwhile, might it not be practicable for many of the able-bodied, and now destitute, male operatives in Lancashire and Cheshire to be conveyed

daily to—or encamped upon—the worn-out pastures, or the moss of those counties; and so, improve, create, or rescue a vast extent of land for their own relief and the advantage of owners and of the poor-rate payers, while the growth of cotton is facilitating, by the transmission of British capital—and contracts, elsewhere than in America. I am not at all conversant with the manipulation of cotton thread, or the business of a cotton-mill, and may be told, that the largest portion of these operatives, although generally in health, are unaccustomed to any out-door work, and, on this account, would be deficient in the muscular strength required for it. For this reason, doubtless, the guardians of the poor in those districts are dispensing with the labour-test. Some of them might fear, that the acquired delicacy of their accustomed touch would be exposed to permanent injury from the rude handling of the spade; but still, the incapacity of some need not be made the rule for all. A large number of the stronger-bodied might earn moderate wages in avoiding the loathed stigma of pauperism.* Yet, Lord Stanley was, no doubt,

* Since penning this paragraph, I have been favoured with a communication from Mr. Speir, upon the subject, under date of the 25th November last, in which he says:—"The Lancashire operatives could, no doubt, be employed in the way you propose. On several occasions, I have given employment to weavers in our district, out of work; and, at this moment, I have a number of cotton-spinners belonging to the large factory upon my property, engaged in spade work, and earning from nine shillings to twelve shillings per week. They are employed on the land which has been cropped, and consequently, easy of cultivation; but, the stronger of them, after their

right in saying, on a late occasion, "*it would be more economical to relieve a man without giving him work, than relieve him by giving him a work he was unable to perform.*" That the difficulty would be insurmountable in the case of female operatives—who might be glad to earn wages in the field—may be readily inferred from the sound reasoning of the benevolent and Right Honourable "S. G. O." "*The work of a factory,*" he says, "*the atmosphere, and the social life in it, necessarily differ altogether from those of common industry. It is a work requiring special finger skill, and skilful manipulation of material, resulting from long practice.*"

Modes of converting forests and reclaiming wastes, vary as much with climate as with soils and other circumstances. The forests of Australia and of Canada are prepared for the plough by felling, burning off, and burning out the trees and roots; and the first year's crop of maize—in the former country,—will often cover the expense, while it serves to sweeten and to clean the land. This excellent grain has nearly all the valuable properties of wheat for human sustenance, and far surpasses barley and oats for the use of cattle. It should weigh sixty pounds to the bushel, and, forty bushels to the acre present an ordinary harvest. Its price in England is commonly a trifle below that of barley.

hands get hardened, are quite fit to turn over the soil in its original state; the drainage, however, can only be done by strong healthy men accustomed to such work."

After what has been said, the reader will form his own opinion on the value of home productiveness and of the facilities afforded by importation, as well as emigration, in their bearings on population. From the peculiar circumstances of our native country, I apprehend that we are not driven to the necessity of comparing our native population with the amount of home production of the staple food. Every year's experience must tend to strengthen our belief that the business of the world—its wants and sympathies—are best provided for and consulted by the interchange of commodities; an advantage so well descanted on by our gifted Chancellor of the Exchequer; each country offering what suits its climate, habits, and its genius best. We often hear regrets expressed that so much hard cash is yearly parted with for foreign corn; ignoring, or overlooking the fact, that it is not with coin, but manufactured goods exchanged profitably, that we pay for continental bread; and that we should have a contracted market for our manufactures without this. It is carrying out a system of barter which experience proves to be even more beneficial to ourselves than to the Continental wheat growers. These latter could not purchase the British goods which they desire, but with the products of their native industry; and each country grows richer, or more at ease, by this convenient system of exchange.

It has been suggested, by a deservedly popular agriculturist, that, by further improvements in agri-

culture, fifty millions of British acres might be made to yield a return of the value of 10s. per acre beyond the present produce. No calculation is hazarded as to the expense by which such an addition could be realized. Yet, it has been supposed, that the nation would be benefited to the full extent of twenty-five millions sterling per annum by the change. The real question seems to be, whether the country would gain more by this speculative improvement than it would suffer by the loss of the operatives' wages, and the manufacturers' and merchants' profits on their part of the supposed increase in production which is to displace the supplies we now obtain from foreign lands in the shape of corn, cattle, butter, cheese, &c., and of the employment of the shipping, sailors, &c., now engaged in the process of exporting of the manufactured articles, and the importing of foreign corn, &c. The old protectionist cry of the danger of supplies being cut off in time of war, would be justified only in the event of England's sacrificing her naval superiority to the clamour of the "Peace at any price" party.

My own prejudices take a different course from those of the writer to whose suggestions I have just alluded; being most unwilling to disturb the genial influence of national interchanges. I should, indeed, regard with pleasure, a larger area occupied, and a greater amount of capital, skill, and labour employed, in the production of other articles of food which suit our climate even better than the growth of wheat.

This being the main object of my writing, I shall dilate more fully on it in the sequel.

At the same time, seeing that a state of war into which we might unwillingly be drawn, would cause no inconsiderable rise in freight and insurance, and even grain itself, through military and naval waste here and elsewhere, there might be no objection to the establishment of a few silos in our chalk districts, in which to store, perhaps, the tithe of our annual consumption of grain (or half our usual importation). In these silos there is no waste, the grain increasing in weight by one or two per cent. in the course of a couple of years, without the slightest deterioration in value. Again, all easy-circumstanced consumers might adopt a custom which I have known practised abroad; namely, to keep by them a few barrels of flour, so as to secure individual immunity from the evils of a universally bad harvest, or sudden interruption of a state of peace. How far the former of these two measures might affect prices generally, or operate to the disturbance, more or less, of a nationally useful mercantile forecast, I am not qualified to hazard an opinion. But, at the worst, the introduction of one-fifth of the mass in potatoes with our own wheaten flour, or the simple retention of invaluable bran in meal, would give us all we want, *under* adverse circumstances.

The surpassing power of English energy and capital might enable us to clothe the civilized world, and furnish it with manufactured goods and almost all the

most desirable appliances for the highest material and social condition; satisfying the wants of other countries in the articles of manufactured goods, machinery, iron, copper, coal, and other raw materials to set in motion the industry of foreign nations. To clothe the world, would seem, indeed, to be our special mission. Sixty millions worth of cotton, silk, and woollen manufactures, and apparel of various kinds, were exported by us in 1860. Our export of coal, for utilizing industrial manual labour abroad, while conveying blessings to other people, will ever add a prodigious value to the British soil. The total shipments to foreign ports and coastwise, of this mineral,—of more real value than the gold of the universe,—amounted in 1859, to 17,218,972 tons; in 1860, to 18,159,488 tons; and, in 1861, to 19,161,615 tons. This was, I apprehend, exclusive of the prodigious quantities circulated for home consumption in manufactories and for domestic use, by rails adjacent to the mines of the interior. Of pig-iron, our exports were four million tons, estimated at thirteen millions sterling. Westmacott's beautiful statue of Commerce, with its appropriate group, in the Royal Exchange, is suggestive of the blessings which reciprocity abundantly scatters, as well as of the goodness of their Omnipotent Inspirer. Mr. Tite, M.P., the architect of the noble pile, informs us in the *City Press*, that the motto on the pedestal—

"The Earth is the Lord's and the fulness thereof,"

was the conjoint suggestion of his late Royal Highness the Prince Consort, and the venerable Dr. Milman, Dean of St. Paul's. It relieves the plainness of the pedestal in an artistic point of view, and, at the same time, as he observes, has the higher merit of exhibiting the devotional feelings of a great trading people, and their recognition of a Higher Power.

A writer in *All the Year Round*, of the 11th December 1861, who had been travelling in southern Russia, says:—"Notwithstanding the wealth of the soil, the eye of the wayfarer aches with the weird prospect of endless desolation. We meet, now and then, a string of carts, each containing a little more than a wheel-barrow would hold, slowly and toilsomely bearing along, over almost impassable roads, the food of the civilized world, to the distant seaports, where half of it arrives spoiled and unfit for use. *Wheat might be sold in London at 20s. the quarter, if there were rail-roads in the south of Russia; so true it is that the civilization and prosperity of other countries are to the advantage of our own.*" This reciprocity may well be said to endue industry with a resistless power, whilst it knits together the four corners of the earth. "With free trade as an untried theory, it would seem a dream to speak of feeding English mouths with corn grown on Russian steppes or American prairies. The abrogation, however, of artificial restrictions, and the timely aid of science, have made the vision true; and what we have already witnessed are only the first efforts of the liberated giant. The

grand work which commercial treaties accomplish is, silently and clearly, to knit nations together by the bonds of good-will, as invisible as silk in the actual weaving, but strong as adamant when fully wove. A thousand ties, a thousand friendly offices spring up and multiply under such a policy. Its beneficial growth is like nothing so much as the production of the coralline reefs. Each industrious individual thinks he is building his own cell, achieving his own interest ; but the issue, guided by God and by good laws, is an island—a country—a continent—a lasting structure of amity.”*

The Russian traveller, observed, in reference to means for economizing labour, “Either the great estates of the landowners must be thrown out of cultivation for several years, or, machinery must supply the place of hand-labour, which is not to be had at any price.”

The causes of this dearth may probably be found in the scantiness of population in these parts, as well as in their sudden emancipation from serfdom. Sooner or later, when the intoxication of liberty shall have subsided, the desire of improving their own scale of comforts will lead to a greater readiness to work

* It is stated in *Fairy Tales of Science*, a most engaging and instructive work, that, “the Coral reef along the North Coast of Australia, is composed of a chain of coral rocks, and is more than 1,000 miles long, and from 10 to 90 miles in breadth ; while it rises from depths which, in some places, certainly exceed 1,800 feet. What a mausoleum for creatures so low in the scale of being !”

for them ; and their industrial powers will be more readily developed.

I was much pleased when I witnessed for the first time, the economy of human labour in thrashing wheat by steam. A 6-horse power travelling engine, which cost £300, and consumed 500 lbs. of coal in the day's operation, thrashed and cleaned 300 bushels easily, for 20s. and the coals found by the farmer. There was the additional cost to him of six farm labourers, men and boys, in charging and discharging wheat and straw close to the rick near the barn-door, raising the entire cost to about three half-pence the bushel. I think it would have taken a paid labourer twelve weeks to prepare the quantity for market by the flail, and, at a time when perhaps it might be of very great importance to be early in it. But, the saving of time and money is not the only recommendation of the power applied. The honesty of an often ill-paid barnsman is not tried. I knew an amateur agriculturist on the banks of the Thames who had a seven-acre field of wheat, estimated at twenty-five bushels to the acre, but from which he had, in all, but 105 bushels for the miller. No fraud was suspected, but my friend became disgusted with his costly pursuit, and dismounted from a hobby that had eaten his own head off. The owner of the estate farmed it the next year ; and he had the same barnsman transported for fourteen years for filling his double coat pockets with clean wheat three times a-day.

An estimate was lately published of the number of people required to produce the amount of human strength equal to the aggregate steam power used in England. The product arrived at was no less than 270 millions of persons,—thus calculated:—"The total amount of steam power is placed by Fairburn at 3,650,000 horses; but, as the several machines in which such mighty forces are pent-up work, it is said, at an average of three times the nominal value, the real total might be set at 10 millions. Now, seven average men are generally pitted against a horse in calculations of this kind. The figures thus rise to 77 millions; but, to produce 77 millions of average men, a population is required of, at least, two hundred and seventy millions!" As yet, only a very small portion of this magic power has been applied to the cultivation of the soil and the conversion of its produce: but, apart from its creation of commercial wealth in our manufactories and otherwise, it furnishes our own people with warmth and clothing, many luxuries, and locomotion; annihilating, almost, with electricity, both time and distance; uniting us in one common brotherhood with the civilized world abroad, and bringing together hearts, minds, and interests at home.

With respect to the produce of our staple food in Britain, we can form but a proximate idea, as the Government has never yet been able to induce growers to make returns. This class of persons have felt suspicious that, if they made them, they might probably

be saddled with some new burden on the land, and that their landlords and the clergy would take advantage of their successful cultivation and improved husbandry, by an increase of rent and tithe commutation; but, surely, reliable returns might be collected through the agency of district officers, who would be less interested in giving to landlords information such as their own agents might gather and communicate with ease. It is, however, pretty generally understood, that the home produce, on an average, bears to the imported grain the proportion of about five to one; and that the general annual consumption of wheat is seven bushels by every individual in the United Kingdom,—inferior grain, for human sustenance, having fallen almost entirely into disuse. The amount of imported breadstuffs is ascertained at the different Custom Houses, where one shilling per quarter of wheat is charged on entry. I have stated, at page 45, the particulars of such aggregate payments for several successive years, and these, in the absence of information to be obtained from accurate State returns, will enable us to arrive at a tolerably correct idea of the total quantity required annually for use. We need only multiply the population by seven. Some very powerful arguments were put forward lately by Mr. Walter, M.P., in the hope of convincing his Berkshire constituents, and farmers generally, that they were standing in their own light by not assisting the views of Government in making accurate returns; and he leant much on the reflection

that the want of general information placed them at the mercy of corn merchants and corn dealers, whose means of subsistence depended on their collecting correct information from all quarters, and availing themselves of a superior knowledge of the state of the markets, and of the probable bearing of the stock in hand on future prices. Were public records kept and left open to all inquirers, both sellers and buyers might be enabled to form satisfactory estimates of the probable requirements for the coming year. At present, scarcely any farmer, as Mr. Walter observed, can state on what data he ever brought his corn to market, unless from want of money, or observation of the last week's supply and prices.

One can hardly imagine a more convincing evidence of the prodigious strides of agriculture within the last thirty or forty years, than the frequent conversion of worn-out, or all but moderately-rich, pasture, into arable. In the year 1817, the Political Economist before quoted, gave publication, in the fifth edition of his "Essay," to this axiom:—"A person who is acquainted with the nature of the soil in this country, and who reflects on the fertility of the lands already in cultivation, and the barrenness of those that are not cultivated, will be very much inclined to doubt whether the whole average could possibly be doubled in twenty-five years from the present period. The only chance of success would be from ploughing up most of the grazing countries" (meaning for grain) "and putting an end entirely to animal food. Yet this scheme

would, probably, defeat itself; because, the soil of England will not produce much without dressing, and cattle seem to be necessary to make that species of manure which best suits the land."

This dictum, of a staunch Protectionist, which will sound strangely in the ears of readers of the present day, assumed, that beef or mutton can only be produced by pasture feeding; and, moreover, that we must starve, if we did not grow our own corn entirely. Its promulgation, *ex cathedra*, was well calculated to give strength to a purpose which he thought humanity suggested,—that of deterring our bread and meat-eating gentry from wilfully contemplating an increase of consumers by marrying in early life. The learned author—highly gifted and enlightened for the age in which he wrote—would be convinced of his mistake, could he have lived to inspect the farm and ox-stalls of Mr. Mechi, at Tiptree Hall, or any one of a hundred other scientific improvers. He would have learnt, that, £5 worth, or five acres, of the average grassland of Britain—giving them the supposititious value of 20s. per annum, and certainly not capable, in their normal state, of raising 300 lbs. of beef—can now, with a few pounds' worth of dry food, add 3,000 lbs. weight to some half-a-score large animals, by the simple process of ploughing in the much-prized turf, and sowing it with swedes and mangold, to raise twenty-five tons to the acre on such land, self-provided with manure. Three times as much clover-hay, and ten times as much of that from Italian rye grass, may

be obtained by such breaking up and conversion. By the same process, a single acre of arable land, supported by the return of its own restoring elements, and of the same intrinsic value, will produce as much milk as six acres of such average grass.

We live, indeed, in an age of progress, and are disposed to regard many of the notions and the practices of half a century ago as mediæval. The truly excellent and learned author, to whose writings I have alluded, was then a great and shining light; yet no one would have rejoiced more fully than himself in witnessing the wonderful expansion of human powers and those of nature, and the application of modern science to discoveries at home, and to the world's wastes and individual comfort, everywhere.

I scarcely need enlarge upon the subject of Emigration, as I have already, parenthetically, showed its value and facilities, while dwelling on the progress of Australia. We have scarcely any colony that is not a Land of Promise; and have an immense variety, to suit the wants and wishes of the present generation, and of those to come. Ages and ages will pass away, before the peaceful suggestion of Abram to Lot will be mere matter of history; but, before they shall have come and gone, the miraculous effects of scientific discoveries — suggesting condensation without incumbrance — will deprive emigration of much of its present interest. Millions upon millions of acres in every kingdom and country upon earth — which the plough, or industry of man, has never

reached as yet—will, ere then, yield, in many instances, double and even treble crops, and, in all others, vastly increased quantities of food. Fifteen of every sixteen acres throughout England alone are said to be as yet undrained of their cold pernicious moisture.

The middle classes are more or less acquainted with the advantages attached to emigration, and are generally furnished with the means of carrying it out at will. My clients belong, rather, to the labouring order; and when they shall have become too numerous for their own or others' good, they can migrate,—for comfortable subsistence and more elbow-room,—if enabled to do so by their own economies, or by the aid of friends. And should even the public—British or Colonial—be called upon to advance such means, a return of the outlay might, in many cases, be obtained from honest and industrious families, without the incubus of legal obligation; or, at the worst, it may be saved in poor-rates at home, in creating the best of all customers for the mother country, and imperial wealth in our colonies. Emigration, at all events, is cheaper than the union, in an economical sense, and infinitely more so in a social one. To reach Canada does not cost much; but it is only available, for unprovided families, during five or six months of the year. Translation to Australia will cost more; but the means of living, when landed, are immediately provided, either by the receipt of high wages, affording ample means of speedy accumulation, or in available

land, that may be cropped during any month of the year.

We will now consider estimates based upon experience in two branches of my subject, namely, The productive power of land in the growth of food for cattle, and the capacity of animals in producing food for man.

They are submitted to the scrutiny of practised judges; and, surely, in no case can a request be more reasonably urged for candid, patient examination, than when men of agricultural science and skill are invited to consider the means of increasing the comforts of their kind. "Philosophy," said Dr. Chalmers, "can never be more honourably or beneficially directed, than when multiplying the stores of comfort and usefulness."

Mr. Mechi, in the treatise before noticed, could have instanced other heavy products of the soil from improved cultivation. He might have added, that an aggregate crop of eighty or a hundred tons of Italian rye grass may be obtained, within the year, at a considerable cost, indeed, from a single acre. The instances adduced by him have reference to our own native climate and soils, and fall far short of the capability of naturally rich land in warmer latitudes. Yet, on the opposite coast of France, in latitude 46° , the Agricultural Society of Rochelle reported, in 1855, that M. Auguste de Gasparin had grown 109 tons of transplanted mangold upon an area cor-

responding with an English Statute acre. At St. Helena, in latitude 15° , one of our Governors exhibited two roots, each weighing more than 56 lbs. ; and in California, it is said, that they have been grown to 115 lbs. I have not seen any beyond 33 lbs.

Perhaps, in no way yet discovered in this climate, can powerfully-assisted nature be made habitually more productive of cattle-food than by the cultivation of Italian rye-grass. Some lands at Portobello, near Edinburgh, consisting of three hundred and forty-seven Scotch acres, realized, in 1860, £9,529 sterling, or £27 per acre on the average ; some acres, however, fetching as much as £38 ; all being supported by town sewage. The grass is cut every fortnight or three weeks in summer, and applied to feeding cows.

London sewage, it is said, contains commonly some fourteen hundred gallons of water to somewhat less than five gallons of human excreta ; but, although a material so diluted might be thought too weak for profitable use, we are told, by Professors Liebig and Way, that such a fertilizer leaves all its valuable contents upon and in the soil over which it is conducted. This may be presumed to be especially the case when the application is well regulated ; that is, frequently repeated, and in measured quantities, so as to descend to the roots, and not much below them.

An instructive address on the application of sewage to Italian rye-grass, and to pasture land generally, was given by Lord Derby, in September last, at a

meeting of the North Lancashire Agricultural Society. His Lordship lucidly explained the system practised at the Wellington College, where eight cuttings of the new grass were taken, in one season, by its aid, and the smallest of them a foot high, from land of which the freehold was thought dear, at its cost price of £10 the acre.

* That the sewage of towns must, on sanitary grounds, be conveyed away directly to the sea, or otherwise disposed of, none will venture to gainsay ; but whether it be advisable to conduct it off by the most direct line, or to make it generally subservient to the purposes of cultivation, by branch drains to the land, must be a question of engineering, and of pounds, shillings, and pence. I confess myself wholly unequal to the discussion ; but am not alarmed by the threatenings of Liebig as to the necessity of returning to the earth, in this form, the identical phosphates and ammonia which have been drawn from it, and found their way into sewage. A Parliamentary Committee is sitting on the inquiry, and obtaining the evidence of scientific and practical men. In their first and second reports, much interesting matter is contained. Lord Derby's recommendation has been ably confirmed before the Committee, by Lord Essex, who avails himself of the sewage of the town of Watford. His Lordship expresses his preference for its application to grasses ; but, at the same time, he reports extraordinary results from his use of it on wheat land, and in root cultivation.

Having seven acres of mangold, of which five and

a half had suffered so much in their early stage of growth that he was inclined to plough them in, he resolved on transplanting from the unthinned ranks, and thus filled up the blanks throughout. He applied town sewage to the whole ; and, in due season, harvested forty-seven tons of root per acre from the entire field. I can readily understand how peculiarly effective this liquid must be upon transplanted mangold, if frequently and moderately applied, as well from my own practice of manuring with liquid this identical root after early potatoes and otherwise, as from the fact of the Chinese custom of transplanting each plant of rice by hand, and forcing its growth by liquid from their houses. Liquid manure is superior to solid, from its not being subject to evaporation, as well as from the fact, that, its absorption by the rootlets is almost instantaneous.

