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ON

THE ADVANTAGES

OF

WILSON'S & BAYLIS'S PATENTS

FOR THE

Manufacture of Salt

FROM

SEA-WATER AND INLAND BRINE SPRINGS.

WITH

AN ESSAY ON THE VALUE OF SALT

FOR

AGRICULTURAL AND OTHER PURPOSES,

AND

Directions for the Use of the same,

BY PERMISSION OF THE AUTHOR,

CUTHBERT WILLIAM JOHNSON, Esq.

BARRISTER-AT-LAW, &c.

ON THE ADVANTAGES
OF
WILSON'S & BAYLIS'S PATENTS
IN THE
Manufacture of Salt,
&c. &c.

WILSON & BAYLIS PATENTS

ON THE ADVANTAGES
OF
WILSON & BAYLIS PATENTS

Manufacture of Salt

1855

ON THE
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FROM
THE UNITED APPLICATION
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LONDON, NOVEMBER 1838.

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ON THE
Advantages
OF
WILSON'S PATENT PROCESS

IN CONCENTRATING SEA WATER AND OTHER WEAK BRINES
UNTIL THEY BECOME SATURATED SOLUTIONS.

THE art of extracting Salt from weak Brines has been hitherto little understood in this Country. The German and other foreign Salt Makers render such available, and extract the finest Salt from Springs which have not more Salt in them than is contained in Sea Water. By Wilson's Patent the Salt Manufactories of this Country will be placed far superior to those of all Foreign States, both as regards the quality of the Salt, and the small cost of its production.

This process combines together the following important objects:—

First, It concentrates into a small space all the advantages that can now be obtained from solar evaporation and graduating houses, avoiding all the evils and inconveniences experienced by them, from rainy and other inclement seasons—affording a constant supply of fully

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saturated Brine at all times of the year ; is adapted to every situation where Sea Water and weak Brine Springs exist ; and, moreover, in situations where hot and dry seasons can be regularly met with, it may be most advantageously used, even without any fuel.

Secondly, It is simple in its construction, and can be made in detached parts, and easily conveyed to such places where the erections are most desirable to be fixed, as being either contiguous to the places of exportation, or where the carriage will be least expensive to the inland consumers.

Thirdly, The materials used in the construction will not be subject to great deterioration by wear and tear ; the annual repairs, consequently, will be very trifling, and the operation continuous, being wholly free from those stoppages to which all saline evaporating works are now subject. It will only require persons of ordinary capacity to attend to the operation and general management, and can be repaired and cleaned when necessary with great facility and convenience

Fourthly, The invention combines a perfect application of Fuel, heated Air, Steam, and condensed Steam, without complicated or expensive machinery ; the heat being equally applied to every portion of the evaporating surface, and the temperature regulated at pleasure. The fluid to be evaporated is always kept in a hot state and in constant motion, and the vapour is carried away without obstruction as soon as it escapes from the fluid.

The evaporating surface exposed (in the same given space) to the action of the heat is upwards of 400 to 1 to that of the present mode of evaporating Brine for making Salt in Cheshire, Staffordshire, and Worcester-shire, and from Sea Water by Solar heat.

Fifthly, The heat that now escapes from a variety of other Manufactories, of which the fuel forms the great cost of producing the marketable article, can be effectively applied without any derangement, at a very trifling expense.

Sixthly, All power required for pumping the Sea Water, and for any other purpose which may be connected with any of the Establishments, will not cost any thing, save the machinery and repairs.

— Having thus briefly explained the advantages of WILSON'S PATENT, in preparing saturated Brine from Sea Water or Weak Brines, we now proceed to shew the importance of Wilson's and Baylis's Patents, in reducing the Brine into Salt.

ON THE

Advantages

OF

WILSON'S & BAYLIS'S PATENTS

IN REFINING SALT FROM SATURATED BRINE.

THE fuel is consumed in the most effective manner, and the heat *equally* distributed to the largest surface of brine by simple means;—the *pan-incrustation* is *prevented*, without complicated machinery;—the vessels are preserved from the destructive action of the fire;—and the expense of repairs is greatly reduced.

The pans which make the Stoved Salt *will produce double the quantity* in vessels of equal capacity to those now in use at Wharton, Anderton, and all other Salt Works in England, (*which has been proved on a large scale*;) consequently the steam that arises from these Fine Salt Steam Pans being properly consumed will make double the quantity of common and other Salt to what is now manufactured at Wharton. The heat and vapour that now escapes into the atmosphere from the common Salt pans will be applied by simple means to the crystallizing of Fishery and Bay Salt.

The great loss of heat from radiation of the external parts of vessels is prevented, as are also the evil consequences of the fire that arise to Steam Boilers in general from the impurities contained in the water that feeds them. The furnace and fire-bars, too, are preserved from the destructive effects of the fire; giving every required temperature at pleasure, in a uniform manner, and not liable to the risk of explosion. The apparatus is capable of being conducted by persons of ordinary capacity, and affords every facility of repairing or cleaning when necessary.

The impurities contained in the Brine can be extracted before it goes into the Crystallizing Pans, without much additional expense or loss of heat.

The refineries can be erected and set to work with great facility in any situation; and the immense advantages will be manifest to all parties of common understanding, by inspecting a more than ordinarily-sized working model, made to afford an opportunity of contrasting the advantages over all other modes of making Salt: in short, *the produce will be more than double in quantity, the Salt of superior quality, with the same quantity of fuel now used, at a cost not exceeding Five Shillings per Ton, where Saturated Brine can be procured**.

The principal expenses in the manufacture of Salt from saturated Brine Springs are,—

* This model may be seen at Portland Chambers, No. 75, Great Titchfield Street.

First, The cost of raising and payment for the Brine ;

Secondly, The Coals, which are brought to the various Salt Works by Canals and Rivers, at a considerable expense, and are used in the proportion of about 15 cwt. (of 112lbs.) to produce a Ton of Salt of the average Qualities ; and where the Brine is not fully saturated, considerably more ;

Thirdly, The Labour ;

Fourthly, The Repairs, owing to the destruction of the vessels by pan-incrustation ; and, where Rock Salt is used, the additional expenses of mining, raising, and conveyance.

Twelve Shillings per Ton is the lowest average cost price of making the various qualities of Salt, from saturated Brine, throughout the kingdom (except at the Wharton Works in Cheshire) by the present Manufacturers, who make about 400,000 Tons annually. The whole demand for British Salt is now about 500,000 Tons per Annum, and this quantity is at present supplied from several Districts—

Cheshire supplying Liverpool and the North ;

Staffordshire,—Hull and the East ;

Worcestershire,—Gloucester, Bristol, and the West : each County supplying a portion to London, and the South, by Canals and Sea.

The present prices at Liverpool are :—

		<i>Carriage.</i>	
For Fine Stoved Salt, 19s. or 20s. per Ton		3s.	22s. to 23s.
Butter 16s.	„	3s.	19s.
Common 14s.	„	3s.	17s.
Large Grain 25s.	„	3s.	28s.

The Carriage of Salt from Cheshire to Liverpool has for many years been a separate branch of Trade, which Carriage, of 3s. per Ton, is paid by the purchasers of the Salt on delivery.

The two largest establishments as Salt Works in Cheshire are the Wharton and Anderton, both of which were built by the Trustee of Baylis's and Wilson's Patents, who is therefore fully conversant with their situation, as also with the minor Works in Cheshire, forming what is called "The Coalition," to the great injury of the public. Particulars of this coalition, together with the creation of the Wharton and Anderton Works and Mines, and those Companies, will be best understood by a reference to a "Narrative of Facts" now published, which may be had gratis on application at Portland Chambers, No. 75, Great Titchfield Street, Marylebone.

