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LETTER

TO

FARMERS AND GRAZIERS

ON THE ADVANTAGES OF USING

SALT

IN AGRICULTURE, AND IN FEEDING CATTLE.

BY

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THE FOURTH EDITION, ENLARGED AND CORRECTED.

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"Quin et pecudes armentaque et jumenta sale maxime solicitantur ad pastum, multò largiore lacte, multòque gratiore etiam in caseo dote. Ergo hercule vita humanior sine sale nequit degere," &c.

PLIN. Nat. Hist. lib. xxxI. cap. VII.



"At cui lactis amor, cytisum, lotosque frequentes
Ipse manu, salsasque ferat præsepibus herbas.
Hinc et amant fluvios magis, et magis ubera tendunt,
Et salis occultum referunt in lacte saporem."

VIRG. GEORG. lib. iii. ver. 394.

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TO THE FIRST EDITION.

It is more than twenty years since the attention of the Author of this Letter was directed to an examination of the laws relating to Salt, in consequence of some chemical experiments in which he was at that time engaged; and the impression which the investigation of those laws produced upon his mind was then so strong, that he determined to avail himself of every favourable opportunity of exhibiting to the public the advantages which would result from their repeal.

This determination was considerably strengthened by the frequent interviews which he had with the late Mr. Hollinshead, a gentleman of large landed property at Chorley, in Lancashire, who spent many years in making experiments upon his own estate with Waste Salt, and also in endeavouring to procure an act of parliament to protect the farmer and manufacturer in the unlimited use of Common Salt.

In order, however, to enable the reader to perceive the progress of public opinion on this important subject; to explain why the question of the repeal should have lain so long dormant; and to shew why the writer of the following sheets should be induced to take so warm an interest in promulgating the alterations which the Salt

laws have lately undergone, he is desirous of giving a very short outline of the measures which were taken both in and out of parliament to forward an event of so much consequence to the agricultural interests of the country.

In the year 1800 much discussion, respecting the general operation of the Salt laws, took place in a Committee of the House of Commons on the herring fishery; and in the following year, owing in some measure to the exertions of Mr. Hollinshead, another Committee was appointed by the House of Commons, expressly "To inquire into the laws relating to the Salt duties, and the means of remedying the inconveniences arising therefrom, and to report the same from time to time to the House."

It was late in the sessions of 1801 when this committee was appointed, yet it sat for a considerable time, and presented two very important reports to the House, in which the following striking passages occur.

"The committee appointed to inquire into the laws relating to the Salt duties, and the means of remedying the inconveniences arising therefrom, have proceeded further to inquire into the matters referred to them, and report—

"That they feel themselves indispensably bound to state, that all their inquiries have tended to impress more strongly upon them the extreme difficulty, not to say the impossibility, of reconciling the collection of any considerable revenue from Salt, with the invaluable advantages which would arise from an unrestrained trade in, and unlimited use of that article. On this subject, the sentiments of the last Committee of the British parliament on the herring fishery entirely coincide with theirs.

"Concurring entirely in the opinion of the committee of last year, but feeling at the same time most strongly the urgent necessity of supporting the public revenue, in a crisis like the present, your committee have come to the following resolutions, which they submit to the judgment of the House, viz. Resolved, That it is the opinion of this committee, that a commutation of the duties on Salt would be productive of many great and important advantages to all descriptions of persons in this kingdom, and would be highly beneficial to its agriculture, fisheries, trade, and manufactures."

When this valuable report was presented to the House of Commons, Mr. Pitt made the following declaration: "That whenever the return of peace enables His Majesty's ministers to venture on a diminution of the revenue, the repeal of the duty on Salt shall have their first consideration." Notwithstanding this assurance, and the reports of former committees, one of which declares that "the Salt duties are in their consequences detrimental to the public in a degree far exceeding the payment of the tax itself," only four years elapsed before Mr. Pitt, urged by the increasing pressure of the war, brought a bill into parliament for laying an additional tax of ten pounds per ton upon Salt; and the duty was immediately raised from twenty to thirty pounds per ton.

In consequence of these unfavourable circumstances, little probability remained that any relief in the affair of the Salt duties could be afforded to the country for many years; however, in the year 1816, the consideration of the subject was revived by the late Sir Thomas Bernard; and it is gratifying to the author of the present publication to believe that he was instrumental in exciting the attention of that excellent man to a cause so deserving

of his support, and which he felt to be of so much national importance, that he determined to call the attention of His Majesty's ministers to it, by laying before them not only the result of the information obtained from the source already alluded to, but such other observations as he could collect from every authority within his reach.

Having had several previous meetings of members of parliament, and other gentlemen, at his own house, to consult upon the measures proper to be adopted, the worthy baronet, towards the latter end of the year 1816, addressed a printed letter upon the subject to the Right Honourable Nicholas Vansittart, and the same was immediately republished as an introduction to the seventh volume of the "Reports of the Society for bettering the Condition of the Poor." Another very interesting letter to Mr. Vansittart, from William Horne, Esq. of Liverpool, was published about the same time; and to the effect which these pamphlets had upon the public mind, together with the extraordinary zeal of Sir Thomas Bernard, and that of a few friends whom he had interested in the question, may be attributed the whole of the investigations which afterwards took place before the Honourable the Board of Trade, and the Committee of the House of Commons.

The examinations before the Board of Trade commenced in the month of April, 1817, and continued, at short intervals, for many days. The written evidence that was delivered on this occasion was printed last year, by order of the House of Commons, and it was from this evidence that those extracts were taken which will be found in the Appendix, No. 66-72.

Early in the last sessions of parliament, a select Com-

mittee of the House of Commons was appointed, on the motion of Mr. Calcraft, to hear such evidence respecting the operation of the laws relating to Salt as should be adduced, and to report the same to the House. By their order the whole of this evidence was printed and attached to the report of the committee; and it is from this document that the important matter which is contained in the Appendix, from No. 73 to 81 inclusive, has been selected.

In making this selection, it was important to abstract only such parts of the evidence as particularly refer to the use of Salt in the several branches of husbandry, as it would have swelled the pamphlet too much to have given the whole of the examinations that were taken before the committee. For a similar reason, the several examinations which the author of the following sheets underwent on the same occasion are omitted; especially as they chiefly related to the operation of the Salt laws upon the manufactures of the country.

It must be admitted, that the extracts which are given in the Appendix, from the writings of such a variety of persons on the use of Salt in agriculture, are not of equal value; but it was desirable to collect whatever appeared to strengthen the evidence on such an important subject: and it is with great pleasure the author embraces the present opportunity of expressing his thanks to those friends who kindly furnished him with their suggestions. To the Right Honourable Sir John Sinclair, Baronet, to Dr. Paris, and to William Horne, Esq. of Liverpool, he is particularly indebted; and their communications he more especially recommends to the notice of the reader. These, together with the very striking

evidence of John Christian Curwen, and Arthur Young, Esquires, on the important savings which would accrue to the nation from the general use of Salt in the food of cattle, sheep, and horses, afford a body of testimony which may be deemed irresistible.

The list of the agricultural societies in England and Wales is given, to enable those gentlemen who may institute experiments on the effects of Salt in the various departments of husbandry, to correspond with practical and experienced men, upon the results of their mutual researches; and the author flatters himself that it will prove useful.

It will be obvious, from the mode of printing, and from the price at which this publication is sold, that it is intended for general circulation; it is therefore hoped that the author may be allowed to suggest to those gentlemen who shall obtain copies, that considerable benefit may result from their lending them to their neighbours, and adopting such other measures as shall seem adviseable for making the subject of this pamphlet known throughout the district in which they live. He is anxious upon this point, that the present season may not be lost, and that every farmer may have an opportunity of learning how to avail himself of the advantages which the legislature of the country now offers for his acceptance.

London, Feb. 22nd, 1819.

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TO THE FOURTH EDITION.

The very rapid sale of the three first impressions of this Letter has convinced me that the Public is really aware of the importance of the subject upon which it treats, and that the employment of Salt in agriculture will soon be as general in these kingdoms as it has long been in several of the other states of Europe, and on the continent of North America.

All the information that can be given respecting the mode of procuring Salt for agricultural purposes will be found at page 101 of the Appendix; and I have authority to say, that every supervisor of His Majesty's excise in Great Britain has received directions to furnish certificates, free of expense, to all those occupiers of land who require Salt, and shall apply for such certificates. From the number of letters of inquiry which I have received from all parts of the country, I find it necessary to repeat, that no Salt is allowed to be used in husbandry but such as is brought from the mines in Cheshire, or purchased at one of the authorized depôts; and I am sorry to say, that it is not likely that the government will at present consent to the employment of any other Salt at the low duty except the scaling of the salt pans, which is sold under the name of refuse Salt, and may be had at Nantwich, Droitwich, Malden, or other Saltworks, when mixed with ashes, free of duty.

In order to remove the fears of those Farmers who may be apprehensive of incurring too large an expense of carriage, and to secure myself from the repetition of letters of inquiry on this point, I have endeavored to procure a most comprehensive list of Freights from Liverpool to the principal Sea-ports throughout the kingdom; and this is now printed at page 102 of the following sheets.

I have also to inform my readers, that since the publication of the last edition, an Act of Parliament has passed to facilitate the distribution of Salt, for feeding cattle, and for agricultural purposes, throughout Great Britain; and that this new statute, which is dated 2nd July, 1819, contains the following very convenient and important enactments.

Section xxxi. That it shall henceforth be lawful for any Salt-maker to mix his pan scales, and other coarse and impure saline substances, not being Salt fit for human consumption, with soot or ashes, in the proportion of not less than one-fourth of such soot or ashes, without payment of any duty for the same; and for any Fish-curer to mix his impure Salt, which is no longer useful for the cure of fish, with soot or ashes as aforesaid, for the purpose of manuring land, and for no other purpose whatever.

Section xxxiii. That it shall and may be lawful for any person or persons, (not being a Salt-refiner) at Liverpool, Glocester, Plymouth, London, Norwich, Hull, Newcastle-upon-Tyne, Leith, and Glasgow, (or at other places, with the approbation of the Commissioners of Excise) to provide and make use of a warehouse or warehouses, for the purpose of receiving Rock Salt, and from time to time to sell and deliver the same, or any part thereof, (being not less than one ton, if any part be unground) for the purposes aforesaid, provided the owners of such warehouses do enter into bond, and observe the several regulations which are laid down in the said act.

Section xxxiv. And whereas formerly no Rock Salt could be delivered for agriculture except in lumps of twenty pounds each, be it enacted, that from and after the 5th day of July, 1819, it shall be lawful for any person or persons, who has or have made entry and given bond as aforesaid, to deliver Rock Salt in lumps not being of less weight than ten pounds; and that it may be delivered in small quantities when crushed and powdered, provided that before the delivery thereof it be mixed throughout with coal tar, in the proportion of not less than half a pound of coal tar for every bushel of Salt.

Here it may be remarked, that coal tar, in the proportion which the act enjoins, is found not to be injurious to cattle, and that a horse that takes three ounces of this discoloured Salt per day will not swallow a pound of the coal tar in less than eighteen months. All cattle take it with greediness.

Section xxxv enacts that the importers of Rock Salt may deliver it, being in no case less than one ton, to their customers directly from the ship or vessel, without being obliged first to land and warehouse the same, provided that every quantity of such Rock Salt as shall be so sold and delivered shall be accompanied with such permit as required by law.

In preparing this edition, the whole of the matter has been carefully reviewed, and such additions have been made as were thought necessary, particularly a List of those public Depôts of Rock Salt which have already come to my knowledge, and which will be found at page 103 of the Appendix.

London, November 1st, 1819.

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LETTER

TO THE

FARMERS AND GRAZIERS

OF

GREAT BRITAIN.

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GENTLEMEN,

In consequence of a late enactment of the Legislature of Great Britain in your favour, and of the share which I took in the preliminary measures for obtaining that enactment, I think it incumbent on me to invite your attention to the subject, by addressing to you, in this public manner, the following observations.

The facts which I shall lay before you are of that importance to your own interests, and the promulgation of them is so likely to promote the welfare of the whole country, that I should consider myself culpable if I omitted to give them the greatest possible publicity, or if I neglected to use my best endeavours to place them in that clear point of view which should enable you fully to understand and appreciate them.

The expediency of manuring arable and pasture lands with Salt, and of administering the same active and wholesome substance to your horses, sheep, and cattle, as a condiment for their food, and as an efficacious means of preserving them in health and vigour, will form the principal objects which I am anxious to point out for your consideration, and future practice.

After a candid and unprejudiced perusal of this Letter, you will, I trust, carefully examine the body of evidence which will be adduced in the Appendix, and then make such experiments upon your own estates, and with your own cattle, as are most likely to determine and convince you how far such a course of proceeding may be applicable in your own management.

The ever memorable Sully, who was one of the greatest men France ever produced, used to say that it ought to be the first maxim of a good government to advance agriculture before manufactures, and to give to the latter only a secondary rank in the state-whereas, COLBERT, who was also a great minister, assigned to manufactures the first place in the economical order of his administration, and gave the utmost encouragement to the arts, from a persuasion that their prosperity would furnish the only means of working up the raw materials which his country produced. It is probable, however, that this eminent statesman would not have protected the arts at the expense of agriculture, if he had considered that the principal utility of manufactures in any country arises from the price which they afford to, and the market which they procure for, the products of the soil.

The immortal Sully, in vindication of the opinion which I have just quoted, used to say that he had ever preferred the products of the soil, which could not easily be ravished from him, to those foreign conquests which occupy the attention of most governments, but which always excite resentment and jealousy. "A large, and an increasing produce of the land," said he, "ensures the liberty of the people, while it places foreigners in a sort of dependence; whereas the want of corn, the first

necessary of life, gives a dependence upon foreigners, who can either furnish the commodity or refuse it. The produce of the land," continues he, "cannot be consumed by strangers but to the profit of the inhabitants; that is, by a traffic more advantageous than the possession of the corn itself-whereas the arts and manufactures may possibly be carried off by the artifices of rivals, and pass away, together with the artists themselves, into all the countries of the world."

If these latter sentiments are founded in truth and justice, and I believe they are, then every improvement in the agriculture or rural economy of these kingdoms may be considered to be an important national acquisition; and I shall be excused in not offering any apology for endeavouring to call your attention to a practice which is little known in our country, but which in some foreign states has invariably been attended with decided advantages as well as profit.

The value of Common Salt for agricultural purposes has been long known in Germany,* in Poland,+ in Holland, in Flanders, and in all the provinces of the United States of America; ‡ it is therefore much to be lamented that the existing duties should so long have deprived the people of this country \ of the various benefits which they might have derived from this valuable native production. | The mineral substance of which we are speaking is found in this island in the greatest abundance, I yet, by a mistaken policy, we have

^{*} See Appendix No. 2. + See Appendix No. 3.

[†] See Appendix Nos. 45 and 64. § See Appendix No. 37.

| The value of Common Salt as a manure was known some hundred years ago by certain individuals in this country, but the high duties and other impediments have prevented its use becoming general. See Appendix Nos. 2, 4, 5, 6, 7, 10, 11, 12, 13, and 34.

I See Appendix No. 30.

hitherto given it to strangers, and have allowed many thousands of acres of our own lands, which, by the free use of Salt, might have been rendered highly fertile* and profitable, to remain nearly sterile, or at least in a state in which they will barely pay for the expense of their cultivation.†

However, since the government has so far relaxed as to remit a great part of the duty on such Rock Salt as shall forthwith be consumed in agriculture, or in feeding cattle, and as so much depends upon the manner in which this valuable boon is received by the country, it is desirable that the greatest extent of publicity should be given to the act of parliament; and that no agriculturist, not even the most humble gardener, should remain ignorant of the terms and conditions upon which he may now obtain so rich and useful a commodity as Rock Salt.

Penetrated with the importance of the subject, and contemplating the variety of advantages which the landed interest must derive from the accomplishment of the measure, the act had no sooner passed than I determined to lay all the particulars before the public, in the hope that these concessions of the legislature, together with the evidence which I should be enabled to offer in proof of the advantages to be derived from the use of Salt, would be amply sufficient to induce a large majority of the farmers of Great Britain to acquire such a knowledge of the new regulations as would enable them, without delay, to avail themselves of all the benefits which the government has thus offered for their acceptance.

Having no private ends to answer, and expecting to

See Appendix Nos. 31 and 32.

derive no personal advantage whatever from the general adoption of this measure, I shall proceed to give you a simple outline of the general view which I have taken of the subject. It may, however, be necessary to premise, that my opinions thereon have been formed in consequence of a careful investigation of a great number of well-attested experiments, and from the perusal of that body of evidence which was delivered in the year 1817 before the Lords of his Majesty's most honourable Privy Council, at the Board of Trade; and again in the spring of the following year, before a select committee of the House of Commons; which committee was occupied from day to day, from the sixteenth of March to the fifteenth day of May, in questioning the witnesses, and in recording their respective testimonies upon this most important proposition.*

From an attentive examination of all these documents, and from a dispassionate consideration of every thing which I have been able to collect upon this great object, I am decidedly of opinion that Rock Salt, at the reduced duty of five pounds per ton, is by far the cheapest, the most efficacious, and the most convenient; manure for arable and pasture land, that can possibly be obtained.

More than one hundred and fifty years ago, Sir Hugh Platt, an eminent writer of that day, speaks very decidedly of the benefits which might be derived from the practice of sprinkling Common Salt upon land, and calls it the *sweetest*, the *cheapest*, and the most *philosophical* marle of all others. He relates the case of a man, who, in passing over a creek on the sea-shore, suffered his

^{*} See Appendix No. 72 to No. 82.

⁺ See Appendix Nos. 6, 22, and 25.

[‡] See Appendix No. 25.

sack of seed-corn to fall into the water, and that it lay there until it was low tide, when, being unable to buy more seed, he sowed that which had lain in the salt-water; and when the harvest time arrived, he reaped a crop far superior to any in the neighbourhood. The writer, however, adds, that it was supposed the corn would not fructify in that manner unless it actually fell into the sea by chance; and, therefore, neither this man, nor any of his neighbours, ever ventured to make any further use of salt-water.

The same curious author tells us also of "a man who sowed a bushel of salt, long since, upon a small plot of barren ground on Clapham Common, and that to that day (the time when he was writing) it remained more fresh and green than any of the ground round about it."*

The eminent Dr. Brownrigg, who wrote in the year 1748, in speaking of Common Salt, says, "it is dispersed over all nature; it is treasured up in the bowels of the earth; it impregnates the ocean; tit descends in rains; it fertilizes the soil; it arises in vegetables; and from them is conveyed into animals; so that it may well be esteemed the universal condiment of nature; friendly and beneficent to all creatures endowed with life, whether it be vegetative or animal."

In some parts of Great Britain, particularly in the neighbourhood of the Salt Works,‡ the value of Common Salt, as a manure, is well known and acknowledged;

^{*} See Appendix Nos. 38, 62, and 70.

⁺ There is a practice in Cornwall of manuring the lands with sea-sand for the sake of the Salt that it contains; and so very efficacious is this found to be, that a writer, ninety years ago, computed the money laid out in that and the adjoining county for sea-sand to amount to thirty-two thousand pounds per annum; and so much has this practice encreased of late years, that Dr. Paris considers "the expense of land carriage for sand used as a manure in Cornwall alone as now amounting at least to thirty-thousand pounds annually." See Appendix Nos. 4, 7, 10, 11, 12, 17, and 40.

[†] See Appendix Nos. 23, 70, and 78.

and it has lately been given in evidence before the select Committee of the House of Commons, by a gentleman of the highest credit, that the farmers in Cornwall are so convinced of the value of Salt as a manure, that whenever the waste Salt that has been employed in curing fish is on sale, there is a violent contention among the occupiers of the land who shall obtain the largest share.* The same gentleman informed the committee, that where wheat or barley has followed turnips, on land which had been salted, the ensuing crop has invariably escaped the mildew, + although that disease had affected all the corn upon the lands immediately adjoining, on which Salt had not been used.

The efficacy of Salt in destroying noxious weeds,‡ grubs, worms, flies, and insects, is well known in many districts, and those who are incredulous may very easily satisfy themselves by direct experiment. For instance, if a few common earth worms be taken out of the ground, and sprinkled with a little Salt, they will be seen to writhe about for a few minutes, and then expire. Thus Salt does, as it were, perform two operations at once, for, by destroying the worms and the weeds,* while the land lies fallow, it prepares the ground most effectually for the reception of the corn or the plants, before it can possibly take any effect upon the crop itself+. And besides this peculiar advantage, the extreme luxuriance and verdure; which common Salt gives to grass lands, when properly applied, would be so satisfactory to such farmers who would make use of it, and so convincing to

^{*} See Appendix Nos. 38, 72, and 79.

[†] See Appendix Nos. 4 and 14. | See Appendix Nos. 4, 42, and 80. * See Appendix Nos. 25 and 38.

[‡] See Appendix Nos. 21 and 24.

⁺ See Appendix No. 38.

[§] See Appendix Nos. 20, 66, 73, and 81.

I See Appendix Nos. 3 and 79. + See this fully explained in Appendix No. 25.

all the neighbouring agriculturists of every description, that if only one or two gentlemen in each district were to employ it in a few instances, I am certain this mode of top-dressing* would very soon engage the attention of every person in the empire, who had even but a gardent to manage and cultivate.

From the evidence which has already been collected upon this subject, it is obvious that a great portion of the land in this kingdom might, by the proper use of Salt, be made to produce nearly double‡ the amount of the present crops of grass as well as corn. How greatly this would serve the manufacturing, and indeed all other interests of the country, I need not attempt to explain to you. Moreover, by forcing the land with a sufficient portion of Salt, our crops would be brought to maturity much sooner than they now are, § a matter of considerable importance in the northern parts of this island, where much of the corn is frequently spoiled by the autumnal rains before it can be sufficiently dried by the sun and wind to stack with safety. And in the hay harvest, should the farmer be induced, from the uncertainty of the weather, to carry his hay too soon, a small quantity of Salt sprinkled upon each layer of the rick

^{*} I think it necessary to remark, that where Salt is used as a top-dressing for grass land, the quantity employed ought to be much less than is commonly used for ground that is to be afterwards ploughed for a crop of grain. Six bushels, or three hundred and thirty-six pounds of Rock Salt, ground very fine, and regularly sown upon the grass, would be a proper quantity for an acre of pasture land; whereas sixteen or twenty bushels may be used upon fallows for cleaning the ground preparatory to the putting in the grain. For meadow land, two or three bushels of crushed Rock Salt may be carefully sown upon each acre, immediately after the hay is got in, with great advantage, especially in hot and dry summers.

⁺ See Appendix Nos. 27, 39, 42, and 78.

[‡] See Appendix Nos. 15, 29, and 37.

[§] The late Dr. Darwin, in treating on Salt as a manure, remarks, that " as it is a stimulus which excites the vegetable absorbent vessels into greater action than usual, it may, in a certain quantity, encrease their growth, by enabling them to take up more nourishment in a given time, and perform their circulations and secretions with greater energy." See Appendix No. 79.

will prevent the hay from becoming mow-burned,* as it is called; and when hay which has been thus treated is presented to horses and cattle, it will be preferred by them to that which has been put together in a more favourable season, and not treated with Salt.

The cleanliness of Rock Salt as a manure is likewise another considerable advantage. In many cases this circumstance will be found to be very important, particularly in the grazing districts.† It has repeatedly been observed, that if land be manured with dung after the hay has been carried off, the neat cattle will refuse to eat the eddish which grows upon such land. On the contrary, if a field be dressed with about two bushels of fine Salt per acre instead of dung, soon after the hay is cut, this inconvenience and loss will be avoided, and a large crop of aftergrass will be obtained, possessing such peculiar sweetness, that all kinds of cattle, as well as horses, will eat it with the utmost avidity.