The second report of the Sewage Commissioners states, that “the cost of its application depends on the relation of the town to the surrounding lands, and to their value and quality ; but, when these relations are not unusually adverse to the application of sewage, it can be applied to agricultural purposes with profit, either to the town, or to the owners of land.” This is obviously clear ; but the frequency of the non-occurrence of these favourable relations, and the difficulty of regulating the flow according to seasons ;—the formation of the surface operated upon ;—and the circumstances of weather, state of atmosphere, &c., must render the practice limited and partial, and

at all times costly; so that, not a few reflecting agriculturists entertain the belief, that, phosphates and ammonia may be imported at a cheaper rate,—in guano and bones,—than town sewage can be used, and far more easily applied to tillage; and that, when these substances shall become scarce, it will be time enough to have recourse to sewage conducted in all directions from trunk drains.

Rye-grass may be almost called perennial: but it is much more profitable to break it up every second year, and to renew it, either by sowing it by itself in autumn, or with spring corn of any kind. An interesting and trustworthy notice of this plant has been given to the public, in a small pamphlet, by Dr. Dickenson of Lymington, who first introduced it in England, and has, ever since, been a successful grower of both the grass and seed. This gentleman himself, Archdeacon Huxtable, of Saffron Walden, and Mr. Kennedy, of Myremill, have taken, I am assured, from eighty to a hundred tons and even more from a single acre, in the course of its growing season of eight months. One acre may be made to yield seven or eight times as much food as ordinary grasses will commonly supply within the year. Our English pastures may produce annually from five to fifteen tons an acre; the lesser quantity being, perhaps, the usual yield from land of 20s. to 25s. annual value, and the greater—that from the richest land of Lincolnshire or Limerick, which will fatten—it is said—an ox and a sheep between May-day and Michaelmas.

This new grass is eagerly and healthfully devoured by cattle; nevertheless, it may be doubted whether it can with advantage be adopted largely in a system of stock feeding, on account of the inequality of its monthly growth, and, more especially, from its dependence on the application, after every one of six, seven, or eight cuttings in the season, of an amount of urine, and other liquid manure, which can only be furnished by a great number of animals, whose solid fæces—always comparatively weak—would be deteriorated greatly by its abstraction. It is quite certain, that, no land can support such exhaustion without corresponding restoration. The irregularity of its growth must also render it embarrassing, from the difficulty of adapting consumption to produce. It is very possible that it might repay almost any cost in manure if irrigation were available to liquify other matter, and a half of it were converted into hay in the seasons of excessive growth; or, if a great portion of the liquid manure needed were supplied from towns, so as not to disturb the general economy of a farm. It might prove of great value in an extensive course of green crop husbandry and cattle feeding, where steam power, for charging pipes, with hydrants, would facilitate the daily watering of the portions mown—for cutting up with chaff,—to which purpose it can be applied, perhaps, more easily than any other kind of green food; and, as affording, also, a fresh variety during eight months, in equal quantities of four or five tons monthly per acre, while every

two and a half or two and three quarters of a ton of all the surplus growth, during the central months, might be made worth £5 sterling by conversion of the green herb into hay.

Dr. Dickenson reports some extraordinary results obtained by Mr. Telfer of Ayr, in highly manuring naturally poor land for this grass. It was worth recording as evidence of the capacity of productiveness in the earth, rather than as a practice to be much followed. The washing in upon every Scotch acre, during the season, a ton and a quarter of Peruvian guano, with the urine of twelve cows (say sixty tons more), and 1,800 tons of water, might well be supposed to produce extraordinary effects, even from land said not to have been of greater annual value than fifteen shillings. If it could have paid Mr. Telfer,—as he says it did,—to raise, at such a cost, green food for his fifty dairy cows, whose produce in butter was sent to London, slightly salted, it would not be difficult to conceive how much more productively some £35 or £40 per acre (which it cost in rent, labour, and manure,) might be employed in other green crops on a larger area. I was induced to visit Mr. Telfer's farm and stalls, in a late excursion to the Lothians. The latter were admirable; and I was pained to hear that so enterprising a man had been much injured, and his pursuits arrested, by the failure of the Glasgow Joint-Stock Bank. It might be reasonably thought, that if other green crops, for dairy purposes only, were cultivated, the third of the animal excreta

(which would be in excess for reproduction), might be employed upon this grass with advantage ; at the same time, I am quite sure that such excess might be still more profitably devoted to the growth of culinary vegetables.

Mr. Caird, in his valuable Essay on "High Farming," says: "*A yearly produce so great as that which may arise from the practice of High farming, with corresponding profits, will be less easily reduced to a vanishing quantity by reduction of prices, than the comparatively small returns of the old system, which, after deducting the expenses of production, leave a margin too narrow for any continued depreciation.*"

We have dwelt long, and, perhaps, tediously, on the subject of Italian rye-grass ; on that of turnips and mangold I am individually more at home, having largely cultivated both, but particularly the latter. In Surrey, I grew moderately heavy sown crops of this root, and, with very little manure, alternating the long red and the yellow globe. On one occasion I fed seventeen cows upon the leaf alone of two acres and a quarter, during three months and more of excessive drought, with no additional food but the after-grass of some twelve acres of old pasture, on which no rain had fallen since the mowing in June. These two and a quarter acres were thought to have yielded about thirty-five tons of leaf, by going three times over the field in three months, namely, August, September, and October ; and sixty or seventy tons of roots were removed in one hundred and ten single

horse cart-loads. The seventeen cows consumed, and even ravenously devoured, some fifty or sixty pounds weight daily, each, of leaf, and would have eaten a larger quantity. On the red sandstone soil of Devon, of good quality and well manured, I weighed, with a friend, an average parcel of a measured acre, on which were growing, and had grown, in two successive crops, fifty tons of root and crown yearly, without stripping any leaves; and the same land yielded, we were told, thirty-eight bushels of spring wheat the following year. In Middlesex, I once saw forty tons an acre of root and crown alone on fourteen acres which had produced no other than a mangold crop for seven successive years; and it was then selling to the London cow-keepers at twenty shillings the ton—they fetching it, and bringing their manure for sale.

When the Regent's Park was first laid out, a large amount of mangold was sown on the trenched portion, and which a daily paper declared had been disposed of at £80 the acre; and in the *Western Times*, of the 19th Nov. 1859, eighty-eight tons of the root and crown per acre were said to have been grown by Mr. Dennis, of Barway, Devon. The late Mr. Pusey found that he obtained, from very indifferent land, twenty-seven and a half tons of this root with only thirteen cart-loads of manure, and, on the same quality of land, no more than twenty-eight and a half tons with the aid of twenty-five such loads; from which he inferred that mangold requires the least

manure of any root, while its consumption at home will cause the reproduction of, perhaps, more than any other.

In Loudon's *Encyclopedia*, it is said that, according to Von Thær, field beet or mangold causes a great increase of milk, and improves its flavour. The leaves, he adds, are taken off and given by themselves. The root, in nutritive matter, stands, in comparison with hay, as 10 to 46, and with the potato, as 20 to 46.

In transplanted mangold I have myself had much experience. I grew, in Surrey, after early "Shaw" potatoes, 21 tons of leaf and 24 of roots per acre, planting at 15 inches' distance every way. In two other different years I planted out, on 16th June and on the 4th July,—both after potatoes,—2 several crops at 13 and 14 inches every way, and scarcely lost a plant. I raised, from the first-mentioned crop, without more manure than what remained from the potato planting, 23 tons of leaf and 25 of root; and from the last-named, 19½ tons of leaf and 23 of root; the closest of the three (but earliest planted) proving to be the heaviest crop, even of root; which closeness may have encouraged the rapid growth of leaf, through the gases formed, but it could not be deemed favourable to the swelling of the root. The frequent partial stripping of the leaf, under such practice, would cause a greater demand for female or youthful hand labour; but, I should here mention—what is but little known,—that, the small, or moderately-sized leaf of mangold (and no other would result from transplantation)

constitutes a most abundant and agreeable culinary vegetable, scarcely distinguishable from spinach. Loudon, in his *Cyclopædia*, mentions, also, that the leaf is thus used largely for the table in Germany and Switzerland. Might not, then, this delicate product, of which 15 or 20 tons an acre may be raised, be added to the varieties of vegetables in use for human sustenance? Supposing it to be worth 8s. or 9s. the ton as cattle food, that price would leave it at 5d. the cwt. only for the vegetable market, during three or four months of the year, and much longer, if earlier planted, and if preserved in a perfectly moist state, as practised in the Rhenish provinces. The transplanted root, having its tap often slightly damaged by removal, will depend much upon the upper soil for food; on which account it would be desirable to alternate the use of the long red and globe kinds, so as to draw their nourishment from different strata of the earth. If liquid manure were applied to these transplanted roots—frequently, not heavily,—the conjoint weight of leaf and root might be found to equal that of a sown and unmoved crop,—even supposing the latter to be liberally dealt with,—except, perhaps, in deep alluvial soils. The mangold leaf is rarely taken off by farmers, as they suppose, that ultimately, the root suffers by the blading. The Lord Althorp, who was President of the Smithfield Club, and a scientific and patient experimenter, thought otherwise; after many trials, he satisfied his own mind that the weight of root at harvest became—through a frequently-repeated moderate abstraction of the

leaf,—ten per cent. the heavier. His Lordship's experiments were reported at some length in the *Farmers' Magazine*; and it seems not a little strange, that, such a commendation of the practice should have been so totally disregarded, as to leave practical and profit-seeking men in the continued habit of ploughing in the crown and all decaying, as well as the decayed, leaves.

In the course of a tour from Brussels to Lucerne in the early part of November 1860, I saw the female peasantry much occupied with pitting leaves for cattle use in winter. The variety of root from which they were stripped at harvest time, was the "Silesian" or "Sugar-beet," and which they cultivate extensively on account of the high price it fetches at the nearest sugar manufactory. The harvesting takes place the last week of October, or first in November, as with us; and the leaf is then pressed lightly down in longitudinal heaps, upon the ground where grown; the bottom of the heap being previously sanded to secure the leaves from damp; the coved roof covered with a little straw and earth, as potatoes and the mangold root are usually preserved in England. Some straw also is generally placed on the several thick layers of leaf. It was said, that, this formed the only succulent food for cows from November to April both inclusive. The October, or harvest crop, of the large kinds of beet, together with the crowns, (in England giving four or five tons per acre,) would be better thus employed than by ploughing in

and simply benefiting, a very little, the succeeding crop. Long practice has convinced me, that, stripping only the large and generally drooping and heaviest leaf, three times in the season of its growth, will largely pay for labour, without any perceptible injury to the root. But, the pitting or preserving of the Summer and Autumnal early growth—some nine or ten tons—would seldom be advantageous to an English farmer, from their having a peculiar value in their fresh state, for stalled cattle, or eating upon pasture, in August and September, when natural grasses have declined, and vetches, and the first, and even second cuttings of clover, and early cabbage, have been all consumed. In October, drum-head cabbages and turnips may supply their place; so that the leaf produce of that month, might, under ordinary circumstances, be spared for preservation as a superior food—with hay or chaff of any kind—to that of roots, for dairy cows in early winter. With us, however, the pulping or the steaming roots in this season, with chaff, affords a feeding which the cattle relish greatly, and they lose scarcely any of their value in six months, having parted only with some 10 per cent.—in water—of their weight, while wetting slightly before storing, and but very little in the next four or five months. Mr. Mechi says, that he has kept the roots in a sound and feeding state until July; a practice which would make the entire crop useful for eleven months. I have never tried to keep them after May. From a single root of mangold, I have taken four pounds of

leaf in a season, and, from a plant of brocoli, no less than nine pounds, without apparent injury to the respective plants for feeding, or the table. These were severally watered three times; neither the root of mangold nor the head of brocoli was weighed; but, they certainly exceeded greatly that of neighbouring plants which were watered only once. The liquids used, consisted of the solid excreta of the cow dissolved in five times their bulk of water; and yet, this most valuable aliment for plants, after being drenched by exposure to the rain in open yard, is generally allowed to float away in drains and ditches, through our rivers to the sea, as if we had no need of it. Not only is such recklessness absurd; it may be justly characterized as a social crime. Nature never wastes, and what we have been ignorantly treating as valueless, she would hoard up and accumulate as the material for fresh crops, "silex to build straw, phosphates to build bone, fibrine to make flesh." It may be that the universe sustains no loss, but, individuals lose, by scattering to the winds and waves these elements of reproduction. Everything resolves itself into elements similar to itself.

Experiments on a large scale have proved, that, the leaf of mangold causes the secretion of more milk than any other kind of green food known. The order in value—say in seven supposed parts—has been found to be as follows:—

1st. Mangold leaf	6·87
2nd. Same with cabbage	6·67
3rd. Cabbage alone	6·26

4th. Italian rye-grass alone 6·01

5th. Second cutting of clover 5·95

And that, next to Italian rye-grass, the milk from such feeding upon leaf, throws the most cream.

In the *Agricultural Gazette*, of the 15th April 1855, may be seen the subjoined report of the result of feeding twelve cows, for nine months, on various sorts of green food, and their several influences on milk, cream, and butter.

	Days.	Milk. quarts.	Cream. quarts.	Butter. pounds.
There had calved some time before April 11th,—7 cows which were fed on 70 lbs. of mangold root, and 50lbs. of turnips each with straw.	3	171	23	19
July 11th.—11 cows. By this time four more had calved, Italian rye-grass <i>ad libitum</i> .	7	692	115	75
Sept. 18th.—12 cows. Second cutting clover.	7	524	88	60
Sept. 25th.—12 cows, cabbages.	7	576	92	62
Oct. 2nd.—12 cows, mangold leaf and cabbage.	7	648	94	60
Oct. 9th.—12 cows, mangold leaf alone	7	848	127	86
Dec. 1st.—12 cows, 50 mangold, 60 turnips.	7	672	93	74

The report does not state when the first three cows calved. It could not have been in April, as they gave in that month but $8\frac{1}{2}$ quarts of milk each daily. By this also it would seem as if the yield did not decrease at all, during the first four or five months.

Then, also, the first of these seven feedings gave : say,

	Qrts. of Milk.	Qrts. of Cream to lbs. of Butter.	Qrts. of Milk to lbs of Butter.
No. 1.—Each quart of cream gave from }	7·43	1·21	9
The second from	6·01	1·53	9·22

The third from	5·95	...	1·46	...	8·73
The fourth from	6·26	...	1·48	...	9·29
The fifth from	6·89	...	1·56	...	10·8
The sixth from	6·67	...	1·47	...	9·86
The seventh from	7·22	...	1·26	...	9·08

Average—one quart and 3-10ths of cream, or little more than five half-pints, to a pound of butter, in summer and in winter; of milk nine and one-third quarts to same. Six and half of milk to one quart of cream, summer and winter.

The report further states, that, oat-straw only was given to all the cows; no hay; that, they were house-fed through the year; but, had access to a field for four hours daily; that, change of food was evidently of great use; that, the green food was not weighed, but given *ad libitum*, though so as not to derange the system. It here appears, that the milk threw about as much cream in December as in April, and, the cream more rich in butter, generally one quart of cream to six and half quarts of milk; an uniformity assisted, I presume, by the maintenance of a nearly equal temperature in the stalls and dairy, through the year.

A similar advantage formed one of the boasts of Corydon, in one of Virgil's Eclogues:—"I am not debarred from the use of new milk in summer's heat, or in winter's cold."* The poet's cows would probably not be housed, but would enjoy the not ungenial climate of the vicinity of Mantua.

The food report just given shows, that, Mangold leaf surpasses every other aliment for cows, in causing

*"Lac mihi non æstate novum, nec frigore deficit."—*Eclogue 2*, v. 22.

a greater flow of milk. It appears, also, that, the cows had all calved some months before the sudden augmentation occasioned by this particular feeding. In one single instance only were ten quarts of milk required to make a pound of butter—the average being nine and one-third. Mangold and turnips, in December, gave a pound to nine quarts. It would appear also, that the cows fed in October upon mangold leaf, were the only ones which yielded ten quarts daily, and that this amount was obtained perhaps in the sixth month after calving. Those fed on mangold root and turnips, in December, made the next best return; or, it may even be as good, (dates of calving considered,) that is, eight quarts daily, some seven months after calving.

None of these milk products were extraordinary, a fact which may be referred perhaps to the small outlay afforded in any other than green food. It would be satisfactory to be informed how much dry food they ate, and what was the breed of cattle.

Of the leaf of sown mangold, I have been accustomed to take from an acre, four tons in August, five in September, four in October, and two or three, including crowns, at the time of harvesting, in early November. The roots, however,—though the only succulent food to be relied on after February or March, when swedes and cabbages are passing away,—are not, generally, in such high estimation for dairy cows as for fattening; yet, the results exhibited from the December feeding may justify a different conclusion.

The nutritive value of the several roots usually

given to milch cows, and other animals, has been ascertained, and thus defined by the late Sir Humphrey Davy.

Respective parts of nutritive powers in a thousand.

	Of Mucilage.	Of Sugar.	Of Gluten.
1. White Turnips	7	34	1
2. Swedes	9	51	2
3. Carrots	3	95	
4. Parsnips	9	90	
5. Mangold	13	119	4
6. Potatoes	177	18	35

This evidence might, one would think, suffice, for settling the vexed question of the comparative value of mangold and swedes, for fattening cattle, as well as for producing milk.

Professor Johnstone found that, one hundred Parts of potatoes have.....75 parts of water.

„ mangold „85 „

„ turnips „88 „

A melancholy proof of the too general preference given to swedes over mangold, for winter and spring use of horned cattle, was exhibited in the Irish winter of 1860-1. It came in early, and continued to be so severe, as to destroy the turnips in the field at a time when mangold might have been all safely stored. The cultivation of the latter root was so limited, that very little remained in the country. As a necessary consequence, hay and straw alone became available for stock of all kind, and the former was sold as high as £12 the ton! Cattle died by thousands, and the

little farmer was in despair. For dairy purposes, the root of mangold is far better than hay alone, and very much cheaper. Three-fourths of a cwt. or more may be given daily, without too much encouraging a disposition in the animal to fatten, with loss of milk; but, in fact, a really good milker is seldom known to lay on fat while milking. Oil-cake or meal, as shown from the practice of many, may be given with advantage, and with no other detriment than that of increase in the cost of diet.

It may be here observed, as a probable result, that, a sown crop of mangold on good land may cost, at most, £14 an acre, in rent, and with hired labour, and purchased manure; and yield some 40 or 50 tons of leaf and root, of which the one-third leaf; and town milkmen would buy readily what was not required at home, at sixteen or seventeen shillings the ton delivered, they generally paying twenty. Town-stall manure might be returned in back carriage. One-half of the weight of green food supplied might be brought back to the farm in liquid manure, upon alternate days, going in empty and returning full, with a light frame-work for conveying the green food over a street water-cart.

In dealing with arable land rich in humus, or mould, and well drained, or with a subsoil fresh and unexhausted—such as old pasture to be broken up,—no manure need be given for a first moderate crop, beyond a little guano to secure what farmers call a “plant,” letting the first crop provide manure for the

second most abundantly, and even in excess, where it is consumed at home. In growing mangold on such land, it would be advisable to begin with the long red kind, the tap root of which would mainly derive its nourishment from the subsoil not worn out by grain. It appears, also, to give most leaf, though it may be somewhat less fattening. As a fallow crop, upon an ordinary farm, 20 tons of Swedish turnips are generally deemed a fair produce from an acre, and 25 of the common white or yellow Aberdeen, each well manured ; but this supposes the turnips to have been grown for eating on the land as a preparation for a following grain crop. To obtain a greater weight than this, more manure must be applied than can be spared from home resources, on such farms, without prejudice to other crops ; and, when the turnip, therefore, forms an item in an ordinary rotation, no greater produce than 20 tons, or 25 at most, per acre, can be reasonably expected under any mode of culture. This calculation, however, cannot, of course, apply to the turnip or any other root grown for soiling or stall-feeding off the ground, in the farm buildings, without reference to succeeding grain crops. If the whole excreta of the animals fed on them be returned to the land for a following green crop, to be consumed in like manner, the objection of extravagant outlay cannot be fairly urged. The more food, the more cattle may be fed by its consumption ; and the more cattle, the greater are the means of reproduction ; so that the heaviest imaginable crop consumed at

home cannot impoverish or exhaust, but will, on the contrary, augment the power of reproduction. The term "exhaustion" should find no place in the vocabulary of an intelligent farmer, who consumes his green crops and his hay and straw at home in stalls.

Regarding the capability of land for a turnip crop, it is indeed asserted, in Loudon's *Encyclopedia*, that 60 tons have been raised in Ayrshire upon an English statute acre; but, the case was most exceptional.

Farm-yard manure, in its customary proportions of solid and liquid, contains all the important constituents removed from the land in crops. These are again restored to it in a form in which they can be made rapidly available; but, if so much of the liquid matter be diverted (for a crop of Italian rye-grass, for instance), on a soiling farm, all other crops must suffer. Urine, the food on which it most luxuriates, contains the soluble products of the soil derived from the consumption of crops; the solid faeces contain the insoluble constituents; so that it is only by returning both to the soil that the elements removed are re-acquired.

Nothing appears more simple than the arrangement of a regular variety of crops. The period of their first coming in, and the usual length of their duration in and out of the ground, may be soon learnt.