The Wharton Salt Works are the most extensive in England (probably in the world), and were the best and most economical—until *abused*; but now sink into insignificance, as Baylis's and Wilson's Patents will produce Salt full 40 per cent. cheaper, besides obviating all

the imperfections and disadvantages which those works have to contend with ; also making a much greater quantity of Salt, of superior qualities, from a given quantity of fuel.

Next in magnitude to the National Patent Salt Company's Refineries and Salt Mines, at Wharton, stands the Anderton, called the British Rock and Patent Salt Company, held on lease for 60 years, from 1825, from the Earl of Mansfield, and underleased to Messrs. Broughton, Sutton, and Co., at many thousands a year rental, which forms the only source of dividends to the Shareholders of that Company ; and for this dividend they are indebted to the Trustee of Baylis's and Wilson's patents, in aiding them in 1827 and 1828 (returning good for evil), as appears by the " Narrative of Facts" before alluded to.

Nearly the whole of the Salt Refineries and Rock-Salt Mines in Cheshire are held on long leases at high rents. These Proprietors and Coalitionists cannot now prevent the patents of Baylis and Wilson from being introduced to the greatest extent ; as those by whom they may be introduced are sure of having every facility afforded them in all localities where they bring a new trade, affording thereby employment, and creating riches for its inhabitants, with a decrease in price of this necessary article of life. Therefore, unless the Salt Manufacturers can actually manufacture *salt of equal quality at 5s. per ton, and transport it, in addition, free from all charges for Carriage and other expenses*, to such places,

for instance, as Liverpool, London, Newcastle, Bristol, the ports of Scotland, Ireland, North and South Wales, and her Majesty's Colonies, they must submit to the loss of their trade.

It has always been admitted, that if at any period a discovery should be made to concentrate Sea Water to saturation, with great facility by *simple* and *cheap* means, so as to form a substitute for the inland saturated Brine Springs and Rock Salt, it would immediately change the position of the Salt Trade of England, and limit the supply from the present Salt districts to those few inland situations which they could command by a cheaper rate of conveyance than would be available in the new localities.

It must also be borne in mind that the consumption of Salt is very trifling in the neighbourhood of the Salt districts; thus it has to be conveyed long distances to market, and from its being a heavy staple article (like Coals) the transit becomes a serious charge; in most instances *more than doubling the cost of manufacture*, which consequently abridges and prevents its consumption in situations where it might be advantageously applied if procured at a cheaper rate.

The Rock-Salt Mines in Cheshire will be comparatively useless when the new Works are established, as the demand for Rock Salt principally arises for the export trade. Foreigners will not purchase Rock Salt in

In 1827 the same bed, without any additional manure, being sown with peas, presented a most remarkable appearance; for when the peas on the unsalted portion was only four inches high, the salted were at least sixteen inches, and nearly in bloom; they yielded five or six times as many pods, and those full three weeks earlier than the unsalted portion.

Will not the market gardener be able to avail himself of this curious property of salt? I can testify from my own experience, that salt forwards the growth of potatoes, &c. And in the year 1834, all those seed potatoes which had been treated with salt, or, before planting, had been soaked for some hours in a weak solution of salt and water, produced excellent potatoes, notwithstanding the general failure of the potatoe crops of that year.

I have, in my Essay, given at length, the experiments of Dr. Priestley, upon various plants vegetating in salt and water. He found that the use of salt materially protracted the existence of the plant. Flowers, kept in water vases, continue much longer in bloom, if a portion of salt be added to the water. It is a common custom with the importers of exotic plants, to dip cuttings into salt water. Before the adoption of this plan, they almost invariably perished in the passage.

To explain these curious facts, it is supposed that the salt acts as a stimulant to the plant; a word, however, merely used for the want of a better, as most of the amazing processes and wondrous phenomena of vegetable life are too inscrutable but for the eye of Him

“Who spoke the word, and Nature moved complete.”

Among the very last letters received on the use of salt in the cultivation of plants, was one from an eminent florist, near Paddington, Mr. Thomas Hogg, and I will here transcribe his own words:—

“From the few experiments that I have tried with salt as a garden manure, I am fully prepared to bear testimony to its usefulness. In a treatise upon flowers, published about six years since, I remarked, that the application of salt, and its utility as a manure, was yet imperfectly understood. It is a matter of uncertainty, whether it acts directly as a manure, or only as a kind of spice or seasoning, thereby rendering the soil a more palatable food for plants.

“The idea that first suggested itself to my mind, arose from contemplating the successful culture of hyacinths in Holland. This root, though not indigenous to the country, may be said to be completely naturalized in the neighbourhood of Haerlem, where it grows luxuriantly in a deep sandy alluvial soil: yet one great cause of its free growth, I considered, was owing to the saline atmosphere: this induced me to mix salt in the compost; and I am satisfied that no Hyacinths will grow well at a distance from the sea without it. I am also of opinion, that the numerous bulbous tribe of Amaryllisses, especially those from the Cape of Good Hope; Ixias, Aliums, which include Onions, Garlic, Shalots, &c., Anemonies, various species of the Lily, Antholyza, Colchicum, Crinum, Cyclamens, Narcissus, Iris, Gladiolus, Ranunculus, Scilla, and many others, should either have salt or sea sand in the mould used for them.

“I invariably use salt as an ingredient in my compost for carnations; a plant which, like wheat, requires substantial soil and all the strength and heat of the summer to bring it to perfection; and I believe I might say, without boasting, that few excel me in blooming that flower.

“If I wished to refresh and improve a soil of what is called an old worn-out garden exhausted by fifty years’ cropping, or more, I would give it ($\frac{1}{2}$ or $\frac{3}{4}$ part at a time) a good dressing of lime in the autumn, spreading it as soon as it was slacked, and forking it in immediately. I would, a week or two after that, dig and trench it well in the rough, and lay it up for the frost to act upon; and then in the spring, I would give it a good dressing of salt (not less than six bushels to an acre.) The good effect of such treatment would be manifest for two or three years after.”

In the inundations of the sea, as in Friesland for instance, in 1825, various curious effects were produced by the salt water. The oak, the mulberry, pear, peach, and others with deep roots, did not suffer; neither did the asparagus, onions, celery, &c., for they were never finer, or more luxuriant. But the vines and gooseberries contracted a salt *taste*; and the apricots, apples, cherries, elms, poplars, beech, willows, &c., could not bear the over

dose of sea-water. They pushed out a few leaves, but speedily perished. *Sharon Turner's History*, 117.

Similar results were noticed, after an inundation of the sea, in the garden of the late talented Richard Gower, Esq. near Ipswich, in Suffolk, in November, 1824. In this instance a portion of the garden remained 24 hours under the sea water. The asparagus beds were materially improved in their produce. The cherry trees, in the following year, actually produced a numerous crop of cherries, which *tasted, however, so very salt that they could not be eaten*, although very fine in appearance. These trees all died in the following year, 1826.

CONCLUSION.

From the statements which I have now been enabled, through the kindness of my friends, to lay before the farmer, he must agree that the use of salt in agriculture is of the highest importance; he cannot but acknowledge this, unless, indeed, he believes that all those who have tried salt as a manure, were alike deceived; that Messrs. Brooke and Ransom, in Suffolk; Messrs. Baynes, Butler, Wood, and Challis, in Essex; Mr. Ross, in Kent; Mr. Burrell, in Sussex; Mr. Long, in Hampshire; Mr. Benett, in Wiltshire; Mr. Sinclair, in Bedfordshire; Mr. Hollingshead, in Lancashire; Messrs. Sickler and Hoblyn, in Cornwall; Mr. Hogg, in Middlesex; Mr. Collyns, in Devonshire, and a host of others, were all deceived in their experiments, and in error in their conclusions.