The farmers, in some districts, are accustomed to steep their seed-corn in lime-water, and doubtless the practice is often useful; but I am decidedly of opinion that a strong brine, made by the solution of Rock Salt in water, will be infinitely more efficacious. Crops of wheat are often reduced one-half in value by a disease to which this kind of grain is very liable, called the *smut* or *rust*;‡ but when the seed has been properly prepared with Salt, this misfortune can never happen.§ It has also been proved by some public spirited individuals,

^{*} See Appendix Nos. 26. 45, 64, 57, and 58. + See Appendix No. 26.

[‡] I am desirous of recommending to my readers' perusal a very valuable paper, which has lately been distributed gratis by the Board of Agriculture, written by the Right Honourable Sir John Sinclair, Bart. "on the means of preventing the rust in wheat by the use of Salt," an object well entitled to be ascertained by decisive experiments.

See Appendix No. 4.

who have made the necessary experiments, that the scab is never found upon potatoes which have grown upon land that has had a proper dressing of Common Salt.*

In many parts of Flanders, but more particularly at Lisle, it is the practice to preserve the urine of those cattle that eat Common Salt with their food. This is preserved in appropriate reservoirs, and when the farmers apply it to a certain description of land, which experience has taught them to select, the effect, even without any other manure, is not only advantageous, but it is truly astonishing.†

Enough, I presume, has now been offered to induce you to expect a satisfactory result from the application of Salt to your fields; and meadows; I shall, therefore, at present, content myself with informing you, that in the Appendix you will find a list of the names of those gentlemen who have borne testimony to the efficacy of Salt as a manure, and likewise the evidence of a respectable individual who has used Common Salt upon his own farm for many years, and has witnessed the use of brine upon the lands in his neighbourhood for forty years, with the greatest advantage; and who came from a distant county on purpose to attend the select committee of the House of Commons, to report to them the substance of his experience for that very long period. You will also there find the proposals of the Board of Agriculture in London, and of the Highland Society of Scotland, both of which institutions are fully aware of the value of Rock Salt in the cultivation of land, for they have offered rewards to such persons as shall give them an account of the best experiments with this valuable mineral

^{*} See Appendix No. 39.

⁺ See Appendix Nos. 13, 18, and 75.

[‡] See Appendix No. 25. § Sec Appendix No. 41. || See Appendix No. 78.

substance, in the different branches of farming, and general agriculture.

We proceed now to the second part of our subject, which relates to the application of Salt in feeding sheep and horses, and for assisting in fattening live stock. Here, however, I shall merely enumerate the several advantages which appear to have resulted from the practice, and shall then place my chief reliance on the effect which may be produced by your perusal of the several documents which are contained in the Appendix.*

To ascertain the exact quantity of Salt which may be necessary for the different kinds of land, and to appreciate the benefits which result from its employment in all the various modes of culture that are adopted in this country, will require several long series of experiments, especially as some of the evidence given before the committee of the House of Commons was unsatisfactory and contradictory; but the advantages which have arisen from giving Salt to sheep and cattle are so determinate and self-evident, that there appears to me to be nothing to prevent every farmer from immediately adopting the practice.

The most undeniable evidence has been afforded, that Common Salt uniformly promotes digestions in horsess and cattle, and that this occasions them to make a rapid progress in fattening. It has also been found, that in feeding with chaff or cut straw, a larger quantity of this cheap and ordinary food can be given when sprinkled

^{*} See Appendix Nos. 43, 46, 47, 51, 58, 59, 60, and 64.

[§] See Appendix Nos. 44, 45, 52, 59, 64, and 79.

[|] See Appendix Nos. 53 and 78.

I See Appendix Nos. 43, 45, 46, 48, 52, 54, 59, 60, 71, and 76.

with Salt than can be administered in any other way;* and that as the filling the stomachs of cattle while fattening is a circumstance of the greatest importance, a very large portion of chaff, if seasoned with Salt, may be given with the utmost advantage to the growth and health of the animals. Thus, every experimental grazier knows that an abundance of very ordinary food, if eaten with relish, will fatten cattle much sooner, when given with a small allowance of substantial provender, than better food alone in a moderate quantity. There is, indeed, hardly any food that can be offered to cattle, which, if mixed with Salt, will not be eaten with eagerness. Hence, nothing can be of more importance to a practical grazier than to know how to obtain this valuable saline mineral substance, at a cheap rate, and with little difficulty.

It was given in evidence last year, before the select Committee of the House of Commons, that in feeding cattle, fourteen pounds of chaff, such as is produced in winnowing corn, and which of itself is of little or no value, will, when properly moistened, and heated by steam, and mixed with two ounces of Salt, save forty-two pounds of turnips.† Surely this is a most important circumstance in the economy of a farm. Is it possible that this fact should pass unnoticed by any agriculturist?

A friend of mine, in the year 1812, travelled through the United States of America, from the state of Massachuset to the River Mississippi. He observed that it was usual, throughout that extensive district, to put Salt within all the stacks of hay, and likewise to sprinkle it among the hay, in the proportion of about fourteen pounds of Salt to one ton of hay.‡ He says it was

^{*} See Appendix No. 75. + See Appendix No. 75. ‡ See Appendix Nos. 42, 45, 57, and 58.

also a common practice in that country to give Salt to sheep and cattle, and that he has frequently seen cattle follow a boy a mile or more, who held a portion of Salt in his hand, tempting the animals by showing it to them.* The same individual assures me also that since his return to England he has adopted the same practice, mixing Salt with his own stacks of hay, and with the mashes to his horses, t and constantly with the same benefit.

That horses, sheep, and cattle, would derive benefit from Salt, might, indeed, be imagined from observing the great desire they discover for it, and which manifests itself in every country where this mineral substance lies within their reach. This is certainly the case, and in the Appendix many undeniable examples will be given to support the opinion. Several most curious facts, that were stated by a very respectable member of the House of Commons, to prove the salubrious effects of Salt upon these animals, may also be seen in the Appendix.

It cannot then be doubted that Salt, when judiciously administered to live stock, assists their digestion, preserves them from disease, I and improves their condition; and from the evidence to be hereafter adduced, it will appear that the milk and butter produced from those cows which have Salt given to them is more abundant,* and never acquires that turnip-flavour+ which is generally so predominant in the milk and butter from those cows which are kept upon turnips without Salt. It has likewise been proved, that Common Salt is a certain cure

[†] See Appendix Nos. 53 and 55. § See Appendix Nos. 44, 48, 55, and 64. * See Appendix Nos. 48 and 64. ‡ See Appendix No. 1. § See Appendix Nos. 44, 48, 55, and 64. ¶ See Appendix Nos. 73 and 75. ¶ See Appendix Nos. 49, 51, 55, 56, 57, 59, 60, and 75. * See Appendix Nos. 12, 49, and 61 + See Appendix Nos. 1, 55, 60, and 73.

for the botts in horses,* and is a specific against the rot in sheep;† and that the wool‡ is materially improved of such sheep as are fed with Salt.

It is impossible, I conceive, to read the great body of evidence which was delivered to the Honourable the Board of Trade, and to the Committee of the House of Commons, without being convinced that the benefits resulting to the grazier and agriculturist, from the employment of Salt, must be great and important; especially the evidence of John Christian Curwen, Esq. the representative in parliament for the city of Carlisle, who is himself a large farmer and grazier, and who stated to the committee, that upon a farm of one thousand pounds a-year, he could not estimate the annual advantages, that might fairly be expected from the free use of Salt, at less than three hundred pounds.

If the benefits and profits arising from the unrestrained use of Salt in agriculture be so various and considerable, how comes it to pass, it may be asked, that its employment has not been universal throughout Great Britain? Various reasons may be assigned for this; amongst others, we may state the unwillingness which farmers in general evince, especially the lower class, to walk out of the old beaten path of their forefathers; the want of directions how to make use of Salt for the purposes under consideration; the enormous duty upon the article itself; and, perhaps, above all others, next to the price, the many vexatious regulations to be observed before a remission of any part of the duty could be obtained.

Let us take one case as an instance of these trouble-

^{*} See Appendix No. 42. + See Appendix Nos. 47, 60, 65, 74, and 79.

[‡] See Appendix Nos. 46, 50, 55, and 60. § See Appendix Nos. 66, 67, 68, &c.

[|] See Appendix No. 75.

some obstructions. By an act of parliament passed in the 57th year of George the 3rd, it was enacted that the farmer might receive Salt for the purpose of mixing with the food of sheep or cattle, at the reduced duty of five shillings per bushel, or ten shillings per cwt. such Salt to be employed only and for no other purpose than feeding sheep or cattle; but before any such Salt could be obtained, it was necessary to give a bend, with sufficient sureties, to the satisfaction of the Commissioners of his Majesty's Excise, in the penalty of six times the full duty upon such Salt; and no farther quantity of Salt could be obtained, however much the cattle, after being long accustomed to it, might require its use, until the bond given on the delivery of every prior quantity should be discharged.

It was also enacted that before such bond could be discharged, a certificate must be given, declaring the whole of such Rock Salt to have been used and consumed in mixing with the food of sheep or cattle, and for no other purpose whatever; and that no such certificate should discharge any such bond, unless the collector of excise should, upon enquiry, be satisfied of the truth thereof, and should underwrite the same upon the said certificate. The act declared also, that if such certificate should not be signed and delivered to such collector before the expiration of thirteen months from the time of the bond being given, or should in any respect be false, or any of the Salt should be consumed in any other manner than in feeding sheep or cattle, the penalty of the bond should be forfeited.

Under such penalties and restrictions,* is it at all

^{· *} See Appendix Nos. 76 and 77.

surprising that Salt has not been more generally employed for the purposes above enumerated; especially when it is recollected that even, under all these disadvantages, the farmer could not use a single bushel of Salt for curing his hay, for steeping his seed-wheat, or for manuring his land, until he had paid the enormous duty of thirty pounds per ton, which of itself amounted to a prohibition?

I have, however, great pleasure in being able to congratulate you that an act passed both Houses of Parliament on the fifth of June last, to repeal the most vexatious of these restrictions, and to impose a low duty upon such Rock Salt as should be hereafter delivered for any purpose of agriculture, as well as for feeding sheep or cattle.

Under this act of parliament, Salt may now be had at the reduced duty of two shillings and sixpence per bushel, or five shillings per cwt.* for any of the following purposes, viz. for mixing with the food of sheep or cattle; for steeping seed-corn; for preserving hay; or for manuring land; and no bond is required to be given, nor any sureties as heretofore, for the faithful employment of the Salt so obtained. And although the farmer must give a certificate that he has consumed the Salt in the way the act directs, it is not necessary that time should be lost, as heretofore, while the collector makes

^{*} Rock Salt is not worth more than ten or twelve shillings per ton at the pits of Northwich, and it may be put on board a vessel on the canal for about five shillings per ton more. Persons may be supplied with any quantity of Salt on the best terms, and agreeably to the regulations of the late act of parliament, by applying to Mr. William Horne, a respectable and public spirited merchant in Liverpool, who has lately been elected an honorary member of the Board of Agriculture in London, for his zeal in promoting agricultural experiments with Rock Salt. See Appendix Nos. 22 and 39.

enquiries to satisfy himself of the truth of the allegations in the certificate, but he is bound to accept the same when presented, and the farmer is entitled to receive a further supply of Salt immediately.

By this important act of parliament, the farmer is also allowed to remove any part of such Salt to another farm, or to sell it to a neighbouring farmer for the purposes aforesaid; and notwithstanding the penalty on a fraudulent misapplication of the Salt is fixed by this act at forty shillings the bushel, or at one hundred pounds, according to the determination of the person who shall sue for the same, still the act contains a proviso, that the penalty may be mitigated by a justice of the peace to one-fourth part thereof.

Such are the alterations which have been made in the laws respecting the use of Rock Salt in agriculture; and it does appear to me that every farmer who has it in his power to purchase Salt should immediately procure a quantity, and make such experiments upon his land and with his live stock as shall appear to him to be most likely to increase the quantity and value of his produce. I am extremely anxious that a great number of agriculturists should immediately enter upon these experiments, because, in my estimation, this Concession of the legislature is the greatest boon that the government has ever offered to the acceptance of the landed interest of this country; and if the occupiers of the land, after the late extraordinary exertions of the select Committee of the House of Commons for their benefit, should discover an indifference or disinclination to accept of the proffered gift, those interested persons who are enemies to the total repeal of the laws relating to Salt will avail themselves of this circumstance as an argument against the advocates

for the repeal; and the whole of the late Salt laws will soon be re-enacted in all their original force and severity. Whereas, if experiments were very generally instituted throughout the country, I doubt not but the farmers would soon become so fully convinced of the value of Salt for the various purposes of husbandry, that a general application would be made to parliament for a total repeal of all the laws relating to Salt; and such a petition as this would be irresistible. The agriculturist and manufacturer would then be empowered to dig Rock Salt with as much freedom as they can now dig sand, or raise coal; and the various national benefits which would result therefrom would be more numerous and important than could easily be enumerated.

Having addressed you at much greater length than I at first intended, all that remains for me now is, that I should give a few necessary cautions and directions to such of my readers as may determine to adopt the practice which has been recommended in the foregoing pages.

In the first place, I am desirous of remarking that no land can be said to be fruitful which is entirely exhausted of carbonaceous matter; therefore, if it were possible for an estate to be so worn out by successive crops that little or no carbon remained in the soil, it is not likely that Salt alone would restore it to its original fertility. I consider also that the land which contains most carbon will derive most benefit from the application of Salt. But the safest way for a farmer to proceed is to use his Salt sparingly at first, and in all cases to leave a small portion of the same land without Salt, so that the real effects produced by the Salt may be, by comparison, in every instance, self-evident and palpable.

A farmer who does not wish his land to lie fallow,* ought, undoubtedly, to use too little rather than too much Salt; because a very abundant dressing of this saline mineral substance might render the land, for one year at least, absolutely barren.+ We read in scripture of the "Valley of Salt," where David smote the Syrians, which in all probability was an extent of low land that had been rendered barren by an influx of salt-water. In one of the very early numbers of the Philosophical Transactions is an account of a valley of the same kind near Aleppo; and the late Dr. Brownrigg relates that there is a vast desert on the frontiers of Russia, towards Crim Tartary, which, in consequence of a superabundance of Salt, has become so absolutely sterile, that for the space of many miles neither tree nor herb grows upon it.

This reminds me of a circumstance of primary importance to all those who obtain Salt under the regulations of the late act of parliament. This act enjoins that the Salt shall be delivered in lumps of twenty pounds each or upwards; consequently the whole of such Salt must be broken before it can be used with any advantage, for wherever Salt is accumulated upon land, it must inevitably destroy all vegetation that lies beneath it.‡ Now it has occurred to me that there is a possibility, from the carelessness of a labourer, of its being sometimes spread upon the land without being properly broken; and I am decidedly of opinion, that wherever a lump of Rock Salt falls, whether upon arable or pasture land, it must do mischief. My advice therefore is, that

the proprietor of a farm, when he receives a parcel of Rock Salt, should make a point of having the whole of it ground, or reduced to a powder nearly as fine as common table Salt, and passed through a sieve of the requisite fineness, before he allows any of it to be laid upon the ground. Rock Salt is not a hard substance: it may easily be crushed and divided as much as is necessary for any of these purposes.

As to the quantity of Salt which it will be adviseable to use for the respective crops, and upon the different kinds of land, this will be best learnt by a perusal of the several testimonials and other documents which will be found in the Appendix.* But the best way of all others for ascertaining this point would be for every agriculturist to depend upon the results of his own experiments.† To this end, I would advise him to institute a set of experiments upon every distinct species of grain which he is in the practice of cultivating, as well as upon his pasture land,‡ and to keep a register of every minute circumstance attending each of these trials.

A large kitchen garden, wherever there is one attached to a farm-house, would in some cases be the most appropriate spot for such experiments; as this would be more under the immediate eye of the proprietor, and the experiments being upon a small scale, would be attended with little or no expense. The circumstance of an agriculturist being now empowered to divide the Salt which he shall obtain by permit, among as many of the neigh-

[‡] The Right Honourable Sir John Sinclair, Baronet, lately published a series of sixteen distinct experiments, which he is desirous of having tried by farmers, as best calculated to ascertain the advantages of using Salt in agriculture; and he distributed the paper gratis. This valuable sheet, which may be obtained at the Board of Agriculture, is well deserving the attention of all practical men.

[§] See Appendix No. 27.

bouring farmers as he may think fit, is extremely favourable to such circumscribed experiments, and will be very gratifying to those who may wish to satisfy themselves of the value of Common Salt, and yet would not like to incur the risk of buying a large parcel solely for their own use. And as the late act allows the use of Salt in agriculture, as well as for feeding cattle, this affords a large scope for its consumption.

dominions affined a striking contrast. ? . "The succent

Few Farmers or Graziers, I flatter myself, will read the foregoing pages, and the Appendix, without feeling some desire to improve their own estates, and increase the value of their live stock by the use of Salt; but should there be any who are incapable of feeling a desire for improvement, I trust there are, on the other hand, many country gentlemen, and enlightened agriculturists, who rejoice in every opportunity of contributing towards the national improvement of Great Britain, and who will entertain the subject from principles of pure patriotism.

It was the opinion of Aristotle, "that the cultivation of the land is favourable to liberty." And a writer of more modern times remarks, "that well ordered monarchies are most frequently found in highly cultivated and fruitful countries." There was an adage formerly in vogue, that "fields covered with ears of corn are the sources of victories." "The Sardinians," says the President Montesquieu, "were formerly very rich; and

Aristeus, so famed for his love of agriculture, was their law-giver. But the Carthagenians becoming their masters, destroyed every thing proper for the nourishment of man, and forbade the cultivation of the lands upon pain of death." The state consequently fell into decay, and for ages became the prey of a variety of conquerors. What is most remarkable, however, is, that even to this day the greatest part of the Island of Sardinia remains an uncultivated barren waste.

To this deplorable state of things the Chinese dominions afford a striking contrast.* "The ancient Emperors of China," says Montesquieu, "were not conquerors. The first thing they did to aggrandize themselves gave the highest proof of their wisdom. They raised from beneath the waters (or rather, they recovered from the sea) two of the finest provinces of the empire. These owe their existence to the labour of man; and it is the inexpressible fertility of these two provinces which has given Europe such ideas of the felicity of this vast country." And, from the united testimony of travellers, we have reason to believe that every part of this extensive empire is constantly preserved in the highest possible state of cultivation; whereas, in England and Wales alone, there are upwards of seven millions of acres of waste land, which have been for ages, and still continue to be, of little or no benefit to the community.+

The greatest obstacle to the cultivation of these lands is the want of manure, there being at present a great insufficiency for the lands which are already enclosed.‡ Let the use of Rock Salt, however, become general in

^{*} See Appendix No. 30. † See Appendix Nos. 29 and 30. ‡ See Appendix Nos. 25, 26, and 28.

agriculture, and this deficiency will in a great measure be supplied. Every opulent farmer will then have the means within his reach of putting the whole* of his farm into the most desirable state of improvement; so much so, that it would soon be considered disgraceful for any agriculturist to allow a single rood of land belonging to his estate to remain uncultivated. This would prepare the way for the enclosure of those vast tracts of common land which we perceive in every quarter of the United Kingdom; and the alteration which this would make in the face of the country, to say nothing of the increase of its inhabitants, may be more easily conceived than described.

Had our ancestors been totally inattentive to the improvement of agriculture, the greatest part of Great Britain would still have been covered with wood; and in like manner, had it not been for the progress of civilization, and the desire of improvement, the finest provinces of France and Germany would still have been overshadowed by the Hercynian forest, which, in the time of Julius Cæsar, extended from the borders of Alsatia and Switzerland, over the greatest part of Germany, Hungary, and Transylvania, and was said to be sixty days journey in length and nine in breadth.

"Agriculture," said the late amiable Mr. Hollinshead, "is the most certain source of domestic riches. Where it is neglected, whatever wealth may be imported from abroad, poverty and misery will abound at home. Such is and ever will be the fluctuating state of trade and manufactures, that thousands of people may be in full employment to-day, and in beggary to-morrow. This

^{*} See Appendix No. 25.

can never happen to those who cultivate the ground. They can eat the fruits of their labour, and can always by industry obtain, at least, the necessaries of life."

However true these observations may be, thank God the times in which we live are propitious to every kind of improvement; to the progress of science, as well as to the advancement of the arts; and the spirit of enquiry which is abroad throughout the kingdom, will, I trust, induce many hundred intelligent agriculturists to attend seriously to the important points upon which I have addressed you.

Allow me to add, that I am confident those of you who feel any solicitude upon the subject, cannot more effectually consult your own interests, or those of the community at large, than by entering immediately upon such experimental researches as are best suited to your respective situations and convenience, as your success, whatever it may be, will be equally conducive to individual and national prosperity.

I am, Gentlemen,

Your most obedient servant,

SAMUEL PARKES.

Goswell-Street, London, Feb. 22, 1819.

APPENDIX.

ON THE EMPLOYMENT OF COMMON SALT IN AGRICULTURE,
AND IN FEEDING CATTLE.

1. PLINY, the naturalist, seems to have known little or nothing of the use of Salt in agriculture; but he was well aware of its virtues in feeding cattle. "Herds of cattle," says he, "being covetous of a salt pasture, give a great deal more milk, and the same is much more agreeable in the making of cheese, than where there is no such saline ground." Pliny's Nat. Hist. book 21, chap. 7.

2. John Glauber, an eminent chemist of Amsterdam, who published several esteemed works on the practice of chemistry about two hundred and fifty years ago, was so thoroughly convinced of the economy of using Salt as a manure, that he obtained a patent from the government of the United States of Holland for the sole disposal of the privilege of applying this valuable mineral to the barren lands in that country. The following brief extracts from his work, entitled "The Prosperity of

Germany," will be sufficient for our present purpose.

"Salts of no great cost are to be had in vast quantity, with which, corn being macerated, and sown in barren lands, and in such as are not dunged, doth come to perfect maturity: and this I have tried not only once, but oftentimes; and have also proposed to bring it into public use in these united provinces: to which end the most Supreme Orders, general and provincial, have granted me a privilege or patent for many years; whereby it is forbidden to sow or plant barren, sandy ground after this kind of way without my consent. The main basis of the knack lies in Sea-Salt, which may be plentifully had in these places, to fatten lean and dry ground with instead of dung." English Translation in folio, London, 1689, page 388.

3. John Jonston, a learned Polish naturalist and physician, who travelled over every kingdom of Europe, and was esteemed everywhere by the learned, has an entire chapter on Common Salt, in which he writes thus: "Also fields, whereupon Salt is sprinkled, become fruitful by it, as experience makes good.

It destroys worms in animals." Jonston's History of the wonderful Things of Nature.* The English translation, folio, London, 1657, page 94.

4. Gervase Markham, a learned writer in the reigns of James the First and Charles the First, who was equally noted for his skill in many foreign languages, and for his knowledge of the various branches of agriculture, published a great variety of treatises on the management of land, + and closed his agricultural labours by the publication of a work entitled " Markham's Farewell to Husbandry," in which the following passages occur. "If you be neer unto any part of the sea-coast, thence fetch great store of the salt-sand, and with it cover your ground which hath beene formerly plowed and hackt, allowing unto every acre of ground threescore or fourscore full bushels of sand, which is a very good and competent proportion; and this sand, thus laid, shall be very well spread and mixed among the other broken earth. And herein is to be noted, that not any other sand but the salt is good or available for this purpose, because it is the brine and saltnesse of the same which breedeth this fertility and fruitfulness in the earth, choaking the growth of all weeds, and giving strength, vigor, and comfort, to all kind of grain or pulse, or any fruit of better nature."