An extensive cultivation of green crops will partake of the nature of field gardening; and, the nearer the approach to garden culture, the heavier will be the

crops. No labourer need be idle for a single hour, except in cases of severe weather ; and, even then, the spade might often be advantageously employed in the process of double digging. Whenever and wherever there should be a redundancy of manual labour, it can hardly be better employed than in such digging or trenching ; it would be extremely beneficial in cases where the top soil had been exhausted by grain crops, in bringing into use the lower strata. In wet seasons, it is often possible to employ the spade when the plough cannot be used. In autumn, a heavy soil—often the most productive if well treated and the seasons favourable—will be greatly benefited by the employment of the spade, in exposing it to the elements. By the latter process, very great and annually increasing crops of mangold, swedes, or cabbage may be obtained, laying up in high ridges a clay soil in autumn, in such a manner as to expose the greatest possible extent of surface to the action of the winter frosts.

In laudation of the instrument in common use from the commencement of tillage, it has been somewhere said :—“ If heraldry were guided by reason, a plough in a ‘ field arable ’ would be deemed the most honourable of arms.” As said before, I entertain no such extreme veneration for this engine in its ordinary use. The pressure caused by four bullocks or even a couple of horses, more than once a year, must harden more and more the substratum of a strong soil, and thus endanger its becoming cold and wet ; a

condition most unfavourable to the extension of a tap root in search of food. It is to be hoped that famine prices and want of employment, will never co-exist again ; but it is no small recommendation of field-gardening, that while it feeds the greatest number, it at the same time provides abundance of employment for them.

Before entering on inquiry into the superior productiveness of cows supplied with diversified articles of food, it may be observed, that, ample provision for the growth of such is derived from the animals themselves, in the form of some 2,500 gallons of liquid manure annually from each, and half that bulk of solid fæces capable of being converted into liquid by the simple process of watering. As already stated, no littering of any kind is wanted, either for the comfort of the animal, or the production of manure. The liquid should be preserved in tanks, and nothing suffered to impede its progress to them from the stalls, and thence conveyed by engines, or its own weight and pressure, over lower land, or else distributed by gutta-percha tubes affixed to hydrants and the rose.

It is generally understood that a well-selected or good average herd of dairy cows will commonly produce, on pasture feeding, in the first three months from calving, some twelve or thirteen quarts per day ; in the second three months, eight quarts ; and in the third and last, four quarts ; after which, the animal is

commonly suffered to go dry on hay and straw, in an uninclosed or partially-inclosed farm-yard. Such animals have no other kind of intermediate food between the green and juicy herbage of the field and their dry winter aliment. Can it, then, be matter of surprise, that, the tendency to a gradual diminution of milk produce—especially in a pregnant animal—should be accelerated by the want of some species of nourishment better calculated to keep up the secretion. Nor is the decrease of milk for the pail to be alone expected; because, the teeming mother, during nearly all the remaining period of gestation, cannot bear hard usage of any kind without injury to her calf and self.

The consequences of the different modes of pasture and stall-feeding may be thus stated:—The stall-fed, or soiled cow, holds her milk longer than the out-of-door one, probably from being provided, in abundance, and much longer, with a variety of succulent food, without trouble or fatigue in the search; while the other is restricted to one kind of green food only, and its amount dependent upon seasons. In fact, in the old suburban yards of London, where 3, 4, and even 500 cows of a large size were stalled together, they were generally milked to within a fortnight of calving, as they attached no value to the calf, and were said to have yielded commonly 4,000 wine quarts of milk per annum.

Regarding the description of animal most useful

for supplying milk, various opinions are entertained. The short-horn^s is confessedly good for all purposes of milk and meat, and has proved extremely profitable for the dairy. I may mention, also, the Ayrshire, the South Devon, the Poley Suffolk, the Hereford and others, all prized in their respective districts. I had once, in my own herd, a large Holderness or Yorkshire cow that gave me $27\frac{1}{2}$ wine quarts of milk in twenty-four hours, on the average of some days after her only time of calving in my possession ; but I lost her, within a week, through my stockman's indiscretion. A milk-seller, and little farmer in Devonshire, assured me lately, that, in his herd of ten cows, he had one which was a cross of the Guernsey male and the short-horn cow, whose milk was plentiful as that of the average of his stock, while her cream and butter were so extremely rich, that he cared not for pouring her produce into the pail with the rest, for sale at fourpence the quart. This man was, however, most probably reconciled to the proceeding, by the reflection, that it would bear more watering. On mentioning such variety to an eminent breeder of short-horns, he suggested, that, a still better cross would be produced by a reversal of the sexes. The rationale of this suggestion would seem to be, that the short-horn male is more likely to communicate the feeding faculty, without interference with the milking one imparted by the Guernsey. This double character is important in the view of loss of milk from any cause. He added that he

would stop at the first cross. Valuable animals are, however, often found among the native herds of a country.

There are many external marks about a cow which are said to indicate her milking quality, and might assist a novice in selection. These seem to be,—a slim head, neck, and horn, rather light in the shoulder, broad across the loins, yellow skin, a hearty disposition to eat, and a good capacity for storing food. These several points are generally found in a good cow.

In buying dairy stock, the condition of the animal should be considered. If it be good, she may be fed more safely upon food producing quantity of milk. "She will generally lose condition in milking," as observed by Mr. Horsfall, "because the elements of condition are more drawn upon, and are converted into the component parts of milk." It must be deemed important, therefore, on every account, to keep her well when dry, in order to restore the exhausted elements. If not so cared for, she will give less milk on her next calving. She will also become less saleable, that is, obtain a less price for fattening off. The quotations of lean stock for fattening, will convince a stockholder of this truth. The price of so much per score indicates the acme of the fattening power; and the practised purchaser will thus decide upon her value. Generally speaking, a milch cow will rarely fetch above £2 or £3 more when fat than she cost with a calf by her side. It usually takes from £6 to £8 to regain even her first cost at the butcher's hands.

With regard to the quantity of green food that a cow requires in stall, much depends upon her size and on the nature of her food. Of such juicy matter as clover or vetches, she would eat one-fourth more than of roots; and they must be given with greater caution,—a little at a time,—and with dry fodder, such as chaff. The large Holderness, or cross of Holderness and Durham breed, which was the favourite of the London cowkeepers formerly, were great eaters, but they yielded milk proportionably. The Ayrshire, Durhams, and the Devons—north and south—are of moderate size, and will consume about one hundred-weight daily with hay or chaff. Some dairy farmers give from one to three pounds of oil-cake, steamed with four to six pounds of chopped hay or chaff, proportioning the allowance to the cow's value as a milker at the time, or with the view of rendering her more saleable for grazing. The Dutch are in the habit of dissolving a small quantity of cake, or rye-meal, in the water given to cows. Professor Musprat, before mentioned for his work on chemistry, declared, that, the richest milk he ever tasted was that of cows fed on mangold and oil-cake.

The addition of this cake, or meal, is by no means necessary to success, as I have shown; and, probably, would not repay the cost in a herd kept for ordinary dairy purposes; perhaps, a variety of succulent food is of more consequence towards filling the pail than either meal or cake, or hay at night.

Whilst the greater productiveness of stall-feeding,

or soiling, dairy cattle is placed beyond a doubt, the gross amount is obtained through somewhat heavier charges. Each 25 or 30 cows, according to the care intended to be bestowed on them, may involve the charge of one man's time and attention. In London, he had formerly the charge of 40 or 60 cows in stall, accordingly as they were currycombed or not ; but in all those cases, the purchaser milked the number of his cows which commonly supplied the milk he wanted, without assistance from the owner. The dairy expense is of course no greater than with pastured animals. The decreasing value of the stock would bear as heavily on one as on the other, except, indeed, that the shelter afforded to those housed has been found conducive to longevity.

I have long thought, that, while an ample portion of monied capital and industry is employed to satisfy the demands of the rich and some of our adults, a very insufficient amount of it has reference to the wants of all of scanty means, and of extreme and early youth.

Passing by the luxuries which will ever wait on those possessing wealth or comfortable means, there seems to be too little of the strong aliment of butchers' meat, and many other nutritive substances, within the reach of the lower orders. I would gladly see the practice of high farming, on economical principles, applied to the relief of all—or some—of these wants

of the many. The placing within the power of every operative's family that needed it, a weekly joint of meat, would involve so large an increase in the number of stalled animals, as would furnish abundance of manure for an extensive field-garden cultivation. This latter purpose would derive still further aid from a greatly increased supply of dairy produce in relief of the still more urgent want of milk; stall-feeding in both these pursuits, would furnish a superabundance of means for growing culinary vegetables beyond a reservation of the required demand for re-producing cattle food.

These views have induced inquiry, and brought about conclusions which I propose to lay before the reader; not, indeed, with any confidence in my own powers of persuasion, but the desire of suggesting matter for the consideration of those who are more qualified to lead in the practice of agriculture, and a study of the material interests of the people.

All who are more or less engaged in promoting the health and substantial comforts of the working classes and the rising generation, cannot fail to regret how very inadequately the inhabitants of our large towns are supplied with the important substances of milk and vegetables; and, especially, will the observation apply to milk, an article which should be within the easy reach of all, as affording a palatable and most nutritious food, alike calculated to promote the vigorous growth of the young, and contribute largely to the sustenance of the old.

Of all substances furnished by the three kingdoms of Nature, milk is said to combine the least quantity of stimulus with the greatest amount of nourishment. Moreover, its habitual use would tend greatly to promote sobriety and domestic habits, and produce many other desirable results.

On a late occasion, Mr. Mechi feelingly observed :—
“Our metropolitan wants are becoming, every year, more urgent. The infants and juveniles of the city would exhibit a very different muscular and general development if they had more food. Their pallid faces and their feeble limbs afford infallible evidence of defective nutrition.” And, elsewhere he says :—
“*An abundant supply of milk, in each city and large town, would arrest the rapid deterioration of our race.*”

There can be no doubt, that, as “the child is father to the man,” too much care cannot be taken to lay the foundation of future health and vigour in his earliest youth. Many are the charitable institutions in our metropolis, and elsewhere, for the saving infant life ; but the out-door waste of it is still such, that, of 50,000 deaths in London, 21,000 are found to be of children under ten years of age.

In this class, it is natural on all accounts, that we should take peculiar interest ; and, although the quality of its requirements is the most simple and the least costly, they are precisely those which we are the least careful to furnish.

Dr. Lankester, in one of his interesting lectures upon food, observes :—“*There is no type of food so*

perfect as milk. It really represents all that of which we partake that is not medicinal. That it is so, is found in the fact, that, the young of all the higher mammalia are fed on it for months, and get no other food. During this period, they grow most rapidly, and increase in size; consequently, they must have obtained all that which contributes their muscle, nerve, bone, and every other tissue, from the milk they take as food." Many, also, are the authorities for recommending this particular aliment to persons in advanced life, having passed the middle and more vigorous age. A very estimable writer upon health and diet, Dr. Wilson, of Malvern, the founder of hydropathy in that healthful and beautiful locality, thus writes of milk in his work upon the "Water Cure:"—"It is my opinion, that as milk forms man's first aliment, so it is best fitted, when judiciously taken, to form his last. In age, and feebleness extreme, for the wasted and decaying powers of the fabric, if that fabric has been in due seasons, and by slow degrees, again accustomed to draw its nourishment from milk, each meal will be permanently more reviving and sustaining than any other form of food."

At a time when wheat was at a famine price, and a Benevolent Society was formed for "bettering the condition of the poor," Mrs. Hannah More expressed to Mr. Wilberforce (the President) her conviction, that, "*the value of anything depended more upon its usefulness than its splendour; and she would rather be able to lower the price of bread than to write an Iliad.*" The

attainments of this highly-gifted lady enabled her to appreciate the transcendant beauties of the poem, while simply drawing a comparison between the conceivable delight of feeding starving millions, and catering to the appetite of a refined taste. The laurels, which would have been prized by this venerable lady might be awarded to those who so pertinaciously and successfully exerted themselves in the struggle against the Corn Laws. Some praise, however, could scarcely be withheld from those who may point, in practice, to the facility of extracting from the soil, without injury to other forms of productiveness, the means of enabling the masses to obtain a sufficiency of milk and vegetables, at prices very considerably below the exorbitant ones which virtually place them almost beyond their reach.

Many considerations—short of optimism—will lead to the belief, that, much good will come out of the evil raging in the cotton-spinning districts. It may be, that the forced limitation—almost amounting to abandonment—of the use of the costly aliment of butchers' meat by the late recipients of high wages—provided they are more sufficiently supplied with milk and vegetables—will produce, eventually, beneficial results. It is said, already by medical reporters, that, the present general freedom from ordinary diseases in the distressed districts may be imputed to the great increase of vegetable diet. I apprehend, indeed, that any great amount of strong animal food is, in few cases, necessary or even desirable in warm,

or even temperate, climates. The porters in Constantinople are said to be capable of carrying heavier burdens than those of other countries; and they very rarely taste the flesh of animals. The active powers of such Irish labourers as have abundance of potatoes and milk, may be adduced in further support of this view.

The poorer classes of the community in town, and even in the country, are rarely able, however, to indulge in beef or mutton, and, from various causes, they are virtually shut out from the enjoyment of milk; while its absence can only be supplied by substances much less nutritious and restorative, and often positively injurious. Such will continue to be the case, so long as the well-being of the many shall be sacrificed to the interest of a few. Articles of the first necessity are the very last in which the partial benefit of individuals should be allowed to weigh against the interest of the public; and the fact should not be lost sight of, that, whatever improves the health, and facilitates the maintenance, of the lower class,—by economizing their resources,—must tend to lessen the frequency of their recurrence to the public stock for relief.

The operative and labouring portions of the community, in populous towns, have little or no power to help themselves in this matter; and we find none whose interference they can successfully invoke. Nor do the higher and middle classes manifest, in their own interest, any strong desire to see the present

system amended. They seem indifferent to the price—and not, practically, to care for the quality—of an article which forms so insignificant an item in their house expenditure and home comforts, and which entails no trouble on their servants. We are too prone to give our virtual assent to the axiom, “What is everybody’s business is nobody’s business;” but it is most strange that, in an age of rapid progress, its warmest friends are willing, in this respect, to stand still, “*super antiquas vias,*” while humanity and common sense alike prescribe an onward march.

It may be well supposed, that the general disregard of the quality of milk is calculated to discourage the would-be honest dealer, in the daily scramble for custom. The entire class seems anxious to conceal from one another and the public their sources and amount of profit. Certain it is, that, the liquid sold is often deteriorated, even before it reaches the udder of the cow, by the use of stimulating and of watery food; and it is commonly skimmed afterwards, and more or less abundantly watered. One might be disposed to think that very few of such dealers would feel abashed, if a customer should send them the full price of a quart, together with two empty pint vessels, to receive pure milk and pure water. The degree in which it is adulterated varies with the conscience, and, perhaps, with the circumstances of the seller. It would, if practicable, be better for the consumer to satisfy the cupidity, or, it may be, the need of the dealer, by submitting to a direct aug-

mentation of the charge for a pure commodity ; he would know what he bought, and might increase the bulk by simple dilution, if he had any motive for so doing.

If reducing the quality by skimming only were openly avowed, there would be but little harm done, as the practice would scarcely be prejudicial to health. Skim-milk differs from the raw, or new milk, only by containing less fatty matter, a large portion of this having been abstracted in the cream. It still retains nearly all of the casein (which is the constituent of cheese), the sugar of milk, a little butter, and the salts of milk ; it is not, therefore, in any great degree less nutritious than the raw ; but, from the diminished amount of fat, it is less adapted to promote the development of that substance in the human frame. In some cases, however, where fatty matter is found to disagree with the stomach, and where, in consequence, pure milk cannot be taken without inconvenience, skim-milk may be substituted with advantage.

It is a fact well known to many, that, the weight of prisoners confined in gaols is much below that of persons of the same size in a state of freedom ; so that loss of weight is the natural accompaniment of prison discipline. The effect produced by milk in arresting this loss has been proved to be most striking, and in a degree far beyond that of the relation of its nutritive elements to the waste of the system. Thus, it was discovered in the Wakefield prison, and reported last year at the Manchester Social Science Meeting,

that, the giving of only a single quarter of a pint of skim-milk to the daily dietary, caused a reduction in the extra diets of from 22·25 per cent. in 1853, to 20·11 in 1854; to 15·27 in 1855; to 14·8 in 1856; and to 9·50 in 1857.

A just estimation of skim-milk might leave us satisfied with a large supply of it, and little else, to the general public, on salutary and humane grounds; but the price supposed of one penny the quart, as now paid for it (more or less impoverished, indeed), would scarcely be deemed, at first, a boon by unreflecting persons, who might regard it as no very charitable mode of getting rid of the refuse of a butter dairy, where it would otherwise be thrown to hogs. That the largest conceivable quantity of it offered would, sooner or later, be relished and sought for, can hardly be doubted. In this way, the purpose of effecting a great good may be satisfactorily carried out without encountering much opposition from the manufacturers of town milk, and without the superficial blemish of pretension in offering the pure article at a reduced price. Skim-milk, after 24 hours' setting in summer, and 48 in winter, is thought by many to be its best condition for children's use; but raw milk reduced to the same degree of strength by water, would retain more of the elementary quality of heat, and of that oleaginous matter which many medical men recommend as a substitute for cod-liver oil. Perhaps, in this view, two-thirds of pure milk and one-third of water would be better still. We are

told by Professor Liebig, in his 30th familiar lecture upon Chemistry and Food, that, "where a mother is compelled to avail herself of cow's milk in substitution of her own, a little sugar should be added, in order to obtain the same effects as from mother's milk."

In one large city abroad, that I am acquainted with, skim-milk is commonly thickened to the consistency of raw by arrowroot. Such a practice is, of course, a fraud upon the unapprised consumer. In a sanitary point of view, indeed, the adulteration is harmless; for, although arrowroot no longer retains the position which it once occupied as a preferable aliment for children and invalids, it furnishes a wholesome, though not very nutritious, food for adults.

Having the curiosity to test a certain dealer's milk at Clifton, I found that, after 24 hours' setting in a moderately warm room, in December, the sample showed, in a 9-inch lactometer (a simple cream-test, invented by Sir Joseph Banks), the smallest fraction more than half-an-inch of cream, this being at the rate of less than 6 per cent., or one quart in seventeen. Pure milk, of an average country dairy, will commonly give 13 or 14 per cent., or one quart of cream in seven or seven and a half, or, sometimes, even in less. The Clifton sample, therefore, must have been impoverished by more than half its bulk of water, or, still more than that, of water and skim-milk together. At 48 hours', the sample rose to $\frac{5}{8}$ ths of an inch of cream; but here, a distinct and inferior

element, consisting of a small portion of casein, had risen to the surface, and increased the mass. Butter, made from 48 hours' setting, is less delicate, and does not, in general, obtain the highest price; while the skim-milk residue is, of course, less rich. The very finest butter is made from 12 hours' setting; after which, an inferior article is made from the further rising.

In July, 1860, I tested, in like manner, the milk of a friend's cow of the Alderney breed. She had calved only three weeks, and was far from being richly pastured. I found, however, that her milk gave an inch and $\frac{7}{8}$ ths of cream in 48 hours' setting, or as 23 to 10 of the Clifton 48 hours' setting. This was equal to rather more than a quart of cream from six quarts of milk. The produce of the Alderney (or Guernsey) cow is, however, proverbially rich, but somewhat less abundant. To the Clifton dealer we paid three-pence per quart for so-called milk, and two shillings for the same measure of indifferent cream; that is, cream with which no inconsiderable portion of the milk was taken up. For the credit of Clifton generally, I should add, that, in the month of August following, having changed our milkman for another, who enjoyed the very best reputation, and mostly supplied large customers, the new purveyor's substance was submitted to the lactometer test, and showed, at 48 hours' setting, $\frac{9}{10}$ ths of an inch of cream; that is, about one quart in ten. It might, then, be supposed, that this sample was impoverished by no more than one part in four. In this case, an ap-

parent extra profit of a penny on the threepence charged was thus secured. If this penny were the only compensation for the dealer's risk and labour and means of living from a very limited undertaking, one would not feel inclined to say it was too much; but, it can hardly be supposed (as he purchased the commodity of a neighbouring farmer, whose cart he met), that he paid so much as threepence for the wholesale quart, or even twopence halfpenny,* and, in that case, this reputable dealer secured a commission of 60 per cent.—for agiotage—upon his outlay.

At all events, the system generally is very much at fault. I have little doubt, that, in several of our large towns, a price corresponding with sixpence the quart at least,—perhaps eightpence or more,—for pure milk, is commonly exacted from the consumer; whereas, pure country milk, as I will show, should nowhere cost above twopence halfpenny, delivered wholesale. Town dealers, being uncertain as to their customers' requirements from day to day, are obliged to have a surplus at command, and which, unsold as milk, is set for sale as cream. This cream, if it may be called such, is sold in most towns at the price of butter—pint for pound. In this way, there can be little doubt, that the sellers of milk at an average of threepence halfpenny, obtain, at the very least, first and last, sevenpence for each quart yielded by the

* One farmer, at least, at Westbury, delivers to a Clifton dealer the gallon of pure milk for eightpence, thereby assuring him a profit of cent. per cent. for simple agiotage, after diminishing its strength by one-fourth.

cow, through the means of weakening again their skim-milk ; being too wise in their generation to open the eyes of their customers by selling milk, under another form, for one penny, which might often bear comparison with what is sold at threepence or fourpence. Our sympathies, however, need not be with the careless buyer any more than with the dishonest or exacting seller, but with the many suffering from the price demanded, and who stand in need of the supply as a necessary, almost, of life.

From cupidity on the one hand, favoured by supineness on the other, a great evil has arisen and gained ground. A moral as well as an economical element has been imparted to the subject.