That salt is alike beneficial to all kinds of land, and at all times, is an assertion too absurd to need refutation, for such an universal property belongs to no other manure; even chalk or lime will not suit all soils. Stable manure may be employed without benefit. When chalk is applied to some soils, years must elapse before its good effects are visible to the farmer; "and yet," said the late eloquent Lord Erskine, "chalk, which has caused to start into life the most inert soils, is just nothing as a manure compared with salt." And, let me ask, what would have been the fate of chalk as a manure, had its early advocates decided upon its merits, without first employing that patient spirit of investigation so especially necessary in all agricultural pursuits? Would chalk, or gypsum, or lime, or bone dust, ever have been generally employed as a manure, had their advocates been infected with a spirit of impatience, and proud contempt of the experiments and rules of those who went before them? Chalk and gypsum had their opponents; they too, had to encounter ignorance in all shapes; but they triumphed at last, and so will the advocates of salt.

It is not intended to be concealed, that salt has been employed sometimes with detriment to the crop under experiment, often without any effect; yet there are no proofs even of its inutility. Some soils require it to be applied in the autumn, others in the spring; some crops are most benefitted by having it applied long previous to their insertion, others at that immediate period. Neither let any farmer imagine, because it is beneficial to his light soils, that it cannot be equally so to more tenacious ones: its gently moistening powers render the first more fertile, the latter friable, and more open to every agricultural operation in the driest seasons. On the richest soils it may be employed with advantage, were it only to destroy the predatory vermin with which they more than usually abound. Those who have studied the subject the most, and witnessed the greatest

should ever revive a duty on Salt it will enable the Excise to collect it with the greatest facility, economy, and security, against fraud or evasion.

Proof, as to the practicability of delivering Salt in the Agricultural Districts, at a price to insure the general adoption of it, will be fully demonstrated to all who may engage in the establishment of the proposed Provincial Salt Companies; and printed Forms of the Prospectus, together with Plans of the requisite Works, according to the intended scale of operation, will be furnished, as soon as the Site for such works, and the parties applying for the Licenses, are approved.

* * Further particulars may be obtained by applying (if by letter, post paid) to the Trustee for the Proprietors of Wilson's and Baylis's Patents, at Portland Chambers, No. 75, Great Titchfield Street, Marylebone; or to Mr. R. Cort, No. 8, Manchester Buildings, Parliament Street, London, their general Agent for the establishment of Salt and other Works connected therewith.

OBSERVATIONS
ON THE
EMPLOYMENT OF SALT

IN
AGRICULTURE AND HORTICULTURE

WITH
DIRECTIONS FOR ITS APPLICATION,

FOUNDED ON PRACTICE.

BY
CUTHBERT WILLIAM JOHNSON, Esq.,

BARRISTER AT LAW,

CORRESPONDING MEMBER OF THE MARYLAND HORTICULTURAL SOCIETY, AUTHOR OF AN ESSAY
ON THE USES OF SALT FOR AGRICULTURAL AND HORTICULTURAL PURPOSES, &c. &c.

TWELFTH EDITION.

LONDON:

SIMPKIN AND MARSHALL; J. RIDGWAY; AND WM. S. ORR AND CO,

1838.

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Barley and Oats.—Ten to sixteen. See page	8
Worms, Grub, &c. See page	8
Grass Lands.—Ten to fifteen. See page	9
If you wish to have a new turf entirely, then from forty to fifty Bushels.	
Beans, Peas, and Potatoes.—Ten to twenty Bushels per Acre. See page	10
Hay.—Half a Bushel to every Load. See page	11
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Fallows.—To destroy weeds, &c. fifteen to forty Bushels according to the state of the soil, as early as possible after the ground is cleared of the preceding crop.	
Turnips and all green Crops.—Five to fifteen Bushels about three weeks before seed time. See page	9

In any researches upon the uses of common salt, the agriculturist must not forget that it is *comparative* experiments alone that are of value, as guides to future operations. For this purpose it will be advisable that the experiment should be—

- 1st.—On as bold a scale as possible; and on different soils.
- 2ndly.—That *part of the field only* should be salted, and the produce on both *salted* and *unsalted* soils carefully *measured* or *weighed*.
- 3rdly.—That the salt should be applied in more than one proportion, and at different periods; as a fortnight before seed time, at the time of sowing, and when the corn is well out of the ground.
- 4thly.—Its use when combined with other manures, as soot, lime, bone-dust, &c., should be, if possible, ascertained. W. Collyns, Esq., of Kenton, in Devonshire, is decidedly in favour of employing, as a Manure, the common Salt made from the Sea Water.

I cannot conclude without again assuring the friends and opponents of Salt for Agricultural purposes, that I shall always be willing to assist in any experiments, receive any communications, and to answer any enquiries, in a cause which is now proceeding so triumphantly: for thousands of tons of Salt are now annually employed in Agriculture.

Just as this Edition was sending to Press, I have received a communication from Mr. Kimberley, a practical farmer of 500 acres of land, with the sentiments of which I so entirely concur, that I deem no apology necessary for inserting it in this place. The letter is dated from Trotsworth, near Egham, Nov. 19, 1838.

“Understanding from Mr. Cort that you are about to publish another Edition of your valuable Treatise on Salt, and that you are desirous of having my opinion on the subject generally, and as regards its applicability to my Liquid Manure, I have great pleasure in giving you every information in my power.

“I have used decomposed Salt for upwards of ten years past in considerable quantity, and with the most satisfactory results, principally in the way now so strongly recommended by yourself. I have also used it for cattle, sheep, horses and pigs, with undeviating success, not only as a preventative, but cure of disease; in fact, I am not aware of any condiment equal to Salt properly administered, that so much assists in improving the condition of all kinds of stock, while it increases the durability and value of their manure. With reference to the applicability of Marine Salt for my Liquid Manure, I have no hesitation in stating that it is one of the most valuable ingredients of its basis; and a material that every farmer should have in his possession, as one of the most important means of supplying himself with manure at all times, and therefore any measure that will cheapen and facilitate the introduction of Salt into the agricultural districts, as now contemplated by Mr. Cort, will confer an incalculable benefit on the Landed Interest, as I consider Salt, in its various combinations, one of the most essential of our artificial manures. It also appears to me, that if the proposed Local Salt Companies could be established contiguous to chalk or lime-stone, so that both can be prepared with the same fuel, and Salt as well as lime delivered at half its present price, there can be no question but that an immense continuous increase in the consumption of Salt would take place, and the land might be dressed at a cost of from 15s. to 20s. per acre, *equal to the best Horse Manure*.

“I am now preparing for the press a Pamphlet fully disclosing the description and method of making and using the Trotsworth Liquid Manure, which I propose to deliver to subscribers of 1*l*. each early in the ensuing Spring, and any gentleman wishing for a copy may signify the same by letter, post paid.”

(Signed)

GEO. KIMBERLEY.”

OBSERVATIONS, &c.

IN the year 1820, when the attention of the public was first generally excited to the impolicy of the Salt Tax, by the late Sir Thomas Bernard, I published an Essay on the Uses of Salt in Agriculture, which has since been twice reprinted with many valuable additional testimonials, especially those of another valued correspondent, the late Mr. G. Sinclair, of New Cross, the author of the "*Hortus Gramineus Woburnensis.*" But as it has often been repeated to me, that the farmer has little time for the perusal of long statements, I now offer to him a few observations which shall at least have the merit of brevity; being most anxious that so valuable a substance may be made known to, and employed by, the most practical, as well as the most scientific agriculturists. I implore, therefore the old English farmer's attention to the few following facts, for the sake, not only of himself, but of our country; and if he should be led to try the very smallest experiment with this Fertilizer (and an acre may now be manured with it for ten shillings), attending carefully to the directions of those who have gone before him, he will enrich not only himself, but the Land which gave him birth.