"Now methinks I hear it objected, what if the ground do lye so farre within the land, that there is no salt-sand within many score miles of it, how then shall I make good my barren earth? To this I answer, that albeit this salt sea-sand be of infinite good and necessary use, inriching grounds wonderfully much; but if your ground lye much within land, and farre from the sea, then to every acre of land you shall take two bushels of very dry bay-salt, and in such manner as you sow your wheat you shall sow this salt upon the ground; then immediately after the sowing of the salt you shall sow your wheat, which wheat would be thus prepared before you sow it. The day before you are to sow your grain, you shall take bay-salt and water, and mixing them together, make a brine so strong that it will bear an egge; then put the wheat you are to sow into that brine, and let it steep therein till the next day; then drain it from the brine and so sow it; and no doubt but you shall find a marveilous great increase thereby. Neither is the thing itself without good

* He also published a "Natural History of Birds, Fishes, Quadrupeds," &c. in 1653, folio; also a work upon the Hebrew and Greek Festivals, in 1660; and some volumes upon other subjects.

[†] Markham, in 1616, published "Liebault's La Maison rustique," or the Country Farm, which sometime afterwards was translated into English by Dr. Surfleit. Besides this, he printed a book entitled "Cheape and good Husbandrie; also the Use and Profit of Bees, the manner of Fish-ponds, and the taking of all sorts of Fish." London, 1656. Another thin quarto, entitled "The Inrichment of the Weald of Kent, or a Direction for the true ordering and manuring all the Grounds within the Wealds of Kent and Sussex." London, 1660. And several other works, which were held in great estimation.

and strong probability of much increase, and strength for the bettering of all manner of arable grounds; for there is nothing which killeth weeds, quicks, and other offences of the ground, so much as saltness."

In chapter V. entitled "of the ordering of all barren clays that are over-run with ling or heath," after giving directions how to make and dress the land, he adds, "And if the ground have been sanded (with salt sea-sand) you may sow your seed-wheat simply of itself, without any doubt of the plentifull increase thereof; but if it have not been sanded, then you shall not only steep your seed in brine, but also you shall mixe your seed with bay-salt, and so sow it into the ground."

In the chapter which treats of the method of recovering such land as has been rendered sterile by the overflow of sea-water, Mr. Markham writes thus:

"In all my former relations, touching the bettering of ground, I do apply, as one of my chiefest ingredients, salt-sand, salt-weeds, salt-water, salt-brine, ashes, and many other things of salt nature, as indeed all the manures and marles whatsoever must either have a salt quality in them, or they cannot produce fruitfulnesse; so that it might be argued, if Salt be the occasion of fruitfulness and increase, then there cannot be much hurt done by these overflowes of the salt-water, that it should rather adde a fattening and enriching to the ground, than any way to impoverish it. But experience shews us the contrary, and that there is nothing more noisome and pestilent to the earth than the superabundance and too great excess of saltnesse, &c."

In the chapter on enriching of barren grounds for the growth of hemp and flax, he directs first to plough it, "then with the salt sea-sand you shall sand it very plentifully, but if that be not to be gotten, and you be very well assured of the natural richness of the earth, you shall then sand it with the best red sand you can find near unto you; and upon every acre of ground you thus sand with fresh sand, you shall sow three bushels of bay-salt, and then plough up again the earth, sand and salt together, which should be done about the latter end of the yeare, as after Michaelmas, and so let the ground rest till seed-time, at which time you shall bring sea-weeds to your hemp land, and cover it all over with the same, and then you shall plough it again, burying the weeds within the earth. As for the weeding of this ground, you shall not respect it at all, for it will put up no weed."

In the chapter on vermin, Mr. Markham says. "The next great devourers of grain are pismires or ants, which, although it be but a little creature, yet it is so laboursome, that the grain which they carry away or destroy amounteth to a great quantity. If you manure your corn lands with ashes or salt sand, you shall be well assured it will never breed pismires."

5. Sir Hugh Platt, a writer of some eminence in the time of Oliver Cromwell, states it to be his opinion that it is Salt which makes all seeds to flourish and grow; and that no dung which is laid on barren ground could any way enrich the same, if it were not for the salt in it." see his Jewell House of art and nature." Folio, London, 1653, chapter 104. Some other extracts from this curious volume have already been given in the foregoing letter, page 17.

6. Mr. Christopher Packe, the translator of the works of John Rudolph Glauber, and an eminent chemist of the seventeenth century, speaks very decidedly of the virtues of Common Salt in agriculture. Having made some observations on Mr. Glauber's processes for mixing lime and Salt, he proceeds to give the following directions respecting the mode of applying the Salt, which are quaint enough, but I shall give them in his own words.

"The lime," says he, "must be spread upon the ground where no rain can come to it, till it slake itself by the air, and fall into a powder. Of this powder you are to take four hundred weight to one hundred weight of any Common Foul Salt, which is too impure for the use of the kitchen, where such may be had, otherwise Clean Salt (for that will be cheaper than dung): the Salt and lime are to be well mixed, and then moistened with such a quantity of water as will bring the lime and Salt mixed to the consistency of a stiff mortar. Of this mass balls are to be made about the bigness of ones fist, and laid under a shed or hovel to dry; being dried, they are to be burnt in a kiln as lime is, so that the balls may be red hot for an hour at least.* When the balls are burnt, they are to be again placed upon a floor under a shed or hovel where they may be exposed to the air, but kept free from the rain, and if you break them with a clodbeater presently, the air will the sooner act upon them, and cause them again to fall into a powder, which powder may then be carried out and spread, or rather sowed out of a seedlet, thicker or thinner as the land shall require; which joining itself with the earth, is again attracted by the seed when it is sown, whose growth is thereby swiftly promoted, and its multiplication much augmented."

7. The great Lord Bacon, who flourished early in the seventeenth century, having noticed the advantages which the farmers of Cornwall, Devon, and other maritime counties, derived from the free use of sea-sand, which upon those coasts chiefly consists of broken shells impregnated with salt-water, declares that the best manure next to marle is sea-sand, which no doubt (says

^{*} This direction for burning the mixture may have been consistent enough with the prevalent notions of the time, but the Salt would doubtless be equally efficacious without that operation.

his Lordship) obtaineth a special virtue by the salt water, and concludes by affirming that Salt is the first rudiment of life.—Nat. Hist. Cent. 6, Exp. 596.

- S. The eminent Mr. Evelyn, in his discourse on the effects of the overflowings of the river Nile, asserts, that "Salt is the vigour and close of all things; the first and last of all elemental bodies; the quid divinum, and original of all fecundity."—Philosophical Discourse of the Earth, page 103, &c.
- 9. The celebrated Anthony De Leuwenhoek, who was a Fellow of the Royal Society, in his observations on the storm which happened in the year 1704, when many of the banks of Holland were broken down and the country overflowed, addresses himself to his countrymen in the following manner:—"There are some," says he, "that affirm, that the scattering of this salt water by the storm will do a great deal of harm to the fruits of the earth; but, for my part, I am of a quite different opinion, for I believe that a little Salt spread over the surface of the earth, especially where it is heavy clay ground, does render it exceedingly fruitful; and so it would be if the sand of the sea were made use of for the same purpose."—Philosophical Transactions, No. 289. The year following, the Dutch had the largest crops of grass and of corn that had been known for many years before.
- 10. In the Philosophical Transactions, is a memoir by the Archbishop of Dublin on the manuring of lands in the counties of Londonderry and Donnegall, in Ireland, with sand and shells from the sea-shore, from which I extract the following passages. Treating of boggy land, he says:-" The turf is nothing but the product of vegetables, which rotting, there remains only the earthy parts: now shells being chiefly salt, the salt incorporates with the sulphur of the plants, and renders them fit for the vegetation of new plants, which further appears from this, viz .- that those shells which have been under the salt-water are much better than such as lie dry on the strands. Some thousands of acres have been improved by these shells, and what formerly was not worth a groat per acre is now worth four shillings. Some years ago they made lime of the shells, and manured their lands with it, but a poor man, who, from laziness or poverty, had not provided to make lime, threw the shells unburnt on his land, and his crop proved as good as his neighbours, and the second and third crop better; and all took the hint, and have used them so ever since. Where shells are not to be procured, sea-wrack or sea-sand supply the want."-Philosophical Trans. No. 314.
- 11. Soon after the formation of the Royal Society, Dr. Bury delivered a memoir, containing an account of the manuring of land in Devonshire with sea-sand, which is much to our pur-

pose. "Salt," says he, "quickens dead land, and is used in the south-west part of that county, which would otherwise be the barrenest, but is now the richest part thereof. The inhabitants go as far as the sea will permit them at lowest ebb, take the sand in bags, and carry it on horseback fourteen miles into the country, and spread it on the land, thereby improving it both for corn and grass. Crude Salt alone, if strewed upon the ground, does not improve but corrode it; the Sea-Salt is too strong and active of itself unless mixed with lime—how to mix them, Glauber directs."—Philosophical Trans. No. 316.

- 12. Dr. Cox, in his memoir, printed in the Philosophical Transactions, on the manuring land with sea-sand, writes thus: "The effect it usually produces where much of this sand is used, is, that the seed is much and the straw little. I have seen," says he, "in such a place good barley, where the ear has been equal in length with the straw it grew on. After the corn is cut, the grass, though it be but short, yet as to feeding, giving good creams, plenty of milk, and all other good purposes, far exceeding the longer grass, where less sand is used."—Philosophical Trans. abridged, vol. ii. page 730.
- 13 Dr. Plott, the author of the topographical histories of Staffordshire, Oxfordshire, &c. when treating of the husbandry of his own time, says:—"At Nantwich they yearly brine their fields, from which they find a more profitable return than from any soil or dung."—Nat. Hist. folio, page 39.

EXTRACTS FROM MORE MODERN WRITERS ON THE

USE OF SALT IN AGRICULTURE.

14. "I am well assured from a Scotch gentleman, that they have long used Salt in that part of Great Britain, always sowing ten or twelve bushels by hand of their coarse Salt on an acre of young green wheat, sometime in November, December, January, or February, it being, from the several accounts which I have had of it, very effectual in the killing of tender weeds amongst corn, yet at the same time cherishing the corn; and though it does not add altogether to the bulk or height of the straw, yet it does much to the goodness and plumpness of the grain. And whoever has been curious in their remarks abroad will find that it is the usual practice of the Milanese to sow Salt on their pastures, as I have been informed by one who has sold great quantities for that purpose; as also by a merchant of

Liverpool, who is well acquainted with that trade, who affirms that the finest crops they have of hemp and flax amongst the Dantzickers and others, who raise those commodities in those countries, are from lands on which Salt is strewed." The Practical Husbandman, Octavo, London, 1733, vol. i. page 48.

- 15. "Salt certainly sweetens the grass much; and it may on all such occasions be mixed with a proper quantity of dung, which is more sulphureous than Salt, and will make grass shoot away much faster than any other manure. Lime in its own nature makes grass sour, but when mixed with Salt, that acidity will be taken away."—Practical Husbandman, vol. i. page 57.
- 16. "As to the proportion of Salt to be used on land, it ought to be according to the nature of it; cold, wet, clayey land requiring more, and loose soft land, though it be poor, requiring less. Again, the proportion of Salt ought to be either more or less, according to the crops of grass or grain you would improve. For cold, wet, and spewy land, ten loads of dung, six of earth, and eight bushels of Salt, per acre.

"For lean, hungry, sandy land, fourteen loads of pond-earth, six loads of dung, and six bushels of Salt per acre when em-

ployed for corn and grazing.

"For meadow land, fourteen or fifteen loads of dung, five bushels of Salt, and four of pond-earth, the quantity of each to be altered according to the quality of the ground." Practical Husbandman, London, 1738, page 59.

- 17. "Thus have I made out what I proposed, viz.: that every acre of land in England which wants to be improved, may be done ten or twelve shillings an acre cheaper by Salt than any other way. Suppose then, that out of the forty millions of acres of land which are calculated to be in England and Wales, there is but one-eighth part, which is five millions, to be improved every year; and that one-half of those five millions may be manured by some other manure, there yet remains two millions and a half to be done by Salt still; which, reckoning the savings at ten shillings per acre only, (the expenses being about the same) comes to one million two hundred and fifty thousand pounds; which, if the old proverb be true, that so much saved is so much earned, then that sum is a real addition to the landed interest of Britain; and this calculation is not at all disagreeable to what is affirmed by some Cornish and Devonshire men, when they say that the money laid out in salt sea-sand, for the improvement of lands in those two counties, comes to thirty-two thousand pounds per annum." Practical Husbandman, vol. i. page 63.
- 18. "On watering meadows with a solution of Salt, we are directed to make a large pit about twenty or thirty feet square,

and five or six feet deep, more or less, as there will be occasion, in the method tan or salt pits are made, and put therein ten or twelve bushels of salt, and as much of lime, soot, or any other ingredient of that kind, and, having a pump near at hand, or some conduit or spring of water, fill the pit up by degrees, at first to three or four feet high, letting the ingredients dissolve in the water, by being there twenty-four hours at least, stirring them sometimes about, and after that, by dipping in of the finger it will be found whether the water is salt enough (as near as you can to the strength of sea-water): if it is not sufficient, then may be added a reasonable quantity more of the above mentioned materials; but if it be too salt, then more water may be poured in till it is just right and fit for use; and being possessed of a moving pump or a skip, pump the water into a hogshead, with a leather pipe, and a watering rose at the end of it, just as is practised in watering the streets in London, and so (having the hogshead placed on a roll) may both meadows and corn land be watered to a good advantage." Practical Husbandman, vol. i. page 74.

19. "To shew an acquaintance of mine the effects and advantages of Salt properly applied to vegetables, I made the following experiment, in an extreme dry summer, upon a bare piece of pasture land, out of which the cattle were all taken for want of grass: I marked four places with stakes, each of which I watered nine nights successively, in the following manner:—the first with spring water alone, to the quantity of a gallon; the second with the same quantity of water, adding an ounce of common salt; the third and fourth with the same quantity, mixing the water in the third place with two ounces of salt; and that in the fourth with three ounces, which produced the following different effects.

The grass in the second place grew more and of a darker green than that in the first; in the third, it only grew by spots, for part of it was killed where the greatest quantity of water fell, and the fourth was quite brown for a greater compass than the third; by which it appeared that an ounce of salt in a gallon of water had a better effect than the water had alone; and that three ounces of Salt, mixed with a gallon of water, was more than the grass could immediately receive; but the fourth place in the ensuing spring was the most fertile of them all."—
Treatise of Fruit Trees, by Thos. Hitt, 8vo. Third Edition,

London, 1768, page 17.

20 "Soils which are subject to the grub, and must be fertilized by common dung, which is a proper nest for the mother beetle to deposit its eggs, must be well impregnated with the brine of dissolved salt, after the dung is first cut up: two large hogsheads of salt will make brine enough for a dung pan of fifty

feet square. This cure for the grub is a late discovery, for which I am obliged to a judicious planter, and which I have tried with success."—From an Essay on Plantership by Samuel Martin, Esq. of Antigua.

- 21. "Having tried Salt upon a small scale on a sandy soil, I can assert sixteen bushels to be a proper quantity for one acre. It gradually advanced in its effects to sixteen, and as gradually diminished to forty bushels when vegetation was destroyed. Twice only have I had an opportunity of buying a few tons of foul Salt, and used it both times on a barley tilth, sowing the Salt immediately after the barley. The event was perfectly satisfactory. The verdure of the spring exceeded any thing of the kind I ever saw; and the ripened appearance was whiter by many shades than I ever beheld. N. B. Salt is noxious both to weeds and vermin." R. Legrand, Esq. on Manures, in the Annals of Agriculture, vol. v. page 149.
- 22. Some Extracts form a Pamphlet entitled "Hints to Country Gentlemen and Farmers, on the importance of using Salt as a general Manure." By the late John Hollinshead, Esq. of Chorley. 3rd edition, 1802.
- "Salt," says Mr. Hollinshead, "will be found to be the cheapest, best, and most durable manure ever yet made use of: and for the readier distribution of this most excellent manure through the kingdom, the public and enterprising spirit of the nation has of late years provided very ample and cheap conveyances to almost any part of the country, which the gentleman and farmer can wish, by means of the numerous navigable canals, which are either finished or projecting in almost every direction. Salt may be laid on the banks of the Staffordshire canal at fourteen shillings per ton: from whence, by means of the Oxfordshire Grand Junction, and other canals, it will with the greatest ease be conveyed to any part of the south of England,

at a very trifling additional expense.

"Suppose a farmer to live twelve or fifteen miles distance from any canal, navigable river, or part of the sea-coast (which in general, perhaps, will be found to be the greatest extent he can have to fetch it), from whence he can import Salt for the benefit of his lands; even at that distance his team will fetch a load of Salt in one day, say at the expense of ten shillings; and with that team he will convey home one ton of salt; therefore, for fourteen shillings, the original price of the Salt, five shillings (more or less) for the freight by the canal, river, &c. and ten shillings for the carriage home, he lays in his own field manure sufficient for two acres and a half of land, at the small expense of one pound nine shillings. What a vast superiority, in point of expense, this would have over all the manures now in use; for lime, dung, or marle, even where most plentiful, on account of their

great bulk, cost more in the single article of cartage, without regard to the expense of buying, or digging for them, than the whole charge of salt when laid upon the ground.* Besides, as so small a quantity of Salt in weight will serve for manuring lands, this is no inconsiderable recommendation, because on that account it may with ease be conveyed to the most rough, steep, and mountainous parts of the country, to which the bulky and heavy manures now in use could not be carried, but with infinite labour, and at an expense far exceeding all the advantages to be expected from it."

23. "That Common Salt is an excellent manure, experience, the most satisfactory of all evidences, clearly proves. It was used round Northwich, in Cheshire, as a manure, so long as foul Salt was permitted duty free, with very great success."

24. "Nothing in nature is so powerful as Salt, to meliorate and drain strong and stiff soils, and also to give moisture to dry ground: it is also a certain destruction to weeds and insects. Besides its efficacy on corn and fallow grounds, its excellent qualities in giving luxuriance and salubrity to grass lands are peculiarly worthy the attention of the grazier and breeder of cattle."

25. "When a farmer intends to fallow a piece of ground, he ought first to sow it with such a quantity of Salt as would be sufficient to destroy all vegetation, viz. forty bushels per acre; † which, by cutting and dividing the viscous substances which are in the earth, would reduce it into a proper state to become food for plants. The farmer must take notice, that this Salt is to be sown on the ground sometime before he begins to work his fallows with the plough (the autumn will be the most proper season), in order to give the Salt sufficient time to destroy the grass and other roots upon it, before he begins to work it. The Salt being thoroughly mixed and incorporated with the soil, during the spring and summer following, whilst the land is on the plough, will, by the time the seed is sown upon it, be reduced to that strength which is the most proper for effectually and vigorously assisting and supporting vegetation while the seed is on the ground, and such lands will be found to produce a crop superior to those under any other mode of cultivation.

"This method of sowing the intended fallows with Salt will, therefore, serve very much to lessen the labour of the husbandman in working his grounds; for the tough and adhesive clods and lumps which are generally so troublesome, especially upon

^{*} This goes on the presumption of Waste Salt being allowed the farmer duty free; but even with the present duty, a ton of Rock Salt, containing forty bushels, may be put on board a boat on the canal for six pounds.—S. P.

[†] I think it necessary to remark upon these directions, that I believe the writer is here, and in the former extracts, speaking of foul Cheshire Salt, such as at that time was allowed to be used for land. Therefore in using Rock Salt only half the quantities which he mentions ought to be employed.—S. P.

clayey soils, will be so completely broken and dissolved by the operation of the Salt, as to give much less obstruction to the

harrow at the first working.

"In deep, loamy, dry earth, upon which wheat has grown, after the crop is got in, the land should be ploughed, and lie in that state until the spring, when it must be cross-ploughed and wrought fine with the harrow, and planted with potatoes: as soon as the potatoes are covered with earth, then sow or spread sixteen bushels of Salt per statute acre upon them; and when they are dug up in the autumn, then sow a crop of wheat again, taking care to pick all the potatoes clean out, that they may not injure the wheat in the following spring by growing up amongst it. By this method of cultivation, a crop of wheat, and another of potatoes, may be produced alternately on the same ground for ever, instead of losing a whole year's produce, according to the old custom, whilst the land is in fallowing.

"For other corn lands sown in the usual way, after a spring ploughing, the best method will be to sow sixteen bushels of Salt per acre, immediately after the grain is covered in by the harrow; this, by meliorating the soil, destroying weeds and insects, and attracting moisture, will produce an abundant crop; and, by sowing ten bushels per acre annually, these

lands will ever after be exceedingly productive.

"There is still a further advantage, which is highly worthy the farmer's attention, which is, that by having constantly a plentiful supply of such a cheap manure, he can always keep his grounds in a condition fit to receive any kind of grain which he would wish to sow upon it, which at present is far from being the case: for instance, if he now wishes to sow a crop of wheat, he cannot do it without lime or marle; if he would plant potatoes, it cannot be done without a large quantity of dung, which, if it is of his own producing, he will impoverish his other lands while he enriches this: if he buy it, it must be at an enormous expense, and also to the proportionate injury of the district from whence he procures it, where it ought to have be expended; and therefore, though it should enrich an individual, it will not be of the least advantage in a public point of view, which undoubtedly ought principally to be attended to in things of this Also, when a person enters on a poor farm, unless he be possessed of a larger capital than usually falls to the lot of this useful class of mankind, with all the industry and management of which he is master, his lease, nay even his life, may be expired before he has manured one-half of his estate, and generally speaking, the parts which he first tilled will be reduced to their former poverty, before one-fourth of the farm has received any benefit.

"But if he were permitted the use of Salt, duty free, with a very moderate some of money, he would have it in his power, in a few years, to bring his farm into the highest state of culture

and fertilization; so that at all times he would be enabled to bring to market those articles, which his situation, or the particular necessity of his neighbours, pointed out as most beneficial to himself.

"Another considerable advantage would arise to the occupiers of small farms in particular, and especially those with large families, from manuring with Salt, as they would be enabled to raise, not only a much greater quantity, but also a much greater variety, of the common necessaries of life, from the same extent of ground. For example: -a man who rents a few closes of land, gets, perhaps, nothing but milk and butter from his little farm, whilst he has the most substantial part of the sustenance for his family (bread) to buy, generally at a high price. But give him Salt duty free, and he may pitch upon one field, which, with the assistance of this manure, will produce him abundant crops of grain annually for ever, whilst his other fields will remain unmolested, and, if also salted, covered with the most luxuriant and wholesome herbage for the use of his cattle. At present, if he ploughs at all, it must be in rotation, or, as the farmers term it, in shifts; and by that means he is constantly injuring his grass-lands.

"When Salt is used upon pasture-lands, it may either be sown upon them in its simple neat state, after the rate of sixteen bushels* the acre, or mixed with compost, mud, or loamy earth; sixteen bushels of Salt to twenty loads of earth, and turned in the heap two or three times to incorporate it properly; this

compost should be laid on and spread in the autumn."

26. "For meadow-lands, we would advise the farmer to sow six bushels of Salt per acre, immediately after the hay is got in. This would be found peculiarly beneficial in hot and dry summers, and upon lime-stone and sandy soils; which, after they are mown, are often so much parched by the heat of the sun, that not only the eddish is destroyed, but also the crop of the ensuing year is very materially injured; but by sowing it with Salt, moisture would be attracted and retained, sufficient to assist vegetation so powerfully, as in a short time again to cover the face of the ground with grass, and by that means effectually to screen the roots, which would otherwise be too much exposed to the direct rays of the sun.