In one of our large cities, it is a fact, that milk is sold without scruple and bought without complaint, at so high a price, and of such inferior quality, as would secure to the possessor of a single well-fed cow in health, decent subsistence for a family ; while it will be admitted, that, an accident occurring to the animal might consign the whole family to the union.

I have stated my opinion, that the industrial classes in our towns have little or no power to relieve themselves from the privations we are now contemplating ; but it might be suggested to them and their well-wishers, that, *such privations may be avoided by a system of co-operative association. The disease, though chronic, might here find a remedy.* The principle has been carried out, with no serious drawback, or external aid, in various places, in the articles of bread and flour, and the supply of groceries and other items

of an ordinary store, furnished to the members at least, at wholesale prices, and for ready money. In Rochdale, it is said that, an accumulated capital of forty thousand pounds is at work from the smallest beginning. Lord Brougham stated, at a Congress of the National Association for the Promotion of Social Science, in June last:—“*There are now 506 co-operative associations in this country; and 273 of them have 69,050 members, with a capital of two and half millions; and that their sales, during the then last quarter, exceeded £560,000.*” His lordship added, that, “*co-operation is become a power in the State.*” Surely the system might be carried out, with perfect ease, in the articles of milk and vegetables. In respect of milk, it is true, the assistance of a confiding stock-holder or capitalist would be required for effecting any large amount of good at an early stage of the undertaking. And how could a superfluous capital be better employed than in extending such aid, and thus helping others to help themselves? In the case of culinary vegetables of the most common kind, there would not even be this difficulty to surmount in the commencement of field-gardening operations, with or without the use of the plough. The combined and unassisted efforts of a number of families congregated in a village,—which might be of their own formation,—and acting readily under an intelligent and experienced leader selected from their body, might secure advantages to themselves, and contribute largely to the comfort of thousands beyond their circle; demonstrating the fact, that, the ruinous multiplication of middle men

may be avoided. No foreign elements of success would be required, and nothing called for, but industry, harmony, and honesty of purpose, guaranteed by considerations of self-interest; "self-love and social" would be found to be "the same."

I incline greatly to this mode of remedying the existing evil. The relief would come from the very quarter where it is most wanted. With earnestness I recommend its adoption, and a benevolent consideration of the means, to the real friends of a people who form the vast majority of the suffering in this respect. There is, indeed, but little doubt of such associations growing into importance, and being substantially aided, if a nucleus were formed by parties well recommended for those moral and physical qualities which would be essential to success.

It cannot be doubted, that, a sense of benefit resulting from self-reliance, and its accompanying feeling of independence, would tend greatly to raise the moral tone in parties so engaged, and to create that "self-respect, which, while it affords important protection against injurious influences, is so great an incentive to perseverance in right conduct."

From this point of view, a greater amount of moral and material benefit might be effected than through the efforts of any one or more individuals, however rich or otherwise qualified. Such societies, though with small beginnings, might soon acquire increased dimensions; and each individual member of them, through the advantages consequent on the sub-

division of labour, would gradually raise himself in the social scale. A writer in *Macmillan's Magazine*, for October 1860, suggested, how much more advantageously a labourer's deposit of fifty or sixty pounds in a savings' bank might be employed, by its investment in a joint-stock company, "*elevating him from the rank of a hired labourer, without prospect of advancement, to that of a capitalist and proprietor; his career would be cheered by the blessings of hope; and, under their benign influence, he would attain those prudential habits and industrial virtues which pre-eminently distinguish our middle classes.*"

In conducting such an undertaking, it should not be more difficult to find a skilful working overseer for a farm, than an efficient and trustworthy salesman in a store. An honest man, for either of these purposes, might be found, without a lanthorn in broad-day. What an amount of good might be done, if we could always depend upon the honesty of instruments necessary to the execution of worthy projects! Will the time ever come, when a transparent honesty and kindness of heart will cease to be the prey and seeming food of subtle craft; when man can will—and surely do—good? Meanwhile, we must content ourselves with the satisfaction of having purposed it, leaving the result to Him who orders all things right.

The *Agricultural Gazette* informs us, that, in Paris, the old frauds of the milk-sellers were nearly put an end to by the strong arm of imperial and municipal power, in 1854. It seems, that, since that time, as

soon as milk comes up to a railway station, or makes its appearance in a shop, it is liable to be subjected to chymical analysis, and not a few farmers and dairy-men have been fined, and even sent to prison, for adding water, or otherwise adulterating this important necessary of life. The example of Parisian authorities might afford a useful lesson to the British capital and other places, if more strenuously enforced ; but, it seems, that such authoritative regulations have only partially succeeded in counteracting fraud. A year or two ago, an act of Parliament was passed in England, which might be supposed to bear on milk-sellers and milk-makers. It is entitled, "An Act for preventing the adulteration of articles of food and drink." It may become a question to be decided judicially, whether mixing water, or taking off the cream, would not be held to render milk impure, and subject the seller to a £5 penalty and costs,—supposing, in the latter case, the residuum to be expressly sold as pure, and not as skim-milk. At the present time, in London, while no butcher would dare to sell meat that is unfit for food, milk that is not fit to drink, and even bread that is unwholesome, are exposed for sale in every street. The liquid sold as milk, at fourpence the quart, is not comparable, in nutritive power or flavour, with the genuine skim-milk of a country dairy. It is probable, that if the ordinary substance sold were subjected to a strict analysis, some impure, and therefore illegal, ingredient might be detected ; but, if not, and no warranty

be given with it, its uniform acceptance as London milk might, perhaps, be a sufficient excuse in law; and, with respect to the subtracting of the cream, though despoiling milk of a natural and important element, it might possibly not compromise the seller any more than the infusion of diluting matter.

It is certain, that, a deficient supply is, in some measure, the cause of an inferior article being sold; and that this inferiority has given rise to many erroneous prejudices against milk as an important aliment.

The increased facilities of conveyance offered by railways, point to the practicability of obtaining a greater supply from distant parts of the country, with advantage to all parties. Farmers, it is believed, have never been heard to dispute the profitableness of a judicious dairy-farming upon grass lands in the immediate vicinity of large towns. The fact that land so situated produces a much higher rent under this system of husbandry than any other, may be considered as conclusive evidence on the point; and the extension of railways has brought many remote farms within the compass of profitable dairying. Experience has, in fact, already settled this question. Comparatively distant farms are now sending milk to the metropolis, which could not do so before the establishment of this cheap and expeditious mode of carriage. But, though the work has been thus begun under favourable auspices, its progress has been but trifling in comparison with what the rapid growth of

population calls for ; indeed, it has scarcely produced any sensible effect on quality or prices. Some country samples have been found to consist of two-thirds of skim-milk mixed with one-third of raw. This, though superior to town milk produced from the large number of house-fed cows, supplied with distillers' wash and brewers' refuse, is far from doing justice to consumers. In other cases, milk sent in from the country has been found to be liberally diluted ; the farmers thus committing the absurdity of conveying water from a distance.

The work of reformation, both as to the condition and management of town dairies, and the supply of good milk from the country, would seem to want only a beginning, in populous districts, to be productive of most satisfactory results.

There might be disinterested and unreflecting persons who would entertain repugnance against innovations on a practice which custom appears to them to have sanctioned, and which affords a comfortable subsistence to many industrious individuals. Such feelings, and the reasoning by which they are defended, will not bear the test of argument. Thousands must not want nourishment—that hundreds may be comfortably fed. It should seem no more reasonable than a readiness to pay an additional threepence a pound for meat, in order that more butchers' families may be supported.

The fact is still painfully overlooked, that milk is really the most beneficial form in which animal food can be consumed by, at least, one half of our race.

I have read, that, in New York, in 1852, the daily consumption of milk averaged 270,000 quarts; having increased, within nine years, nearly sixfold, that is, from 47,000 quarts in 1843. A rapid increase of population would account partially for this; but it was mainly caused by the reduction in price to one half, that is, from eight cents (or fourpence) per quart, to half that sum. The consumption of each inhabitant was at the rate of 204 quarts per head per annum, a quantity far exceeding that of London (where it is said to be 60), as in the proportion of three and a half to one. Of this large amount, we are informed that about two-fifths were brought into the city at six railway stations, the remainder being produced in New York itself. This latter portion was usually called "swill-milk." A single proprietor kept 2,000 cows, in Sixteenth-street, under one roof. Another, with 1,000 cows, worth some £7 a head, based his calculation of profit on their living, upon an average, for eight months after entering his stalls. They were fed entirely on distillers' waste and grains, and were, in a measure, drunk during the entire period; and yet they ventured to designate their vile produce as pure milk! The outcry against the quality has since become so general, that the cowkeepers have been compelled to furnish better, but at an increased price of a halfpenny or penny the quart. Many of the large hotel-keepers keep their own cows, and advertise that no swill-milk is brought inside their doors. It may be supposed that by far the greater portion of the increased consumption in New York, at the time men-

tioned, was among the working classes, of whom thousands and tens of thousands would, from the first reduction of the price, become large consumers, who purchased very little before. The 204 quarts per head may not have represented one half, or even a third, of the amount or value of pure milk, and yet, perhaps, it was as good as that sold in London at fourpence, after attaining its acme of dilution. The operatives of New York may earn more than the same class in London, where the cost of 204 quarts at fourpence would be an average charge upon a family of two adults and four children, of seven shillings and upwards weekly; and, most probably, not even the smaller quantity of 60 quarts per head is, on the average, supplied for each and every individual resident in London, or any of our second or third class towns, as it would suppose a quart to be purchased daily by each family of six persons, or two and fourpence per week. That this quantity, indeed, or anything approaching it, is not consumed annually by families of the lower order, may be deemed certain. Among the upper fourth of a population of 50,000, a family of six persons may probably take a quart daily, on an average, and often, more; 365 quarts annually would give the 60 quarts per head for each; but the lower three-fourths take nothing like it. I was assured, in 1859, by a very decent sober operative at Clifton, a working gardener, earning 3s. a day, when health and weather permitted, and who had a wife and four out of eight children at home, and unable to earn a living

or assist him, that, he indulged only in the purchase of a halfpenny-worth of milk per day, and that was to colour his wife's tea. It is certain that the best farinaceous food can never supply the requirements of extreme childhood, nor furnish to individuals of all ages such an endless variety of agreeable viands as those of which milk is the basis; so that, although good household bread is now, happily, to be purchased for about three halfpence a pound, the necessity for paying twopence the pound, or fourpence the quart for milk and water, as in London and elsewhere, is a sore evil, not to say a most disgraceful one.

A large increase of the consumption of an article of daily use would, of course, follow a reduction in price and improvement in quality. The palate of man in any class is not entirely weaned from the taste, or disqualified for the enjoyment, of good milk. A gentleman, however, of my acquaintance, residing near Bristol, in his anxiety to restore this taste, and to put down an injurious monopoly, sent pure milk for sale into the city (at the price of the impure), but could not get purchasers, on the ground actually alleged by many, that "it could not be milk." Had he mixed with it an equal quantity of water before their eyes, they might have recognised their accustomed beverage, and been glad to save three-halfpence in the quart.

Could families of the working class be enabled often to make their breakfast upon bread and skim-milk, or on milk porridge, and indulge their children

sometimes with a rice-pudding dinner, the consumption of this nutritious food would be trebled throughout the kingdom, without the necessity of a heavy price, and health and comfort wonderfully promoted. A pound and a half of well-soaked East India rice, with four quarts of skim-milk, and a quarter of a pound of sugar or of treacle, will make nine pounds of pudding, at the cost of eightpence—only half the price of bread.

The ancient port and modern watering place of Whitby, on the Yorkshire coast, with a population of about ten thousand, is abundantly supplied with milk of more than average quality, at twopence the imperial quart; but this contrast with the current prices elsewhere may be accounted for by the peculiarities of the neighbourhood. The town is surrounded by much land of an uneven surface, the most of which is unsuited to the plough; whilst the large amount of pasture renders dairying comparatively easy, and liable to competition, among a class of persons doing their own work in milking and delivery. The low price here obtained for milk, while yielding, no doubt, a comfortable living profit to producers, invites increased demand supplied by a *pro rata* diminution of labour in delivering. The same observation, it is believed, applies to Lancaster, with a population of equal amount, and, doubtless, to other places somewhat similarly circumstanced.

I have thus far stated the results of my own observation, and conclusions from experience and

reliable information, in regard to the consumption and the price of milk in England Proper. In Scotland, very generally, and in Ireland also, neither raw nor skim-milk is obtained in any great quantities from the country; milk there is very rarely skimmed for butter-making, it being the almost universal practice to churn the whole milk, with cream on it, and to sell the butter-milk to the lower orders. This last-mentioned nutritious and agreeable aliment, is commonly disposed of in the market-places at a half-penny the quart in summer, and three farthings in the winter. It is said that about an eighth more of butter is thus procured than by churning the the cream only, as in England; if so, the commercial and the sanitary differences have to be adjusted between the relative values of skim-milk and butter-milk, taking into the account the extra produce of butter. From reports received by me of the practice followed in the counties of Lanark, Dumbarton, Renfrew, and Ayr, being those more near or most contiguous to the densely-peopled city of Glasgow, it must be presumed our Northern neighbours have discovered a capacity in milk for producing butter, little known to Southerners; for, it is asserted, that 2,700 to 3,600 imperial quarts are annually yielded by a cow, and that seven quarts on the average of nine months' pasture feeding, with auxiliary food in oil-cake or bean meal, are often known to give a pound of butter, the whole milk and cream being churned. The seven imperial quarts, sometimes so

rich in butter, are said to be consequent upon a fact not generally apprehended, that, from the milk produced in the first three months after calving, one pound of butter will commonly be given by eight quarts of milk; in the second three months, seven quarts; and in the last three of nine, six quarts—the milk becoming richer in proportion as it is more stale. I have never witnessed such results in my own or any other English dairies.

Regarding the sale of milk in Glasgow, the retailers get a quantity delivered to them pure, from those farmers who do not make butter, at three-halfpence the imperial quart in summer, and twopence in the winter; and are able to dispose of all they get, at the double price of threepence and fourpence (deteriorated, no doubt), from door to door. Small as is the wholesale price of milk conveyed by farmers to the town, I have evidence before me that, their profit ranges at £8 to £11 per cow over the cost price, according to circumstances, such as the quality of her food, and of the attention given by no hireling dairy managers or drivers to market.

The Scotch experience of the profit to be derived from the production and sale of milk by practical men doing, mostly, their own work, warrants, it may be hoped, the confidence with which I assert, that, a liquid equal at least to average town milk, may be produced and profitably sold at half the price now usually exacted.

It would, apparently, be much for the advantage

of the inhabitants of Glasgow, if the stringent conditions of the farm leases in the adjoining counties did not prevent the tenant farmers from producing a greater quantity of milk, for their own as well as the public advantage, to be dealt with by the retail dealers in the city, checked only by greater competition. There would be less opening for the town manufacturers of a liquid less wholesome and nutritious. I have been informed, that, the largest herd kept in any of the four counties I have mentioned, is one of twenty-five cows. The vast population of the city is, therefore, mostly supplied from town-fed cows. Last year, I visited an establishment in Glasgow, where eight hundred cows of every variety of breed, but mostly inferior Ayrshire, were closely huddled together. They were fed, as I was told, with a large quantity of distillers' wash, three times a day, and some grains in it, two pounds of bean meal, and one-fourth part only of a stone of hay. In fact, they seemed no other than machines used for converting wash into milk. Their produce was distributed in the city after milking, three times daily, by a number of carts, with a driver and two boys attached to each, for prompt delivery from two to three barrels, and sold at threepence the quart, on weekly credit, without the intervention of middlemen. It is generally admitted, that, a small quantity of wash will increase the yield of milk without diminishing its strength or wholesomeness; but, it is not conceivable, that the injurious nature of a

large quantity can be corrected by the simple process of passing through the animal's system and milk veins. If the neighbouring farmers could realize, as asserted, £8 to £11 per cow profit on the sale and delivery of pure milk, at the average of seven farthings per quart, in summer and winter, the profits made by this establishment must be great indeed ; though it may be presumed, that the animals cannot live long under such treatment, and they must be of little value when disposed of dry.

This City establishment places in strong relief the admirable one of Mr. Littledale, of Liscard, near Birkenhead, where the entire produce of 70 or 80 splendid cows, out of above 90, is sent out twice a day in the direction of New Brighton, Egremont, and Seacombe, and sold at threepence the quart. The extreme cleanliness and other inviting features of this establishment almost defy description ; and the buildings, stalls, dairy, wash-houses, utensils, and the animals themselves (which were improved short-horns), are of surpassing attractiveness, and should be seen in order to be justly estimated. The cows are purchased from dealers in Liverpool, who bring them mostly from Skipton and Gisburne, in Yorkshire, and cost him from £18 to £26 per head. They never leave the stalls after once entering them ; but are currycombed and brushed every morning. They were fed, when I saw them, with Italian rye-grass and clover, half a bushel of grains, and a few crushed oats daily ; and they have hay in winter, but none in

summer. Their winter food consists of grains, roots, and hay. I was informed by Mr. Teasdale, the agent of Mr. Littledale, that the cows then actually in milk were giving from 230 to 250 imperial gallons daily, and that the entire stock yielded about 900 gallons, each cow, in the twelve months. Their condition is so well maintained as to render them tolerable meat at all times; being allowed, however, a little oil-cake towards the last, when meant to be disposed of for beef, and while yielding 2, 3, or even 4 quarts of milk daily. They are large animals, and fatten to 40 or 50 score under this treatment. Mr. Littledale has a considerable estate around him, for the most part a corn and hay farm, of great variety of soil; but of Italian rye-grass he had only 40 acres, and that (which is sown biennially after grain) is cut only three or four times in the year, and assisted, very moderately, with liquid manure laid over it from 3 hydrants and a gutta-percha tube of 150 yards in length. He is not disposed to abandon the use of liquid manure from any fear of its injurious influence on the surrounding atmosphere, or on the comfort and health of those who live within its range, having heard no complaints regarding it. Any milk that is not sold in the day from this establishment is churned, without skimming, and by steam, in ten or twenty minutes, after 48 hours' setting, and the butter-milk disposed of at a halfpenny per quart throughout the year.

Mr. Horsfall, a leading merchant in the same great

commercial mart with Mr. Littledale, and representing Liverpool in Parliament, has stated, that, his herd of 22 cows pay him, each, £25 a head, valuing milk at only twopence the quart from butter and the sale of skim-milk. Every proprietor of dairy stock should read the very instructive reports of this gentleman's theory and practice, published in the 17th and 18th volumes of the Journals of the Royal Agricultural Society. His object is not, indeed, confined to milk produce, but has regard also to the production of butchers' meat from the cows fattened off. On this account, they are kept in as high condition as he finds compatible with the twofold purpose. He gives rape-cake, or bean-meal, to all his cows in preference to linseed, of which, however, he sometimes gives three ounces daily, in the oil, when using wheat or barley straw. He believes that, steaming food adds considerably to the yield of milk, as this process volatilizes the essential oils, and diffuses them through the mass of rape-cake, bean, or other straw, bran, and malt-combs. There is no doubt that animal heat is thus produced more cheaply from a little coal than by extra weight of food. Mr. Horsfall admits that, for milk-sellers, it would be more profitable to keep the animals in ordinary store condition, by giving them a larger proportion of succulent green food; but, that, it is in all cases desirable to give chaff, or a little meal, in a warm state, by the simple application of hot water. It is his opinion that, a cow which gives, from grass-feeding, 9 quarts of milk per day, abstracts from the soil 7 pounds of phosphates per

acre in 20 weeks. He turns out his stock, in May, to grass, but houses them at night. In June, he gives cut grass and steamed food, and houses them entirely in October, giving them cabbages and steamed food until February, and then mangold in the room of cabbage.

Mr. Caird, M.P., the "*Times* Commissioner" for reporting on the agriculture of the English counties, and himself a large cultivator and stock-holder at Baldoon in Wigtonshire, informs me, that, his dairy cows yield often some 14 imperial quarts for the first three months after calving, 12 for the second three months, and 5 quarts in the last three months of nine, or about 2,800 quarts within the year. My own experience upon grass, with a considerable stock, some years ago, did not quite equal this. Eight quarts a day, for 300 days, would be highly remunerative.

Individuals sympathising with their kind, and who may be glad to see brought about a wide-spread amelioration in this important matter of domestic comfort, would be glad to see it generally effected by its recommending itself to practical agriculturists as a sufficiently remunerating pursuit; because, any plan not offering mutual advantage to producer and consumer could never become general, or be largely practised. "*Mihi vobisque*" should be the common motto. The devotion of time, intelligence, and money, with some amount of risk and disregard of gain, might be charity, but would afford no evidence of a wise and practical—as well as large—philan-

thropy. Before the public can reasonably expect to derive advantage from the employment of capital, industry and talent, for its good, it should be in a position to assure the individual possessing these means of production, that adequate remuneration would result to himself from the attempt to benefit others ; that he should partake largely of the advantages derivable from the use of instruments which he has the power and will to employ in a manner advantageous to all. Indeed, such undertakings should be always left to private enterprise—as a matter of commerce—paying its own way. The idea suggested would have no vitality, would be worth nothing, if it were not self-supporting. Pounds shillings and pence may be regarded as a great motive power, and we will presently look at practical conclusions from this point of view.

In the vast field of improvement spread out before us, if entered upon by unpractised men, the ground must be first broken by individuals, or bodies, of stout hearts and strong wills, and endowed with the faculty of judiciously selecting their subordinates. They must be able to bear up against prejudice and even ridicule, and not be deterred by opposition or small difficulties.