In the first ages of the world, salt could not have remained long unnoticed or unemployed; its inhabitants must have soon remarked that the animal tribes had a strong predilection for this saline mineral; as even the thoughtless savages of North America make the observation, that, near to their salt licks, their game always abounds; and the Laplanders, to this day, bring their rein-deer periodically to the sea-side, for the purpose of drinking the salt water.

The briefness of some of the writers of the Old Testament has often and very justly been regretted. I cannot but consider as another object for this feeling the short account given of the healing by Elisha, of the waters of Jericho, by means of salt. (2 Kings, c. ii. v. 19, 22.) It was the universal custom among the eastern nations to irrigate their lands; and if the waters in the neighbourhood were unfit for this purpose, the soil, from the heat of the climate, was rendered unproductive. This appears to have been the case at Jericho, and to heal them, Elisha threw in salt. The smallness of the quantity added could, in the natural course of things, have had no influence: whether he directed it to be often repeated is not stated, nor is it material as regards the observations I have to make upon it. The agent employed in these miracles had usually a typical meaning, or conveyed useful instruction—thus, when Moses healed the waters of Marah (Exodus, c. xv. v. 25), he threw in the branch of a tree; which, although we are not told so there, yet afterwards is said Ecclesiasticus, c. xxxviii. v. 5), to have been done to inform the people of its sanative qualities. Salt had been held up as the cause of barrenness, and had been sown by Abimilech, with that typical representation, over the

ruins of Sechem (Judges, c. ix. v. 4, 5); it was now employed perhaps as a means of conveying the information, that in small quantities it produced a very different effect. I have thus early been induced to remark upon observations in the Old Testament, because I know that these, the earliest notices of salt being applied to land, are in the hands of every farmer, and are very justly looked upon, by him, as volumes from whose statements there is no appeal.

That salt was very early applied as a manure in the East, we have abundant testimony. "Salt," said our Saviour, in one of the addresses to his disciples, "is good; but if the salt has lost its savour, wherewith shall it be seasoned? it is *neither fit for the land nor yet for the dunghill*, but men cast it out." (St. Luke, c. xiv. v. 34). What was meant by salt losing its savour, has puzzled even some of that school whom Southey has, more emphatically than poetically, denominated the Satanic. Mr. Maundrel, however, in his journey to Jerusalem, has cleared up, in some degree, the mystery; for it appears that there is found in Syria a peculiar kind of fossil or rock salt, which in progress of time, by exposure to the air, though to all appearance as crystalline as ever, loses almost entirely its taste, except in the very centre of the lumps. How this is effected, it is perhaps difficult to explain; for it has not, to my knowledge, been subjected to chemical analysis; but it is probably a mixture of salts; for instance, crystalized sulphate of lime (gypsum) and common salt: the first quite tasteless, and nearly insoluble in water; it is consequently very little altered by exposure to the dew, rain, &c., but the common salt mixed with it would, in moist situations, readily dissolve away, leaving the remaining mass little altered in appearance; its savour would be gone, and the residual sulphate of lime little fitted either for the land or the dunghill.

In the works of early writers upon rural affairs, we find little notice of salt as an agricultural agent. Virgil reprobates a salt soil; for he had probably observed, that where the sea overflowed its usual boundaries vegetation was completely destroyed, and the poet paused not to consider what would have been the result had any other manure been applied in a similar excess; for instance, if an ocean of chalk and water had inundated the same land; and a suspicion that a small quantity might have quite an opposite tendency, was an idea too refined even for the court of Augustus. He says, however, that it must not be a salt soil; and in that conclusion every one will agree with him. He commends the use of salt for cattle very highly, as does Cato, the earliest of the writers upon rural affairs whose writings have come down to us: he says, "sprinkle your best straw with salt, then to serve it for hay!" Lord Bacon, who died in 1626, recommends its use for the garden.

Sir Hugh Platt, in 1658, bears testimony to its value for grass lands. Frederick Hoffman, in 1742, and Dr. Brownrigg, in 1748, celebrated its importance as a condiment for cattle.

Amid, therefore, such an almost universal conviction of men of all ages and countries as to the value of salt in agriculture, it may be perhaps inquired why its general use has been so much prevented? One reason is sufficient in reply to such an apparent objection. From the days of King William the Third, to the year 1824, salt had been burthened with an increasing tax, hampered with restrictions, overwhelmed with prohibitions; but still, in spite of these burthens, the use of salt in agriculture

never entirely ceased. Every ostler knew that it was good for his horses. The farmers of the West of England still used sea-sand, as their ancestors did before them; for that was not under the controul of the exciseman—that could not be warehoused: thus the farmers in the neighbourhood of Padstow Harbour annually employ nearly 54,000 single-horse cart loads of sea-sand; and they are so convinced of the superiority of this salted sand, that they prefer, says Dr. Paris, “sending four or five miles to the shore to obtain this calcareous sand, which has salt in it, although, at much less expense, they might procure drifted sand, which does not contain salt, at their own doors*.”

Every farmer has it in his power, even in the most inland situations, to procure soda for the use of his farm, by means of a mixture of two parts of lime and one part of common salt, made into a thick mortar with water, and suffering the mixture to remain incorporated in a shady place, or covered with sods, for two or three months—a plan which I suggested some years since †, and which has been recently, I believe, successfully adopted by Mr. Benett, in Wiltshire. By this process a gradual decomposition takes place, muriate of lime and soda are formed, the whole mass speedily becoming encrusted with alkali. There is another advantage to be derived from the adoption of this process, besides the formation of soda, viz., that the muriate of lime is one of the most deliquescent or moisture-absorbing substances with which we are acquainted; and in consequence, whenever it exists in a soil, the warmth of the sun has in summer much less influence upon it than it would otherwise have. The use of this mixture of salt and lime was noticed, I find, in the year 1800, by Mr. Hollingshead, of Chorley, in Lancashire, who observes:—“Lime prepared for manure should be slacked with salt springs or salt water; lime so slacked will have a double effect ‡.” And in 1816, Mr. James Manley, of Anderton, in Cheshire, when giving his evidence before a Committee of the House of Commons on the salt duties, mentioned, that in getting marl (which is a mixture of carbonate of lime, alumina, and silica), he had found that, by mixing it with brine instead of water, that the portion of the field on which the brined marl was used yielded five bushels of wheat per acre more than that portion on which the watered marl was employed; and it may be well to remember that the celebrated salt sand of Padstow Harbour is composed of 64 per cent. of carbonate of lime; and that, in the experiments of the late Rev. Edmund Cartwright upon potatoes, of twenty-five manures or mixtures of manures, salt and lime were found superior in their product of potatoes to nineteen others. §

I would especially warn those who try the effect of a mixture of salt and lime, to attend carefully to the directions I have given, and not, as some farmers have done, to use the mixed salt and lime immediately, before any decomposition has taken place. After it has been well mixed with water into a thick mortar, it should be allowed to remain two or three months undisturbed, and then applied at the rate of from twenty-five to thirty bushels per acre, either by sowing it out of a seed basket, or mixed with earth, and spread in the usual way. It is necessary to give the mixture time, since the decomposition proceeds very slowly, and is not to be hastened by any simple process.

* My Essay on Salt, p. 30.

† Ibid. p. 32. 3rd Edit.