"It may, indeed, be said, that dung will answer the same purpose: in some degree it might, but dung cannot always be had, never in sufficient quantities: besides, if it could, this objection lies against it, that neat cattle will not eat the eddish after dung, consequently one valuable crop is lost to the farmer,

^{*} I think it necessary again to caution the farmer against using this quantity of pure salt upon grass-land, as it would probably burn up the grass. The writer speaks all along of foul waste Salt, from the Salt Works, which was seldom more than one-third of it real Salt.—S. P.

which, if Salt were used, would be both productive and wholesome. Also, the hay, when put into the mow or stack, should be sprinkled with Salt on every layer. When hay is housed soft, this should never be omitted, as it would prevent what the farmers call the *mow-burn*, and make the hay far more pleasant and nutritious for the cattle in winter."

- 27. "Mr. Beck, gardener in Chorley, has constantly made use of Salt in his garden for upwards of thirty years, principally upon his onions; and he has invariably found the Salt to exceed every other kind of manure which he could have used for the like purpose. His method is to sow the Salt immediately after the seed is covered in. But as he never had any thought of communicating his observations and experiments to the public, he took no care to ascertain the exact quantity necessary to be sown on an acre, and proportionably upon any smaller quantity of ground: yet he thinks, if he might hazard a conjecture, that he has not sown less, and probably more, (of waste Salt) than sixteen bushels per acre. One year, by way of trial, he sowed the usual quantity of Salt upon a plot of onions, after they had begun to shew themselves above ground, and the crop, so far from being improved, was entirely spoiled; from this he infers, that the experimental gardener, who may be inclined to make use of Salt, will do well to throw it on as soon as possible after the seed is sown."
- 28. "The only manure that can be procured in all places is dung (lime and marl being entirely local, and confined to certain districts); and how insufficient it is to answer all the purposes of husbandry, need not here be insisted upon, since it must be plain to the most superficial observer. Let us turn our eyes for a moment to the generality of breeding and grazingfarms, and see in what state they are. The dung that can be raised from the produce of the farm is all expended upon a few acres of meadow-land, whilst the pasture-grounds are destitute of every kind of improvement. This is no idle speculation; for which way so ever we turn our observation, we shall find abundant proofs of the truth of the assertion-thousands and ten thousands of acres lying in the same state, with regard to any actual improvement that has been made in them, in which they came out of the Creator's hands, and must inevitably remain so, unless some other manures are introduced into practice, besides those which are now in use.

"What a misfortune to the dairy must this neglect of the pasture-grounds be! and this too is the ground upon which the occupier must principally rely; for it is well known, that during the summer months, whilst his cows are at grass, is the time in which he chiefly produces his butter and cheese; and yet this ground is entirely neglected. Whilst the demand for those articles is daily increasing, we are indifferent whether their productiveness be proportioned to that demand; by which inatten-

tion the price of those commodities has, in a few years, been doubled. And what shall bring them to their former price? Manure these pastures with salt. By this means we shall increase their produce two-fold, and consequently decrease the price of those necessaries of life nearly in an equal proportion. This would be an unspeakable advantage and comfort to the labouring poor, at the same time that it was enriching both the

farmer and land-owner.

"I know some will say that there are many soils which cannot be improved. I deny the assertion. Let but the farmer be properly encouraged to make the trial, and I am convinced he will not find his labour lost. If our ancestors had always been indifferent to agricultural improvements, what must have been our situation at the present day? We might have lived upon the haws and berries of the field; for nature has not been so lavish in her gifts to this country as to some others: few of the necessaries of life will thrive and flourish without the most unremitting industry. By nature our apples are crabs, and our plumbs sloes! but art and nature have changed the scene: and health giving exercise, properly directed, and duly encouraged, would bring the kingdom to an unexampled pitch of plenty and splendour.

"The proper cultivation of the soil is an object so peculiarly interesting to the community at large, that those who industriously attend to it are perhaps to be esteemed the most meri-

torious citizens of their country.

"Of such importance are the study and practice of agriculture in Scotland, that they have instituted a professorship in one of their universities; and it is much to be lamented that a similar institution is not introduced into our universities, as it would essentially tend to the promotion of this most important department of knowledge, so highly beneficial to mankind."

29. "It is proved by the general returns of the number of inhabitants in *England* and *Wales*, that there has been an increase of two millions (or nearly one-fourth of the whole) during the last century. Then, as population and manufactures are rapidly increasing, is it not of the utmost consequence that we should have a proportionate increase in the productions of the earth?

"With proper encouragement to and management in agriculture, I have no hesitation in affirming that the generality of land, in most parts of England, might be made to produce double crops in a very little time; and with the addition of Salt as a manure, instead of importing corn from abroad, to the great disadvantage of the nation, we might make our own produce not only sufficient for home consumption, but also to supply the wants of our neighbours. I need not insist on the advantage to be derived from such an improvement, not only to the farmers, but to the public at large, for it is well known to every commercial man of what importance it is that our merchants should

always have it in their power to undersell their rivals in foreign markets: this, however, it will be impossible for them to do, even if there be no advance in the price of the raw material, unless by bringing down the price of provisions we proportionably keep down the price of labour. And no other mode can be adopted so likely to accomplish this most desirable end as

the general use of Salt for manure.

"We shall just mention one thing more in support of what has been advanced respecting the benefits of Salt for manure, which falls within every farmer's notice, but which, probably, has not struck him in that light in which we are about to represent it. Cattle kept in a straw-yard, without any thing but straw for their sustenance, yield a poor light manure, little superior to natural soil; whilst cows or oxen feeding on good hay, assisted by corn, oil-cakes, or other invigorating food, produce manure of the best kind; thus the stronger the manures are impregnated with Salts, of more value they are."

30. "We have at least seven millions of acres of uncultivated land in this kingdom! What a loss to the community must this be! Here is ground sufficient, if properly cultivated, to furnish all the inhabitants of the country with bread, lying entirely waste, whilst they are paying a double price for the necessaries of life! Let us not neglect the advantages which providence has so kindly put in our power: the means of relief are within our reach, if we are not wanting to ourselves. If half the money that was necessarily and humanely spent during the late scarcity, in bounties on the importation of grain, had been laid out in inclosing waste lands, and giving premiums to farmers, I am convinced that in any future unfavourable season we should not be obliged to rely upon a scanty and precarious supply of grain from other countries, but on our own granaries at home, which have been well stored in a time of plenty by the wholesome produce of our native soil.

"If we turn our eyes to the empire of China, we shall there see the beneficial effects of a due attention to agriculture. The population, upon an average throughout that vast empire, amounts to the surprising number of three hundred inhabitants to every square mile; that is, nearly three times the population of this country; and yet these people are maintained in plenty, without any assistance from other nations. How this is accomplished, Sir George Staunton, in his elegant and authentic account of Lord Macartney's embassy to China, informs us. 'The whole surface of the empire,' says he, 'is, with trifling exceptions, dedicated to the production of food for man alone. Few parks and pleasure-grounds are seen except those belonging to the emperor. Little land is taken up with roads, the chief communication being by water. There are no commons or lands suffered to lie waste through neglect, or the caprice or

for the sport of great proprietors. No arable land lies fallow. And whatever defects there are in the soil, it is supplied by mixture with other earths, by manure, by watering, and by careful and useful industry of every kind.' Let us copy

after so useful an example.

"The present high price of Salt, encumbered as it is with heavy duties, is such as to prevent all attempts of the farmer to ascertain its real utility by experiments. In order to do away this inconvenience, we sincerely hope the legislature will take this matter into its further consideration, and repeal the duty upon Salt, as the only thing that can effectually promote the

proper improvement of the country.

"The Salt Rock in Cheshire lies about thirty-six yards below the surface, in thickness from ten to forty yards; it extends twelve miles in length, and several miles in breadth: and throughout the whole district springs arise, which are made into Salt. This rock, together with those which are in Worcestershire, &c. are sufficient to supply the whole kingdom for ever, without any fear of their being exhausted; and, if properly applied, are a treasure far greater than the gold mines of Mexico and Peru."

- 31. "The following account we had from Mr. Thomas Sutton, of Middlewich, in Cheshire. 'About twelve years since I dug up,' says he, 'a quantity of earth out of a field where a new building was going to be erected, in which there was some appearance of Salt-springs, the water from which had oozed up through the soil, and left an incrustation composed of the particles of Salt upon the surface of the ground. This soil, together with the Salt contained in it, I mixed with horse-dung: after it had lain some time in the heap, I spread it upon a piece of meadow-ground, which has been mown ever since, without any other manure having been laid upon it; and the other part of the meadow has been manured in the usual way every second year, and yet is now in no better condition than that which was covered with the Salt and dung twelve years ago."—Mr. Hollinshead's Hints to Gentlemen, &c. Page 5—33.
- 32. "A farmer at Glasson, near Lancaster, has for some time been in the habit of carting Salt-water to put upon his dung whilst in the heap in the yard, before it was taken to be spread upon the ground, which he has found by experience very much enriches the dung, and makes it better manure. A great advantage might also be derived to the farmer from spreading seasand under and amongst the dung, whilst it is in collecting, during the winter, and also in the cow-house, stable, and yard, not only on account of the particles of the Salt contained in it, but likewise by its retaining and absorbing the urine of the cattle, which is itself a very excellent manure."

"A farmer in the county of Sussex, some years ago, had a field, one part of which was very wet and rushy, and the grass

produced upon it was of so sour and unpleasant a kind, that the cattle would not graze upon it: he tried several methods to improve it, but to little purpose; at last, having heard of the benefits of Salt as a manure, he determined to try that; for which purpose he procured a quantity of Rock Salt, which in a random way, without any regard to the precise quantity, he threw upon this rushy ground, fencing it off from the other part of the field; the first effect of which was a total disappearance of every kind of vegetation. In a short time after, however, it produced the largest quantity of mushrooms ever seen upon an equal space of ground in that county. These in the spring following were succeeded by a most plentiful and luxuriant crop of grass, far exceeding the other part of the field in the richness of its verdure and the quickness of its growth: the cattle were remarkably fond of it; and though the Salt was laid on it upwards of twenty years ago, this part is still far superior to the rest of the field."-Appendix to Mr. Hollinshead's pamphlet, page 33-35.

33. Mr. Wedge, in his agricultural survey of the county of Chester, says, "foul Salt is a most excellent manure, either for pasture lands or fallows: and it is much to be regretted that so large a quantity as seven or eight hundred tons should annually, in Cheshire alone, be lost to the community. The heavy duty laid upon refuse or dirtied Salt prevents its use for manure.

"A difference of opinion," continues he, "having been entertained as to the utility of Salt as a manure, we insert the following experiment, which we have been favoured with by a gentleman of Northwich: In a meadow, where the after-grass being of a coarse, rank nature, which the cattle refused to eat, Salt was laid upon a part of the meadow, and the cattle have ever since preferred the grass growing on that ground to every other part of the field, and eaten up every blade. He also states that the good effects of Salt are particularly seen by mixing it even with the coarsest manure, and then laying it upon the land."

34. The late Thomas Butterworth Bayley, Esq. who was a Fellow of the Royal Society, and honorary member of the honourable Board of Agriculture in London, in his "Thoughts on Manures," after enumerating nineteen different substances which improve land, adds, "there is another source of improvement Lost to the country, but not through the fault of the farmers, viz. refuse Rock Salt, and refuse liquor from the salt-works. I trust the very impolitic restriction which forbids the use of this valuable manure, and causes its total loss, will soon be removed by the exertions of this society, and those of the honourable Board of Agriculture." From an Address read to the Members of the Agricultural Society of Manchester, October 22, 1795.

35. "Salt is the mother of all manures, as every kind of manure is higher or lower in value according to the Salt it pro-

duces; and every kind of manure is portioned out to the land according to the quantity of Salt or nitre it is thought to have in it. Formerly, Salt was thought to be an impoverisher of land, but experience has taught us wisdom: it is now found to be otherwise, provided it is duly proportioned to the state the land is in, and mixed to mollify it as follows: take ten bushels of Salt, and six bushels of dry ashes, and mix all together; then spread them on the land, and harrow them in with the seed: this is a sufficient dressing for an English acre, as it is better to repeat the dressing than to lay too much on at once. By being thus mixed, one particle incorporates and mollifies the other. Salt itself is rather too severe and harsh in its nature, and if laid too thick on, might prove of bad consequence; but if conveyed into the earth by a soapy, smooth method, will prove the real enricher the earth wants to send forth vegetation: this dressing will last for three crops. Sea-weed, shells, fish, seawater, sea-sand, have in them a proportion of salts, and, therefore, must be esteemed a manure."-From C. Varley, Esq. communicated to the Chester Chronicle by the Rev. B. Dacre of Mosely, near Manchester.

36. "After draining a piece of sour rushy ground, about the middle of October, some refuse Salt was spread upon a part of the land, after the rate of eight bushels to the acre, and in another part sixteen bushels. In a short time the vegetation disappeared totally; and during the month of April following, not a blade of grass was to be seen. In the latter end of the month of May, a most flourishing crop of rich grass made its appearance on that part where the eight bushels had been laid. In the month of July, the other portion produced a still stronger crop; the cattle were remarkably fond of it, and during the whole ensuing winter, (which is ten or twelve years since) and to this day, the land retained, and yet exhibits, a superior verdure to the neighbouring closes.

"A gentleman lately carried a small quantity of couch-grass roots and other rubbish harrowed off his land to the Salt Works, and laid it for some time upon the ground, where the foul Salt, by the direction of the officer, is destroyed; he then carried it back, and mixed it with other manure. His barley and his hay-grass were strong from this composition, beyond his

most sanguine expectations.

"Its effects on fallow-land are equally advantageous. By sowing it at the time of breaking up the lands for a fallow, its strong saline quality destroys vegetation and every noxious insect; but by being mixed sufficiently with the soil before the wheat is sown, it adds a strong nutriment, and ensures the best of crops." Dr. Holland's Agricultural Survey of the County of Cheshire.

37. The following impressive expostulation is said to be from

the pen of the Right Honourable Lord Erskine.

"The science of agriculture is by no means at its height; and in the almost miraculous advance of chemistry, new means may be found from the concentration of known composts, and the discovery of new, to lessen the cost of culture, and to increase its returns. But here again your revenue stalks like a ghost across my path which ever way I turn; as otherwise you have a superior unbounded source of improvement trodden under your very feet, and cast as refuse into your rivers, beyond all that chemistry is ever likely to discover. You have Salt in endless abundance, but your necessity turns it into money, even to forty times its value, instead of spreading it abroad for various uses, to rise up in property which no money could purchase.

"Do you know what Salt alone would do for you? Can you be so ignorant as not to know, that by taking the tax upon it directly as money, you rob yourselves of fifty times its amount in the production of your soil, in your fisheries and manufac-

tures, and in the universal prosperity of the country?

"Lime, which has caused to start into life the most inert and sterile parts of Great Britain, is just nothing as a manure when compared with Salt, which differs from it besides in

two remarkable qualities decisive of its superior value.

"Lime, and I believe all other known composts, are powerful only according to the quantities in which they are used; whereas Salt to be useful must be sparingly applied; it corrupts vegetable substances when mixed with them in small quantities, but preserves them when it predominates in a mass. It is needless, therefore, to add, that, independently of its comparative lightness, the expense both of the article and its carriage must be very greatly diminished. Yet you rob the mother of your people of this food which indulgent nature has cast into her lap, sufficient, as you will see hereafter, to feed all her children, even if their numbers were doubled." Armata, part 1. page 169.

38. "Salt answers best as a manure for green crops, especially for turnips and clover. It is not of much benefit to barley or wheat, if sown; but in compost it proves very advantageous; using thirty Cornish or forty-five Winchester bushels per Cornish acre, which is larger than the statute acre, nearly in the ratio of six to five. Prepare the ground for turnips, and sow the Salt a fortnight before the seed, or longer, if a larger quantity of Salt is used."

Mr. Seckler, at Henver, in the parish of Gwinear, has just applied Salt in the above proportion to poor exhausted land; being clay, inimical to turnips: the effect has been a heavy, rich crop, which I have had an opportunity of seeing. It is such a one as a hundred tons of dung per acre would scarcely produce in the same land. The Salt employed is that which is considered refuse, after having cured the fish, and been condemned by

the excise. Over this they throw some dirt, and it is then sold to the farmers by the fish-curers. If the duty were taken off Salt, for every bushel now used there would be at least a hundred bushels employed for this purpose. It has been said that the value of refuse Salt, as manure, depends upon the soil and animal matter which adheres to it; but the farmer knows from experience, that that Salt is to be preferred which has cured only one bulk of fish; and they give a higher price for it than for that which has been twice employed, and which consequently contains more animal matter. Where an estate has been salted for two or three crops, the effects are visible for at least seven years. It has a particular tendency to convert poor and light soils into firm and adhesive ones, 'giving them body.' Among the farmers there is a general scramble for the refuse Salt, to try

who can get most of it by purchase.

"The following curious anecdote may be related as serving to illustrate the effect of Salt: Mr. Seckler made a little heap of earth in the midst of a field, on the top of which a cart load of refuse Salt was thrown; the earth in the heap itself, and (after its removal) the earth under it, for upwards of two feet deep to the clay, was rendered so perfectly barren, that the most common weeds would not vegetate in it. This barren earth, however, furnished the richest dressing for the remainder of the field. Mr. Seckler found Salt the best preservative against the mildew in wheat. When the wheat followed turnips with Salt, it escaped the mildew which attacked other fields which were not salted; and this he finds to hold universally good, as far as his experience goes. The improvement of bad hay, by Salt applied in the proportion of about one hundred weight* to three tons, and sprinkled between the layers, is very striking, preventing mildew, and rendering it more grateful and beneficial to cattle. especially if the hay is bad: and even in good hay it is very greatly ameliorated. A testimony in favour of the benefit of Salt is furnished by the striking fertility of the land in the neighbourhood of the sea-shore in Cornwall; more especially in those situations which are favourable to the general distribution of the saline spray, as is exemplified in the parish of Fennor." Sir Thomas Bernard's Case of the Salt Duties, page 272, communicated by Dr. Paris, late of Penzance, but now of Dover Street. London.

39. "Notwithstanding the excessive duty, numerous experiments have been made, and almost invariably with uniform success. An interesting detail from the Rev. E. Cartwright will be found in the fourth volume of communications to the Board of Agriculture, which is conclusive, as to the application of Salt as a manure for potatoes. It appears from this communication, that the experiment could not have been tried on a soil better adapt-

^{*} This is foul fishery Salt: of pure Salt, a third of the quantity might be sufficient.

ed to give impartial results. Of ten different manures which were resorted to, most of them of known and acknowledged efficacy, one only excepted, Salt was superior to them all. Its effects, when combined with soot, were extraordinary, yielding in a row two hundred and forty potatoes, whilst one hundred and fifty only were produced from the row manured with lime. It was observable also, where Salt was applied, whether by itself or in combination, the roots were free from that scabbiness which often infects potatoes, and from which none of the other beds (and there were in the field near forty more than made part of the experiments) were altogether exempt. And in Dr. Holland's Agricultural Survey of the county of Chester are clearly shewn the good effects resulting from its use on grass lands, and as a manure for wheat and barley. In the twenty-seventh volume of the Annals of Agriculture, there is a communication from Davies Giddy, Esq. of some interesting experiments on the use of Salt in the culture of turnips; by which it appears, that on a part of a field, which had been previously exhausted, half a crop of turnips was produced: but the crop totally failed in that part of the field where the ordinary manure was laid without Salt. In another instance, three acres of land, which in the preceding year had borne a crop of wheat, not exceeding twelve bushels on an acre, were ploughed before Christmas, and brought into fine tilth by the Midsummer following. On each acre were sown twenty bushels of Salt, excepting that two ridges towards the middle of the field were purposely left without it: on these two ridges the turnips totally failed; but the remainder of the field produced a plentiful crop. It is farther instanced, that four acres of land, completely worn out by successive tillage, were ploughed before Christmas; three acres were sown with Salt, at the rate of twenty-five bushels, and the remaining acre with eighteen bushels, without any other manure: the crop was in general a good one, but was visibly the best where the greatest quantity of Salt had been used. Crops of turnips were subsequently raised with equal success; and in the severe winter of 1794-5, it was much less injured by the frost than others similarly treated and cultivated in the common way."-Letter to the Right Hon. Nicholas Vansittart, by William Horne, Esq.

40. "Sea-sand is very generally used in the county of Cornwall for manure, and the quantity which is every season carried away from different parts of the coast for the purpose of manure almost exceeds belief. From Bude, in the parish of Stratton, it has been ascertained that in one day as many as four thousand horse-loads have been taken; and from the harbour of Padstow, it has been computed, that fifty-four thousand cart-loads are annually carried. The expense of land-carriage for sand, used in the county, has been considered as amounting at least to thirty thousand pounds annually."

- "That the beneficial operation of this sand depends upon the presence of calcareous matter there cannot be any doubt, but, at the same time, we are borne out by unequivocal facts, in believing that the Sea-salt, with which it is impregnated, contributes materially to its fertilizing powers." Dr. Paris's Memoir in the Transactions of the Royal Geological Society of Cornwall, vol. 1. 8vo. London, 1818, page 193.
- 41. "It has been said, that the benefit of Salt as a manure has not been demonstrated: that reither the scale upon which it has been tried, nor the period for which it has been used, has been sufficient to remove all doubt upon the subject. The want of general use, however, and the paucity of experiments, are accounted for by the prohibitory duties which the Salt laws have imposed upon the use of it; and since that objection was urged on the part of the Excise, in April last, the production of Mr. Hollinshead's statement has added so much strength to the former proofs, as to carry them almost to moral demonstration. In other enquiries we balance the comparative weight of testimonies. The twenty-nine persons whom I have referred to, as having expressed their opinions in favour of the use of Salt as a manure, are many of them men of the first rank in point of science; all of them respectable in character, and with the advantage of practical knowledge. I add the list of their names: Bishop Watson, Sir John Sinclair, Dr. Darwin, Sir Rose Price, Colonel Scobell, Mr. Hollinshead, Mr. Davies Gilbert, Dr. Paris, Sir Hugh Platt, Mr. Alderman Farley, Mr. Jay, Mr. Ford, Mr. Bayley of Hope, Mr. Elliott, Mr. Rigg, Mr. Le Grand, Mr. Kingston, Mr. Boaze of Pensance, Major Taubman, Mr. Stephenson, Mr. Horne, Mr. Gilbert of Wincham, Mr. Hill, Mr. Wedge, Mr. Lee of Oldford, Mr. Beck, Mr. Sutton of Middlewich, Mr. Holt, and the Rev. Mr. Cartwright.* It is hardly to be conceived that they should all of them be misled, or have united to mislead the world upon the subject. I presume not to offer either argument or opinion, but merely submit to the reader facts and authorities, -quæ neque confirmare argumentis, neque refellere in animo est. Ex ingenio suo quisque demat vel addat fidem."-Case of the Salt Duties, by Sir Thomas Bernard, Bart. London, 1817, page 289.
- 42. Extracts from Papers published by the Right Honourable Sir John Sinclair, Baronet, on the Uses of Salt for Agricultural Purposes.
 - "Salt, if employed in large quantities, in its natural state,

^{*} To this very respectable list the following names may be subjoined: Gervase Markham, Lord Bacon, Mr. John Evelyn, Dr. Bury, Dr. Cox, Dr. Robert Plot, Dr. Brownrigg, Mr. Thomas Hitt, Mr. C. Varley, Dr. Holland, Lord Erskine, I. Christian Curwen, Esq. Dr. Rees, Lord Kenyon, Mr. Arthur Young, Mr. William Johnson, Mr. James Manley, and the late worthy Sir Thomas Bernard himself.—S. P.

is hostile to vegetation, yet it operates advantageously, in various ways, when judiciously applied to arable land. In large quantities it has a tendency, like every other excessive stimulant, to disorganise and destroy the vegetable substances with which it comes in contact; but in *moderate quantities* it promotes the growth of vegetables.