It cannot be reasonably doubted, that tillage green crops are far more productive of dairy cattle food than pasture land ; and, an alternate application of a large portion of the soil to green and white crops, or

two-thirds of the former where consumed at home by cattle, would present facilities for accomplishing the objects in view, with results gratifying alike in a private and a public sense.

Experiments have proved, that the milk of stall-fed, or, as they are called—soiled cows—is most rich in cream and butter, although that of grass-fed may abound more in casein or cheese.

I have repeated in my title page the opinion of Adam Smith, that “*Food not only constitutes the greatest part of the riches of the world, but, it is the abundance of food which gives the principal value to many other sorts of riches,*” inasmuch as with a scarcity of food, many other sorts of riches, many other species of property, are almost or altogether unenjoyable. In this view, it may be said, that he is the best statesman who provides the greatest quantity of food for man. The grave philosopher Dr. Johnson has familiarized the subject by asserting that, “*There are no better friends of their kind than those who grow two cabbages where one grew before.*”

The dictum of Adam Smith—though in the main incontrovertible, should be received *sub modo*. An abundance of excessively cheap food may be carried to the extent of enfeebling energy and, consequently, slackening progress. George Henry Lewis, author of *The Life of Goethe*, and *The Physiology of Common Life*, lays down in the first chapter of the last-named work, the following axiom :

“Look where we may, we see that hunger is the motive power which sets the vast array of human machinery in motion. Hunger is the invisible overseer of the men who are erecting palaces, prison houses, barracks and villas. Hunger sits at the loom which with stealthy power is weaving the wondrous fabrics of cotton and silk. Hunger labours at the furnace and the plough, coercing the native indolence of man into strenuous and incessant activity; so indisputably dependent are our higher efforts on our lower impulses. Nothing but the necessities of food will force man to that labour which he hates, and will always avoid when he can; and, although this seems obvious only when applied to the labouring classes, it is equally, though less obviously true, when applied to all other classes; for, the money which we labour to gain is nothing but food, and the surplus of food which will buy other men’s labour.”

From the considerations suggested, I am led to infer that, an extended production of such food as milk and culinary vegetables is an object of the greatest national importance. I trust, also, that before closing, I shall have succeeded in showing, that, a combination of these two objects will increase the safety of the undertaking, and enhance profits in producing each.

The blessings of Free Trade are strikingly manifest in the article of bread. The importing merchant keeps in wholesome check the corn-grower and the corn-dealer; whereas, in respect of culinary vege-

tables — potatoes, particularly, are engrossed by jobbers and retailers; and the other kinds are raised in such small quantities, as not to offer to consumers that benefit of competition which would result from an abundant field supply.

That gifted and excellent lady—Florence Nightingale—in her *Notes on Nursing*, says: “*It has been satisfactorily proved, that there is as much nourishment in half a pint of milk as in a quarter of a pound of meat.*” It follows hence, that 600 such half-pints, or 150 quarts of milk, are equivalent to 150 pounds of beef; and this is quite as much as an average acre of 40s. land would add to the weight of an ordinary grazing bullock upon grass and hay. Supposing that an acre of roots, providing 30 tons, would produce (with slight help in dry fodder), within the year, as it certainly may, 5,000 quarts of milk—the equivalent of as many pounds of beef—the difference would be as 32 to 1!

I think that no exaggeration can be charged against the subjoined table of comparative products of food from an acre of 40s. land in pasture or in tillage:—

	lbs.
1. Of beef, from an acre of 40s. grass, may be obtained	150
2. Of beef, from tillage, the addition to weight of 3 lean bullocks, fattened on swedes and mangold roots, with the aid of £10 worth of hay	1,050

	lbs.
3. Of white bread, by fermentation, sup- posing 32 bushels of wheat to the acre (besides bran)	1,978
4. Of meal bread, by inflation or effer- escence	2,579
5. Of milk, from 40 tons of roots and leaf, with aid of a little maize-meal, and chaff.....	16,000
6. Of potatoes, 9 tons weight, at lifting in October	20,200
7. Of turnips, 25 tons ditto	56,100
8. Of cabbages, early and late, 32 tons to acre together	71,680

It should be noted, that the treatment of acre No. 1 tends to impoverish the land; while that of 2 and 5 will improve it, by returning, in excreta, all the elements withdrawn, and one-third more than needed, for general use of the farm. Nos. 3 and 4 are exhausting crops, and rendered productive at the expense of others. No. 6 is a very scourging crop; and so is No. 8, if not consumed at home; but this and No. 7 are self-restorative, if not sold off.

Mr. Caird has stated, that, the long-continued practice of grazing cows and cutting hay had so deteriorated the Cheshire pastures, that they did not produce, at the time he wrote—some four years since,—so much cheese, by thirty per cent., as they did fifty years before; and that three acres and a half were then usually required for the summer and

* winter feeding of a cow. This animal, it would seem, (as thought by Mr. Horsfall, as well as Mr. Caird), habitually extracts from the soil of which she consumes the produce, an important element that is not sufficiently refurnished by the droppings of an animal at grass. In this particular, Mr. Caird found the pastures to be greatly deficient. By way of remedy, he drew attention to the expediency of a liberal use of bone and superphosphate; and the dairy farmers of the county are availing themselves of the suggestion by applying the restorative, chemically prepared, and especially adapted to grass land. It is spread over the surface broadcast, in a minutely pulverized state, and with much advantage, by the allowance of 5 to 10 cwt. per acre. It is principally obtained from the great artificial manure establishment of Proctor and Ryland, at Saltney, on the Dee, near Chester. Regarding its use and its effects, Professor Voelker has declared that he could scarcely have believed it possible that bone manures were capable of altering in so marvellous a manner as they have, these Cheshire pastures; that where they have been used, white clover springs up in places where, previously, only rank innutritious grasses grew; and land, which not long since was counted dear at 15s., is now worth 30s. rent.

The economizing our national means of supplying the wants of an increasing population must be deemed an object of no small importance; and it may, sooner or later, happen, that such increase—among our non-

producing ranks—coinciding with a disturbance of international intercourse, may render necessary an economy of soil, and the growth of great varieties of food.

At present, the main object of a large majority of farmers is to increase their wheat crop ; to this their fallows and rotations tend ; yet, foreign wheat can be easily imported, and is so to a large extent, as we have seen, against payments derived indirectly from our extending manufactures ; thus encouraging its growth abroad, and forwarding the great interests of manufactures, and of that peace which is essential to all progress. Moreover the acreable produce of home-grown wheat would be greatly augmented, without any considerable increase of expenditure—except in the first cost of stock—by judiciously admitting a much larger proportion of green and fallow crops. Indeed, it may be said that, rotations varying grain crops alternately with green, are not absolutely called for, if we return, in animal excreta, for a new green crop, the elements which former ones exhausted.

We grow no corn in gardens ; nor is it necessary that all farmers should do so in the field. Here, however, we may cultivate from year to year, such vegetables as by reason of their bulk and perishable nature are least exposed to foreign competition, and are less easily obtainable from abroad.

The rapidly increasing value of the soil which is subjected to such green crops, is a most important consideration. We will suppose them to be consumed

upon the farm. Many properties are known to me in which such improvements—caused by an undeviating system of alternation,—are most remarkable. The fact will not be overlooked, that, the raising the permanent annual value or prospective capacity of such land, to the extent of eight or ten shillings an acre, after several rotations, adds virtually ten or fifteen pounds to the value of each acre of the freehold ; a result which may well reconcile landed proprietors to having a very moderate return of interest or profit, at once, on costly outlays. I have watched the progress of such gradual improvement on one particular dairy and corn farm, of 130 acres, in my own neighbourhood, on which a former renting occupant gained a bare living for his family, and was able to fatten off, at most, two barreners in the year ; and now, the spirited proprietor fattens twenty purchased bullocks annually. This last is an uneducated person, and knew nothing of farming till he purchased the estate with a portion of his profits on tunnelling contracts as a working mason. With no guide or instructor but his own common sense, nor any aid whatever, save that of his own money, to purchase lean stock for consuming roots, he is supposed to have raised the permanent annual value of the land from 25s. to 35s. an acre in the course of ten years ; and to have farmed profitably meanwhile. He grows swedes and wheat, mangold and spring corn (seeded or not seeded), almost without interruption, and gets some eight to ten bushels of wheat more per acre than the land formerly produced.

“The circle is every day widening,” says Mr. Caird, in his instructive pamphlet upon “High Farming,” *“within which dairy farming, the cultivation of vegetables for sale, and the production of butcher’s meat, with a more garden-like management of the soil, are found to be the most profitable points to which a farmer can direct his attention.”*

The time has arrived in which less reluctance is evinced by gentlemen than formerly to engage in agricultural pursuits. The cultivation of the soil, in this country, was regarded as a vulgar art; and individuals of the upper class were easily deterred, or soon disgusted, by that very general amount of ill-success which might be expected when a special education was not found in combination with sufficient capital.

It was, I think, Cato the Elder who said, “It is going badly with the master whom the hind or clown instructs;”* but, the ancient art is now in progress of elevation to a modern science, recommending itself to men of capital and mental cultivation.

At a meeting of the Royal Agricultural Society in York, in July 1846, the late lamented Prince Consort observed, that, *“Science and mechanical improvement have, in these days, changed the mere practice of cultivating the soil into an industrial pursuit requiring capital, machinery, industry and skill, and perseverance in the struggle of competition. This is a great change, but we*

* “Male agitur cum domino, quem villicus docet.”

must consider it a great progress, as it demands higher efforts and a higher intelligence."

Agriculture is seen to borrow largely from the stores of knowledge which Natural History presents from Geology, Chemistry, and Botany ; a study which may be regarded as far more useful than many of the speculations which have occupied the attention of learned men. *Of this pursuit it was said, in the best days of Rome, by no less an authority than the refined and philosophic Cicero, "There is no subject more worthy of the study of a gentleman."** In practice, however, it is most strange, that, although for six thousand years, few, if any, subjects have occupied so much of man's attention as the supply of daily food, it is only within the last half century that science has been engaged in considering the best means of producing it.

Lord Sidney Godolphin Osborne, so much admired as "S. G. O.," has thus expressed himself on the subject of the recent strides of agriculture and the practical patronage which the noble and intellectual are bestowing on it :—"Gentlemen who cultivated home farms formerly, were supposed to do so simply for amusement, and at a cost the process never paid. How great is the change in all this ! It has come to pass with a rapidity almost inconceivable. It has done a work the value of which is beyond all praise. I have seen Ireland's Duke stand over a tank on a model farm, exquisite in its extreme filth, whilst one

* *Nihil homine libero dignius,*"—freely translated.

of England's best classic scholars, eloquently,—as a labour of love,—gave us the primary compounds of the horrid composition ; dwelling, as we inhaled it, on its true gaseous and chemical elements ; without moving a step, branching off into an extravagant exordium on the wickedness—the positive guilt—of any waste of such Providence—by—beast-offered wealth. I have met with men irritable to the border of insanity on the smell of an oil-lamp which has put itself out ; who have been so fastidious that one fly in the soup would condemn the whole tureen ; the smell of the groom in cotton gloves waiting at a poorish neighbour's dinner, been so destructive of their appetite as to outrage the hospitality of the house by an abstemiousness irreconcilable with their apparent health ; and yet, these very men will dally with the smell of a pig-pit, and hang over compost as if it had the aroma of their best claret." He says later : "The care-worn soil may indeed deplore the days of long naked fallows ; it has since known no rest ; for ever knocked about, it never knows in what form to expect the next blows. Drained of the moisture treasured up in the depths of its old lazy content ; pierced with fistulous passages of miles of hard piping ; submitting to all manner of scarifying, crushing, drilling ; ploughed and rolled to the confusion and pulverization of its clod existence ; every kind of horrible compound that fish, bird, man, or beast can conjointly and severally afford, driven into its texture ; thus abused, it has proved grateful ; and

industry will ever reap her due, and—in that due—find in agriculture a pursuit worthy of the best powers of the wisest, the most active exercise of the efforts of the most energetic.”

In every age, indeed, the investigation of the principles on which a rational practice of the art might be founded, has been thought entitled to command the attention of the greatest minds ; and, to no other object could they have been more beneficially directed. “*It is,*” said Columella, “*without doubt, the nearest approach to wisdom, and, as it were, consanguineous.*”* And who would venture to prescribe a limit to the powers of chemistry and geology, directing human skill and capital in dealing with the soil ?

Following up Mrs. Hannah More’s idea as to the comparative value of brilliant and useful undertakings, I might ask how can agriculture be regarded as less dignified than other occupations ? The respectability of any enterprise is usually estimated by its magnitude, and the private worth, intelligence, and capital of any one engaged in it. Surely, then, we should respect the combined efforts of intelligence and capital in the direction of public good, towards fostering and preserving life.

The principal obstacles which present themselves in the way of a large and safe enterprise, in the hope of destroying a mischievous monopoly, and substituting an ample and cheap supply by an indi-

* “*Res sine dubitatione proxima, et quasi consanguinea sapientiæ.*”

vidual, would seem to be twofold; namely, the interference with imagined vested interests of the present race of dealers, and the difficulty of securing a faithful distribution by subordinates, of a purer and more abundant supply from the country. The latter obstacle might, probably, be avoided, if not wholly, at least in part, by a careful selection of such agents at a number of depôts, or by furnishing shops, on an allowance of a trifling per centage on the sales. The former objection is scarcely worthy of consideration. Partial interests of the few should never be allowed to over-ride the important interests of the many. However, the Rochdale Association mentioned before, as taking the lead in those beneficial undertakings, did not, I believe, commence its operations, in the store, by professing to undersell the old-established dealers; but they uniformly gave genuine articles for the prices usually paid for inferior ones. They sold to others as well as to the members of their own body, dividing profits quarterly, *pro rata* with the custom which they severally brought, in the way practised by some of our Life Insurance Companies. This plan of selling only the pure beverage at the same price as that exacted for the adulterated ones, might be adopted by individuals engaged in the proposed reform, or by an associated body providing for themselves and selling to others more abundant and more wholesome food. If the latter alternative were adopted, the objection as to interference would be fairly met and parried.

There is, however, no doubt that the public are at present partly stinted in supply by causes in no measure chargeable upon honest dealers; such, for instance, as the combined influence of costly production in towns, want of capital for more extensive dealing, and minute laborious delivery. In this way, cause and effect are constantly acting and re-acting on each other. It is not unlikely, indeed, that the present town dealers themselves, or those of them who have the custom of large consumers, would gladly be disencumbered of their quarter-pint or even half-pint customers, on whom they have to wait in all weathers and seasons, whereby much time is necessarily expended, and even health endangered. No inconsiderable portion of the excessive price of town milk may certainly be referred to the labour of delivery; but this might be removed, as far as regards the lower class of purchasers, by providing either raw or skimmed milk at so cheap—though remunerating—a rate, as should make it worth the while of some individual of an operative's family fetching it from a short distance.

The legitimate purveyor of milk is the dairy-farmer; and it would be desirable to bring him in more direct communication with the would-be consumer.

The simplest method of production might be the use of grass land; but how rarely can two or three hundred acres of pasture be found in one spot, at a convenient distance from a large town—say for one

hundred cows? On this and other more important grounds, it would be effected more advantageously by the application of tillage. Moreover, the fact now fully ascertained, that cows, stall-fed, produce a greater quantity of milk than those kept at grass, is easily accounted for. The lacteal secretion is stimulated by variety of food, and protection from the extremes of heat and cold. At the same time, the greater rest afforded to the animal from being so much sooner filled, and with no labour in obtaining food, is also highly favourable to increased production. A large portion of the food of animals—a third or fourth, I believe—goes to the supply of animal heat; but if this heat can be furnished by other means—such as warm houses, and some warm food—particularly in winter, that portion of it which would otherwise be so appropriated might be converted into milk or fat.

For the private gentleman's establishment, or the small business dealings of a dairy farmer, the grass farm may be the most simple and convenient; but, on a large scale, the two systems are not to be compared. To feed a single cow on forty shillings pasture land, during eight months, would require an acre and a-half, and the after grass of another acre. To feed six or seven cows on the same quantity of land by tillage, and for a like period, would require no more. Moreover, while the former system deteriorates the land, perhaps, by one or two per cent. per annum, the latter would afford the means of restoration greatly in excess.

Were efforts to relieve the many from the almost total want of the invaluable aliment of milk confined to private gentlemen, the sale of butter and skim-milk would be the least troublesome form of dealing, and expose them less to annoyance from town dealers and from fraud, while the public would substantially obtain the greatest amount of value for their money.

One reason of dairy farming, as generally practised, being a paying concern only, in general, to such small farmers as do all the work by themselves and by their family is, that it is not found practicable, or convenient, or even worth while, to send skim-milk to market; and it is not possible that this article, converted into pork, will pay even a halfpenny the quart. By this means, some twenty or thirty per cent. of the farm return is lost.

Discarding the evidence of peculiar and successful practice, we may safely calculate on 10 to 11 quarts of milk yielding a pound of raw-cream butter, where the mode of feeding and of management renders the season's produce pretty equal. This, at 1s. 2d. the pound, on the average of nine or ten months, including all the dearest of the year, would pay about 1s. 11d. for $10\frac{1}{2}$ quarts of raw material, or nearly $2\frac{1}{2}$ d. for the quart of pure milk.

What this quart should cost the farmer, I shall attempt presently to show. In this case, however, the scalding system, practised in Devon and Cornwall, would seem to promise more advantage still; inasmuch as 15 or 16 per cent. more of butter is

commonly made from it, and is most relished in the West of England; and yet, strange as it may seem, the scalded skim-milk has the richer taste, and is generally thought most palatable.*

In the extensive Vale of Honiton, in Devon, where the largest quantities of scald-cream butter, I believe, are made, the contract wholesale price to dealers has of late, in many cases, been fixed at $11\frac{1}{2}$ d. for the six summer months, and 1s. $2\frac{1}{2}$ d. for the winter six, presenting a general yearly average of 1s. 1d., wherever cows are brought to calve equably through the year for summer and winter dairying. Some of the best herds in this district are commonly renewed by heifers every fourth year, or one-fourth yearly; and the discarded cows are either sold, with calves by their sides, or fattened off as barreners upon their milk, or sudden discontinuance of the drain.

* It may seem strange that 17 quarts of raw milk will give 18 quarts of cream and skim-milk! This seeming anomaly of an aggregate of parts being greater than the whole, is easily explained. Raw milk is, in fact, the substance called skim-milk, with its interstices stuffed with cream; by which stuffing, an addition is made to the weight without any increase of bulk. When the cream rises, whether with or without the aid of heat, the milk, upon conversion into skim-milk by being deprived of its cream, occupies nearly the same space as when it held the cream within it. The skim-milk and the severed cream occupy more space than the raw milk.

The effect is somewhat analogous to that which would be caused by the subtraction of sand used to fill up the interstices of a case of bullets. The latter, so disburthened, would fill up the same number of cubic feet and inches as before, and the severed sand would occupy additional space; but the aggregate of the two substances would remain the same.

Until all classes shall have become sensible of the injury arising from the system now pursued by dealers, and assented to by consumers, every conceivable species of annoyance may be expected to be practised by them, to resent, and render difficult, an interference with their exclusive sale of what they venture to call milk. In time, however, these very dealers would find it to their advantage to obtain wholesale supplies from the country, and might discover that they could earn more, legitimately, than they now do by a course bordering on dishonesty.

Any quantities of pure or skimmed milk might be sent from a considerable distance, at a trifling cost, by rail; and the latter would be found to be as nutritive as ordinary town milk.*

Probably, the best results would be obtained for the public advantage and individual profit, by devoting to the purpose a breadth of arable land, with a small quantity of grass, at such a distance from a town as would be beyond the radius of what is termed accommodation land, and yet near enough to that town or a railway station, to admit of transmission twice a day, if needed. At such a distance as this, high quality may generally be considered to be the condition of high rent; at all events, 20s. or 30s. per acre more in rent is of secondary importance to the facility of access, or the acreable amount of produce.

* The London Railway Companies charge farmers for transmission of their milk to London, if under 10 miles, 6d. for every nine gallons; above 10 miles and under 25 miles, 9d.; over 25 and under 50, 1s. 4d.; empty cans returned free.

The experiment succeeding, the practical farmer, occupying even distant land, might be induced to turn his attention to the raising and bringing to market such produce, by cultivating green crops largely; and if a non-professional agriculturist, employing hired labour, and possessing only ordinary faculties of observation and caution, could see his way, the practical farmer would make a large interest on his more or less of capital, by economizing 20 or 25 per cent. of outlay in labour and superintendence.

Should land of desirable extent and quality not be found within three or four miles of a city or town, or still closer to a railway station, a tidal river might, in some cases, become available for the saving of horse labour, the expense of which bears so heavily on the cereal produce of the soil.

An engine of 4-horse power performs the work of as many horses as would consume the produce, probably, of 16 or 20 acres of medium quality in horse food. Mr. Mechi, I think, calculates that every horse that feeds on hay and corn, consumes the produce of five acres of land of the annual value of 20s. an acre; but Mr. Mechi usually feeds on roots and corn without any hay. This estimate differs very little from that of Liebig, who asserts—in noticing the amount of food consumed by different animals—that the yearly consumption of a working horse is, or should be, 5,475 lbs. of hay and 1,642 pounds of oats.*

* These quantities refer, doubtless, to some Bavarian measure. Reduced to English, they would represent a weekly allowance of 105 lbs. of hay, and 32 lbs. of oats.

A horse's working power stands in a fixed ratio of the excess of food which, in a state of nature, increases the weight of his body.