‡ Hints to Farmers, p. 20. Edition 1800.

§ Communications to the Board of Agriculture, p. 370.

The mixture of salt with soot produces the most "remarkable" effects, especially when trenched into ground prepared for carrots. Mr. G. Sinclair found that when the soil, unmanured, produced 23 tons of carrots per acre, that the same soil, fertilized with a mixture of only $6\frac{1}{2}$ bushels of salt, and $6\frac{1}{2}$ of soot, yielded 40 tons per acre*. Mr. Belfield describes the mixture as equally beneficial for wheat †; and Mr. Cartwright found, that when the soil, without any addition, yielded per acre 157 bushels of potatoes, that, dressing the same land with a mixture of 30 bushels of soot and 8 bushels of salt, made it produce per acre 240 bushels ‡.

Some farmers feel a difficulty in believing that a salt can be a manure; but let such be assured that almost all the most valuable fertilizers are actually salts. Need the intelligent farmer be told, that chalk (carbonate of lime) is known by every chemist to be a salt, and must he be informed that gypsum (sulphate of lime) is another salt?

The fate of gypsum well illustrates the progress made and making by salt as a manure in this country. When gypsum was first proposed as a fertilizer, it was laughed at and ridiculed, especially by those who knew least of its properties and powers; and then it was used for every thing and for every crop, in defiance of the remonstrances of its early advocates, who warned the agriculturist that it operated only as a *direct food* for some plants, and that only three commonly-cultivated grasses contained it in sensible proportions—Lucern, Sainfoin, and Red Clover, to which may be added the Turnip. The failure, therefore, of gypsum, in the first instance, was general and complete; time, however, enlightened its enemies, for time polishes even a block of granite, and gypsum is now generally and scientifically used to these four crops only, for it does not, like salt, possess properties useful to vegetables of all kinds.

Phosphate of lime is another salt extensively employed in agriculture, for bone-dust contains of it 55 per cent. Every tiller of the earth knows that the ashes of the soap-boiler abound with salts of various kinds, both of soda and potash. And, let me ask, what but the presence of twenty different salts (common salt among the rest) makes the urine of animals so valuable as a fertilizer? And what would be the value of the largest dunghill, so justly splendid in every farmer's eyes, without the presence of these salts? Would it be of more value than so much tanners' bark or peat?—and does not every farmer know what Lord Meadowbank has so ably illustrated, that even inert peat becomes a manure by being putrified and mixed with the salts of the dunghill?

I have elsewhere endeavoured to prove that salt is a manure to plants in six different ways, and I refer the farmer to my Essay on Salt for the proofs and illustrations. 1. By *promoting*, in *small* proportions, putrefaction. 2. By destroying weeds, grubs, &c. 3. As a constituent, or direct food. 4. According to Dr. Darwin and Dr. Priestly, as a stimulant to the absorbent vessels of plants. 5. By preventing injury from sudden transitions in the temperature of the atmosphere. 6. By keeping the soil moist. In this tract, however, I have no intention of entering into such detail, nor is it perhaps requisite, though always useful, that the farmer should in every case understand the chemical processes he is daily witnessing, or the laws by which he cultivates the earth.

* My Essay on Salt, p. 146.

† Ib. 44.

‡ Ib. 86.

WHEAT.

Whoever makes trial of salt as a manure must be attentive to the rules laid down by those who have for years employed it for such purpose; otherwise, without any beneficial result, every experiment will merely serve to prejudice others against its more judicious employment:—thus, salt, it should be remembered, *rarely causes the wheat plant to grow larger or taller*, but it fills up the ear better, and brings the weaker plants forward. We have it on the authority of Mr. Sinclair, that “salt appears to lessen the produce of straw, and increase the weight of grain.” I have never been able in my experiments, nor in any I have witnessed, to see any increased quantity of straw, even in cases where there was an increased produce, by means of salt, of six bushels of wheat per acre. I cannot enforce this too much upon the attention of the agriculturists. Let not the farmer be deceived by appearances; let him have the salted and unsalted portions, at harvest time, carefully separated and examined by weight, if the plots are small, or by measure, if extensive. A few square roods, or even yards of each, will be sufficient; and I have no hesitation in saying, that he will find the result highly in favour of salt: but if, on the contrary, after having carefully applied salt to *half* of the field, he judges at harvest time merely by his eye, in such an unfortunate case, let me request of him, for his own credit’s sake, not to mention *his experiments* upon salt manure; how carefully he tried it, and how complete was its failure: let him be assured that such modes of investigation, though very common, are worse than useless to the agriculturist; are marks of obstinacy and presumption to be excused only on the plea of ignorance.

Let the salt be applied some time before sowing the seed, not less than ten and not more than twenty bushels per acre. I regret that I cannot transcribe from my Essay on Salt the experiments of Mr. G. Sinclair upon wheat (page 39); they are too numerous for this Tract, and too valuable to be mutilated by an abridgment.

In my own experiments upon a light gravelly soil, at Great Totham, in Essex, the use of twenty bushels of salt per acre, (in 1819,) produced an increase of five bushels and a half per acre.

The following statement of the result of some trials in 1820, will show how important may be the result to the country at large, by its judicious application. I regret that incessant employment of a very different nature has hitherto prevented my continuing these experiments.

	PRODUCE PER ACRE.	Bhls. lbs.
No. 1. Soil, without any manure, for four years		13 26
2. Soil manured with stable dung to the previous crop (Potatoes)		26 52
3. Soil with five bushels of salt per acre, and no other manure for four years		26 12
The soil light and gravelly.		

The testimony of a plain Essex farmer may have some weight in corroboration of my own, even with the most suspicious. “The soil,” says Mr. James Challis, of Panfield, “that I described to you to be of rather a loose hollow description, had a dressing of salt put on it in November, after the wheat was sown, about fourteen or fifteen bushels per acre: it produced at the rate of six bushels per acre: more than that which was not dressed, and it may be stated to be £1 per load of forty bushels better in quality.”

Another Essex farmer, the late Mr. Baynes, of Heybridge, had his

doubts removed by the result of the following experiment—the soil, “a sandy clay :”

PRODUCE IN BUSHELS.	Per Acre.
Soil dressed with 15 loads of stable dung per Acre	17½
Soil dressed with 14 bushels of salt per acre, immediately after the seed was sown	36½

I select these statements from a host of others, which the unsatisfied farmer will find in my Essay, because these experiments were made by men prejudiced against the trial of salt as a manure : they had not been taught by any theoretical reasonings ; and supported as they are by the experiments of Mr. Sinclair and numerous others, they form a mass of evidence totally incontrovertible.

It is a custom in most counties of England, to apply salt and water as a steep to prevent the ravages of a disease in wheat, called smut : the value of this is known to almost every farmer. Recent experiments have suggested that it may even be of use, when employed in larger quantities, as a preventative of mildew—the most dreadful of the numerous diseases to which the cultivated grasses are exposed. The experiments of the late Rev. E. Cartwright strongly evidence, that when salt and water are sprinkled with a brush upon diseased plants, it is actually a complete *cure*, even in apparently the most desperate cases.*

“The proportion, one pound to a gallon of water, laid on with a plasterer’s brush, the operator making his casts as when sowing corn : it is instant death to the fungus.” The time and expense are trifling.

It appeared, in the course of some inquiries made by the Board of Agriculture, that a Cornish farmer, Mr. Sickler, and also the Rev. R. Hoblin, were accustomed to employ refuse salt as a manure, and that their *crops were never infected with the rust or blight*.

BARLEY AND OATS.