"It has been proved by Pringle, and Macbride, that though Salt will, in large quantities, prevent putrefaction, owing to its antiseptic properties, yet that it has an evident tendency to promote the process, when used in small quantities. Hence the advantage of mixing it in moderate quantities with farm-yard

dung, and other animal and vegetable substances.

"An experiment was tried in Cheshire, of mixing grass roots and other rubbish harrowed off the land with foul Salt: it was then incorporated with other manures; and the effects of this compost, on a crop of barley and grass seeds, is said greatly to have exceeded the most sanguine expectations that had been formed of it.

"A farmer mixed up a quantity of refuse Salt with the earth taken out of water furrows, and another portion of the same earth with lime. Of the two, the vegetation of that part of the field which had the salt compost laid upon it was by far the healthiest

and most vigorous.

Vermin. "Salt destroys vermin in the ground, by making them void the contents of their bodies, such evacuations being too powerful for them to withstand. It has this additional advantage, that the vermin thus become food for those very plants,

which otherwise they would have destroyed.*

Turnips. "Equal quantities of salt, and of turnip seed, were tried on a small plot of a garden, by the author of this paper; and the produce was more abundant than from the same quantity of turnip seed sown without Salt. The efficacy of Salt, as a destroyer of the turnip fly, or beetle, ought to be ascertained."

TESTIMONIALS ON THE EFFECT OF SALT IN FEEDING HORSES, SHEEP, CATTLE, &c.

43. There is no substance yet known which is so much relished by the whole order of graminivorous animals as Common Salt. The wild creatures of the desert are so fond of it, that wherever they discover a bank of earth impregnated with a small portion of Salt, they come to it regularly ever after to lick the saline earth. It is also admitted by all who have tried the experiment, that Salt given along with the food of domestic ani-

^{*} Lord Dundonald on the Connexion of Husbandry with Chemistry. Page 138.

mals (except fowls) tends very much to promote their health; and accelerate their fattening; and although some persons, who have been at a loss to account for the manner in which this stimulant could act as a nutritious substance, have affected to disregard the fact, yet no one has been able to bring the slightest show of evidence to invalidate the strong proofs which have been adduced in support of it. It is not, therefore, an extraordinary position to say, that by a proper use of Common Salt, the same quantity of forage might, on many occasions, be made to go twice as far as it could have done in feeding animals, had the Salt been withheld from them. If so, then we have here laid open to our view an easy mode of augmenting the produce of our fields to an amazing extent; for if the same quantity of forage can be made to go, not twice as far, but one-twentieth part only farther than it now does, it would be the same thing as adding one-twentieth part to the aggregate produce of meat for beasts throughout the whole kingdom."-Dr. Anderson on Salt.

44. "Salt provokes the appetite, strengthens the stomach, promotes the digestion and concoction of the aliments, resists putrefaction, prevents unnatural concretions of the humours, and is most friendly and agreeable to the human body, entering its composition as a necessary ingredient. No wonder, therefore, that the Laplanders, amongst whom the use of Salt is unknown, seem to discover the want of it by the exility of their bodies, and the weakness of their constitutions; being much less robust and strong than other northern nations who enjoy this excellent gift of God. Moreover, its uses extend to many other animals besides the human race: black cattle and sheep take a pleasure in licking it, and by it are preserved from many diseases; they also thrive to admiration, and quickly grow fat in marshy grounds that are frequently overflowed by the sea. And if we descend to the vegetable tribe, we shall find that Salt contributes greatly to fructify the earth; and when properly used as a manure, affords ample nourishment to corn and other vegetables; and renders kingdoms rich and fertile where it happens to abound in the soil." Dr. Brownrigg's Art of Salt, Octavo, London, 1748, page 157.

45. A Letter from a very considerable North American planter to the Editor of the Museum Rusticum, respecting the great Benefit of Salt to Cattle, with the method of using it. Extracted from the Museum Rusticum et Commerciale, London, 1764.

Gentlemen,

I do not find that the farmers in England know the great advantages which may be derived from the use of Salt in the business of fattening cattle; whereas, in America, we think it in a

manner absolutely necessary, and accordingly give it to almost every kind of cattle; and those with parted hoofs are particu-

larly fond of it.

Horses are as fond of Salt as black cattle; for with us, if they are ever so wild, they will be much sooner brought to a handful of Salt than any kind of corn whatever. We also give Salt to our sheep. To this practice of feeding with Salt, it is generally ascribed, that the American cattle in general are so much more healthy than the same animals in England: certain it is, that they are there subject to much fewer diseases. There is one very advantageous practice we have, which I cannot enough recommend to the notice of the farmers here in England: it is mixing Salt with our hay-ricks when we stack it, which we call brining.

Just before I left America, I had a crop of hay, which was in a manner spoiled by rain, being almost rotted in the fields; yet did this hay spend as well as if it had been got in never so favourably. When my servants were making up the stack, I had it managed in the following manner: that is, as soon as a bed of hay was laid about six inches thick, I had the whole sprinkled over with Salt; then another bed of hay was laid, which was again sprinkled in like manner; and this method was followed

till all the hay was stacked.

When the season came for cutting this hay, and giving it to my cattle, I found that so far from refusing it, they ate it with surprising appetite, always preferring it before the sweetest hay, that had not in this manner been sprinkled with Salt. I have, in North America, some very considerable plantations; but having been for some time in England, I dedicate all my leisure hours to the study of Agriculture, and have regularly, since the first publication, taken in the numbers of the Museum Rusticum, with which I cannot but in justice declare myself perfectly well satisfied; and am of opinion it will be of great service, not in England only, but in America also.

I am, gentlemen,

London, May the 14th, 1764.

Your constant reader,

46. "In looking over the first volume of the Memoirs of the Royal Academy of Sciences at Paris, I met with a paper, entitled 'Physical Observations on the Effect of Salt in fattening Cattle.' The title excited my curiosity; and on reading the memoir, the author's reasoning appeared to me not only pleasing but convincing. His views are certainly enlarged, and directed to objects of the most important kind, viz. the improvement of land, and the increase of cattle. He lays it down as an axiom, or self-evident truth, that by increasing cattle, land may be improved; and by improving land, cattle may be multiplied.

'The farmer,' says he, 'who has more than an ordinary stock of working cattle, reaps a double advantage; the one by having his work done in season; the other, by enriching the greater proportion of his land, by means of their additional manure.' The only difficulty is, how to maintain an increased number without increasing the expense; this, he asserts, may be done by the use of Salt, and advances the three following propositions:

"Ist. That Salt given with the food of cattle augments the

nourishment of that food.

"2nd. That in the proportion to the quantity of Salt eaten by cattle, the effects of that augmentation will be perceivable.

"3rd. That no ill consequence will follow from excess of Salt eaten by cattle, even though it should be given them without stint.*

"These propositions he endeavours to support by unquestion-

able facts.

"In the jurisdiction of Arles, in the county of Provence, there is,' he says, 'a district called the Crau, extending in length about six leagues, and breadth about three, the whole surface of which is covered with small rough stones, and not a tree or bush is to be seen in the whole district, except here and there upon the borders; yet on this spot, so seemingly sterile, by the free use of Salt, more numerous flocks of sheep are bred and reared than upon any other common of equal extent throughout the whole kingdom; and what is not less remarkable, the sheep are healthier, hardier, and endure the severity of the winter with less loss, though they have fewer sheep-cots for covering than those fed and bred in more copious pastures; and that have, besides, the advantage of more convenient shelter. Add to this, that the wool of the flocks bred and brought up in the Crau is not only the finest in the whole country, but bears the highest price of any in France. From hence he concludes, that it is to the unlimited use of Salt that these surprising effects are to be ascribed; for it frequently happens that the Crau is so burnt up in the summer, that the poor animals are forced to turn up the very stones to come at the few blades of grass that grow round them, and yet none perish for want of food. Let every excellence, therefore, that can reasonably be supposed inherent in the herbage be allowed to it, yet the quantity of it is so small,

^{*} From the trials which have already been made in feeding the live stock upon a farm, it appears that the following quantities may at all times be administered with perfect safety.

To neat cattle four ounces of Salt per day, mixed up with steamed chaff or other moistened food; one half to be given in the morning, and the other half in the latter part of the day. To horses four ounces per day, as aforesaid. To young heifers two ounces per day, at twice, as aforesaid. To calves one ounce per day, divided into two portions. To sheep two ounces per head per week. The Salt to be spread very thin upon slates or tiles, in the field where the sheep are fed.

that without the abundant use of Salt, a fourth part of the sheep

kept in the Crau could not subsist on it.

of the Annals of Agriculture.

"But as a still farther demonstration that this astonishing effect is solely to be attributed to Salt, we have,' says the writer, 'in Languedoc, on the borders of the Rhone, a spot of the same kind of stony land, in every respect similar to that of the Crau, though in other respects it is no ways inferior; the wines and other fruits produced on the borders of both being in their goodness and other essential qualities equal.' Having proved his first proposition incontrovertibly, he proceeds to prove the second, to recommend an easy experiment, which it is in every farmer's power to make, and that is, to give one-half of his cattle Salt, and to the other half none: by this simple trial,' he says, 'in less than a month the difference will be discernible; the cattle to whom the Salt is given will shew it in their looks, in the sleekness of their coats, in their growth, and in their strength and firmness of labour. He adds, that with little more than half their usual food all these effects will be produced.

"To establish his third proposition, he appeals to the practice about Arles, where the cattle have as much Salt as they will eat; and none are so healthy, or thrive so fast, as those that eat most of it. 'To the above observations of our correspondent,' adds Mr. Young, 'we may state, that in Spain, where the finest wool in the world is produced, great quantities of Salt are given to the sheep; to which they attribute, in a great measure, the fineness of the wool. The Salt is laid upon the rocks, and the sheep come and lick it, and are exceedingly fond of it."—Letter to Mr. Arthur Young in the 24th volume

47. "We are not aware that the practice of giving Salt in its raw state to sheep is to be found any where in this kingdom except on our own estate (meaning the estate belonging to the Board of Agriculture); we shall therefore speak with due caution on the subject, confining ourselves to what has actually been done, and to the effect, which in several years' trial has been most The heavy duty now imposed on Salt seems sufficient to deter others from its use, as it for some time deterred At length we fortunately lost sight of this timidity: our motive was not to promote this or that imaginary effect, but to keep sheep in health. It was reasonable to conjecture, that the flock would demand more Salt in the autumn and spring months, when dews are heavy, than in the summer or dead winter months; and so it proves. In Spain a thousand sheep use in five months four arobes, or one quintal of Salt, which is one hundred and twenty-eight pounds. Their sheep would fatten at about thirteen pounds per quarter upon the average. This is the quantity given out, all of which may not be consumed. And as the price of Salt in that country is no object, more would have been given

if more was necessary. Without reference to what was allowed in Spain (for the increased moisture of our climate, and the peculiar properties of our various soils, would not allow such a reference safely to be had) the quantity given to our sheep was such as we have before stated would keep them healthy, or such as they appeared to demand. It is given in the morning when the sheep are looked over, in order to counteract the ill effects of the dew. They have consumed at the rate of one ton of salt for every thousand sheep annually, amounting to thirty-six pounds sterling; the consumption of one thousand sheep might occasionally, but varying according to the season, amount to thirty pounds sterling per annum, and no more. A small handful of Salt is put on a flat stone or slate, and ten or fifteen of these slates, set a few yards apart, are enough for one hundred sheep; at first the sheep may be moved towards them; if they feel a craving for Salt they will lick up quickly as much as is necessary: if they do not want it, what remains dry when the sheep are next looked at is taken up and reserved for future use. Twice a week has been usually found sufficient: in particular cases it may be offered thrice. As to any doubt respecting their inclination to it, none can be maintained; for of a flock approaching to one thousand, there are not ten old sheep which have not taken kindly to it, and not a lamb which does not consume it greedily. When turnips in the early season are stocked with sheep, and the greens are rank and strong, many die suddenly, more especially two-tooth sheep. The disorder is a pent-up wind occasioned by excess of fermentation in the stomach: here salted hay and Salt are devoured with a greediness that denotes their salutary effect. The autumn of 1801 was rainy and unfavourable, yet we did not lose one sheep in turnips, and probably never shall whilst we persevere in the use of Salt. In that of 1802, we had many hundred fat weathers, gales, and hog sheep, in turnips, and lost two the first month the turnips were stocked. Certainly the chances were, that in any keep, and any season, of such a flock more might have died. In strong pastures likewise, when seasons are wet, the rot often spreads destruction over whole tracts of the country: here Salt must be beneficial, and an object of national importance. It is supposed, and with great truth, to correct acidity in the stomach; a disorder common to sheep even in Spain, but of a much more serious nature in the damp climate of Great Britain; more particularly when stocked on green floaty food, such as turnips, vetches, and young clover. Salt may not be a specific on land naturally unsound: such land it is madness at any rate to stock with sheep: but where the rot occasionally prevails, those who have carefully noted how Salt affects cattle, can hazard little in supposing that the disease will be much less heard of when such a corrective is applied. We must content ourselves rather with a negative

than a positive proof, because it is not easy to ascertain how many sheep might have fallen sick or have died, which are now in health and alive; but it may be put to any flock-master, whether he would not consider himself a fortunate man, if at the expense of thirty pounds sterling per annum * he could materially improve the health and condition of a flock of one thousand sheep weighing fourteen pounds per quarter. His probable answer will be, that he would give double the money to secure to himself such an advantage."—Lord Somerville's Communications to the Board of Agriculture.

48. "Amongst all these animals there are some naturally better disposed to fatten than others; and care and attention are paid to giving a plentiful supply of food to those who are least inclined to fatten, in order to sell them at the same time, and to give them an equality with others to facilitate the sale: for this purpose Salt is added to their common food. This ingredient, of which they are very foud, gives them an appetite, excites thirst, and facilitates their digestion. There are various methods of administering it, such as hanging it up in a bag between two bullocks, who lick it after feeding, or melting it in the white water, the paste, or in the chesnut bread, or, in short, by giving them some handfuls of it, either on a board, or at the bottom of the troughs when empty."—Monsieur Juge, on the Fattening of Bullocks at Limoges. Annals of Agriculture, vol. xviii. page 17.

49. "In visiting Mr. Mosselman, who occupies a large farm at Chenoi, beyond Wavre, I was surprised to find a quantity of Rock Salt from Cheshire. He assured me that the use of it was

of the greatest advantage to him, in three respects:

1st. "That by allowing the sheep to lick it the rot was effec-

tually prevented.

2nd. "That his cattle, to whom lumps of it were given to lick, were thereby protected from infectious disorders; and the cows being thus rendered more healthy, and being induced to take a greater quantity of liquid, gave more milk; and

3rd. "That a small quantity pounded was found very bene ificial to horses when new oats were given them, if the oats were at all moist."—Sir John Sinclair's Agricultural state of the

Netherlands.

50. "That sheep are fond of Salt is beyond all doubt; it is equally certain that to these animals it is a preservative against many diseases, and, if I am not greatly mistaken, contributes in no small degree to render their wool finer."—Landt's Description of the Faroe Islands.

^{*} I have great pleasure in reminding the reader, that in consequence of the late reduction in the duty on Salt consumed in farming, a grazier may now derive all the benefits described by his lordship at the expense of SIX POUNDS. S. P.

51. "There is a custom in Spain and Portugal, which I have personally witnessed the practice of in North America, of daily placing on stones, in the sheep pastures, some dry Salt for the use of the sheep. I have seen each of the sheep in his turn, and with eagerness, take a small portion of it. This is considered as a preservative against the rot, and as contributing to their general health and good condition. It is understood that a considerable part of the Salt, which we export duty free to America, is used for the purpose of Agriculture: though by the time it reaches the American farmer it costs him as much as two shillings and sixpence per bushel; and, I have no doubt, but in our humid and uncertain climate, and in the variety of our soils, it would, in small quantities, be found generally useful in preserving our sheep from the rot, and other complaints hitherto deemed inevitable and incurable.

"In Spain the cows are regularly supplied with a little Salt, and the increase of their milk, and the benefit which stable fed cattle derive from it, are confirmed by many authorities. A Cheshire gentleman informs me, that when he wants extraordinary exertion from his horses, he always gives them a little Salt; and this is analogous to the practice in the East, where the camels are allowed Salt during the passage of the caravans over the desert to Alexandria, as a support in the extreme fatigue they undergo."—Sir Thomas Bernard's Letter to the Right Hon. Nicholas Vansittart.

52. "The Onondargo is a fine lake of brackish water surrounded by springs, from two to five hundred gallons of the water of which make a bushel of Salt. It appears as if nature expressly intended this region to be populated; and, as a strong temptation, placed this treasure in the bosom of hills and woods. Had it not been for these and similar springs dispersed through the western country, Salt must have been at such a price as to deter persons from settling there. All the animals of those parts have a great fondness for Salt. The cattle of farmers, who give this substance to their stock, prove superior in value by twentyfive per cent, to such as are not supplied with an article so essential not only to their general improvement but their health. The native animals of the country too, as the buffalo, elk, deer, &c. are well known to pay periodical visits to the saline springs and lakes, bathing and washing in them, and drinking the water, till they are hardly able to move from their vicinity."—Ashe's Travels in America.

53. "In visiting Mr. Alderman Farley's Salt-works at Droitwich (17th August, 1817), I was struck with the appearance of an old black horse, that worked the machine for raising the brine. He was in very good condition, and his coat was like the finest black satin. I asked the old man, named Twigg, who had the care of him, what made the horse so sleek and plump:

his answer was, that he had regularly given him a little Salt in his chaff three days in the week; about four ounces each of the three days; or if he was not very stout, then sometimes a little more; but that in general the horse was very well, and did his work well. He said he did not give him the whole four ounces at once, but at several times; about a table spoonful each time. The horse had been purchased by Mr. Farley about four years ago, being then about twenty years old, and his health and appearance, though he had constant work, had been since very much improved: the Salt, he added, had made him eat his food and work better. A farmer, who was present, observed that he usually gave his horses a little Salt in their grains, and found that it did them good; and also that he gave it them as a cure for the bots."—Sir Thomas Bernard's Case of the Salt Duties.

- 55. "Every species of live stock is very much injured by being denied the due supply of Salt. Salt forms an essential ingredient in the food of every species of domestic animals. We feel how requisite Salt is to the health and comfort of the human species: it is equally so to that of cattle. Salt softens the skin of the domesticated kinds, and makes their hair and wool fine and shining. When horses are fed on bruised gorze, or any kind of fruit abounding with Salt, or when a handful of Salt is put into their food every day, their pile becomes soft and shining. The superior quality of wool in Spanish sheep proceeds chiefly from an abundant supply of Salt. When Salt is given to cows, it improves the quality, and increases the quantity of their milk. It is necessary to cows: they are so fond of it that they eat wet litter from under horses, or on the dunghill, because it is impregnated with Salt, the Salt of urine. It is a great pity that animals so very valuable, and whose produce depends on their being properly fed, should be obliged to eat litter mixed with dung to obtain a Salt with which they ought to be amply supplied. The duty on Salt is of all others the most improper."-From William Alton, Esq. Communicated to the Chester Chronicle by the Rev. B. Dacre, of Mosely, near Manchester.
- 56. "The mortality has increased in our fields since the augmentation of the price of Salt has obliged the farmers to give it more sparingly to their cattle. In the district of Champsaur, and the adjacent countries, we are accustomed to give every ox and cow four ounces of Salt every eight days, and about an ounce to every sheep and goat at the same intervals. When this practice is neglected the animals eat less; they lose their spirits, their hair rises, they go licking in their stalls the bottom of the walls where the salt-petre is formed, they grow lean, become barren, and disease ensues."—From the History of the Royal Society of Medicine at Paris, for the years 1777 and 1778.

57. "It is well known that hay, mouldy from rain, is rendered palatable and remarkably nutritious to cattle, by simply strewing Salt on the stack, at the rate of ten or fifteen pounds per ton when making. Equally notorious is it, that a sensible effect is hereby produced to the taste; that cattle will prefer it to better hav well put together, and will demand, when fed on it, without injury to themselves, three times as much water; which circumstance alone accounts for that aptitude to fatten which is conspicuous in cattle fed upon hay so salted. It remains to be proved, how good hay, which had not spent its strength in premature fermentation, would bear such a quantity of Salt as would invigorate the stomach, quicken the circulation of the blood, and excite in cattle a desire to drink largely; that it does bear it, and that the effect this hay has upon stock, almost surpasses belief, we have ascertained. Some of our hay lately in use was of the first quality of sheep-hay, the produce of rich and deep loam on a limestone bottom; it was put together without wet, and had twenty-five pounds of Salt per ton sprinkled through a sieve, a greater quantity than has yet been used. colour, flavour, and proof, it equalled any hay whatever; and satisfies us that this or a greater quantity of Salt may be infused into hay of the best quality, and with the best possible effect. In confirmation of these facts, we have also the authority of Mr. Darke, of Breedon, one of the most celebrated graziers in the kingdom, who has mixed Salt with his flooded mouldy hay, eight pounds of Salt only to a ton, and declares that his Hereford oxen did better on it than others that had the best hay he had, and that he was, and is convinced, that the hay had all its good effect from the Salt. Salt cannot be conveyed into an animal in a more effectual manner than by sprinkling it on hay through a sieve, when in the act of putting it together; for every particle is imbibed in the fermentation without a possibility of waste. It will upon trial, no doubt, prove a better breakfast than those cold dews which prevail in this country nine months out of the twelve; and which are more prejudicial to the wool and carcase of those feeble animals, than has hitherto been considered." Lord Somerville's Communications to the Board of Agriculture.

58. "As the season for hay-making is drawing near, we must beg leave to recommend the salting of ricks. I am persuaded few farmers are aware of the benefit arising from this practice, particularly in stacking in sultry weather. The Salt preserves the hay from over heating and becoming mildewed: it may be put together greener than otherwise, without danger of firing. All kinds of cattle, &c. prefer inferior hay thus managed to the best that can be placed before them that has not been salted: the Salt assimilates with the juices of the hay, and thereby prevents too great a fermentation, and by its soporific quality gives

it a superior flavour. The proper way of using it is, in building the stack to sprinkle the Salt alternately between each layer of hay, in the proportion of one hundred weight to seven or eight tons."—Annals of Agriculture, vol. vi.

- 59. "In the survey for the county of Lancaster, Mr. Holt says, 'the high duties upon Salt operate as great obstacles to the application of this article to the advantage of cattle, in giving it in troughs, &c. in certain cases. It is an article most cattle are fond of: it assists digestion, promotes a disposition to fatten, prevents certain disorders, and in foreign parts they use it in large quantities, not being loaded by high duties; and, it is asserted, entirely prevents that fatal disease amongst sheep, the rot."
- 60. "A salt-marsh is not only the best and most healthy place for thriving and fattening all sorts of cattle and horses, but it is likewise the best medicine for any putrid or contagious disorder which they may have contracted. As a proof of this assertion, when the farmer suspects his sheep are in a consumptive state, or his horned cattle or horses have contracted any putrid disorder, they are sent (where it can be done) to pasture on a salt marsh, which is the best remedy for these complaints, and which never fails to work a speedy and perfect cure. In Spain, Salt is given to their sheep in the rot as a medicine, and also to those that are sound, by which means the shepherds of that country say that their wool is much improved in fineness. The grass of salted lands would doubtless be attended with these beneficial effects in a superior degree, as it would operate constantly and more effectually upon them."

"And if the salt marshes be found to be so safe and certain a remedy for the disorders of the brute creation, might we not expect equal advantages to accrue to the human species, if our milk, butter, and all our vegetables, were produced from grounds

manured with Salt?"