In many large dairies, churning is now performed by steam or water-power. No wonder that the little farmer does not now get on, through want of machinery, which his small extent of land and capital would not support. The spade and dibble would seem best to suit the means of such a man, with a few sturdy children to assist him in the labour of his farm.

One who professes but little veneration for the ponderous and clumsy plough, may well view with admiration the wonderful inventions of modern times for the economy of labour. Many there are, or have been, among our rural population, disposed to look on them with pain and jealousy, as intruders on their honest calling, and threatening even its extinction. These would hail a more general adoption of the spade or fork; and, it must be conceded, that such instruments effect a finer commination of the under strata of the soil than any mode of ploughing and subsoiling with horses or by steam. Subsoiling will augment the influence of two or three after years of simple ploughing; but 16 or 17 inches may be moved far more efficiently by the spade; and in succeeding years much less would be required. On this subject, a writer in the *Journal of the Bath and West of England Agricultural Society* declared lately, that, "although the plough cannot compete with the

steam cultivator, and bids fair, ere long, to be a comparatively disused instrument, there is a humble agent for turning the soil which will never be wholly superseded, and that is the spade. It is found more expensive, on a large scale, to keep horses all the year round for cultivation, than to purchase and keep in order steam machinery; but, hitherto, a pair of human arms, exercising a spade or digging fork, have often proved our cheapest mode of tilling the land. Indeed, it was very much the custom some years ago, in one of the fertile districts of Somerset, to employ redundant hands in winter at spade husbandry, even when horses were standing unemployed in the stable." It is possible, however, that, in those times, reflecting farmers may have thought it more expedient to employ redundant hands in field labour than to maintain them, doing nothing, in a workhouse. To this spade practice Mr. Acland refers in his report on the farming of Somerset, published in the 2nd Vol. of the Agricultural Society's Journals, where he states, that "Mr. Churchill Peren, a very good farmer in South Petherton, asserts that he goes down eighteen inches for his manure when he wants it! He is in the habit of employing spade labour, and turns over his fields occasionally, at a cost of 30s. per acre." Sir John Sinclair, the original founder of the Board of Agriculture, (writing when labour was abundant,) strove to inculcate the maxim that hand-labour is more economical in its application to the soil than that of the horse. "It is," he remarks,

“almost incredible what two able and industrious labourers will perform in a year, for 10s. a week, or £26 per annum each. The original price of horses, their annual decay, the accidents to which they are liable, the cost of implements, the bills of saddlers and smiths, inclusive of the expense of keeping them, which cannot be calculated at less than 2s. per day, or £36 per annum, besides a ploughman to attend them,—all must amount to a considerable sum. In regard to difference of produce, an experiment was tried in the neighbourhood of Hamilton, expressly to ascertain that point. A field was taken which had been cropped with beans the preceding year, and in that before, with oats. Two ridges were dug and two ploughed, alternately, and the whole was sown on the same day. A part of both the ploughed and the dug was drilled with the garden hoe. The whole was reaped the same day, and, being thrashed out, the produce of the dug land, sown broadcast, was to that of the ploughed land sown broadcast, as 55 bushels (the Scotch acre) to 42, while the dug and drilled was to the ploughed as $20\frac{1}{2}$ to $12\frac{1}{2}$. The additional grain produced was not the only beneficial result gained by digging; for, in this instance, there was also a great deal more of straw, and the land was more easily cultivated next year.”

When Sir John wrote, our manufacturing towns had not drained the country of its rural population.

This mode of cultivation, by the spade, must, at the present time, be deemed exceptional, from its

exacting too much manual labour, when there is generally a good demand for it, and it is certainly not redundant.* Machines may, in a certain sense, be said to create labourers without the expense of maintaining them; and yet, "*Paradoxical as it may appear,*" says J. B. Say, author of the celebrated "*Treatise on Political Economy,*" "*it is nevertheless true that the labouring class is, of all others, the most interested in promoting the economy of human labour; for, this is the class which benefits the most by the cheapness of commodities, and suffers most from their dearth.*" He adds, what cannot be disputed, "If the different dressings and workings which the soil requires could be no otherwise given than by the spade, the hoe, and such other simple and tardy expedients; if we were unable to make available in agricultural productions those domestic animals, which, in the eye of political economy, are but a kind of machinery, it is most likely that the whole mass of human labour now applicable to the arts of industry, would be occupied in raising the bare necessary subsistence of

* The relative costs of drilling, and of dibbling by hands hired, were thus stated in the *Agricultural Gazette* in 1848:—

Dibbling 3 acres in a day.			Drilling same quantity.		
	£	s. d.		£	s. d.
20 men at 1s. 8d.	. 1	13 4	2 men and boy at drill	0	3 10
12 women at 9d.	. 0	9 0	1 man with harrow	0	1 8
16 boys at 4d.	. 0	5 4	4 men with manure carts	0	6 8
2 horses at 2s. 6d.	. 0	5 0	7 horses at 2s. 6d.	0	17 6
	£2	12 8		£1	9 8

Per acre 10s. 6d.

Per acre, 5s. 11d.

The produce of each was not given. Probably that of the dibbled portion would have turned the scales the other way.

the actual population." Monsieur Say wrote before the present higher order of machines were in use.

At the present day, we are not conversant with any power so great as that of machinery set in motion by human hands. Horse labour would be much less costly than it is if we could but learn to eat his flesh. If horses were all fattened, like oxen, in the various countries of the world, and when about fifteen years old, what a prodigious augmentation would it cause to the mass of human food, and what a diminution of the misery of brutes !*

Returning from the subject of machinery and hand labour in cultivation, let me observe that, some care would certainly be required, and some anxiety attach, in the case of a purely country dairy undertaking for the sale of raw milk, by reason of the supposed expediency of exactness in the time of milking and delivery at a distance. In eight months of the year, however, as I shall presently show, one delivery in the day would suffice for all parties.

* In Algiers, some months ago, a considerable number of high public functionaries, superior military officers, judges and clergy, partook, in the saloon of the theatre, of a grand banquet, the greater part of the dishes of which were composed of horse flesh and ass flesh. The object in getting up the feast was to combat the popular prejudice against such food. The several dishes were dressed in the French style, and pronounced excellent. One of them consisted of a young ass roasted whole. After dinner, suitable toasts were given, and speeches were delivered ;—one of the latter was by Monsieur Decroix, the Veterinary Surgeon of the First Mounted Chasseurs, who maintained, that, horseflesh was very nutritious and that its adoption as an article of food would present many advantages.

As soon as the town milkmen shall be convinced of the desirableness of giving cultivated green food to their stock, and on a very much larger scale than at present, to the partial exclusion of washy grains and costly hay, the system of feeding and production might be modified by the establishment, at convenient distances, of a number of more attractive wholesale and retail feeding stalls, dependent on the country for the supply of cattle food, and which would be less bound to a perfect regularity in its delivery, inas-much as two or three days' consumption, or more, of winter roots at least, might be had in store.

For thirty or forty years, much of my leisure has been devoted to this inquiry, with some practical experience on a small and a large scale ; and, after collecting the evidence of a number of other persons, I have arrived at the conclusion, that a safe undertaking may be entered on, and a large interest of money obtained, by any person of ordinary caution and inclined to country pursuits, who would invest a capital of, say, £3,000 in one hundred cows, with horse stock, and implements ; such an undertaking not being too large for supervision, nor too small for the requirements of a considerable portion of the public ; and this with a greater or a less resulting private benefit proportioned to the price received for milk delivered at depôts twice a-day, if deemed desirable, by three times milking as in Belgium, and Holland and Glasgow, and to be obtained at such depôts by

consumers; or, the expense of carriage might be diminished, at least during nine or ten months of the year, by making a single delivery daily, adopting one or other of two practices not uncommon in Scotland, —that of preserving the evening's meal in a deep vessel through the night, and mixing it with the next morning's meal for sale; or, setting it in a shallow pan for creaming in the morning, and selling the head as cream, and the residue, which is in great request as a superior kind of skim-milk, for the porridge of the citizen.*

If the experiment were tried with a grass-fed dairy and a few acres of supplementary artificials, the conductor of it would be acquiring an insight into produce and markets, supply and demand, and the best mode of disposal, at little expense.

In making preparation for an undertaking on a large scale, it would, perhaps, be advisable to purchase two-year-old heifers, (not in calf,) and to pasture them in a cheap district for calving down, in such order as would be most convenient for a winter, or a full year's dairying, as desired. Prime cows, with their second or third calves, are seldom to be purchased, save as parcel of an entire stock; and a heifer dairy would require, perhaps, but the weeding of one half its number in the first year of trial; or at most, the

* For creaming in summer, shallow pans are best, say two inches deep; and in winter those of four inches. Glazed earthenware pans are now, I believe, the most generally approved.

selling and purchasing some twenty or thirty per cent. in number, in the second year; until, at length, a first-rate stock should be secured. Perhaps 130 or 140 heifers would be required to supply a produce equal to that of 100 full-grown cows—the former yielding commonly one-fourth less milk than the latter, and consuming, probably, four-fifths of as much food. But, costly as such changing and re-changing might be, it should be borne in mind, that, a heifer commonly rises 50s. or 60s. in saleable value as she approaches her second calving. While the heifers would be passing through the term of their first gestation, green crops of all kinds, on a moderate scale, might be grown, from which safe conclusions could be drawn; and their produce might be disposed of to advantage, specifically, to the owners of town stock, until required at home.

Above all, the experiment should be made upon good, well-drained land, with a command of water for irrigation, or for liquefying and diluting manure. The cautious renter of good land can seldom do himself much harm; nor can the hard-working occupier of poor heavy land ever do himself much good. Soil of the latter quality costs most in labour, and needs most manure, and is ungrateful, commonly, for both; while it is more dependent upon seasons for preparation of the ground and harvesting the crop. Most obvious is the truth of that axiom of J. B. Say:—“*Nature is commonly a fellow-labourer with man and his instruments; and the fellowship is profitable*

in proportion as he succeeds in dispensing with his own personal agency, and that of his capital, and in throwing upon nature a larger share of the burden of production."

Many grass-dairies in Dorset and elsewhere are let off at an annual rent per cow ; the lessee milking, and the owner feeding the animals in pail, with grass in summer and hay in winter. He replaces, also, such as die. The rent varies, I believe, from £9 to £11 or at most £12 per head. At £10 10s., supposing the herd to yield the local average of eight quarts per day for nine months—that is, twelve, eight, and four quarts respectively, in the first three, six, and nine months, the produce would cost the lessee about a penny and half-a-farthing per quart, besides the cost of milking.* The pastured cow requires considerable range for grazing. In the dairy counties of Devon, Somerset, Dorset, and Buckingham, it is usually found that the requisite quantity per head is two-and-a-half acres, including one for hay, with only straw—too often—for the three dry months.

Cows cannot secrete so much wholesome milk in

* An instrument, called the "Patent Cow-Milking Machine," of American invention, now sold by a Company in Birmingham, is highly recommended by many, though susceptible of considerable improvement. Twenty cows are milked by it in an hour ; and the animals like the application. It requires no skilled labour in which a boy cannot become perfect in a week. Where the labour of milking forms a large item in the cost of a dairy, as in Australia and Canada, this apparatus, when improved to suit peculiar formations in the teats of the cow, would be of inestimable value. The Company have agents for its sale in all our large towns.

the close atmosphere of towns as in the country, nor so cheaply as where the owner grows the food, and with unbought manure. All stall-fed animals can be kept, without discomfort, upon boarded floors. To litter them on straw is now thought to be a waste of so much food. Fine straw should be given as food, in some form or other, raw or steamed, being first cut into chaff, to all soiled cattle. It preserves a healthy condition of the body, and compels the animal to masticate her food ; by returning, thus, the silica and potassa, in excreta, nothing is abstracted from the soil which is not given back.

From reliable information, and my own partial observation, I am satisfied, that, the generality of milk purveyors in our towns earn but a very moderate subsistence for their families, with the most scanty means of accumulation, notwithstanding the high prices they obtain, and the practices to which they resort. We may set down the average amount of stock which such dealers possess as hardly exceeding five cows, or four in milk at the same time. They estimate, very commonly, the cost of each cow's diet at 8s. a week, in grains, half-a-cwt. of green food (at 20s. the ton), and some hay ; to which must be added the labour expended in cleaning, feeding, and milking, as well as delivering in all weathers, some thirty-two quarts daily of milk, swollen by dilution, perhaps, to sixty. Such labour, with town rents and town living, may be placed at 30s. weekly more ; and then we have to estimate the uncertain amount of risk, disease,

and the expediency of changing one-fourth yearly of their stock to keep up its strength, and interest on £100 of capital engaged. Statistics, indeed, are published, showing the annual mortality of town-kept cows to average twenty-five per cent. But, be this as it may, there is the notorious fact that, scarcely one individual of the entire class of milk-sellers is ever seen to raise himself above the rank of a common artisan ; and that these dealers are, for the most part, in possession of means so limited, that they continue, longer than they should, to feed a bad-milking cow, through want of means in hand to exchange her for a better. It should be observed, too, that they rarely make a shilling of their manure,—being commonly glad to exchange it for litter to be spread on the cold earth or pavement of their stalls. It can hardly be doubted, therefore, that such men would be better off in giving to the farmer twopence-halfpenny a quart for the pure quantity they deal with, and selling it pure for threepence-halfpenny through the year. The gain would be at the rate before supposed, some 25s. weekly, for the devotion of only one-third of their time, and obtained without risk, anxiety, or need of capital.

An undertaking might be first started as a winter dairy, beginning, as nearly as possible, by calving down in August and September, when such succulent food as I would recommend, is most abundant ; milking for nine or ten months, and letting the herd,

at first, go dry mostly in June and July. At that season, the labouring classes are better able, from long days and, commonly, fine weather, to earn good wages, and so, to stand less in need of cheapened food.

As already stated, the class of persons now suffering from the want of milk, are also obliged to pay costly garden prices for such common culinary vegetables as are deemed necessary adjuncts to animal or stronger food,—of which, indeed, they get but little. I shall, therefore, endeavour to show, how advantageously the culture of such vegetables, upon a large scale, may be interwoven with that of cattle food. The necessity, indeed, of being provided with an apparent superfluity, to meet the possible requirements of a stalled herd in extraordinary seasons, suggests the propriety of considering the best means, not only of furnishing what may probably be a superfluous quantity; but, also, of selecting such materials for the eventual surplus, as would be equally fit for table use. This would appear to be more obviously important in dealing with rich and highly-rented land. Here, it would be wise to obtain the advice of our most esteemed agricultural chemists as to the aptitude of soils, as well as on the alternate use of homemade manure, and of guano and super-phosphates, so as not to be wholly dependent upon the former means of production. Nearly equal areas might thus be devoted to the growth of market produce and cow food.

Few persons seem to be aware of the amount of comforts denied, virtually, to the many, through the high prices demanded in our markets, and still more in our hucksters' shops, for those vegetables which, being of the utmost importance for sustaining the human frame in a healthy state, ought to be largely provided and procurable for daily use by every one; and these, being easily raised in abundance, ought to be accessible through their cheapness. It would appear that 300 or 400 or even 500 per cent. beyond the cost of production, is often paid for such commodities as are supplied through retail dealers, and, sometimes even in the market.

The price, on any market day, would, of course, be governed by the amount of supply and demand at the particular time and place. The profits of the several parties through whom the supply is obtained, would depend, first, on the cost of production on the land from which the article is raised, including rent, &c.; secondly, upon the expenses necessarily incurred in the progress from the producer to the consumer, with interest of money, value of the time of those engaged, and including any absolutely necessary middle men, loss by non-sale, &c.; and thirdly, the average prices obtained not merely on a particular day, but during the whole year, or, perhaps, a cycle of years. Still, some light may be thrown on the subject, by taking the prices of one particular market-day, and comparing these prices with an assumed average cost of production before the in-

curring of any expenses between the grower and the consumer.

In a market report which appeared in an Exeter paper, the *Western Times*, of November 1859, it was stated, that, cabbages were selling by the score pounds, at the rate of 5s. the cwt. As these might generally be grown—in the field—for 9d. the cwt., the difference, or profit, would be 600 per cent.; but, cabbages are not often grown in the field, or, if so, very seldom find their way into the market. This vegetable, for table use, is almost wholly furnished from gardens, thus rendering the supply costly and precarious. Sooner or later, farmers will be induced to grow them as a field crop for market; and many think that there is no kind more agreeable to the palate—with some condiments—than the solid interior of the Flat-pole sort. A well-manured crop may be heavier than any other kind of food; and, although delighting in a strong rich soil, it may be cultivated with profit on a cold clay. Cabbages for the table, may be planted out for spring or early summer use in alternate rows with the heavier autumn or winter sorts; the latter being at three feet distances; and these are equally adapted to the use of man and beast. Thirty-five or forty tons an acre, in the double row, may be easily obtained, if well manured for, and even fifty tons of the winter kind alone have been produced. The cabbage is certainly an exhausting plant, from being long in the ground; but, the outer refuse portion of it would be consumed upon the farm, and contribute towards the soil's recovery.

On the same market-day in Exeter, turnips, which might be grown upon the farm and consumed off it, at 10s. the ton, were selling at 2s. 9d. the cwt., or £2 15s. the ton, leaving a profit of some 450 per cent. beyond the cost of production. Potatoes, which should then have been at their minimum price, being of the late sort, just harvested, and might have been delivered, with good profit, at 2s. 3d. the cwt., were then selling, by the peck,—at the rate of 9s. the cwt., or 300 per cent. profit. Of these,—being reputed objects of domestic necessity, and consumed at every table, and with which families often supply themselves in advance,—the price of the particular day would not be likely to differ materially from the average price of the month, or even of a greater portion of the year. But, in fact, the price of potatoes, on that particular day, was far less than they soon afterwards fetched,—and are almost always fetching—nearly everywhere. In March of the following year,—when the root was somewhat lessened in weight, by losing a portion of its valueless, watery contents,—the market price in Bristol (where they are usually cheapest) was 10s. 6d. for the bag (of 135 pounds), being £8 13s. the ton; and at the same time the price demanded by the greengrocers at the adjoining suburb of Clifton, where I resided, was 10d. for the measure of—nominally 10 lbs., but really 9 lbs.,—that is, £10 4s. the ton. In August, 1860, at the same shop, 1s. was charged for the same measure of the then ripe and full-grown early and even late sorts, or £100 for the acre of even eight tons

only. Would the public endure such a state of things in the articles of bread and butcher's-meat? I will not say that a monopoly exists in the potato market; sacks of them are often piled for sale there; but they are for the most part bought up for regrating; and their amount is not calculated to affect prices materially, because, farmers find them generally an inconvenient and exhausting item in a general course of husbandry. Moreover, it is notorious, that high prices, in every stage of buying as well as selling, are more productive of profit to the retail dealer, although involving less deliveries and sub-sales. The shopkeeper finds it more desirable to buy liberally from the grower or the salesman, than encumber highly-rented premises with bulky articles which would be made cheap by more expensive competition. On the same principle, it is well known, that the importers into London of the salmon and other fish in well-boats, throw a portion of them into the sea or river if they find the general day's supply to be more than conveniently large. A greater demand for the two products—of bread and meat—among the upper classes, gives rise to closer competition, and, consequently, more moderate profits to the baker and the butcher. An extended cultivation of common vegetables, by field-gardening, would tend much to lessen this evil, and a mode of delivery might be devised which should dispense with the regrater. Bad seasons might affect the market somewhat, but not much, under scientific and careful management.

A measured acre of early potatoes lifted in June, and early in July, and estimated at five tons weight, was sold, in 1859, by a dairy tenant of mine on the South Coast of Devon, for £30, in the ground, to a jobber, for resale; and an excellent crop of turnips was afterwards obtained from the same land in the late autumn. In the first week of July 1861, I witnessed the sale of seven acres, statute measure, of potatoes, not far from the town of Ayr, at exactly the same rate per acre,—that is, 210 lbs. for the crop; and Aberdeen turnips were intended to be sown within the week. The buyer was to lift the whole, and the seller to cart it into Ayr for railway-carriage to Glasgow.

With respect to store, or late potatoes, I was assured by the factor of a gentleman in Renfrewshire, two years since, that he had refused £40 an acre for a large quantity, growing, of the latter kind; and having been referred by him to an article in the *Scotsman* newspaper, reporting that a gentleman in East Lothian had just sold the produce of $72\frac{1}{2}$ Scotch acres, at £52 10s. the acre, I was induced to write the grower on the subject, and he more than confirmed the newspaper report; having, indeed, sold only 25 acres at that price, to an East Lothian merchant, but, the whole of the residue was disposed of in Edinburgh, at an average of £70 the acre, thus realizing some £4,800 for the $72\frac{1}{2}$ acres! This much respected party manures good land, rented at £4 the Scotch acre, with 25 cart loads of farm-yard

manure, five cwt. of guano, and three cwt. of dissolved bones. The 25-acre produce first sold was shipped to London. If such prices are obtained in extensive transactions, what may be expected to be the retail cost to consumers in Edinburgh, Glasgow, Liverpool, and London? I know not what these identical potatoes were sold for in the London wholesale market on arrival; but, "York regents," which are scarcely held in greater estimation, were quoted at 155s. to 180s. the ton, in London, in the previous month of September, when "Scotch regents" could hardly have been lifted. At equal prices, the East Lothian shipping merchant may have made something like cent. per cent. on the prime cost,—great as it was.