Apply from ten to sixteen bushels per acre just before you sow the seed. Mr. Legrand, a Lancashire farmer, states, “in a sandy soil I can assert sixteen bushels to be a proper quantity for a statute acre ; it gradually advanced in its beneficial effects to sixteen bushels, and as gradually diminished to four bushels, where vegetation was stopped.

A Norfolk farmer, Mr. Ransom, of Sprooughton, also says, when speaking of his experiments on a light sandy soil, “The barley thus dressed, *presented no difference of appearance to the rest of the field*, until within a fortnight of harvest ; the salted crop was then brighter, and about one week forwarder than the rest of the field.” The following are the results, when carefully cut and measured.

PRODUCE IN BUSHELS.	Per Acre.
Soil without any manure	30
Soil dressed with 16 bushels of salt per acre, in March	51

Were these gentlemen, too, deceived in their experiments ? Had they both the misfortune to be in error ?

Mr. Sinclair’s experiments are unfavourable to the use of salt to oats, as far as they were conducted ; but he unfortunately only tried it in the much too large proportion of forty-four bushels per acre, at the time of inserting the seed.

* My Essay, p. 49.

WORMS, GRUB, ANIMALCULÆ, &C.

No person has employed common salt for the purpose of destroying worms, to a greater extent than Jacob Busk, Esq., of Ponsbourn Park, in Hertfordshire. His valuable experiments have extended over some hundreds of acres of wheat. To use his own words—"In every situation, and at every time, the effect appeared equally beneficial." The quantity per acre—"about four or five bushels, sown out of a common seed shuttle." The period—"In the evening." The effect—"In the morning each throw may be distinguished by the quantity of slime and number of dead slugs lying on the ground. In some fields it has certainly been the means of preventing the destruction of the whole crop."

Six bushels of salt per acre were applied by hand, in April, 1828, to a field of oats attacked by the slugs and worms, on the farm of Mr. John Slatter, of Draycote, near Oxford. The crop was completely saved by this application, although an adjoining field, *not salted*, was completely destroyed by this sort of vermin.

What answer can be given to these statements of plain practical farmers? Is half-a-crown's worth of salt too dear an application to save an acre of corn from utter destruction? Must the worms still be suffered to devour annually thousands of acres of corn, and the farmer yet regard the employment of salt with all the apathy of indolence?

Salt is a complete prevention of the ravages of the weevil in corn. It has been successfully employed in the proportion of a pint of salt to a barrel of wheat. I learn from an American merchant, that wheat placed in old salt barrels, is never attacked by these destructive insects. Six or eight pounds of salt sprinkled over every 100 sheaves of stacking, produces exactly the same effect. The holders of bonded corn would do well to remember these facts.

TURNIPS, MANGEL WURZEL, &C.

I select from my latest communications, the following from Killerton, in Devonshire. In a letter dated August 26, 1826, Sir Thomas Acland, Bart., favoured me with the following statement from his bailiff:—"The first experiment I made of salt for manure, was on seven acres of land for mangel wurzel. I first heaped out the field with earth, forty heaps to an acre, as is usually done for lime: I then put in each heap thirty-three pounds of salt, and mixed it well with the earth, and let it lie a fortnight before I spread it over the land; after that, I ploughed the land three times before I sowed the seed, and I had roots there 32lbs. each. Since that time, I prepared a field of five acres, in the same way, for turnips,—one-third part of the field with lime, one-third with salt, and the other part with hearth ashes. When the seed came up first, the turnips appeared most promising where the hearth ashes were: but after the first month, the turnips did not grow so fast as where the salt or lime was; after that time, the turnips, where the ground was manured with salt, grew faster, and the green looked stronger and darker, and at the end of the season was the best crop.

"The next year, I put the field to barley: and where the salt was put, it was the strongest and best crop. After that time, it was a great deal heavier to work; therefore I consider it a good manure for light sandy soils, but not calculated for clay or heavy lands."

Mr. Hare, of Beaconsfield, in Buckinghamshire, uses salt regularly. In

1822, on one acre of a large field—the soil very gravelly, he applied about 2 cwt. of salt, without any other manure; the rest of the field was manured as usual. The turnips produced on the salted acre were just as good as on any other part of the field. In the following year, on another field of the same quality, he manured the *whole* field with farm-yard manure, adding to one acre of the field, $2\frac{1}{2}$ cwt. of powdered rock salt. On this *salted* and *manured* acre, he had more and finer turnips than were produced on any other field of equal extent in the whole parish. He approves of it also very decidedly for barley.

GRASS LANDS.

Apply ten or fifteen bushels per acre in the autumn.

I rejoice to find that, in Devonshire, salt has found, in Mr. Collyns, of Kenton, an able and zealous advocate: from a letter dated October 17th, 1826, with which I was favoured by that gentleman, I make the following copious extract:—

“One of my neighbours writes me, in using salt as a manure on grass land, I have found the salted portions not to be affected by severe frosty nights, when every blade of grass on the unsalted portions has been in a frozen state.

“I observe, too, that it is destructive to every kind of grub and worm; and I am convinced, where it has been used with judgment, that it has not failed.” Another intelligent neighbour, continues Mr. Collins, whose farm is almost entirely a light black sand, writes—“I have found salt answer my most sanguine expectations for barley, oats, potatoes, and turnips, both as to the increased quantity and improved quality of the crops, of which I can now give ocular demonstration to any one you will send: my barley and oats, which used to yield me only 15 to 20 bushels per acre, now yield from 40 to 45. My wheat is certainly much improved in quality, but I expected more in quantity. I have had 35 bushels of wheat from an acre dressed with ten bushels of salt; and from the same field last year, after the same quantity of salt, 140 bags of potatoes per acre. This year again, dressed with ten bushels of salt, I have not more than 20 bushels of wheat per acre, but the quality very superior indeed, and the root of clover in it very fine and luxuriant. In every field I have salted, I find the grass very much superior to any produced before the use of salt.

“I have since (adds Mr. Collyns,) gone over his farm, and am astonished at the verdant pasturage, in what used to be coarse and rushy meadows. In this arable land he never got more than ten bushels of wheat per acre until he used salt; so that this is also a decided improvement.”

I will give but one other testimony in favour of its use, and that one of the latest I have received from an old Suffolk agriculturist, Mr. Broke, of Capel, near Ipswich:—In the month of April, 1821, six bushels of salt manure were applied to half an acre of red clover,—the soil good turnip land, not sharp; extent of the field ten acres. The salted clover at first looked very yellow, and apparently injured, but it soon began to recover, and when mown, the increased produce was, at the very least, 10 cwt. per acre; and the aftermath proportionally good; the cattle eating it down closer, and in preference to any other part of the field.

I might add easily to this plain statement numerous other experiments,

even of the same farmer : I might add those of Mr. Long, the late high sheriff of Hampshire ; or those of Mr. Benett, in Wiltshire ; or Mr. Burrell, in Sussex : but for the unprejudiced farmer, one fact is quite sufficient, and the opponents of salt manure will still believe that they were all alike deceived : there is "no good in salt," says the farmer who has had his marshes flooded with salt water, and he finds many ready to agree with him in his thoughtless conclusions.

POTATOES.

Apply from ten to twenty bushels of salt to the surface as soon as the potatoes are planted, or ten bushels in the previous autumn, and ten after inserting the set.