- "Nothing could be more disagreeable and prejudicial to the human species, than for them to be deprived of the use of Salt; the prohibition would be insupportable. Why then should we withhold from the beasts of the field a thing which is so agreeable to their palates and conducive to their health?" Mr. Hollinshead's Hints to Farmers, page 12.
- 61. "When grains, ground corn, &c. are given to milk cows, feeding cattle, or horses, there ought to be two ounces of Salt mixed with every feed that is given to them. This has been the practice of a gentleman in the county of Lancaster, for several years, and has been attended with the greatest success; his cows giving a much greater quantity of milk, and at the same time being in much better condition than those which are fed in the ordinary way." Hollinshead, page 12—13.

62. "The following experiment is communicated to us by

William Stephenson, esq. banker, of London:

"Upon a small grass field, which for many years after it had been in tillage, produced nothing but a very dark-coloured, dry kind of grass, and neither horses nor neat cattle would thrive upon it, I sowed about sixteen bushels of foul Salt per acre, in April, 1778, and ever since that time it has been perfectly green, both in summer and winter, and cattle of all kinds thrive in it remarkably well." Hollinshead, page 18.

63. Extracts from Papers lately published by the Right Honorable Sir John Sinclair, Bart.

Hay. "Lord Somerville is of opinion that Salt cannot be conveyed into an animal in a more effectual manner than by sprinkling the Salt through a sieve, at the rate of twenty-five pounds weight of Salt to a ton of hay, when in the act of putting it together, for every particle is imbibed in the fermentation, without a possibility of waste. This salted hay is of great use to sheep, when put on turnips early in the season, for the tops being then rank and strong, many of the sheep die suddenly from pent-up wind, occasioned by excess of fermentation in the stomach. Salt, or salted hay, are then devoured by them with a greediness which denotes their salutary effect. By the use of salted hay, Lord Somerville did not lose one sheep on turnips in the autumn of 1801, though the season was rainy and unfavourable.

Straw. "The ancients were accustomed to prepare their straw for feeding stock, by keeping it for a considerable time sprinkled with brine; it was then dried, rolled up in bundles,

and given to oxen instead of hay.*

Horses. "In Flanders, it has been found that a small quantity of pounded salt is very beneficial for horses, when new oats are given to them, if the oats are at all moist; and there can be no doubt that moist food in general might be rendered less injurious by the same means; for instance, when raw potatoes are

first given to horses.

"Mr. Birkbeck, in his notes on a Journey in America, recently published, mentions, that the horses he saw in the interior of that country were of an excellent description, and are in high condition, even when travelling at the rate of forty-five miles per day, on long journies. They are fed well, getting from four to five gallons of oats per day, besides hay, with a good handful of Salt about twice a week.

"Salt given to horses cures the botts; and it is said might be given with great advantage to race-horses, and would prevent the necessity of applying those severe purges to which they are

at present subjected.

^{*} Dickson's Husbandry of the Ancients, vol. ii. page 408.

Bullocks. "In the East Indies they give Salt to their bullocks, in general daily, to the amount of two or three ounces mixed with their feed of pulse; a due proportion of Salt they consider to be essential for their health, and almost as necessary as food.

Hogs. "Great quantities of Salt are considered to be injurious to hogs; but, in America, Salt is occasionally given to them, to render them tame, and to prevent their being lost in the woods. Mr. Curwen also mixes some Salt with the steamed

potatoes he gives his hogs, and he thinks with benefit.

"It is said that in Ireland, when fattening their hogs, they sprinkle a little Salt with every meal, by means of which they are found to fatten in half the period they would otherwise require."—Observations by John Marshall, Esq. on the Medical as well as Dietetic Properties of Common Salt, in the London Medical and Physical Journal, vol. xxxix. fo. 231.

Poultry. "Salt also may advantageously be given to poultry, and may prevent some of those disorders to which they are liable. The avidity with which pigeons consume Salt is

well known.

Hay. "In a recent communication from A. Bracebridge, Esq. of Walton-on-Thames, he states, that some years ago, the clergyman of Holmes Chapel, who lived near the Salt-Works, gave a favourite old mare, who was much broken-winded, some spoiled hay that had been salted (at that time Salt for agricultural purposes was free of duty). The mare had nothing else to subsist on, but throve on that food so well, that she was fit to be put to work again next spring. This induced Mr. Bracebridge to drench some rotten sheep, night and morning, with strong brine; after which, he did not lose one; they became fat, and the meat was fine and good, as if the animals had never been affected."

64. Extract of a Letter from I. C. Curwen, Esq. to the Editor of the Carlisle Journal.

"I avail myself of this opportunity to say a word or two on the subject of Salt. I rejoice to find the trials of it are numerous. In addition to what I have formerly stated in favour of it, I am now enabled to add, that out of fifty shearling Devons, killed this winter at the Schoose, the whole have been perfectly sound. Previous to the use of Salt, it was rare to find a liver (of a sheep) that was not more or less tainted. The cattle and horses are continued in the free use of Salt. Latterly, at the Schoose, I have given six ounces per day to work-horses—four with steamed potatoes, two with steamed chaff. I fully expect it will operate powerfully in preventing horses greasing. In the course of a few months I shall be able to speak more decidedly on the subject. I find the additional quantity of Salt so far to agree perfectly well with the horses. The general use of Salt

will not only be found highly beneficial to the agriculturist, but will furnish so large an addition to the amount of the salt tax, as to justify and call for the reduction of the duty in favour of the public at large. About fifty thousand tons is all that pay duty in Great Britain. If Salt were generally applied to the feeding of cattle, the consumption would reach six times that amount, and produce, at five pounds a ton, a sum equivalent to the present oppressive and unequal tax, in which a labourer pays a 26th part of his earnings, whilst the opulent do not pay more than from 500 to 1000th part on this indispensable necessary of life." Copied from the Farmer's Journal for the 4th of January, 1819.

65. On a Remedy for the Black Scour in Sheep, extracted from a letter to the Editor of the Farmer's Journal.

Kilton, near Bridgewater, Somerset, Dec. 21, 1818.

Sir,

Salt possessing septic and antiseptic properties, it is obvious that it should be used with caution; indeed, experience (the best test of wisdom) has so instructed me. I have for the last ten years, and more, given Salt to sheep in the following proportions, in all cases of diarrhoea, with the best possible success; two drachms (apothecaries weight) of dry Salt for a lamb of nine months old, and that quantity increased to three and a half drachms for a large and full-grown sheep; and in the same ratio for the intermediate ages. The mode I adopt is to introduce the specified quantity into the mouth of the sheep with a spoon, withdrawing the spoon and closing the mouth. In a few seconds the Salt dissolves in the saliva, and the sheep readily swallows it. I consider water not only inconvenient, but improper, as a superabundance of it was, in my opinion, the original cause of the disease. I have seldom found a repetition of the above dose necessary; but if one should not prove effectual, there can be no objection to repeating it, every other day, till the desired effect is produced.

Desirous of communicating, as well as receiving, useful information, I am induced to submit the above observations, under the full impression that they will be found beneficial to those who may be induced to make trial.

Remaining, Sir, truly your's,

CHARLES ADDAMS.

From the Farmer's Journal, January the 4th. 1819.

On the use of Salt to Bees.

66. Copy of part of a letter from Sir John Sinclair to the Right Honorable Charles Arbuthnot, secretary to the Treasury.

Sir,

Every day furnishes some additional evidence of the advantages to be derived from the system adopted by parliament last session regarding the Salt Tax. A curious proof of it has lately

come to my knowledge.

It is well known that bees do not thrive in damp seasons. A lady whose bees were perishing owing to wet, was induced to try whether Salt would not be of use to them. She spread some thinly on a dry substance near her hives, and found that it was regularly consumed by them. The result was highly satisfactory; for, when all the bees in her neighbourhood either perished or were unproductive, her's throve, and produced a great quantity of honey. This discovery may render the culture of bees less precarious than hitherto has been the case in this country, and may be of great use to industrious cottagers.

I have the honour to be, &c.

EVIDENCE DELIVERED BEFORE THE HONORABLE THE BOARD OF TRADE, IN APRIL, 1817, EXTRACTED FROM PAPERS RELATING TO THE SALT DUTIES, PRINTED BY ORDER OF THE HOUSE OF COMMONS, DATED THE 4TH OF JUNE, 1817.

67. The Evidence of the Right Honorable Lord Kenyon.

"By the information which I have been able to collect, I am induced to consider Salt, when sparingly applied, as an admirable manure, especially for fallows and arable land; and when mixed up with soil out of the gutters, or refuse dirt, or ashes, to be very valuable also on grass-land. My own experience convinces me that it is very powerful in destroying vegetation if laid on too thick, having put a large quantity of refuse Salt on about one-fourth of an acre of land, which, after two years, remains quite bare. A land-surveyor of high character in my neighbourhood considers that the use of Salt would be likely to be very valuable in destroying the slug, wire-worm, snail, &c. which often destroy even whole crops. He also well remembers that Salt was used largely in the neighbourhood of the higher and lower Wiches in Cheshire, before the duties were raised to their present height."

68. The Evidence of Sir Thomas Bernard, Baronet.

"The use of foul or refuse Salt for manure is well known in Cheshire, Worcestershire, and the adjoining counties. It contains about a third of pure Salt, the rest being the dirt and ashes thrown under foot in the path-ways about the Salt Works. The farmers paid government for the use of it as a manure a duty of fourpence per bushel, and as much more to the Salt proprietor, as I was told, for the purchase of it at the Salt Works. Bishop Watson states, in his Chemical Essays, that near three thousand tons of this refuse Salt were annually sold at Northwich alone for manure, at eight-pence per bushel, including duty, or one pound six shillings and eight pence a-ton or load; and I am informed there was a constant demand for it at that price; and that in Worcestershire, the late Lord Coventry bought many hundred loads of this manure for his place at Crome Court. In 1785, however, its use was put a stop to by an act, which charged it with the full duty on pure Salt; in consequence of which, several hundred thousand loads of very excellent manure have been thrown into the river, under the inspection of the excise officer, and have been wholly lost to the country. The preference given to this manure for a series of years during which its use was permitted, is a proof of its value. The dirt and ashes mixed with the Salt were not worth carrying far; and it would have answered better for the distant farmer to have paid even four pounds a load for pure Salt, thereby saving two-thirds of the carriage, and to have mixed the pure Salt with double the quantity of dirt and ashes in his dunghill at home."

69. Extracts from the Evidence of John Christian Curwen, Esq. Representative in Parliament for the City of Carlisle.

"The superiority of the Flemish husbandry over our own is in the unrestricted use of Salt, by which means the best pasture and meadow grounds in that country are put under a convertible system; and by the augmentation of green crops the produce of every acre is doubled.

"The free use of Salt would greatly tend to promote the cul-

tivation of green crops.

"Norfolk and Suffolk, the two best cultivated counties in England, have one acre in six under green crops: the average of the rest of England only one acre in seventy. Salt in solution is a highly beneficial steep for the prevention of smut in wheat."

70. Extract from the Evidence of Major John Taubman, the Speaker of the House of Keys, in the Isle of Man.

"He has, he said, used refuse Salt as a manure on meadows with advantage: it was sown thinly by hand—cannot speak to the quantity used: the meadow had been much covered with moss, which the dressing of Salt entirely destroyed."

71. The Evidence of William Horne, Esq. Merchant of Liverpool.

"In respect to the use of Salt as a manure, I am very much encouraged in my favourable opinion of it by Mr. James Manley, an old inhabitant of Northwich, who says, that before 1785, when the use of foul Salt was permitted, it was applied very largely by farmers in the vicinity of the Salt Works, and that a considerable quantity was sent to London for similar purposes. I have had an opportunity of witnessing its good effects on grass land in the immediate neighbourhood of Liverpool, which to this day retains a verdure superior to the adjacent fields, without the aid of any manure since the application of the foul Salt. Mr. Riding, of Hayton, near Prescot, recollects the application of Salt on rushy land with great success, and the late Mr. Tunstall, of the same parish, a large farmer, drover, and butcher, only desisted from the use of it as a manure and for his cattle when the high duty was imposed."

72. The Evidence of Mr. Kingston.

"In reply to your queries, as an agriculturist, I have no hesitation in saying that Salt, if free of duty, would become one of the most useful and general articles of manure that ever was thought of, if properly prepared, by mixing it with mud of any kind, the cleanings of ditches and ponds, the surface of coarse grounds thrown into heaps to rot, blubber, &c. &c. I am likewise persuaded that if it could be afforded to be sprinkled on the layers of hay when making into the rick, in catching weather, it would prevent its heating or getting mouldy."

"I had once some small oxen tied up to fatten, which did not thrive, owing, as the bailiff said, to the badness of hay, of which they wasted more than they ate, but by sprinkling it with water in which some Salt had been dissolved, they returned to eat it greedily. From this and many circumstances of a similar nature that I have been informed of, by persons of undoubted credibility, I am free to say, that if the food of cattle tied up to fatten was sprinkled with a proper quantity of Salt, they would thrive much faster than by the present mode, and would prevent their

being hoven by an excess of food."

EXTRACTS FROM "MINUTES OF EVIDENCE TAKEN BEFORE THE SELECT COMMITTEE OF THE HOUSE OF COMMONS ON THE SALT LAWS."

No. 73. Monday, April the sixth, 1818.

John Calcraft, Esq. in the Chair.

John Ayrton Paris, M. D. called in and examined.

You are one of the Censors of the College of Physicians in London, residing in Dover Street?—Yes, I am.

Have you ever resided in Cornwall?-I have during five

years.

Do you know any thing of Salt being used as a manure in Cornwall?—The refuse Salt is purchased by the farmers for that purpose, and there is generally a scramble for it, it is considered so desirable to attain it. The effect of it is certainly very striking: it seems to answer best, as far as my enquiries go, to green crops; for instance, to clover and turnips. To wheat and barley it produces a good effect; but it answers better when applied in compost with other manure. I would beg to state one other circumstance in addition, that where wheat or barley has followed turnips, the land of which has been salted, the crop following has escaped the mildew, which has affected land immediately adjoining on which Salt had not been used.

May not the beneficial influence of this Salt depend upon the animal matter which is mixed with it?—Certainly not, for farmers find that that Salt is to be preferred which has been used but once, and they give a superior price for it. That which has been used two or three times, and consequently contains much

more animal matter, is considered as inferior.

Do you know the comparative strength of pure and foul Salt?— I can merely give a rough conjecture: it varies considerably in different parcels. I should think, speaking generally, it would

be more than half impurity.

Have you formed any opinion as to the effect of a material reduction of the duties on Salt ?—It is my opinion, that a very much greater quantity of Salt would be used for manure generally, if the duties and restrictions were taken off. I think there is a feeling among many of the more intelligent farmers of the utility of Salt for a manure, and it is shewn by the readiness with which it is purchased.

You have stated that in some cases it was necessary to mix refuse Salt with compost to make it effectual?—Yes, it appears to be the case that it answers better to wheat and barley when so applied; that it is more successful in fertilizing than when sown

with seed.

Does not that lead you to believe it may be essential that it should be mixed with some other material?—The only conclusion that can be drawn is that which is necessarily drawn from experience: we cannot reason in the present state of our knowledge, with respect to the application of Salt, except by facts, and the facts I have stated are, that to green crops it answers better when sown, and to other crops when in compost.

You say when sown: is the refuse Salt then thrown into the

ground with the seed ?- Yes.

In the quantity stated ?- Yes.

Have you seen it used in those proportions ?- Yes.

It gives you about thirty bushels of clear Salt?—Supposing my data to be accurate, it does.

Have you seen it used to a great extent?—No; I have seen enough to satisfy me that it may be used very beneficially.

Have you seen it used to such an extent as to justify any general conclusion?—My impression about it is, that it is ex-

tremely useful as an article of manure in Cornwall.

What is the sort of soil; is it strong or light?—I feel a difficulty in defining the soil: it was a clayey soil where I saw the turnips growing; and in a neighbouring field which was not salted, and where turnips were growing, the crop was good for nothing.

You stated the price to be tenpence per bushel?-Last year:

I believe it is sometimes a shilling.

The value of sixty bushels, therefore, would be nearly sixty shillings. Is there any manure you could apply to ground that would be so cheap at that price?—I am not farmer enough to answer the question.

If the effects are so obvious as you state them to be, can you give any reason for it not being much more generally used than it is in Cornwall?—The difficulty of obtaining it is so great.

Do you mean to say that all the refuse Salt that is to be had

is so used?-I believe it is.

You are not aware whether any applications have been made from Cornwall for the Rock Salt for manure ?- I am not ac-

quainted with that.

You stated you had observed the effect for a considerable number of years, can you state what number ?—No; but it is the tradition of the people, that Salt was spilled between Penzance and St. Ives many years ago, and the spot is marked by an increased luxuriance in the herbage which is now visible.

Tuesday, 7th day of April, 1818.

74. John Christian Curwen, Esq. a Member of the Committee, examined.

Have you any information to give to the committee, relative to the operation of the Salt Duties on the agricultural interest of

the country?—I hold in my hand an affidavit that has been made by a person who has the charge of the cattle, and the conduct of an experiment that has been carrying on since November last, in feeding with the addition of Salt. The affidavit was made in consequence of an application by Sir Thomas Bernard. I requested that he would make the application for it, that it might not be said that any influence had been used on my part; he did so, and an application was made to a Mr. Thompson, an attorney at Workington, the secretary to the Agricultural Society there; in consequence of which the feeder was examined before Mr. Thompson as to the effects of the experiments; and I have in my hand his affidavit, taken before a magistrate.

[It was delivered in, and read as follows.]

"William Glover, of the Schoose Farm, in the parish of Workington, in the county of Cumberland, the feeder and superintendent of the cattle of John Christian Curwen, Esq. at the said farm, maketh oath and saith, that this deponent began to give Salt to the cattle under his care the nineteenth day of November last past; and from that time till now the said cattle have had Salt as follows: forty milch-cows and breeding heifers have had each four ounces per day; fourteen oxen for fat, and sixteen oxen for work, each four ounces; twenty-seven young cattle, seven of them two years old, the rest one year old, have had each two ounces per day; twenty-six young calves, each one ounce; two bulls had also Salt administered to them; and forty-eight horses kept at the farm have had each four ounces per day; four hundred and forty-four sheep had four stone, or two ounces each per week given at twice, and on slates. The advantage of Salt for sheep appears to this deponent to be great, as he says none of the stock have died in the sickness since they commenced giving Salt, and they have had none in the rot; in other years they lost some of their ewes and wethers in the sickness. The cattle, both old and young stock, have their Salt given in steamed chaff twice a-day, which makes them eat it up, as well as other inferior food. The horses have their Salt given them amongst their steamed potatoes twice a-day, which makes them clean out their cribs, and is a benefit to their health and condition; that the cattle have been in the highest health ever since they commenced the use of Salt. And this deponent saith that he has now kept the cattle at the Schoose Farm for ten years, and they never were so long without sickness; they were formerly subject to obstructions and inflammations; and that he has not had occasion to use any medicine since the twenty-ninth of November last, except in one instance of a cow (now quite well), and he can shew the whole of the said stock, one hundred and twenty-five head of cattle, without the exception of any one animal that is out of order. And he believes there is nothing

that will promote the health of cattle and their good condition more than Salt, when rightly administered; and that medicine would, in his opinion, be little required, if he had Salt at command. And this deponent saith, that the fourteen oxen abovementioned for fat were fed on straw, steamed chaff, and turnips only; and eight of them were weighed on the thirteenth day of February last, and seventeenth day of this month of March, and the increased weight of the eight was thirty stones, of fourteen pounds to the stone.

WILLIAM GLOVER."

Sworn the twenty-fifth day of March, one thousand eight hundred and eighteen, before me,

One of his Majesty's Justices of the Peace in and for the county of Cumberland.

"I have also another paper which I wish to put in; it is a statement of about thirty persons, farmers, who have signed the paper which I hold in my hand, who declare they would use Salt if they could procure it.

[It was read as follows.]

"We the undersigned, being farmers and owners of land in the neighbourhood of Workington, do hereby certify, that we are acquainted with and witnesses to the fact of Mr. Curwen giving Salt to his cattle and horses with their food, at the Schoose Farm and at Workington; and that we are desirous of using the same for our live stock, if it could be obtained without difficulty, and at a cheap rate. Witness our hands, the 24th of March, 1818.

> William Salkeld, John Pearson, Henry Stalker, Robert Pitts, William Simon, John Rook, William Rogers, John Wilson, Ostle Mardaunt, William Dixen, George Baines, William Haig, Isaac Simon, James Graham, Thomas Barnes, John Hetherington,

John Birkett, Alderce Miller, Matthew Sproutt, William Fisher, Thomas Miller, Joseph Simon, John Thomlinson, John Sanderson, Francis Porter, Thomas Sparks, Cuthbert Wilson, John Greener, Robert Bell, Joseph Crosby, Joseph Messenger, James Case.

"I would wish to state, that in consequence of a clause introduced in the fish-bill of last year, I made an application to

the collectors of the Salt-duties at Northwich, for liberty to import five tons of Rock Salt. From that period the Salt has been administered with great advantage to my cattle, sheep, and horses; their condition is greatly improved, and their health has been invariably good, and which I attribute greatly to the use of Salt given with steamed chaff; that is, the husk of the corn, which was of little or no value prior to its being given, dissolved in the quantity of four ounces, in about two stone of that steamchaff per day to the cattle; this, of course, makes a considerable saving in the quantity of green food which would otherwise be required. Having been a considerable corn-farmer, I have a sufficiency of wheat and oat chaff for the supply, which is about two stones each per day; it is prepared by the application of steam; for food of this kind is of so little value, that cattle would hardly be induced to take it without oil-cake, or ground grain; but by the application of Salt, it is taken exceedingly well, with very little loss: the first visible effect of the Salt was in its freeing the milk from all taste of the turnip. I am in the practice of selling a large quantity of milk to the town of Workington, and heretofore complaints were often made of the milk tasting of turnips; but since the giving of Salt, there has not been a single instance of complaint. As this was a result I had not looked for, I was disposed a little to question whether it was not owing to the better state of the turnips, and better care. I was aware that saltpetre, when dissolved in milk, evaporates the taste of the turnip: but on stating some doubt upon this matter, I learnt a fact from my horse-drivers, with which I was not at that time acquainted, which was, that the dung of the horses fed with steamed potatoes was highly offensive; but from the period of giving them Salt, the odour of the dung was totally destroyed, and became perfectly sweet; all the obnoxious smell was quite done away; and uniting both these circumstances together, confirmed me in the opinion that it was the Salt which had produced the effect upon the milk. The advance in fattening of stock has certainly been very considerable; but it must appear evident, that without experiments accurately made, and for a length of time, it would be utterly impossible to say what may be the comparative advantage derived from it; for at the last return of thirty-five days, the gain per day of animals fed on the same food varies from six ounces to two pounds six ounces per day, in animals of from one hundred to one hundred and fifty stone; therefore it will be seen, that to make an experiment with any degree of accuracy, much care must be taken in selecting animals whose propensity to fatten is equal: but I conceive I am justified in considering that the free use of Salt would be an immense advantage to the farmers; in stating of which, I dare say there are few gentlemen I shall not surprise. In stating what I conceive to be the advantage, to many it might appear an exaggerated statement, though I am much below, rather than above the benefit which would generally result from the free use of Salt. In Great Britain there are thirty millions of sheep: the loss upon these, at the most moderate computation, may be taken at two per cent. or six hundred thousand: * taking them at five shillings a-piece, that would amount to a hundred and fifty thousand pounds. Now, my opinion is, that for insurance of health, the advantage of fattening, and for the benefit to the wool, I shall be found to under-rate, when I state the advantage would be sixpence per head upon the whole thirty millions, beyond the cost of the Salt, or a saving of seven hundred and fifty thousand pounds per annum.

"There are supposed to be four millions five hundred and twenty-one thousand beasts of various descriptions in Great Britain. I would suppose the advantage in being able, with the addition of Salt, to feed with inferior food, health, and fattening, would produce a saving to the farmer, taking it only at seven shillings a head, of one million five hundred and eighty-

two thousand three hundred and fifty pounds annually.