The heaviest crops are commonly obtained from land altogether fresh from the state of pasture, or ley. It is stated in the *National Encyclopædia*, that, when cut sets have failed,—from the disease,—the entire tubers have resisted premature decay. Whether this arises or not chiefly from atmospheric influences, or debility of constitution, or from any other conjectural cause, it is certain that the entire roots keep off better the approach of disease, and germinate more healthily and more freely. It is also a fact well ascertained, that the early sorts, planted in November or February and ripe in August, though eatable, as a luxury, in all June, are very rarely known to suffer. I have myself obtained, without forcing, in my garden, several rods measure, yielding at the rate of eleven

tons an acre, of a fine white kidney sort, planted on the 15th of February, and lifted on the 20th of August. In the following month, an inferior kind was selling freely in the markets at a penny per pound, which would have given, retail,—at the rate I grew in August,—£150 the acre. In the first four days of July, I have taken up, from moderate culture, eight tons and a quarter to the acre, when they were retailing at twopence the pound, (a price which would have given £154 to the acre,) and left the ground free for after cropping in the year. I have before supposed only five tons to the acre of this early crop. The French Minister for Agriculture, some years since, addressed circulars to all the Prefects of the Empire, impressing on them the propriety of recommending the cultivation of the early kinds as much as possible, in preference to the later ones, because they were less obnoxious to disease.

I have not been able to find the publication of any reliable experiments on the comparative value of potatoes of approved modern varieties; but, some years ago, trials were made on such as were then cultivated, under the direction of the Committee of the “Useful Knowledge Society,” instituted and presided over by Lord Brougham. The result is published in one of their volumes of reports. I am not apprised of the means employed in producing such extraordinary crops as are there mentioned, or whether the experiment was made for the purpose of

ascertaining simply the extreme capacity of each kind. The authority, however, cannot be questioned.

Here is the published result of the growth :—

	Bushels.
The “red white” potato produced, per acre	622
“The late wild”	612
“Lumpers”	555
“Red Bread”	713
“Black Seedling”	745
“Cape” ..	651
“Wellington”	838

The weight of the bushel was not stated; that of Covent Garden is, I believe, 70 lbs. At this rate, the least producer yielded $17\frac{1}{2}$ tons to the acre, and the greatest 26!

New varieties of this esculent appear so rapidly, that it is probable that those just named are little known to modern growers; but, as they can hardly be thought to have been forced into a deceptive productiveness, it is difficult to imagine that they can be very much surpassed. I am told, that the varieties which obtain the highest prices in London now, are the “shaws”—for early produce from mid-May,—and the “flukes” and the “York regents” from August, September, and October; it does not, however, necessarily follow that they yield the largest profit to the grower, this depending much upon their merit as bearers.

It should, throughout, be understood, that there is a wide difference between what is called *market-gardening*

and *field-gardening*. My remarks have generally reference to the operations and results of the latter, and not to a catering for the luxurious and costly demands of the rich, in London or elsewhere. In the neighbourhood of Town, it is no uncommon thing for the great market-gardeners to obtain four, and even five crops of different vegetables in the year on the same land. These, however, are raised by means of an enormous expenditure of labour and of bought manure ;—that of horses being almost invariably preferred, as being hotter, and, consequently, more forcing than that of cows. The natural soil, indeed, is little cared for, so long as this matrix be light and warm; the bulk being, perhaps, one-half manure, and constantly supplied with water, and many varieties are sheltered from the early frosts.

A superabundance of culinary vegetables—particularly potatoes—might be brought within 100 yards of a public market, at the leisure of a farmer's team, stored there, and thrown in as required. Early potatoes may be made to frank a succeeding crop of turnips or of transplanted mangold. Each crop would be chargeable with one-half the rent. The potatoes might cost £12 an acre, (including half of £3 rent,) lime, seed, &c. ; and the succeeding one of turnip or of transplanted mangold—from 7 to £8 at most,—with home-made manure, such as these crops will commonly supply. As the consumption of very early potatoes is principally confined to the upper classes, they would seem hardly to come within the

scope of an inquiry into the means of providing cheap vegetables for the masses. It is certain that the price of these when lifted early, with a view to a succeeding crop, will be found beyond the reach of a prudent family of the working class. Its partial introduction, however, in a rotation,—or, largely in a field-garden,—may be very beneficial to the grower in dealing with highly-rented land, inviting a succeeding crop—and, ultimately,—to the general public. The root is dearest, out of London, towards the close of June or early in July, when other vegetables for the table, with the exception of green peas, early cabbage and brocoli, are scarce and dear. Were these potatoes left in the ground six or seven weeks longer, their weight would be nearly doubled, but, their so remaining would involve a greatly diminished tonnage, and even acreable, value, and the loss of further use of the land within the year. The best results have been obtained from planting whole sets in November and in February, seeing the risk accruing in a wet or very cold season, from cutting them. I have used, as seed, tubers of eleven to sixteen to the pound, and have no doubt that twelve is a safe size. This would give some 16 cwt. of seed for nearly 30,000 setts per acre, at 18 in. by 10; they are more commonly planted at 18 in. by 9. It is important to change the seed often, and, where feasible, to alternate the seed-soil from light to heavy and heavy to light. For potatoes, at all seasons, mineral manures are best. Lime, in any form—and ashes, too,

are good. A Scotch gardener, of much experience and intelligence, has found that, about 6 cwt. of salt spread over the rows as the plants rise above ground, will considerably augment the weight of produce. Farm-yard manure will add to weight, but at the expense of quality.

With regard to general cropping and suitable rotations, whether for milk or table vegetables, but little confidence will be placed in the lucubrations of an unknown author, who avows his having long ceased to cultivate largely, though unremittingly engaged in experimenting. Almost all reflecting agriculturists have favourite theories and notions. My individual bias has been sufficiently exposed in the preceding pages, as well as the authorities which gave it birth and have encouraged its growth.

On modes of profitably cultivating culinary vegetables of the common kind in fields, it would seem unnecessary to dilate. As regard to soils and seasons seems to be the one thing needful. I do not believe that Mr. Mechi over-estimated the profits of market-gardeners, in saying that £100 or £150 was obtained often from a single acre; but, no doubt, he contemplated their raising every kind of delicate vegetable for the tables of the upper classes in London, and by appliances not within the reach of distant field-gardeners. For healthful growth of the human frame among our lower middle and inferior grades, no such costly varieties are called for; and a simpler and more safe cropping is desirable. There are few

common gardeners who are not conversant with the best modes of raising the potato, cabbage, brocoli, and turnips, onions, leeks, and Belgian carrots (most useful in the thickening of soups); and, of all these, the usual products may be pretty safely calculated. Little is wanting here, save the animal and mineral manuring of friable soils; the former of which may be secured by a combination of stall-feeding, or by rearing and fattening hogs on the offal root, and other vegetables boiled with purchased meal, and from which the individual may reasonably expect, as a resulting profit, the solid and liquid manure furnished by the last-named animals so fed.

For FIELD-GARDENING, a village might be formed of ten or twelve families operating together, under a leading member—and interested in results in proportion to their supply of aid,—or else, individually, exchanging their leisure, from separate undertakings;—and on a press of work,—with a neighbour, at the times of digging, planting, and harvesting.

The latter plan might probably work best, each family being independent, while acting for a common purpose. A perfectly co-operative undertaking might expose the most able and industriously inclined to frequent and considerable checks and damage from the less able, less industrious, or less disciplined of their fellows. In this way, perhaps, each family might cultivate five or six acres; and a neighbouring capitalist, or looker-on, might cheer them with the hope of having cows entrusted—on remunerating

terms—to the most deserving. Indeed, a land proprietor would find his interest in the encouragement of a number of improving tenants of this description, whose operations—under a long and liberal holding—would gradually convert a field into a market-garden. The manure produced from eight or ten cows, and spread on a small quantity of land, comprising each allotment, with cultivation by the spade, would speedily effect this change.

By whatever means, or class, effected, should the simple undertaking of a butter and skim-milk establishment be preferred to the sale of raw milk, the gain might be smaller, but with less road-work, hurry, and care.

Let us, then, suppose 120 cows kept by a company, or an individual, or a set of individuals, through the year, with the view of MILKING 100 DAILY, and drying off as many as practicable in the grassy months of June and July, upon 50 acres of distant pasture of some 30s. quality; and where it would be desirable to graze 20 or more heifers, from two years up to three years old, and calving,—or springing,—*under* the care of a married stockman.

Supposing, further, that we have 120 ACRES of 60s. land, of which 20 only are kept in permanent pasture (for hay and for enjoyment, if not health, of cattle), and 100 acres in tillage.

Let us imagine, also, the following continuous appropriation in alternate cropping, by a farmer with a team :—

	Acres.
Mangold, leaf and root	40
Cabbage (Spring and Autumn), tur- nips, &c., chiefly for market	20
Oats, mainly for their 70 or 80 tons of fodder, and not seeded	40
Grass, for hay and run	20
	120

Wherever practicable, profits would be considerably enhanced, as I have shown, by a previous growth of early potatoes, on more or less of the 40 acres of mangold, bearing in mind that transplanted delays the summer food of cows by a month,—that is, in the leaf crop.

For the private gentleman, or for the resident members of a co-operative society, the following arrangement may be thought still more simple, for feeding the same number of cows, for 10 months, and requiring no plough team for a grain crop; in fact, the preparation of the soil might be wholly effected by the spade; purchasing some hay and straw for chaffing—warm in winter.

40 acres of grass, in four paddocks, cutting 30 acres twice within the year—highly manuring, and frequently watering,

40 acres of mangold and cabbage, in the proportion of 4 to 1.

20 acres in culinary vegetables, for the fine growth
— of which an ample quantity of rich manure
100 would be furnished from the stalls, thus

offering something for the supply of green food for the stock. Limeing moderately every three years, in autumn, to sweeten the soil; and having occasional recourse to artificial manuring, would still further aid the product of culinary vegetables.

And, what may be expected to be the commercial results?

Mr. Horsfall tells us that his cows yield a gross return of £25 each, while valuing the quart of milk (for butter and skim-milk only) at 2d. One hundred and twenty cows would, therefore, on his feeding, yield £3,000 per annum; and if the mode of feeding I have mentioned, could be deemed equal to that gentleman's—and, further, if instead of twopence the quart, the produce were sold wholesale at twopence-halfpenny, without his labour or cost in the conversion, £3,750—at least—would be the resulting figure. But a town manipulator buying this would derive from it, by reducing strength, some £7,000 or £8,000 per annum!

Mr. Horsfall's estimate was formed upon hired labour throughout. A practical industrious farmer, with a family, would save one-fourth of the outlay in the several items of cultivation, feeding, milking, and delivery by the road.

If I might venture (from some experience) to estimate the hired labour cost of producing hay and root crops, I should set down £4 an acre for that of grass land of £3 value, taxes included, and £10 for that of roots, with self-provided manure.

I would earnestly invite reflection on these several estimates by practical men endowed with common sense, and who are willing to examine well their prejudices regarding the quantity of cow-food procurable from bladed mangold on good land well manured;—as well as its peculiar usefulness for nine or ten months of the year. For the sake of simplicity, I have not calculated, in the first place, upon seeding oats, believing that 50 acres of a cheap pasture, at a few miles' distance from the stalls, might give as much early summer food as wanted, either in cut or kept-up grass, and a lesser costly area employed at home,—while the important and interesting object of the sustained strength of herd would be simultaneously carried out on the same distant spot.

While entertaining a thorough conviction that the richest milk may be produced, with ample profit, for 2d. the imperial quart; it may be admitted, that a liberal margin should be left, at the outset, for sanguine estimates and the mischances occurring in a large and new dealing with an almost untried system,—an untried herd, perhaps an untried soil, and with an untried public. But, with the allowance of one-third margin, a year or two's experience would, in all probability, admit of a reduction to 9d. or 10d. the gallon from 1s., in the second or third year; after which, the ground would be cleared for the easier and cheaper practice of working farmers, in a safe and honourable rivalry for producing it, finally,—at 2d. for the quart pure.

It is very probable, that the first effect of a partial supply of pure and cheap milk would be the multiplication of middle men and women, for buying up and retailing at a profit, by providing patronizing families at their domiciles; but, such a combination would not be subject of regret. If a milk-walk supplying a hundred families were divided into seven or eight, it would carry comforts to the houses of so many poorer ones,—instead of one individual, and the male labour now employed in heavy dairy town work, would be available for higher uses.

So soon, however, as observant country stockholders shall become satisfied that, increased supply would meet with an increased demand, and the dealing found to be sufficiently remunerative, competition in the country districts would very soon secure a sufficiency to the entire public, at the lowest price admitting profit, with a slight augmentation of cost to families for domiciliary labour and risk; and, below the wholesale charge of twopence, it certainly need not descend. The lower, too, the price,—the temptation to fraud among competing distributors, would become less and less.

Where no public lactometer may be immediately accessible under the late Act regarding the adulteration of food, consumers should be exhorted to adopt a frequent recurrence to a private one, of very low price, in order to check and expose fraud, or to obtain satisfactory evidence that none has been practised.

The profit, and, I might say, the blessedness of an enterprise of this kind, might be obtained by three classes of persons :—First, the working and renting farmer, with a useful family and a capital of £1,200, might give his whole attention to the feeding of fifty cows, from thirty or forty acres of land—half tillage and half pasture ; economizing the cost of assistance in hired labour by the use of his own head and hands and those at his command at home ; Secondly, the private gentleman, cultivating his own land ; or Thirdly, the renter, under a liberal landlord, or with the security of a long lease, with a capital of £3,000 or £4,000 for a 100 or 150 cows, who, though dependent upon hired labour, would, on the other hand, diminish its expense by useful machinery, including an engine of from four to six, or ten-horse power—according to the extent of his undertaking.

When the bulk of the population of a large town shall become sensible of the advantage of such an extended supply, the most simple and manageable means of furnishing it from the country, would be through a number of dairy establishments, of some fifty cows each, surrounding a town, within the distance of three or four miles, or close to a railway-station.

As milk would be sold to all comers, either from carts or from such depôts as before suggested, it would be important that the delivery should be so made as to render unavailing the obtrusion of dealers who might buy and adulterate the milk, in order to bring it into disrepute, or do so for the purpose of

individual profit, and create an excessive advance upon the article. Without some precaution, the benevolent object of the undertaking might be defeated, although the personal advantage of the producer would not be affected. Inquiry and observation might, probably, in time, give to the agent the personal knowledge of the individuals of a district, which would suggest the most convenient remedy.

A more extensive and cheaper distribution of milk, without the intrusion of middle-men, would render ready-money sales important. To this end it would be necessary, though at first difficult, to combat *the mischievous habit, almost universally prevailing, of weekly credits; one that tends to make the buyer less careful, and the seller more exorbitant*, to cover his own risk, while securing his hold over the self-made dependent purchaser. At present, everything is obtained on credit by the masses; and, certainly, a family not having the value of a week or two's maintenance beforehand, must be fed before the week's wages are received. Credit may, therefore, in such cases appear unavoidable. At the general shop, the wife obtains her bread, her butter, coals, candles, and vegetables; of the milkman she gets her modicum of milk; all on the promise of payment out of the wages to be received on Saturday. If the husband is prudent, he enables her to pay off the scores, and buy a little meat for the Sunday's dinner. It rarely happens that a shilling is left on Monday. Too frequently, the bills are not all paid on Saturday, and the wife has to

implore a prolongation of credit and continuance of supply, for which she and her family are sure to pay dearly in the end. If a credit must be given, it would seem impossible indeed for any but a middleman, with large apparent profits in the shape of price or deterioration, to watch the solvency of the halfpenny or penny a-day customer. The pernicious custom, however, once overcome, by a sense of the glaring advantages which would accompany its extinction, a general habit of prudence and forethought might be expected to supervene. This happy change would effect a very large saving, say of 2s. or more weekly, tantamount to a substantial increase of so much in the earnings of an operative, by the greater quantity of nutritious food to be obtained elsewhere than at the general shop, for a given portion of the weekly wages; and, should an old score have, unhappily, accumulated, through illness or any other cause of distress occurring to an honest, industrious, and sober man,—such a saving as supposed might enable him to wipe it off much sooner than any County Court Judge's order would, probably, require.

I have been contemplating especially an increase in the comforts of the industrial classes, who comprise three-fourths, at least, of the population of our towns, and certainly cannot purchase one-fourth of the aliment disposed of.

I have said that the legitimate producer of milk for all is the dairy farmer. This will hardly be disputed, seeing what superior advantages he enjoys in the

growth of food, with home-made manure ; the outlet to pasture or a run ; the health of stock, from superior accommodation ; the comparatively low rent of stalls ; and lower price of labour in milking and attendance. I have shown, from the Lothian practice, and otherwise, that the richest milk can be produced, with sufficient profit, at twopence the imperial quart. If the present class of milkmen be retained, and we add to this price one halfpenny on the grower's behalf, for delivery to them at short credit from a dairy farm, a man buying wholesale at this price, and reselling pure at threepence halfpenny, (where that is the average price through the year of an adulterated liquid,) would gain eightpence daily by the sale of every cow's produce procured by him, of eight quarts ; and if he have custom for 60 quarts of pure milk, he would be getting 35s. weekly for two women's labour for a few hours in delivering it pure, right and left, from door to door, and this without any other charge, or even the employment of capital in stock, receiving and giving the usual credit of a week.

The present class of monopolists would have no reason to complain if these terms were offered them, (and required to be honestly carried out on their part,) with the alternative of quadrupling the number of retail purveyors—and underselling them by a halfpenny the quart pure, or at twopence for a liquid equal to their own.

A considerable portion of the present large consumers would rather pay threepence, or fourpence, as

at present, for their daily quart of milk, (particularly if they could get it pure,) than disturb their household economy and service by dispatching one of their domestics, in all weathers, even to the nearest depôt, with the chance, too, of disappointment, and would therefore continue to be served by the milkman. My last suggestion would meet this case; but for their benefit, I will propose another convenient and beneficial arrangement.

Stalls might be erected for fifty or more cows, in and about the town—in all directions—to become as it were milk-fountains. This would constitute a distinct business of the simplest kind for persons in possession of £1,000, selling their milk wholesale, as in the London and other suburbs, and obtaining their supply of cattle-food entirely from the country, and transmitting, by return carriage, large quantities of manure. The upper classes would be benefited through that extensive rivalry for favour which would be entered into by individuals buying at such wholesale depôts, and incurring no risk and wanting no capital. By such means, also, a taste for wholesome milk and cream would be promoted, by a view of its superior quality, and the pattern neatness of the cow-stalls; a neatness which would be alike conducive to the health and comfort of the soiled animals, and to a vast economy of the means of reproducing cattle-food. Or, again, a greater number of stalls might be scattered over a town, for feeding only ten to twenty cows each; the animals to be fed from the country, and

changed by a neighbouring stock-proprietor every six months, so as to have those kept in town always of a condensed value, calling for the transport of less food in proportion to the milk yielded. In this case, it would be advisable to have the stalls in town and country as nearly as possible alike, so that the animals would not be sensible of their frequent change; and should the American milking-machine be made to answer, the change of hand in milking, too, would be unfelt.

The establishment of such a system as either of these last might well engage the exclusive attention of many tillage farmers in the extensive growth of cattle-food for sale.

Practical men will probably consider, that the largest acreable profit would be derived from the application of green crops to a large dairy in the country for the sale and the delivery of milk; and the largest interest on the same amount of capital would be obtained from the cultivation of market vegetables and the sale of green food for town stalls. Thirteen or fourteen shillings the ton—or two-thirds of the price now generally paid for the latter—would cover every expense of cultivation and carriage, including that of liquid or soluble manure, and would, I believe, leave a profit for the farmer of £6 or £8 per acre; while such a reduction to the feeder as one-third in the price of green food,—its extended use or substitution for what is more expensive in production,—and the sale of that stall manure which now

returns him nothing, would enable him to sell, with advantage, a greater quantity of pure milk, at the price he now exacts for an article which is shamefully deteriorated.

The power of dealing with the subjects opened out is well-nigh exhausted ; and with it, possibly, the patience of my readers. I have placed my thoughts and conclusions in a strong point of view, although most anxious to inspire confidence by their obvious approach to truth.

I have endeavoured to support, by evidence, my own conviction, that the deprived three-fourths of our town populations can easily be furnished with the inestimable comforts of milk and vegetables at half the prices hitherto demanded, and I am mistaken greatly if my position be not established. Without having travelled much beyond the region of facts, or, in any way exaggerated them, it may surely be admitted, that I leave a large margin for the doubting.

While thus presenting my own strong impressions, the welfare of the largest portion of the community has seemed to me very deeply interested in the inquiry ; particularly that of the working classes, whose interests are so closely interwoven with those of society at large. My arguments may have failed to convince ; but I venture to hope, that some matter has been suggested for useful reflection. The ground is broken for others to cultivate and improve.

I think that justice will be done to my intentions, although I may be regarded by many as a speculative enthusiast. My notions, and, perhaps, my purpose, will be slighted by those whose temperaments, and outward circumstances, and experiences of life, are different from my own ; but, “if all that is useful met with no impediments, our arms and hearts would not be required to promote it.”

Few phases of benevolence can be more attractive than those displayed in an earnest, practical endeavour to increase the comforts of those who labour, by enabling them to live healthily and well.

Let us, then, evince our sympathy with need by kindly actions and not words. We are indeed told “to weep with those who weep ;” but, our feelings will be hollow and worthless, unless an effort be made by us to dry up the source of grief.

In conclusion, should any friend of his kind be roused to exertion in this field of charitable enterprise, his success may extend itself incalculably, and afford him the consciousness of being a public benefactor ; reaping golden opinions, in no wise incompatible with golden harvests.

To the suffering many I repeat—Co-operate, co-operate ; and, for myself, declare, I never had a desire so like covetousness, as to be allowed any kind of participation in the carrying out a purpose apparently so fraught with good.

AGRESTIS.

ADDENDA.

ON THE STAFF OF LIFE.