My experiments with salt to potatoes were upon a light gravelly soil. The result was as follows :—

Experiments.	PRODUCE IN BUSHELS.	Per Acre.
1. Soil without any manure		120
2. Soil manured with 20 bushels of salt, the previous September		192
3. Soil manured with stable dung at the time of planting		219
4. Soil manured with stable dung and twenty bushels of salt		234
5. Soil manured with 40 bushels of salt alone, 20 in September and 20 in the spring, after the sets were planted		192½
6. Soil manured with 40 bushels of salt as in the last experiment, and also with stable dung		244

These experiments are entirely confirmed by those of the Rev. E. Cartwright, of Tonbridge. From a copious table, which the farmer will find at page 82 of my Essay on Salt, I extract the following statement :—

Experiments.	PRODUCE IN BUSHELS.	Per Acre.
1. Soil without any manure		157
2. Soil manured with 9 bushels of salt per acre		198
3. Soil manured with 8 bushels of salt and 30 bushels of soot per acre		240
4. Soil manured with 30 bushels of soot per acre		182

"Of ten different manures," concludes Mr. Cartwright, "most of which are of known and of acknowledged efficacy, salt, with one exception, is superior to them all."

HAY.

Put about half a bushel of salt to every load of hay, spread it by hand, or through a sieve. Mr. Woods, of Ingatestone, in Essex, has employed it for thirty years ; his plain unvarnished statement need not be supported by any other.

"I use about a quarter of a peck at each laying, thinly spread, which I find is about 4 bushels to a stack of 20 loads. I am fully satisfied that double the quantity would be much better."

"In a particularly wet season, a few years since, I used twelve bushels to a stack of forty loads, the whole of which was consumed by my own horses, and I never had them in better condition. I am so fully convinced of the benefit of salt to hay, that while it is allowed duty free, I shall use it in all seasons." (For other testimonials to the same effect, see my Essay on Salt, page 100.)

The avidity with which animals consume salted hay, is not so generally known as it ought ; I will give, therefore, a fact related to me a short time since by Mr. Law, of Reading. Mr. Green, of Wargrave, in Berkshire, had, in the season of 1824, a parcel of sour rushy hay from a meadow on the banks of the Thames, which both he and his men despaired of render-

ing of the least value ; it was, therefore, stacked by itself, and well salted ; the quantity supplied was large, but Mr. Law did not know the exact proportion.

When the period arrived that his sheep wanted a supply of hay, Mr. Green directed his shepherd to use the salted inferior hay first, and, to his surprise, the sheep consumed it with the greatest avidity. The stack being finished, the shepherd was directed to supply them now with the best hay he could find of other stacks of fine meadow hay.

He came, however, the next morning to his master, and made the following remark :—“ We, sir, must have made a great mistake, and forgotten which stack we salted, for our sheep will not eat the hay which we think the best.”

LIVE STOCK.

The importance of salt to animals is so generally admitted, even by those who deny its value as a manure, that I shall not here dwell at great length upon it. When animals are in a wild state, it is observed, that at certain periods of the year they seek the salt water, or inland salt springs, with great avidity ; and every farmer observes that his cattle, horses, &c., are remarkably fond of licking the salt earth of the farm-yard, stables, &c. In Spain, they give their sheep salt with great regularity—112lbs. in five months to one thousand sheep : as such, I fearlessly assert, that the importance of salt for cattle is incontrovertibly established, however imperfectly it may be practised. I subjoin the statement of the late Mr. Curwen, M. P. for Cumberland. He employed salt to his live stock daily for years :—

For horses he gave	6 oz. per day.
Milch cows	4 ditto
Feeding oxen	6 ditto
Yearlings	3 ditto
Calves	1 ditto
Sheep	2 to 4 per week.

“ If on dry pastures ; but if they are feeding on turnips or coles, then they should have it without stint.”

Some give it to live stock, on a slate or stone, some lay lumps of it in the cribs or mangers. It is a fact *indisputably proved*, that if *sheep are allowed free access to salt, they will never be subject to the disease called the Rot*. Is not this a fact worthy of the farmer's earliest, most zealous attention ? Some recent experiments also lead me even to hope that I shall one day or other be able to prove it to be a *cure* for this devastating disease. I have room but for one fact. “ Mr. Rusher, of Stanley, in Gloucestershire, in the autumn of 1828, purchased, for a mere trifle, twenty sheep, *decidedly rotten* ; and gave each of them, for some weeks, an ounce of salt every morning. Two only died during the winter ; the surviving eighteen were *cured*, and have now,” says my informant, “ lambs by their sides.”

The late Mr. Butcher, of Brook Hall, in Essex, for years employed salt for his cattle and sheep, on his farm near Burnham, in Norfolk. One of his fields was so very unfavourable for sheep, that before he used salt, he had lost ten and twelve sheep in a night, when feeding on the turnips ; but after he had adopted salt, he never lost one. He used to let the sheep have the salt without stint ; and he remarked, that the *sheep* always consumed four times the salt *on this particular field*, than when feeding on any other

on the farm. Mr. Butcher one year let this field of turnips to a neighbour, who did not use salt; and consequently, after losing ten sheep the first night, gave up the field in despair.

Sir Jacob Ashley, of Melton Constable, in Norfolk, gives about a table spoonful per week to each of his fox hounds:—it keeps away distempers, and preserves them in the best health and vigour. It is administered wrapped up in a paper as a bolus.

Although the use of salt for live stock is now becoming quite general, yet the enlightened farmer must not suppose that its introduction, even for that important purpose, was the work of a day. The very magistrates were opposed to its use—for, only a few years since, some honest farmer's servants were brought before a justice of the peace at Winchester, charged, by their ignorant master, with the dreadful crime of giving his horses salt in their corn. "I should not have suspected it," said the farmer, "had not my horses' coats *become so fine* lately." "Salt for horses!" exclaimed the indignant magistrate, "can any thing be more poisonous? Let the rascals be committed to the Bridewell for a month."

HORTICULTURE.

In the garden, much good may be effected by a judicious employment of common salt. I am indebted to my brother, Mr. George Johnson, for several important experiments with salt, in the kitchen garden: they were made with much care, and I can vouch for their correctness.

The soil on which these experiments were made was sandy; and I abridge from his paper, read before the London Horticultural Society, in November, 1821, the following detail of the result.

WINDSOR BEANS.

Experiments.	PRODUCE IN BUSHELS.	Per Acre.
1. Soil without any manure		135½
2. Soil dressed with 20 bushels of salt per acre, week before seed time		217

ONIONS.

	tons.	cwt.	qrs.	lbs.
1. Soil manured with 20 bushels of salt and 10 tons of farm-yard manure	3	12	3	12
2. Soil manured with 12 tons of farm-yard manure	2	10	2	19

CARROTS.

	tons.	cwt.	qrs.	lbs.
1. Soil manured with 20 bushels of salt and 20 tons of manure	23	6	1	18
2. Soil, 20 tons of manure only	22	18	0	26
3. Soil manured with 20 bushels of salt only	18	2	0	0
4. Soil without any manure	13	4	0	0

PARSNIPS.

	tons.	cwt.
1. Yard manure 20 tons, salt 20 bushels	6	15
2. Yard manure 20 tons	6	11

EARLY POTATOES.

Experiment.	PRODUCE PER ACRE.	Bushels.
1. Soil without any manure		308
2. Soil manured with 20 bushels of salt per acre		584

In 1826, salt at the rate of 20 bushels per acre was applied, soon after the seed was sown, to *half* of a carrot bed, in a garden belonging to Richard Francis, Esq., Droitwich: the summer proving dry, the carrots received but little benefit—(the salt should have been mixed with an equal quantity of soot,)

In 1827 the same bed, without any additional manure, being sown with peas, presented a most remarkable appearance; for when the peas on the unsalted portion was only four inches high, the salted were at least sixteen inches, and nearly in bloom; they yielded five or six times as many pods, and those full three weeks earlier than the unsalted portion.