"There are supposed to be one million five hundred thousand horses of all descriptions, which, in point of health and feeding with inferior food, I calculate a saving equal to ten shillings a head, which amounts to seven hundred and fifty thousand pounds annually. I would also state, that in an examination formerly before the Board of Trade, I have given a statement which was then mere matter of opinion. I then supposed the quantity of Salt that might be given to sheep to be equal to two stone of fourteen pounds each, per annum; in this I certainly was mistaken, because what I have given is, I believe, more than double what was given by Lord Somerville, and amounts to about nine pounds per annum each. In regard to cattle I have under estimated the quantity, because if Salt could be had at a moderate price there is no animal I would give less than six stone to per annum. I by no means state that the quantities I am giving are precisely what might be given; I think it probable that much greater quantities might be given with advantage; but in an infant experiment like this, I considered any failure might have been attended with bad consequences. I was therefore anxious to give even less than I might probably have done with benefit after the experiment, and which I shall in a short time be induced to try. The fondness of animals for Salt is very remarkable: I have been in the habit almost daily of feeding the young stock with a mixture among bran, and it brought them to be so familiar, that many of them, which before would

^{*} This calculation is upon the supposition that on an average two sheep in every hundred sheep throughout the kingdom now die of the rot, amounting in the whole to six hundred thousand, and that this immense loss would be entirely prevented by Salt; as it has been found that this disease never attacks those sheep which have free access to Salt, or that have Salt regularly administered to them.

not suffer even the feeder, except very early in the morning, to touch them, became so familiar, that I could handle them in any way whatever. In the last year I was induced to make an experiment with Salt, by mixing a quantity with earth, and taking a number of grubs and putting them amongst the soil: I found it proved destructive to them all. In the present year I have directed a pound of Salt to be mixed with every Winchester bushel of oats, about six pounds to an acre, and I have sown it upon such ground as I thought likely to be troubled with the grub, in the hopes that it may be the means of preventing their destroying the crop, and the destruction which of late years has taken place in various parts of Cumberland from the grub."

Eighth day of April, 1818.

75. Arthur Young, Esq. called in, and examined.

You are secretary to the Board of Agriculture?—I am. Did you ever try Salt in the feeding of your cattle?—Yes, but chiefly with sheep, and I found the sheep astonishingly fond of it. I found them so fond of it by some small trials, that I had troughs ten feet long, nine or ten inches wide, and three or four inches deep, in which I scattered Salt for them, and feeding them with my own hand I found them so ravenously fond of it, that the moment they saw me at the gate of the field they gallopped up from every part, and surrounded the troughs so eagerly, that I was forced to place a pole about eighteen inches or two feet long over the troughs to keep them from jumping in, but all their heads were in the trough in a moment.

Can you state what was the quantity you gave?—I cannot with accuracy; but the quantity they took was a perfect contrast apparently to the extreme eagerness with which they came; they took a good lick at it, and went away; but they were excessively eager to come and get that lick: some would take more than others.

Can you state precisely what was the quantity you might give ?- No, I cannot.

Do you consider that it would be beneficial in preventing the rot in sheep?—I found it so, in the years when my neighbours' sheep were generally affected with the rot, my sheep escaped; and my land was quite as wet as my neighbours'.

By the returns to the Board of Agriculture, the number of sheep in Great Britain appear to be estimated at thirty millions; the Committee would ask you, whether you conceive the advantage of sixpence a-head for the free use of Salt would be stating it too largely in favour of the Agriculture of the country?—If any person, at the time I was in the habit of giving my sheep Salt, had offered me a shilling a-head to let it alone, I should have rejected it at the very first blush.

Would you think, considering the advantages in health, fattening, and the power of using inferior food in the feeding cattle and stock in general, that the free use of Salt would be an advantage equivalent to seven shillings a head to the farmer?—I should think it would be worth a great deal more. I think it is INVALUABLE; in short, let my answer be what it would, I am confident I should be under the mark.

You consider seven shillings a-head very much under the mark?—I should suppose seven shillings a-head for cattle is

much under the mark.

Do you think ten shillings a-head upon horses, for the advantage of health and the use of inferior food, would be estimating the free use of Salt too high to Agriculturists?—I have so little experience myself in giving it to horses, that it must be nothing but a matter of opinion; but I should have no hesitation in giving it as my opinion that it is certainly worth that and more too.

If upon thirty millions of sheep the advantage at sixpence per head to the farming interest of the country makes an aggregate of seven hundred and fifty thousand pounds, and seven shillings upon four millions five hundred and twenty thousand, stated to be the quantity of beasts in the kingdom, making one million five hundred and eighty-two thousand three hundred and fifty pounds, and ten shillings upon one million five hundred thousand horses, making seven hundred and fifty thousand pounds, the total of which amounts to three millions and eighty-two thousand three hundred and fifty pounds, in estimating that advantage to accrue from the free use of Salt, is it overstated?—I do not think it is overstated.

You have said your sheep took a lick or two, and then left the Salt?—Yes.*

Did they consume all you had given them?—It was all gone very soon.

There was none left?-Not an atom.

76. John Christian Curwen, Esq. M. P. further examined.

Are the statements of the affidavits given in by you yesterday confirmed by any inspection of your own, or do you rest entirely as to the Salt given, or the effect produced, on the reports of your bailiff or manager?—They certainly are confirmed by my own observations up to the twenty-first of January, which induces me to believe them to be perfectly correct with regard to the quantity; I can only state it according to my directions, and I have no doubt of their being exactly complied with.

^{*} I have myself seen similar instances. The circumstance is owing to the refined salt being too sharp for the mouth. It is therefore always better at first to dissolve the salt in water and sprinkle the food with it. The quantity might afterwards be gradually increased; and by this management, sheep, horses, and eattle, may be all brought to swallow salt with greediness.—S. P.

Your personal inspection goes only through a month?—For two months I can speak of my own knowledge; and I can state that the affidavit is in perfect conformity with the weekly return made to me.

The first statement is with respect to milch cows: the affidavit states, that one effect produced, was taking away the taste of the turnip in the milk; what other effects have you observed?— I observed that the condition of the cattle was greatly improved; that they were in a state of perfect health during the whole of the period to which I can personally speak, and that those complaints that upon so large a stock were usual in other years did not occur; and that the inferior food, such as the steamed chaff, was infinitely better eaten by the addition of Salt in the last year, than it had ever been at any former period whatever when it was given without; and it now comes to my recollection, that though the milch cows would always take the chaff, the oxen would not till it was mixed with Salt or some other ingredient.

In what degree does the use of Salt enable you to feed with kinds of food which would not have been useful without the mixture of Salt?—The weight of chaff given to each milch cow and ox is about two stone a-day. I consider it to be of no more value than the mere cost of preparing it, and that it does materially lessen the consumption of green food; admitting, that by the use of Salt the cattle were induced to take two stone instead of one, that would make a difference of two stone

of turnips a-day.

What will be the value of the chaff, unmixed with the Salt, in the feeding of cattle?—It has seldom ever been made use of whatever.

What quantity of Salt do you mix with it to make it palateable?—Four ounces have been given; and I am by no means satisfied that a larger quantity of Salt might not be given with

advantage: I am of opinion it might.

What proportion would you consider the chaff, when mixed with Salt and rendered palatable, would bear in its nutritious quality to any other food on which they had been accustomed to be fed?—I conceive that chaff has some nutrition, because in steaming one easily perceives that kind of odour from it which argues that it is of some value: but undoubtedly it cannot be of very great value: the Salt operates upon the digestion of the animal, and in promoting its health.

You consider it to be as valuable as any other food you are accustomed to give the animal, in proportion to its quantity?— Undoubtedly not; it cannot be supposed that if the whole consisted of this food it would produce the effect; but it is highly valuable on this account, that with the quantity of turnips given, which is about eight stone, with two stone of steamed chaff and one stone of straw, milch cows are kept in the highest possible condition: the operation of this warm food upon the bowels of

the animal will prevent that great quantity of turnips having the effect it would otherwise have; it keeps the bowels and stomach in perfect good order: for it is found from the state of the dung of cows, when it is too solid or too much otherwise, the animal

is never in a good milking state.

You state, that with the admixture of four ounces of Salt per day, two stone of chaff, which would not be otherwise useful, is rendered useful, and the rest of the food is rendered wholesome?—I consider the value of the Salt great in itself, but greater still when mixed; inasmuch as it puts it in the power of the farmer to make use of one-eleventh part of the whole food given in the feeding of the stock that would otherwise be of no use whatever.

By what rule were you governed in the quantity of Salt you gave to your own cows?—It was from the quantity we had been in the habit of giving to cattle out of order as a medicine, and therefore I adopted that proportion as what I thought might probably be the appropriate quantity; but I by no means wish it to be understood that there may not be great improvements

by increasing the quantity.

Is it not a much greater quantity than that stated by Lord Somerville, or in any other previous experiment?—I am not aware that my Lord Somerville ever gave it to cattle, nor had I the benefit of the experience of any preceding agriculturist that had made use of it: recently I had an opportunity of conversing with General Boyd, who served during the last war in the American army, and from him I learnt that in America they were in the habit of giving Salt with great advantage to their horses.

Do you mean the horses in the King's troops ?- The horses in general. He stated that it frequently happened, in that warm climate, that the horses have been over-driven, and are extremely sick; that by taking a handfull of Salt and rubbing over their mouths, they would, in a quarter of an hour or twenty minutes, recover themselves, and take to their food again. In giving Salt to horses, one very valuable result has been found, that in feeding with steamed potatoes and cut straw, frequent accidents, by overloading the stomach, have occurred, with symptoms which have very much the appearance of paralysis, as the animal was found to lose the use of his limbs: but subsequent experience has taught us that it proceeded from the animal being overgorged, and the powers of digestion being lost; and it has often happened that horses have been lost by giving them too much food; but since Salt has been given, (from the twenty-first of November last up to this time), no instance has occurred in which there has been the least inconvenience arising from feeding with steamed potatoes.

You conceive that those complaints of the horses are perfectly remedied by the application of a certain quantity of Salt in their

food ?-Yes.

And that quantity being four ounces?—Yes; and I am led to believe that in soiling, particularly in giving clover and tares, the cattle are very subject to blowing. I am strongly disposed to believe, from the effects I have seen, by giving them Salt with their potatoes, the same benefit would be found to result from giving them Salt to lick with their green food; that they would not be subject, as they have been, to blowing or being hoven, which perhaps is one of the greatest drawbacks upon one of the most beneficial practices in agriculture, which is that of soiling cattle.

Do you believe that Salt, as applied to the food of cattle, is nutritious in itself, or that it only contributes to render the food given to them more so, and therefore makes it go further?—I should apprehend that its benefit arises from promoting digestion and keeping the animal in a state of health. I hold in my hand a paper containing a statement of the last thirty-five days of the progress of a certain number of cattle, with their ages and their weights, fed upon turnips, steamed chaff and straw, and four ounces of Salt per day.

It was read as follows:

Weight of feeding oxen at the Schoose Farm, February the twenty-first to March the seventeenth.

Gained per day from Hereford. the 11th of February till the 17th of March.

Stroller, nine years old.	1261271 st. 6 oz.
Punch, nine do.	1211221 st. 6 oz.
Pink, nine do.	1321386 st. 2 lbs. 6 oz.
Rose, nine do.	1531563 st. 1 lb. 6 oz.
Brown, nine do.	1111154st. 1 lb. 6 oz.
Prince, nine do.	1391445 st, 2 lbs.

Short horn, reared in the house.

Simon, 2½ years	1111165 st. 2 lbs.
Magog, 2 years 2 months	1101144 st. 1 lb. 10 oz.

Will you state whether a beast eats the same quantity of food with the Salt as he did without, or more or less?—I should have no doubt on the average he would eat more, because I conceive the operation of the Salt is to keep him in better health; and as his stomach is always good, he would eat more, and make a more rapid progress in fattening.

Of the same kinds of food or inferior food?—I have stated an ox would take with Salt a certain portion of inferior food along with a sufficient quantity of nutrition; for I have long been of opinion, that if in the weight that is required to carry on the economy of nature, cattle could be induced to take it, that use might be made of a certain proportion of inferior food; and out of this is to arise one of the great advantages in the use of Salt.

Have you any means of estimating the difference in the value of the food that might be applied to fattening the animal with Salt, and without?—I should state, that I conceive that giving an additional stone of chaff might save three stone of

turnips.

Have you any means of judging whether the use of Salt would bring young cattle forward to pasture, so as to enable them to be fattened and killed earlier than they would otherwise be ?— I should think it would. I should think, whatever promotes the general health of the animal, must accelerate its progress. I may also state, that Salt to the amount of two ounces a-day has been mixed with the new milk and given to calves; with which stock, as we have been remarkably fortunate in the present year, we are inclined to suppose it has had a very beneficial effect.

The use of Salt given to milch cows and cattle is of very old date?—I do not know of any in England, and it certainly does seem a very extraordinary thing, that whilst we know that Salt to a very large amount, and at considerable cost, has been exported to the Netherlands and other parts of Germany, for the use of their cattle, no use of it has been made at home. It is one amongst the many pernicious consequences of the Salt duties that they have prevented the English farmer making use of that which is attended with such beneficial consequences in other countries.

Of what description of sheep does your flock consist? - South

Down.

Of what number?—I think the number returned at present is four hundred and forty-four.

Upon what sort of ground is it usually fed?—Upon a strong clay: as unappropriated for sheep as any land in the kingdom.

Have you always been in the habit of feeding upon that sort of ground ?-Yes.

Have they succeeded upon that ground generally ?- I used to

have a great number of losses before I used Salt.

Have you read the astonishing effects ascribed to Salt in France, as stated in some passages in Mr. Parkes's* book?—
I have.

Do you believe, or have you found that the same ground with Salt will support double the number of sheep that it would without it?—I have not had experience enough to give an opinion upon it.

^{*} This refers to the testimony of Dr. Anderson, which I quoted in a former publication of mine, entitled "Thoughts on the Laws relating to Salt," &c.

The committee apprehend, that with respect to sheep, as well as with other animals, the quantities that have been stated by you are matter of experiment, and that nothing particular is to be concluded from them, except that Salt is acceptable to animals, and beneficial to them?—I certainly consider four ounces a-day for stock to be what may be relied upon throughout the year: but with regard to sheep, the difference of their food being so considerable from that of cattle, I do not feel so competent to

speak so decidedly.

You have stated yourself previously to the last year to have been in the habit of using Salt as a medicine, and from your experience of its salutary effects, you consider the free use of it as a condiment would be the greatest boon government could bestow. It is stated also, by Mr. Horne, that Mr. Curwen assured him he would give Salt in great quantities to his cattle if it were duty free?—The opinion that I had then formed from theory is considerably strengthened. I may safely say, I entertain not the least doubt that I have understated all the advantages resulting from the use of Salt. I was led to form my opinion upon what I understood to be the practice of every farmer in the Netherlands.

What is the value of hay when flooded and mouldy, which cattle will refuse?—I believe it is of no value but for the dung-hill.

What is the value of good palatable hay per ton, for the use of

cattle?-I should think from three to four pounds per ton.

What is the quantity of Salt that would be applied to sweeten mouldy hay?—I am unable to say, because I never had Salt in my possession till last November; therefore I cannot say what quantity should be used.

Do you not think if ten or twelve pounds of Salt, under the high duties, could convert mouldy and flooded hay into nutritious and palatable hay, that it would be a considerable gain to the

farmer who used it ?-- There can be no doubt of it.

In your evidence of last year you referred to the Flemish husbandry, and that by the free use of Salt, the produce of an acre is doubled: will you state how the Salt is applied?—The Flemish husbandry consists in converting the whole of their soil to either corn or green crops; they have therefore little or no meadow or pasture; the consequence of which is, that the product of an acre of green food is generally, in point of feeding (as they do in the soiling system) rendered capable of producing more than double the quantity of either milk or fat, than could be produced by the best grazing acre in this kingdom; and that to bring it into general use, and to avoid the difficulties that arise from blowing or hoving, I consider Salt would be of the most material benefit, because, with all the care and attention that can be paid to feeding stock, the accidents from hoving fre-

quently occur, and that those under unskilful hands very

frequently prove fatal.

If the committee understand you, the advantage arises from soiling.* and not from applying Salt to the land?—Undoubtedly from soiling: but I consider Salt would most materially contribute to the general introduction of soiling. In the county of Cumberland, within the last seven years, there is scarce a farmer that has not been more or less in the habit of soiling his cattle during a part of the day: in many instances it is continued throughout the whole of the day; but the objection to it generally is the liability of hoving,† which is a very great impediment to its general introduction.

Are the committee to understand that by this system, by the use of Salt one acre will support two beasts that would support only one before?—Yes. I consider, from the experiments that have been made at Schoose Farm, that a hundred stone of green food will produce one stone of animal food to the butcher.

Have you made any experiments in the solution of Salt for steeping corn in, to prevent the smut?—It has very long been the invariable practice in the north of England to use a quantity of Salt, or sea-water, in the steeping of corn: it is a very old practice, and is supposed to be the best mode by which the grain can be secured against the smut.

What is the quantity necessary for steeping a certain quan-

tily of corn?-I do not exactly know the quantities.

Is the value of wheat very much impaired by the smut?—Yes. In what proportion?—I should think smutted wheat in years when the best wheat is worth ten shillings a bushel, smutted wheat would not be worth one-half.

Has this been found to be an essential security against it ?— I believe in a great measure it has. I own I was myself a little incredulous upon this subject, as I could not perfectly comprehend how it acted. I was disposed to call in question the using of Salt in steeping; and, acting upon my own opinion, I sowed

* Lest this term should not be understood by every reader, it may be worth while to observe, that soiling is descriptive of the practice of cutting green food daily, and giving it to cattle in their stalls, or putting it in their racks, instead of allowing them to collect it for themselves in the fields. By this treatment, the animals will eat many plants with great relish, which they would not touch while growing upon the land; and the quantity of manure which any farm would produce under the usual management is much increased by this method of

feeding .- S. P.

⁺ The term hoving, or hoven, is made use of by graziers to describe a violent distention of the stomach of an animal, from the extrication of gas in the decomposition of green food, when eaten too greedily, or in too large quantity. The extrication of this air from the food occasions some contraction in the upper part of the stomach, which prevents the gas from passing off by the throat; so that if the animal is not relieved by artificial means, it generally dies in agony. It was usual formerly to relieve a beast under this suffering by making an opening in the side with a knife; but flexible tubes, to thrust down the gullet, and which are sold in London and elsewhere for the purpose, are now I believe generally employed in such accidents.—S. P.

my wheat without steeping it, and I was certainly very early convinced I had better have followed the ancient practice than

have deviated from it.

You have stated, that the advantage to your farm (of eight hundred acres, at one thousand pounds a-year) you should estimate at three hundred pounds per year; upon what grounds is this calculation made?—The calculation was made upon the supposed advantage to a stock of one hundred and twenty head of cattle, eighty horses, and five hundred sheep, with the benefit that would accrue in feeding of them, by giving them a portion of inferior food, which, without Salt, oil-cake, or some sort of meal, they would not be induced to take; also, in the increased fattening and milk of the stock. Supposing Salt to be forty shillings a ton, being in the habit of consuming ten tons, or sometimes more of oil-cake, the cost of which might be taken at average years at ten pounds a ton, there would in that article alone be a saving of eighty pounds; that whatever portion of Salt was used, the value of the manure would be most considerably augmented, as no particle of this Salt, or at least a very small portion of it, would be lost; by proper care, therefore, the ground would in another shape have the full advantage of all the Salt that had been used in feeding. In order to secure this advantage, I might state, that the urine is conveyed into pits, which, by forcing pumps, is thrown over the midding: * from this I should calculate a very great advantage to accrue; and I do not think, as matter of opinion, that the calculation I was led in a former year to offer of an advantage of three hundred pounds on a farm of eight hundred acres, or one thousand pounds a-vear, was overstated.

The augmented value of the manure must be in proportion to the value of Salt as a manure?—To be sure. I entertain no doubt it will be found of great value as manure. I have heard there have been experiments tried at Lisle, by applying urine

entirely alone, and the effect is astonishing.

Are you not aware that there is a great deal contained in urine

besides the saline particles?—Yes.

From whence do you derive your knowledge of the Flemish husbandry?—From acquaintance with the country, from travel-

ling through it, and residing there.

You mentioned in your evidence yesterday an application you had made to Northwich for Salt: will you state how long that was after the passing of the bill?—I wished to have it as early as possible. The bill passed in July; and I think my applica-

^{*} To those farmers who reside upon the sea-coast, the practice of throwing seawater upon their composts and dung-hills, and occasionally upon their fields, may be recommended with great prospect of advantage.—S. P.

tion was in September. The salt is given to cattle dissolved in their steamed food: to horses it is given bruised in their corn; and to pigs it is given dissolved in their wash.

April 13th, 1818.

77. John Christian Curwen, Esq.

Delivered in some papers, containing information to be laid before the committee.

St. Helens, April 10th, 1818.

Dear Sir,

According to your desire, I went over to the Schoose Farm last Friday to view your stock, and to make a report of the supposed advantages to be derived from giving animals fed on green food a proportion of Salt along with it. Having had an opportunity of viewing your stock about this time last year, and also during the summer and autumn prior to your beginning this plan, I am enabled to point out, in a great measure, the advantages to be derived from it; for certainly every animal, according to its respective age, is much better in condition than at this period of the spring last year; and to my knowledge the stock were fed precisely in the same way, except that of giving them the proportion of Salt; and, according to William Glover's statement, they have been much less subject to disorders. From the experience I myself have had, for twenty-six years past, in the greatest and highest bred stocks of short horns in the counties of Northumberland and Durham, I can safely say I never saw so many in such high condition as they are; from the oldest cows and oxen taken off work, to yearlings and calves, they are all in the most thriving state, and fit for the shambles. I very much regret that some have not been fed without the Salt, as the advantages would have appeared more plainly from the contrast : but it is not yet too late, as one or two of the yearlings and old cows may have their Salt taken from them, which, by your return home. would shew the difference. My own sentiments, with regard to Salt, are, that in itself it does not possess any fattening qualities; but as a means of creating appetite, and assisting the digestion, it may be employed to very great advantage, and more particularly where green food is given to cattle in summer, or a large portion of turnips in winter; but a little more experience is required before I can decidedly speak as to its advantages, though, so far as the experiment has gone, it appears very striking, and the use of it ought to be encouraged: the benefit to sheep has long been known and admitted; and reasoning from analogy, there can be little doubt of its advantage to large cattle also: but so long as the difficulty with regard to bonds, &c. in procuring, and the jealousies of the excise of its being properly applied, exist, no person who values his own quiet will enter into

the bonds necessary for that purpose, or wish to have it in his possession, if there is a power left in any petty exciseman to harass and vex him about it; so that, however advantageous the use may be, the present bar must be entirely done away with, before it can be brought into general use and benefit to agriculture.

Your most obedient humble Servant,
ROBERT THOMPSON.

J. C. Curwen, Esq.

"I, Samuel Woolf, of Haslingdon, in the county of Chester, farmer, do hereby voluntarily make oath, that in the farm in my occupation I make in the months of June and July in each year (being the principal dairy months) cheese of one hundred and twenty pounds weight daily, and that I put into each cheese six pounds and a quarter of Salt, four-fifths of it in the vat, and one-fifth part upon the cheese, when taken from under the press, and put into the salting turnel and upon the drying benches. And I do hereby also make oath, that much of the Salt used in the vat is pressed out in the process of making the cheese under hand, and whilst under the press, and strong brine exudes from it afterwards, whilst in the turnel, and most of the Salt put upon the top of the cheese in the turnel, and on the benches, melts, runs upon the floor, and is lost; and that the brine which comes out of the cheese is of little use to the farmer. And I do further make oath, that the salt put into the cheese does not, to the best of my knowledge and belief, add to the weight of it; but if the whey and oily matters were not pressed out by the help of the Salt, * but suffered to remain in the cheese, they would materially injure its quality. SAMUEL WOOLF.