It might be expected that a Treatise on Population and Food would not pass lightly over the important subject of BREAD ; and, although I can add nothing to the amount of knowledge which practical men possess regarding the cultivation of wheat, I will hazard a few remarks as to its conversion after being grown and ground.

The present age is rife with new inventions of methods and machinery in bread-making ; but they all seem to me to have reference more or less to the satisfying a somewhat vitiated taste. With the exception of the aërated bread of Dr. Dawguish, which has been brought under the notice of Parliament by Mr. Tremenheere, commissioned to inquire into the broad subject of bread-making and bakers by the Home Secretary, no advertised improvement advocates the retention of the smallest portion of the bran in flour, or (with the solitary exception of Stevens's patent) mitigates the suffering of the operatives in bread-making and baking.

The aërated bread is carefully and specially pre-

pared by avoiding fermentation, and thereby economising, it is said, four quartern loaves in the sack of flour. It seems to be made of a material somewhat coarser than that in ordinary use, and shows, by this means, an alimentary gain of three to four shillings in the sack. It is no small recommendation of this method that it saves some four-fifths of the labour of the operative.

Perhaps the costly machinery which is necessarily employed in the preparation of this bread will delay its coming into general use at ordinary prices, and will render it commercially successful only on its being very generally adopted. The improvement, no doubt, is great; but great as its superiority may be over ordinary baker's bread, blown out by fermentation, it does not at present offer to the working classes the two great desiderata of assisting in the growth of bone and muscle, and of economising their means, in an equal degree with meal bread prepared by effervescence only.

Town-bred people of all classes despise the element of bran; and, it may be that, to the consumer of a quarter or half a pound of bread daily, it matters little if the eye be pleased at the expense of perfect wholesomeness; but, to the town or country consumer of three or four times the quantity every day—with the accompaniment of any deleterious substance—it matters much; and I propose to show that the pockets and the health of the working-classes are alike interested in the inquiry.

Bread is ascertained by men of science to contain the same principles as milk. They both combine fuel and flesh-making substances, but in different proportions; on which account it is important to take butter, or fat, in some shape, with bread, even in the temperate climate of England. In the northern parts of Russia, the inhabitants instinctively luxuriate in train oil; while, in the warm climate of Southern Italy, they may be kept in as good health by macaroni.

It is observed in a recent publication entitled "The Philosophy of Common Life," that, "some materials are used in bread-making for the mere purpose of swelling the bulk of product; others, for the improvement of the visible quality, as imparting whiteness, sponginess, &c. The chief cereal substance used in the adulteration of white bread is *rice*, on account of its causing the dough to absorb and retain a greater amount of water, and which the usual heat of a baker's oven cannot wholly drive away, thus adding to the weight of the bread. *Bone-dust* is often given to add to its whiteness, as well as *alum* and *chalk* to contribute both whiteness and weight." Professor Liebig says: "In England, bakers use a quantity of alum in their bread. It is employed to make it white and soft and moist. It acts by coagulating the gluten of the wheat, but is deleterious in its effects." He discovered that water saturated with lime produced the same whiteness in bread, the same softness, and the same capacity for retaining moisture; while the

lime removes all acidity from the dough, and supplies an element needed in the structure of the bones, which is deficient in wheat, and still more so in rye. He puts 5lbs of water, saturated with lime, to nineteen pounds of flour ; the bread weighs well, and the Bavarian bakers consequently like it.

Extravagance and wastefulness in regard to this important article of food are, however, chargeable on the great body of consumers rather than on the miller and the baker. The miller is encouraged in the withdrawal of all the bran from the meal, by a generally morbid taste on the part of the public. Yet *the bran is a most nutritive constituent in bread, as the staff of life, supplying, as I have said, the animal frame with bone and muscle.* Until a famine shall occur, the great mass of bread consumers will not probably be brought to their senses, or awake to a conviction of the monstrous folly of rejecting all but the very whitest bread. It would seem as if brown, or household bread, were regarded by the lower orders as a badge of degradation, without any consciousness of the advantages foregone. It often happens that, while the master of the house is luxuriating on a brown loaf, his servants will reject it as inferior food.

A belief that the whiteness is a proof of superior quality is a popular error ; and the unwise preference almost universally given to it, has led to the pernicious practice of mixing alum with the flour. The use of this is very general if not universal ; the most honest baker employs it, since all bread not whitened by its

means is rejected as of base quality. The proportion of alum used is said to be from twenty-two grains in the quartern loaf to three times that amount.

It is well known to men of science that the *entire meal will sustain life, while bread made of the finest flour will not*. It has been stated on authority that *if a man be kept on unfermented brown bread and water, he will live and enjoy good health, and if you give him fermented white bread and water only, he will sicken gradually and die*. The meal of which the first is made contains all the ingredients essential to the nourishment of the various structures of which our bodies are composed. Some of these ingredients are removed, or much reduced in quantity by the miller, in his efforts to please the public taste; and others are destroyed by fermentation, through the application of yeast, or leaven.

Fine white bread is found to be not only less nourishing, but also more difficult of digestion. The passion for it, as regards the mass of the population, is almost peculiar to England. In making it, the purpose of lightening the dough by the admission of air is generally effected by the process of fermentation, which is carried out by the introduction of leaven (sour dough), or yeast, into the mass of dough; but, science informs us (and the practice has been long adopted in my own family) that, instead of resorting to the destructive process of fermentation, the lightening of the dough may be effected by applying hydrochloric (muriatic) acid to carbonate of soda. The carbonic

acid, expelled from the carbonate by virtue of the superior attraction of the hydrochloric acid to the soda, escapes in the form of effervescence, from its connexion with the soda, forming carbonic acid gas, by which the mass of dough is sufficiently blown out and distended. It simply acts mechanically, without creating any chemical change ; whereas, fermentation acts by converting some portion of the dough itself into alcohol and gas ; and the portion so converted is lost. It is found, in consequence, that a sack of fine flour, of 280 lbs., which makes 360 lbs of white bread by fermentation, gives 420 lbs. by effervescence ; and it is also found that 280 lbs. of wheat meal will give 464 lbs. of a more wholesome bread by effervescence. The total loss by fermentation and refining, taken together, is, therefore, underrated at twenty-five per cent., a loss exceeding the annual value and amount of bread-stuffs imported annually from abroad, on the scale shown *ante* at page 70.

I am aware that the bodily habit of not a few among the labouring classes particularly would be apt to give way under the general use of brown bread, through irritation of the bowels by coarse bran. For such, I apprehend, the substitution of tartaric acid for the muriatic, in the preparation recommended, will present a remedy, and leave the product not less wholesome. Much useful information on this subject may be gleaned from several numbers of that interesting periodical, “ *The Family Friend.*”

ON CHEESE AND BACON.

Some of my readers may have seen a great American cheese that was sent last year to England to be placed in the Exhibition Building ; but, arriving too late, it was shown publicly enough, for two or three months, in a dealer's shop in the Borough. This cheese was said to weigh 1,040 lbs., and to be sound and good throughout.

A friend of mine in Australia converts daily into cheese, the morning meal — or milking — of above 1,200 cows (the after-secretion in the day, being abandoned to the calves). Their feeding upon grass alone, throughout the year, costs next to nothing, and they yield on it as much milk as average English herds. They are all Short-horns, nearly pure, and may be worth some £5 per head. The finest descriptions of hogs are bred and weaned upon the whey, and then turned out to graze, summer and winter, for some twelve or fifteen months, in large and close-railed paddocks, to acquire frame. Some three months before slaughtering, they are brought into smaller paddocks, nearer to the homestead, and allowed a little clover, but no maize or other meal until the last five or six weeks. Their dead weight ranges usually from twelve to fourteen score. For fattening 470 of these in the last year, and other uses,

700 or 800 acres of maize were grown. Such carcasses cannot cost much upon the spot, and they bear the voyage to Europe well. In the several Australian capitals, the hams are pronounced quite equal to those of Yorkshire or Westphalia. It is said that, in their curing, besides salt and saltpetre, some kind of alkali is used, which, while imparting a peculiar mellowness, proves, also, a safeguard against "reast" or rusting.

With regard, therefore, to cheese, bacon, and hams, it may probably be found ere long, that only those of first-rate quality will pay the British farmer for producing; while the greater body of consumers will discover an abundance of cheaper food of these descriptions "looming in the distance."

ON HONEY, AND THE BEE.

I will venture, further, to invite attention to a minor episode, the cheap production (in our colonies particularly) of a most agreeable and nutritious matter in the form of HONEY.

The value of this delicious substance is but little known in England, where it is only procurable at twice, at least, the price of sugar, while its quality is of the very lowest order; it may indeed be admitted, that the amount of attention and of support called for by our English climate, and the very limited provision which nature here affords for the sustenance of the bee, during four months of the year, may, to a certain degree, account for its neglect. In some parts of Germany, however, individuals are seen to possess 100 and even 200 stocks. Hybla in Sicily, and Hymettus in Attica, were famous for their honey some 2,000 years ago. Many ancient celebrities held the bee in great estimation; Virgil styling it "*a ray of the Divinity*" (the heathen Jupiter);* and Plutarch designating the honey-comb as a "*Magazine of Virtues.*"

* "Nunc age, naturas apibus quas Jupiter ipse
Addidit, expediam."

—*Virg. Georgic., lib. iv. v. 149.*

Its produce, we all know, was mentioned, together with milk, as one of the chief attractions of the Land of Promise to the Israelites; the country to which they journeyed was "*a land flowing with milk and honey.*"

In such genial climates as are neither so cold and unproductive in winter as to call for the artificial feeding of the bee; nor hot enough in summer to cause the wax to melt (which it does at above 140° of Fahrenheit), the production of honey may be carried to any extent, and without sensible cost,—the live stock and their food being self-supplied. Tons may be obtained almost as easily as pounds from nature's lavish wastes.

I am acquainted with the management of a very large apiary in the possession of a friend in Australia, who finds no care or precaution needed beyond the screening the covered shed on the north-western side, from which quarter a hot wind occasionally blows.

"Honey is generally known to be a fluid or semi-fluid substance, the materials of which, for domestic use, are collected by the neuter, or working-bee, from the chalice of flowers. This nectar cannot be said to be a purely vegetable production; because, after being extracted by the proboscis of the insect, it undergoes a process in the sucking-stomach, or honey-bag, where it is elaborated and again disgorged, and lodged in the cells of the honey-combs. Of these, some are store-cells, and others kept for daily use of the nurses and the young broods chiefly. Al-

though the cell is horizontal, the honey does not escape ; as a thick cream rises and forms a glutinous film obliquely placed, and keeping in the treasure. The store-cells are covered with a wax lid."

Honey is, of course, capable of vinous fermentation, and it furnished the principal festal drink of our ancestors, in the shape of *Metheglin*, or *Mead* ; and the friend I mentioned has often made from it both wine and beer. He was in the habit of keeping a great number of hives, or boxes, some eighteen or twenty inches square, formed of the light wood of the country. He has taken 120 lbs. of honey from a single hive, without destroying the bees ; and the stocks increased so fast, that he had once as many as seven swarms in a day,—a single queen-bee laying as many as 30,000 eggs in the year. Three or four of these swarms were secured by the gardener's shaking them gently from a pendant bough on which they clustered, into a fresh hive ; being protected by gloves and a gauze veil. The swarms which escaped crossed a river at the foot of the garden, and, no doubt, formed colonies in the bush, of the most industrious class of labourers, for the benefit of future settlers. The gardener adopted the ancient custom of making a noise on an iron pot, whenever he saw the insects issuing in great numbers from the mouth of the hive, and following, apparently, the queen-bee. It was, however, the common practice of the owner to place extra hives by the side of those filling, for the purpose of emigration, as well as vessels of glass

in the shape of bell or finger-glasses, deposited over an opening in the ceiling of the hive, and which the insects proceeded to furnish when they had no more room in the body of the original vessel. These glasses are easily detached in the night, when the bees are asleep in the centre of the hive, by removing the wooden cap from over the glass (placed there for the privacy and quiet of the animals while at work), and cutting off the superficial mass, together with the glass containing it, by means of a piece of tin drawn horizontally across the bottom, at its junction with the roof of the hive, and replacing the full glass by an empty one.

It may not, perhaps, be saying too much if I expressed my firm belief that very few among the millions of square miles which comprise the vast continent of Australia—or fifth quarter of the habitable globe,—would not support, each one, 100 stocks of these delicious food producers; supplying honey, wine, and beer to numerous families, without the least intrusion on the means, or lessening the supply, of any kind of food for man or beast.

In such latitudes as the hill countries of India, too, honey could in this way be raised, without limit, through the year; but certainly, in no part of the world more advantageously than in botanically-rich Australia, through the abundance and variety of its aromatic flowers and blossoms. The honey there produced, is less cloying than any found elsewhere. As a human aliment, it can be used, I am told, with

safety and advantage, to the extent of two ounces daily, by man or woman. The gastronome might lunch delightfully for weeks together, without surfeit, upon biscuit dipped in Australian honey.

The bee will seldom use its sting except in self-defence. An experienced bee-keeper has no more fear in the midst of a humming multitude than if he were surrounded by a host of butterflies; and the bee itself has sagacity enough to know by whom it is approached. I have seen an apiarian put these insects on his lips, and take them in his hand, and stroke them down the back, with perfect impunity. "Such is the dominion which the human intellect can exercise upon instinctive races!"

Connected with the honey is the wax,—the material of which the comb is formed,—and it furnishes no inconsiderable portion of the profit of bee-keeping; but its consideration would be foreign to the purpose of a disquisition upon food.

Could I but know that these remarks may cause an increase in the comforts of a single British family emigrating to a genial suburb, I shall not have used my pen in vain.

ON DRINKING-FOUNTAINS AND PURE WATER.

Having considered the important subject of the staff of life and other food, I will invite attention to that simple but invaluable aliment—PURE WATER—a subject that is suggestive of no small amount of moral good.

Water furnished by Artesian wells may be the most pure. That in Trafalgar Square, which supplies the fountain, is 392 feet deep; but, one lately completed in the Bois de Boulogne in Paris, has a depth of no less than 2,100 feet! It has a bore of eighteen inches in diameter; and the quantity of water it discharges would suffice for the constant use, it is said, of half a million of people.

The liquid taken at our English drinking-fountains is, for the most part, river water; and, generally speaking, it may be deemed as pure as rain water collected in the open country, and more to be depended on than that from springs or shallow wells, which are often affected by their position and the nature of the soil through which the water passes.

A leading article on this subject appeared in the 80th number of *The Friend of the People*, which any of my readers will do well to peruse, or re-peruse, attentively. "Few subjects," observes the writer,

“call more loudly for the interference of law than the introduction of sufficient drainage, and a more sufficient water-supply, into populous districts. A liberal amount of pure water appears, indeed, to be one of the first essentials of healthy living. Without it, cleanliness is impossible; and the temptation to resort to beer and other intoxicating drinks, to quench the thirst, is great.”

Notwithstanding the importance of the establishment of *Drinking-fountains* as a sanitary measure, its progress has been slow, from two causes; first, the large expenditure which has generally been incurred in their erection; and, secondly, the waste of element consequent upon an unchecked discharge.

There can be no doubt that costly marble fountains may be more attractive than those of sombre iron—as the gin-palace is more alluring than a dingy public-house. But, in seeking to satisfy a natural want, facility of access to a comparatively ubiquitous source seems much more important than an outward show.

Geneva is said to be entitled to the honour of the first conception of these establishments; since which, not less than fifty have been erected in Liverpool alone, through the untiring exertions of one active and benevolent mind—Charles Pierre Melly. The population of that metropolis of commerce have risen to do honour to one who has not limited his practical benevolence to this particular object; but has, in numberless ways, entitled himself to the gratitude of the public. A splendid testimonial was recently

presented to him by his fellow-citizens, expressive of “esteem and respect, and their appreciation of his benevolent and philanthropic services, in the establishment of fountains, and other acts of kindness, for the social and material comfort of the working classes.”

An elegant fountain erected in Dublin, as a memorial of the late Sir P. Crampton the very eminent army surgeon, is remarkable for the characteristic inscription upon it, written by Lord Carlisle:—“1862. This fountain has been placed here—a type of health and usefulness—by the admirers of the late Sir Philip Crampton, Bart., Surgeon-General of Her Majesty’s forces. It but feebly represents the sparkle of his genial fancy—the depth of his calm sagacity—the clearness of his spotless honour—the flow of his boundless benevolence.”

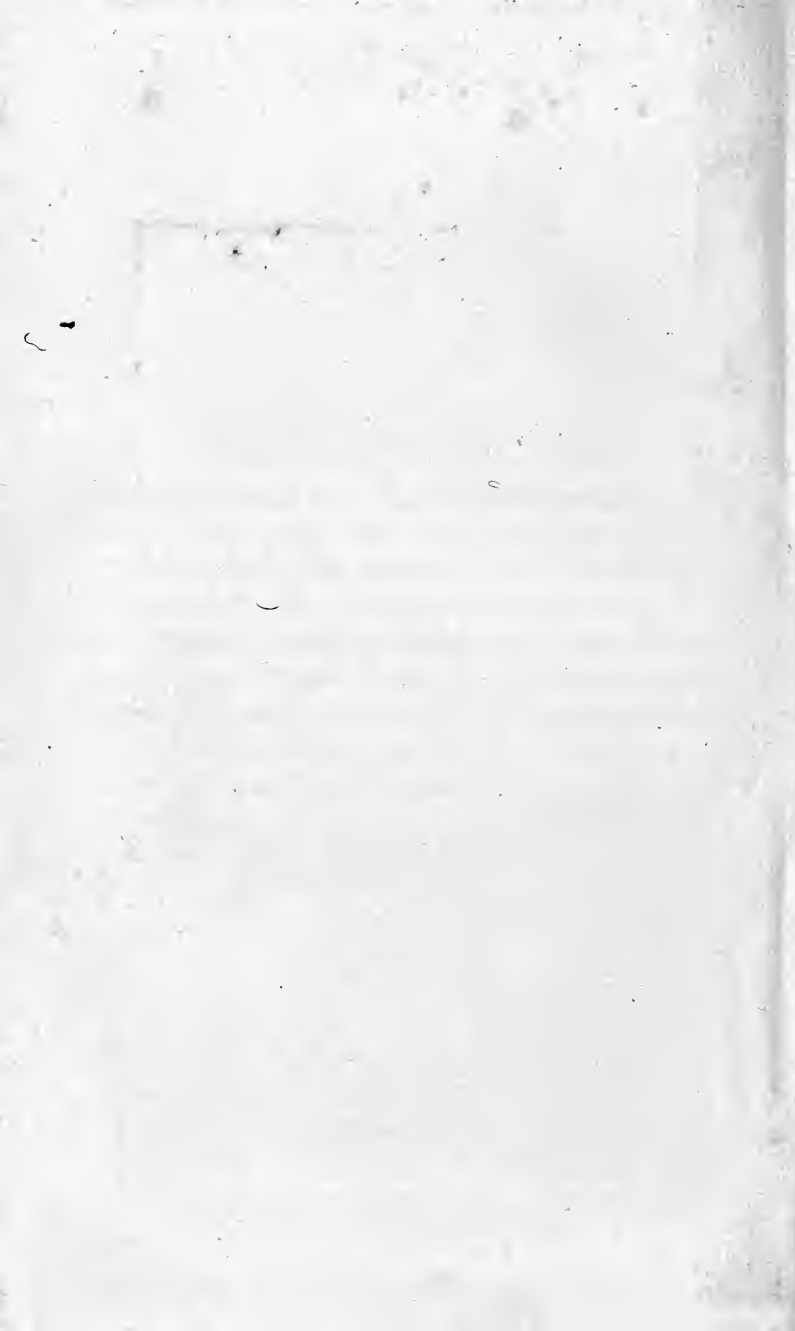
I saw, last year, at several railway-stations in the north, a very simple machine of iron, patented by Messrs. Macfarlane, of Glasgow, which meets the two objections of extravagant expense in erection, and the waste of liquid. At no greater cost than some £4 altogether, it supplies two thirsty wayfarers at once with as much water as they wish to drink. The forefinger of one hand pressed upon a valve on either side, causes the water instantly to flow into a cup, and not one drop need be wasted, as the flow ceases the moment the finger is withdrawn. It is adapted to the being fixed against a wall, or so far within it as to prevent the basin from obtruding, and

the thoroughfare from being obstructed. No dampness can be communicated to the wall, the back being a solid plate without an opening, so that no injury can accrue to the building. The water-supply-pipe is carried through the interior of a fluted column, and a dog-pan rests upon the ground, the water being supplied through a descending pipe, or through a hole in the upper basin. No expenditure beyond the first cost of about fifty shillings is required, except for a lead pipe, which may be of an inch diameter or less, communicating with the main in the street, through which the water is forced up the column by distant and ever-active hydraulic pressure. The trifling cost of a few shillings, occasionally required in paint, &c., it would not be difficult to meet.

A practical reform might thus be brought about, more effective than all the denunciations against drunkenness, by the very simple means of removing one of its causes. Who that could afford the expenditure, would shrink from incurring it, if he believed it probable that the souls, or bodies only, of a few of his fellow-creatures might be saved or served, by an invitation to quench their thirst, without the supposed necessity of resorting to a public-house!

THE observations at p. 189 "On the Staff of Life" were in the press some time before the appearance of the Report of the Directors of the Aërated Bread Company to the first Ordinary General Meeting of Proprietors of that Company, 28th May, 1863. The intention announced in the last page of such Report, to add to their undertaking "the manufacture of brown or whole meal bread, as a cheap and highly nutritious bread to meet the low price demand," gives promise of a great national benefit.

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