Will not the market gardener be able to avail himself of this curious property of salt? I can testify from my own experience, that salt forwards the growth of potatoes, &c. And in the year 1834, all those seed potatoes which had been treated with salt, or, before planting, had been soaked for some hours in a weak solution of salt and water, produced excellent potatoes, notwithstanding the general failure of the potatoe crops of that year.

I have, in my Essay, given at length, the experiments of Dr. Priestley, upon various plants vegetating in salt and water. He found that the use of salt materially protracted the existence of the plant. Flowers, kept in water vases, continue much longer in bloom, if a portion of salt be added to the water. It is a common custom with the importers of exotic plants, to dip cuttings into salt water. Before the adoption of this plan, they almost invariably perished in the passage.

To explain these curious facts, it is supposed that the salt acts as a stimulant to the plant; a word, however, merely used for the want of a better, as most of the amazing processes and wondrous phenomena of vegetable life are too inscrutable but for the eye of Him

“Who spoke the word, and Nature moved complete.”

Among the very last letters received on the use of salt in the cultivation of plants, was one from an eminent florist, near Paddington, Mr. Thomas Hogg, and I will here transcribe his own words:—

“From the few experiments that I have tried with salt as a garden manure, I am fully prepared to bear testimony to its usefulness. In a treatise upon flowers, published about six years since, I remarked, that the application of salt, and its utility as a manure, was yet imperfectly understood. It is a matter of uncertainty, whether it acts directly as a manure, or only as a kind of spice or seasoning, thereby rendering the soil a more palatable food for plants.

“The idea that first suggested itself to my mind, arose from contemplating the successful culture of hyacinths in Holland. This root, though not indigenous to the country, may be said to be completely naturalized in the neighbourhood of Haerlem, where it grows luxuriantly in a deep sandy alluvial soil: yet one great cause of its free growth, I considered, was owing to the saline atmosphere: this induced me to mix salt in the compost; and I am satisfied that no Hyacinths will grow well at a distance from the sea without it. I am also of opinion, that the numerous bulbous tribe of Amaryllisses, especially those from the Cape of Good Hope; Ixias, Aliums, which include Onions, Garlic, Shalots, &c., Anemonies, various species of the Lily, Antholyza, Colchicum, Crinum, Cyclamens, Narcissus, Iris, Gladiolus, Ranunculus, Scilla, and many others, should either have salt or sea sand in the mould used for them.

“I invariably use salt as an ingredient in my compost for carnations; a plant which, like wheat, requires substantial soil and all the strength and heat of the summer to bring it to perfection; and I believe I might say, without boasting, that few excel me in blooming that flower.

“If I wished to refresh and improve a soil of what is called an old worn-out garden exhausted by fifty years’ cropping, or more, I would give it ($\frac{1}{2}$ or $\frac{1}{4}$ part at a time) a good dressing of lime in the autumn, spreading it as soon as it was slacked, and forking it in immediately. I would, a week or two after that, dig and trench it well in the rough, and lay it up for the frost to act upon; and then in the spring, I would give it a good dressing of salt (not less than six bushels to an acre.) The good effect of such treatment would be manifest for two or three years after.”

In the inundations of the sea, as in Friesland for instance, in 1825, various curious effects were produced by the salt water. The oak, the mulberry, pear, peach, and others with deep roots, did not suffer; neither did the asparagus, onions, celery, &c., for they were never finer, or more luxuriant. But the vines and gooseberries contracted a salt *taste*; and the apricots, apples, cherries, elms, poplars, beech, willows, &c., could not bear the over

dose of sea-water. They pushed out a few leaves, but speedily perished. *Sharon Turner's History*, 117.

Similar results were noticed, after an inundation of the sea, in the garden of the late talented Richard Gower, Esq. near Ipswich, in Suffolk, in November, 1824. In this instance a portion of the garden remained 24 hours under the sea water. The asparagus beds were materially improved in their produce. The cherry trees, in the following year, actually produced a numerous crop of cherries, which *tasted, however, so very salt that they could not be eaten*, although very fine in appearance. These trees all died in the following year, 1826.

CONCLUSION.

From the statements which I have now been enabled, through the kindness of my friends, to lay before the farmer, he must agree that the use of salt in agriculture is of the highest importance; he cannot but acknowledge this, unless, indeed, he believes that all those who have tried salt as a manure, were alike deceived; that Messrs. Brooke and Ransom, in Suffolk; Messrs. Baynes, Butler, Wood, and Challis, in Essex; Mr. Ross, in Kent; Mr. Burrell, in Sussex; Mr. Long, in Hampshire; Mr. Bennett, in Wiltshire; Mr. Sinclair, in Bedfordshire; Mr. Hollingshead, in Lancashire; Messrs. Sickler and Hoblyn, in Cornwall; Mr. Hogg, in Middlesex; Mr. Collyns, in Devonshire, and a host of others, were all deceived in their experiments, and in error in their conclusions.

That salt is alike beneficial to all kinds of land, and at all times, is an assertion too absurd to need refutation, for such an universal property belongs to no other manure; even chalk or lime will not suit all soils. Stable manure may be employed without benefit. When chalk is applied to some soils, years must elapse before its good effects are visible to the farmer; "and yet," said the late eloquent Lord Erskine, "chalk, which has caused to start into life the most inert soils, is just nothing as a manure compared with salt." And, let me ask, what would have been the fate of chalk as a manure, had its early advocates decided upon its merits, without first employing that patient spirit of investigation so especially necessary in all agricultural pursuits? Would chalk, or gypsum, or lime, or bone dust, ever have been generally employed as a manure, had their advocates been infected with a spirit of impatience, and proud contempt of the experiments and rules of those who went before them? Chalk and gypsum had their opponents; they too, had to encounter ignorance in all shapes; but they triumphed at last, and so will the advocates of salt.

It is not intended to be concealed, that salt has been employed sometimes with detriment to the crop under experiment, often without any effect; yet there are no proofs even of its inutility. Some soils require it to be applied in the autumn, others in the spring; some crops are most benefitted by having it applied long previous to their insertion, others at that immediate period. Neither let any farmer imagine, because it is beneficial to his light soils, that it cannot be equally so to more tenacious ones: its gently moistening powers render the first more fertile, the latter friable, and more open to every agricultural operation in the driest seasons. On the richest soils it may be employed with advantage, were it only to destroy the predatory vermin with which they more than usually abound. Those who have studied the subject the most, and witnessed the greatest

number of experiments, must agree in considering that there is no soil or crop that will not, under some circumstances, be benefitted by the application of salt; it cannot be otherwise, but in the immediate vicinity of the ocean. The misfortune is, that no enlightened agriculturist has grappled with its investigation, with the patient determination to establish its true worth: the Drill Husbandry has had its Coke: the Grazing System its Somerville; but salt is still without its demonstrator. The combined exertions of the many may obviate this deficiency. Let every farmer but institute and carefully pursue an experiment, and let him communicate it to the public, whether favourable or otherwise, in all its details; and the true value of salt as a manure will soon be established.

It is scarcely necessary to add, let no one view the subject as of small importance: say nothing of it in a scientific point of view, that cannot be unimportant, with which is connected one of the staple manufactures of the country, and which involves the cheapest and most profitable manure within the reach of the agriculturist. Let no one think he can do nothing in furtherance of the research: the most ill-directed and unsuccessful experiment serves at least as a warning, a beacon to others: a judicious one, especially when crowned with success, bears with it the inestimable gratification that a benefit is conferred upon mankind!—the pleasure that always accompanies the illustration of truth.

It has been often and well said, that, “He who makes two blades of grass grow, where but one did before, deserves better of mankind than the whole race of politicians.”

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