Before me, EDWARD TOMKINSON,
One of his majesty's justices of the peace for the said county."

April 14th, 1818.

78. Mr. William Johnson called in and examined.

You are concerned in a Salt manufactory at Malden in Essex? Yes, under the firm of Johnson, Tuck, and Bridges.

Have you had any application for Rock Salt for agricultural

purposes ?- Not one.

To what do you attribute that?—To the bonds and restrictions and securities required, and the penalties.+

+ These bonds, restrictions, and securities, have not been required since the

passing of the late act of parliament.

^{*} From the enquiries which I have been able to make, it appears to me that salt is of use in a dairy, by acting as a vehicle to carry off the whey from the new cheese, and that if the farmer could use salt without stint, the cheese would in general be more sound and better flavoured.—S. P.

Have you any reason to think, that if those restrictions and embarrassments were done away with, the farmers in your neighbourhood would use Salt for manure and for cattle?—I have no doubt they would come in great numbers for it for manure; and it would be the interest of the manufacturer to promote it as much as he could: we should be induced to let them have it as cheap as possible; and experiments on a small scale, in every field, would be made so conveniently and so cheaply, that there is not a farmer that would hesitate to come for it when the tax was removed.

What induces you to think they would come for it as a manure: have you ever seen any experiments?—No; but the general opinion in favour of it, and the experiments that have been made; and it then being in their power to adopt the trial of it at little charge, no man of common sense would hesitate to make trial of it.

79. Mr. James Manley called in and examined.

You are a farmer residing at Anderton in Cheshire?--I am Have you resided in the county of Cheshire, in the neighbourhood of the Salt Works, for a considerable time?—For thirty-five years.

You at one time overlooked some Salt Works?-Yes, the works

of Swinton, Blase, and Co.

Are you aware of the use of Salt in agriculture, and have you tried any experiments with respect to its use?—I have tried it in my own garden upon onion land.

Is it very serviceable ?-Yes: we use it every year if we can

get it.

Have you tried it upon potatoes?—We have a man who lives on the bank who has tried it. He puts four or five cwt. of refuse salt upon his land.

How much land has he?-Ten Cheshire roods, equal to

twenty statute roods.

Have you ever tried the use of Salt in marling ground, by using brine instead of water in getting marl?—Yes: I have a marl field of eight statute acres: in one part of the field marl was got with brine, and in another part of the field it was got with water.

Can you state the difference of the land you marled with brine and that which you marled with water?—It (the crop) was as much as five bushels to a statute acre more in that produced by brine than that produced by water.

What was this crop ?-Wheat.

Have you any knowledge of the Salt leys, where they use the brine to irrigate the fields to force the grass?—I know Nantwich ley, where they do that, and have known it forty years.

Is not that floated by a forcing pump, throwing the brine over the ground?—Yes, every autumn.

Is the pasture upon that ley looked upon as particularly good?

-Yes.

Are not horses and other cattle very often sent to run upon that ley?—Yes.

And is not the price of the ley much higher than on other

land?-It is double.

For what reason do you conclude that the value of the ley has increased?—It is called the Salt ley, by using the brine to it; and they send their cattle there to run, and horses that are lame or ill: they send them to it as to an hospital to physic them.

Can you speak to the use of Salt with sheep or cattle?—I know a farmer of the name of Sutton who uses it for his sheep

and an old favourite horse.

Have you understood his flock have been better since he has used Salt, and have they been freer from the rot?—Yes; he told me last week he attributed it to Salt only that has saved them from the rot.

How long has he used it?—Three or four years.

Do you know its use in hay that has been damaged, to make it a palatable food to animals?—Mr. Marshall of Northwich buys ten bushels every year to put into his hay.

Whether damaged or not?—Yes, he has done it for years. Have you observed the cattle passing the brine pits disposed

to stop and drink it ?-Yes.

Do you know of horses having often been taken to drink it when they have been out of order?—I have known it given to them.

At the brine pits?—Yes; but they will not permit them to take it from the pits. The farmers very frequently come to the works with a horse that has a strain to bathe him with hot brine from the pan; but they are not allowed to take it off the bank: they must bring them to the works.

You state that you got five bushels more of wheat upon an acre from your field that had been cultivated with Salt and marl than you did when it was manured with marl and water?—Yes.

Was there no difference in the season, that accounted for that difference in the produce; was not one season much better than another?—It was in the same season, on the same field; one half was marled with brine, and the other with water.

You stated, a friend of your's had for some years employed

Salt for sheep? - Yes.

And he found it very advantageous to do so?—Yes.

And that for a number of years?—Three or four years.

And that under the present duties?—Yes.

April 21st, 1818

80. The Right Honourable Sir John Sinclair, Bart. called in and examined.

Have you considered any of the advantages that are likely to arise to agriculture, in case of the repeal or modification of the Salt laws?-Yes; I have had frequent opportunities to investigate the subject, and occasionally to make some enquiries both at home and abroad; and I am fully convinced, that in many respects, Salt might be made of material service to agriculture; and if it is the wish of the committee, I will shortly state my views of the subject. It is a general principle that Salt in itself, applied in large quantities, is rather hostile to vegetation: it has a tendency, like every other excessive stimulus, to disorganize and destroy the vegetable substances with which it comes in contact; but in moderate quantities it promotes the growth of vegetables, by enabling them to take up more nutriment in a given space of time, and to perform their circulations and secretions with greater energy. Without referring to a number of curious and important facts in the Cheshire and other reports, I shall state one circumstance, transmitted to me some years ago by Mr. Sinclair, a farmer, in Cornwall, and lately confirmed to me by the Rev. Robert Hoblin, who possesses considerable property in the neighbourhood of the pilchard fisheries in Cornwall, and I believe he is concerned in some of the pilchard fisheries there. Mr. Hoblin, in that communication, states to me, that in those parts of Cornwall where the pilchard fisheries prevail, considerable quantities of old or condemned Salt are used as a manure mixed in compost with earth, broken fish, sea sand, and other substances: the quantity of Salt allotted to an acre mixed thus in compost is about a ton, which he states may cost about ten shillings; the broken fish is considered by him to be the most valuable article, but the Salt has acted friendly to vegetation in cases where it is thus used in a mild and modified form.

Have you seen, and can you state the results of any experiments made in the feeding of cattle, from your own observation?—I was at the farm once of a great farmer in the Netherlands, a Mr. Moselman, at Chinoi, near Wavre, where I was surprised to see an immense heap of Cheshire Rock Salt, which he said he found of the greatest use for his stock: he said, first, that by allowing his sheep to lick it, the rot was effectually prevented; secondly, that his cattle, to whom he gave lumps of it to lick, were thereby protected from infectious disorders; and the cows being thus rendered more healthy, and being induced to take a greater quantity of liquid, gave more milk; and I saw lumps of this Salt to which his cows had access in the place where they were kept: he also said a small quantity was found very bene-

ficial to the horses when new oats were given them, if the oats

were at all moist.*

With respect to steeping corn to prevent the smut, have you ever seen experiments on that subject?—Yes; in East Lothian, the favourite practice, as a preservative of seed-wheat against the smut, is to immerse it in water, so impregnated with saline particles that the wheat will float in it, which being frequently stirred, all the unsoued grains will rise to the top, which are then skimmed off: after the wheat is separated from the pickle it is spread on the floor, and a sufficient quantity of new slacked lime

to dry the whole is sifted upon it.

Can you state what is the quantity of Salt that would be necessary to steep a certain quantity of corn?—I cannot say exactly: one of the most important uses of Salt, as connected with agriculture, is, that it preserves seed when sown from the attacks of the grub: this has long been the practice in some of the western districts of Scotland; and from the great destruction the crops of oats received from the grub, it has lately been revived. Observing an account of it in a Scotch newspaper, I wrote to the Earl of Hopetown, the lord-lieutenant of West Lothian, in whose district the practice had been tried, to know the effect; and he sent me a letter the other day, from which it appears that it has been attended with great success, and that in the cold districts in the west of Scotland its effects are considered to be so very great that few of the farmers have omitted it this season.

Do you believe, that by the use of Salt the food of animals could be made to go twice as far as it does at present?—I am of opinion that much coarser food might be used by animals with the aid of Salt, and, consequently, that cattle and other ani-

mals might be maintained at much less expense.

Do you expect the use of Salt ever to become general among the farmers of the country, but in consequence of the result of the experiments made by the great landholders?—I should think it would be a strong inducement in many parts of the country, having the experiments of the great landholders previously tried; but I know in many parts of the country, where the farmers of themselves, if every obstacle were removed, would try such experiments; and I received the other day a letter from Mr. Robert Brown, of Merkle, who is one of the first farmers in Scotland,

^{*} Since the last edition of this pamphlet was published, a gentleman has informed me, from his own experience, that the quantity of Salt to be given to animals ought to be varied according to circumstances. For example, when horses are fed upon old oats, and old hay, three 'ounces of Salt per day will be sufficient, and may be given regularly with advantage; but where horses or cattle are kept upon moist food, such as new hay, grains, potatoes, or fresh oats, they will require double this quantity, or more, per day. The same person informs me also, that with respect to horses, he has thought it most advantageous to lay a large lump of Rock Salt in the field or the stable, and allow them to lick it as they have occasion.—S. P.

who strongly presses the idea of the reduction of the duty, for the purposes of enabling the farmer to carry on his agricultural

experiments.

Do you know at all the value or extent of the farm held by that gentleman?—Between three and four hundred acres. I would also mention one other thing, which is the benefit of Salt to oily seeds. It was first discovered in America, in the culture of flax, and has since been ascertained in this country by the experiments of Mr. Lee, of Old Ford, near Bow, in Middlesex, who tried it at my desire. The quantity of Salt should be the same as that of the seed sown, namely, about three bushels per English acre: it should be strewed upon the surface after the seed has been sown: it improves greatly the quantity and quality of the flax, and in particular the quantity of the seed from the new crop; it is thence conjectured it would be of use in other seeds of an oily nature.

Are you acquainted with the experiments made by Lord Somerville in mixing Salt in feeding his sheep? -I have read it,

but never was present at any of the experiments.

Have you any doubt that Salt would be highly beneficial to the feeding of all kinds of stock, sheep, cattle, and horses?— It is imposible to doubt it. I find from a communication transmitted to me from Sweden, by Baron Schultz, that the Salt destroys the different kinds of worms which are found in the bodies

of sheep, but in particular the liver-worm.

Would half-a-dozen well-attested experiments, proving the advantage of Salt, be sufficient to induce a very general concurrence in the same practice in farming?—I have no doubt that the minds of the farmers, and their dispositions to receive information, have been very much increased and improved by the discussions that have been going forward for these many years past, and that a few successful experiments, a knowledge of which was generally spread, and some expense incurred in making them known, and perhaps attended with some premiums to those who tried them, would soon spread any beneficial practice very generally throughout the country.

Do you suppose that the use of Salt would increase the disposition to fatten, and to milk in cattle?—I have not the least doubt of it: I have the authority of Mr. Moselman in particular, who is one of the most intelligent farmers I have met with, and

who gave it to his cows for the purpose.

Have you ever seen any experiments made with Salt on damaged hay, by strewing it upon it in the stack?—I have never seen any experiments myself; but in some of the best authenticated reports to the Board of Agriculture, (that of the North Riding of Yorkshire, and that of Derbyshire) it is stated as a practice not unusual, and attended with great advantage, particularly when applied to the second crop of clover, which very often experiences bad weather.

Do you not thin that a great deal of fodder, which would be fit for nothing but the dunghill, could be made extremely good and nutritious food for cattle by mixing Salt in the stack?—

I have no doubt, that by mixing Salt or brine with food that the stock would otherwise refuse, that it might be made extremely acceptable and nutritious."

Twenty-ninth of April, 1818.

81. Mr. Bryan Shaw Hilditch called in, and examined.

Where do you reside?—At Pretston, near Sandbatch, in Cheshire.

What is your business?—A farmer.

Have you tried several experiments on your farm, in the use

of Salt as a manure? - I have.

Be so good as to state what those experiments were, and the result of them?—I have tried it twice only; once about seven years ago, as near as I can recollect. I procured five cart loads of refuse Salt, mixed with ashes: I spread it upon a piece of land which I had in summer fallow, intended to be sown with wheat, and I had it sown accordingly, the result of which was a very middling crop. I suppose that was upon about an acre and a half to two statute acres. This produced me, as far as I can recollect, about from eighteen to twenty Winchester bushels to an acre: from the expense of a summer fallow it ought to have produced from twenty-five to thirty, considering the kind of land.

If it had had a coat of dung upon it in the ordinary course,

you mean to say?-Yes, or manured with a coat of lime.

Have you not used it also for turnips?—In consequence of this not succeeding to my wish or expectation, I never used it again, till last year I was induced to attempt it again, in consequence of what I heard spoken of, that government was going to take part of the duties off, to enable it to be used as a manure.

State the particulars of the last experiment?—It was land that was going for turnips, and I procured one load of this refuse Salt as good as I dare take, for I was apprehensive of the exciseman: it was better than I had before, and I had it spread upon what I judged to be a quarter of an acre, statute measure, about two months, or it might be three months, previous to sowing the turnips, for I was apprehensive it would entirely destroy the seed, to give it time to mix with the soil: this I caused to be sown with yellow Swede turnip seed, and the common white turnip seed: the Swede turnip produced almost next to nothing: they were very small, very little larger than potatoes; the white turnip seed was a great deal better, though I ought to have stated, that in the same field I had about three acres sown in the

common drill way with manure which is generally used for turnips, and the crop was a fair average crop, both of the Swede and the white: the white turnip seed, which was sown on the salted land, though considerably better than the Swede upon the same land, was considerably inferior to the crop grown from common manure. This is the result of the two experiments I have made.

In the first experiment you tried yourself, namely, that of wheat, was it a whole close of ground you manured with Salt?

-No.

Was there wheat in the other part?-Yes.

With what was the other part manured?-I believe* the

other part with common manure.

Can you recollect what the produce of the other part was per acre?—It was considerably better; it might be six or seven bushels better by the acre: it was not good wheat soil: it was light, and we do not consider that so good.

The whole of the close was soil of the same description?—Yes. Was the crop of turnips at all eaten by the fly?—It was not;

that is the advantage I observed.

The part which was manured with Salt did not suffer so much

with the fly?-No.

Was the other part of the field that was not manured with Salt eaten by the fly. —It was attacked by the fly, but did not suffer much.

Was there any part of the field affected with the grub in either of the experiments ?—I cannot speak to that, it is so long ago.

Seventh day of May, 1818.

82 Sir Thomas Bernard, Bart. again called in, and examined.

You have stated, that the poor would use a great deal more Salt if it was duty free: from what do you collect that?—I have heard it expressed by poor people, that if they could get

^{*} Much having been said respecting this evidence, I think it necessary to remark that the experiments were made in so loose a manner, that nothing can be learnt from them. The experiment with the wheat, he says, was seven years ago, and he seems to have kept no account of the management or the results; and we are not even told how many bushels of real Salt were put upon an acre. All we learn is, that after a summer's fallow, he manured part of the field he BELIEVES with dung, and the other with Salt, and having sown both parts with wheat, he expresses his surprise that the Salt did not produce him so large a crop as the dung, though he acknowledges that the soil was light, and not fit for wheat. The same want of accuracy is observable in his account of the experiment with turnips, though he acknowledges that the crop upon the salted land was protected entirely from the fly, while those in the same field which were grown with manure were attacked by that insect; and yet he says it is so long ago that he cannot recollect whether any part of the field was eaten by the grub in either of the experiments. Had Mr. Hilditch dunged the whole of the land alike, and then had sown a part of it with Salt, and given the committee a statement of the differences observable in the respective crops, from a written account kept at the time, some judgment might have been formed as to the advantage or disadvantage of using the Salt; but as it is, it appears to me that these experiments decide nothing .- S. P.

more Salt, they should be better, and more happy: this is confirmed to me by Dr. Paris, who has informed me that the disease in the interior of Cornwall arose principally from the want of Salt; and that disease was worms, which was almost universal in that country, and which he believes was from eating their potatoes and pilchards without a proper, or any pro-

portion of Salt.

Do you found that opinion upon any other medical opinion but that of Dr. Paris?—I do not recollect any other; but there is a case now published in the Medical Journal, which seems to confirm that opinion, of a lady who was at the point of death from worms, and it appeared she had never used or enten any Salt; and she has been, as I have been informed, almost entirely cured by the administering of Salt.* I have the particulars in my pocket if the committee wish to see them.

Are not worms a common complaint all over the country?—I am not a physician; but it is notorious they are very general among the children of the poor in the interior of Cornwall, but

on the coast they have them not.

EXTRACTS FROM THE REPORT

OF THE SELECT COMMITTEE APPOINTED TO TAKE INTO CON-SIDERATION THE LAWS RELATING TO THE SALT DUTIES.

Ordered by the House of Commons to be printed June 1, 1818.

83. "The principal increase of demand for Salt which your committee can venture to look to in case of a considerable reduction of the duties, is in respect of sheep and cattle: the application of Salt for this very beneficial purpose is general in many parts of the world, and the circumstance of its not being used in England may principally be attributed to the excessive tax imposed on that article. The use of British Salt in the Netherlands, and in the United Provinces, has been long known; and in Spain and Portugal, also, its value is fully appreciated; it appears, therefore, not too much to presume, that what is frequently applied in other countries, at considerable expense of carriage, might be soon brought into general use by the more enlightened farmers in the United Kingdom. Should this happen, and the application of Salt to agricultural purposes become general in the United Kingdom, it might ultimately so extend the consumption of it, as to enable parliament, without any

sacrifice of revenue, to make such a reduction in the duty as would destroy every temptation to fraud and evasion, remove every alleged grievance that is now ascribed to the Salt laws, and furnish the means of realizing every advantage to the different classes of the community, and the great interests of the nation, which are dependant on the use of Salt in the most unlimited extent."

Resolved, with the left a stone balding out to eno most visiting "That it is the opinion of this committee, that the repeal of the Salt duties would be productive of the greatest and most important advantages to all descriptions of persons in this kingdom, and that the present state of the income and expenditure of the United Kingdom alone prevents your committee from instructing their chairman to move for leave to bring in a bill for such total repeal."

Resolved.

" That in many points of grievance which have been brought under the consideration of the committee, a reasonable relief may be afforded, without exposing the revenue to the danger of material loss."

Resolved,

"That as at the present period of the session it is not practicable to pass a detailed law, in reference to the points alluded to in the last resolution, your committee have confined their instructions to their chairman to the single point of furnishing Salt to agriculture with additional facility, but it is desirable that a bill should be brought forward in the ensuing session; and that in the mean time any relief that can safely be given by official regulation should be afforded, and that means should be adopted to render the administration of the Salt laws in Scotland in all respects similar to the administration of them in England."

Resolved,

"That it is the opinion of this committee, that the consideration of this subject should be resumed early in the next session of parliament." June 1, 1818.

DIRECTIONS OF THE LATE ACT OF PARLIAMENT FOR ENABLING FARMERS TO PROCURE SALT THE REDUCED PRICE.

84. Any farmer or other person requiring Rock Salt for any of the aforesaid purposes, must procure from the nearest excise officer a certificate that he is an occupier of land, or otherwise, as the case may be. This paper will authorize and enable him to receive the Salt, any part of which (if he be a farmer) he may

Salt, as Manure.

To the person who shall make, and report to the board, the most satisfactory experiments, to ascertain the advantages or disadvantages which have attended the use of Salt as a manure, either simple, or mixed with other substances—the gold medal, or fifty pounds.

Accounts, verified by certificates, specifying the nature of the soil on which the experiments are made, with the quantity of the Salt, and the time of its application, the effect on the crop cultivated, to be produced on or before the 1st of March, 1820.

It is to be hoped that these premiums will excite a laudable spirit among enterprising farmers, to ascertain particulars of such importance to the agricultural interest.

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OFFERED BY THE HIGHLAND SOCIETY OF SCOTLAND FOR EXPERIMENTS WITH SALT.

Highland Society Chambers, Edinburgh, 19th August, 1818.

87. The duty on Rock Salt, to be applied to purposes of agriculture, having been reduced, by an Act passed in last session of parliament, to two shillings and sixpence per bushel, or five pounds per ton, the following premiums are offered by the Highland Society of Scotland for experiments with Salt.

I. To the person in Scotland who shall make and report to the society the best and most satisfactory experiments on the effects of Salt as a manure in general—a piece of plate of thirty guineas value, or that sum in money.

2. To the person in Scotland who shall make and report to the society the best and most satisfactory experiments on the effect of Salt in feeding and fattening live stock—a piece of plate of thirty guineas value, or that sum in money.

It is required that the extent of land to be treated with Salt shall not be less than five English acres, and that the number of live stock, in the feeding of which Salt is used, shall not be fewer than five black cattle and twenty sheep. The respective reports must distinctly specify the nature of the experiments, and how often repeated, the quantity and proportion of Salt employed, and any other circumstances connected with the subject, which may be considered material. The reports to be lodged with the deputy secretary on or before the tenth of November, 1820, accompanied by certificates by two members of the society, or by one member and a justice of the peace, in support of the several matters therein detailed.

By order of the directors, Lewis Gordon, Dep. Sec.

88. A COMPLETE LIST

OF THE

AGRICULTURAL SOCIETIES IN ENGLAND AND WALES.

Name of the Society.

Abbey Holme,

Anglesey, Bath and West of England, Barnard Castle,

Bawtry,

Bedfordshire, Berkshire, Board of Agriculture,

Border Agr. Society, Boston, Bramber, Brecknockshire, Cambridgeshire, Cardiganshire, Carlisle, Carmarthenshire, Carnarvonshire, Christ Church, Cleveland, Cornwall, Craven. Derbyshire, Devon, (South) Doncaster, Dorsetshire, Drayton, Shropshire,

Durham, Essex, Farmer's Club,

Fenwick,
Garstang,
Glamorgan,
Hackness, East Riding, Yorkshire,

Secretaries.

Mr. H. Jones, Hetling House,

Mr. Times, Solicitor,

A. Young, Esq.

Mr. Geo. Jordan, Chas. Tunnard, Esq. Mr. Stedman, Mr. Edwards, Mr. A Chevell, Mr. J. Bowen, Mr. John Studholme,

Address the Secretary Mr. James Angier,

John Wallis, Esq.

Mr. Jos. Webster,

Mr. Thomas Coombs, Mr. Thomas Duken,

Mr. Thomas Bell, Edward Bradley, Mr. Allison, Address.

Abbey Holme, Cumberland. Llangefrie. Bath.

Barnard Castle, Durham. Bawtry, West Riding, Yorkshire. Bedford. East Ilsley, Berks. No. 32, Sackville St. Piccadilly, London. Kelso. Frampton near Boston. Horsham. Old Red Lion, Brecon. Cambridge. Lechryd near Cardigan. Address not known. Carmarthen. For the Anglesey. Christ Church, Hants. Guisborough, Yorks. Bodmin. Skipton, Yorkshire. King's Head, Derby.

Skipton, Yorkshire. King's Head, Derby. Totness, Devon. Doncaster, Yorkshire. Dorchester. Peatswood, near Mar-

ket Drayton.
Darlington, Durham.
Chelmsford.

Thatched House, St.
James Str. London.
Fenwick, Durham.
Garstang.

Cowbridge. Grime. Hampshire,

Hayfield,
Hertfordshire,
Herefordshire,
Holderness,
Howden,
Holkham,
Kendall,
Kent,
Kent Association,
Kimbolton,
Kinlet,
Lamport,

Lancaster,

Leicester and Rutland, Luneside,

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