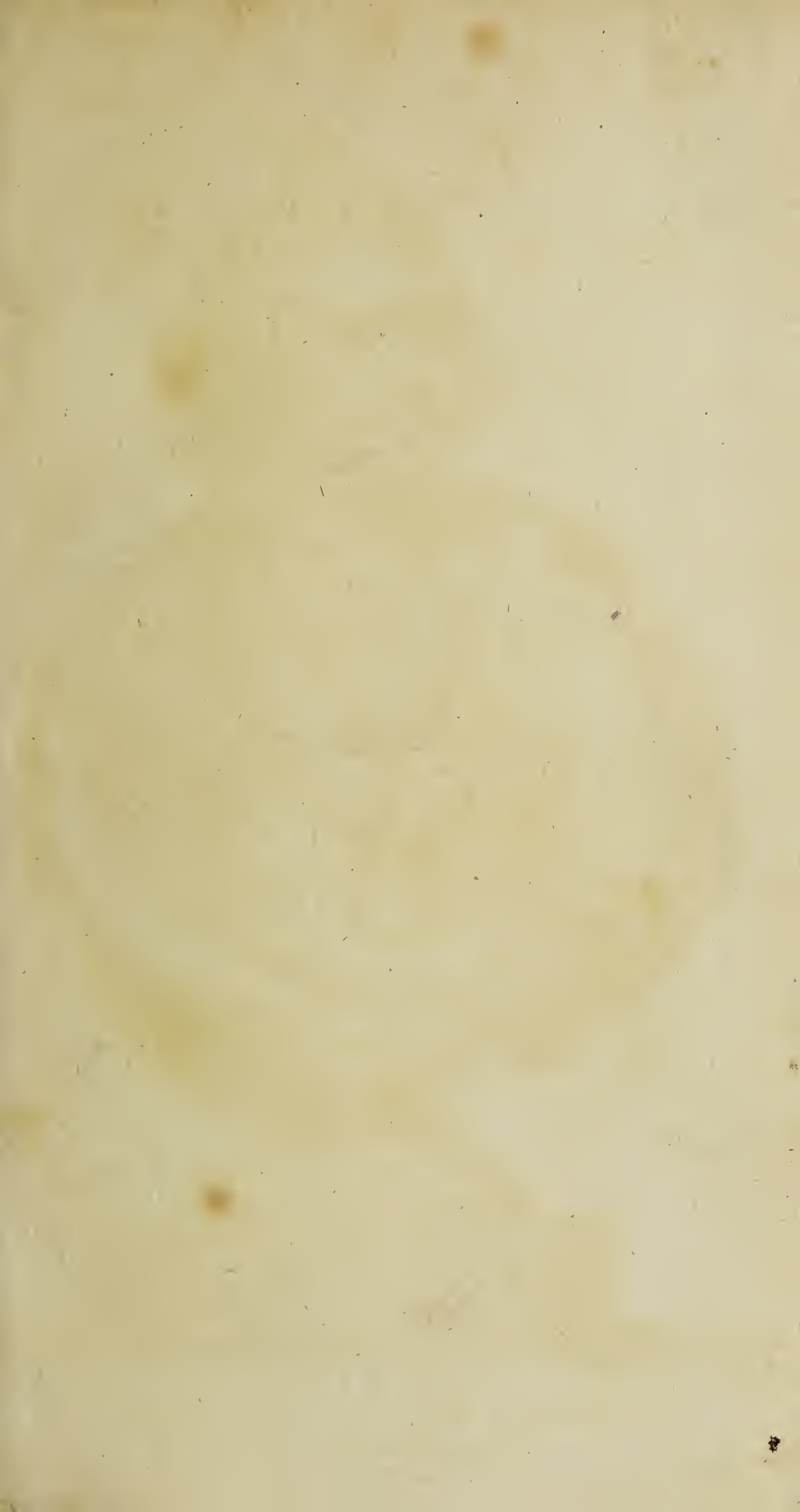


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The Marquis of Stafford.

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GEORGE, PRINCE OF WALES, 1791.
From a Bust by J. C. Lochee.

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T R A N S A C T I O N S

O F T H E

S O C I E T Y

I N S T I T U T E D A T L O N D O N

F O R T H E

E N C O U R A G E M E N T

O F

A R T S, M A N U F A C T U R E S,
a n d C O M M E R C E ;

W I T H T H E

P R E M I U M S o f f e r e d i n t h e Y E A R 1 7 9 2 .

V O L . X .

L O N D O N :

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To be had, by MEMBERS, of the REGISTER, at the SOCIETY'S
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M.DCC.XCII.

P R E F A C E.

THE Print from the Bust of his Royal Highness the Prince of Wales, which was intended to have been prefixed to the Ninth Volume of these Transactions (see Preface to that volume), being now completed, will be found here inserted.

The several Papers in the following sheets are, as usual, arranged under the different Classes into which the business of the Society is divided; and, in AGRICULTURE, it is presumed the Public will receive much satisfaction from the perusal of the several Letters on planting various kinds of Trees; the judicious remarks on Oaks and Chesnuts; and the Improvement of Waste

and Barren Land, by the rearing thereon a variety of mixed Forest-trees. The Letter from Mr. Dunn, giving an account of the Crop of Wheat raised on Land prepared by planting with Potatoes, instead of summer-fallowing (see Vol. IX, page 38), will tend to prove the advantage of that practice; and it is hoped that whoever shall think proper to adopt that mode of cultivation, will favour the Society with their observations thereon, that the country at large may be enabled to judge how far it may be proper to extend such practice, and on what soils, and under what circumstances, it will be most profitable. The Papers of Mr. Dann and Mr. Hunter will shew the advantages arising from the feeding Cattle and Sheep with Potatoes; and should that practice become general, and the preparing land for Wheat, by a crop of Potatoes, prove in general as beneficial as it has been in the case above mentioned, the advantages to the Public will prove of the very first importance.

The

P R E F A C E.

v

The Papers of Mr. Rogerson and Mr. Smith, on the comparative Culture of Wheat, as well as those from Mr. Dann and Mr. Ambrose, on Turneps, will serve to throw considerable light on a question that has long, and still continues to divide the opinion of some of the most ingenious and skilful Agriculturists, and which the Society, by the offer of various Premiums, have endeavoured to solve. How far they have succeeded, must be left to the judgment of the Public; and as the Premiums for ascertaining the comparative merit of the Drill and Broad-cast Method in the Culture of Grain, Pulse, Turneps, &c. are renewed, it is to be expected a question of so much importance will in time be clearly determined: yet, when it is considered under what variety of circumstances of soil, situation, and seasons, all experiments in Agriculture are and must be made, it ceases to be a matter of surprise, that so little general knowledge can be drawn, and that consequently few, very few, clear and determined inferences can be deduced from them.

The culture of that useful drug, Rhubarb, will be found to extend itself in this country, as a plantation has been made in the neighbourhood of London, by Sir William Fordyce; and as the seeds of that plant may easily be procured, it is submitted to gentlemen possessed of large woods on light sandy soils, whether it might not be propagated to advantage in such situations, and produce its roots there without the expence and trouble of garden culture.

In the Paper from Mr. Poynter, on gaining Land from the Sea, a method of compressing the Bank, and rendering it in a short time sufficiently solid to resist the action of the winds and waves, will be found practised, and is well worthy the attention of such persons as may hereafter be engaged in similar works.

The advantages that arise to the proprietors of Wet or Springy Land, from complete and effectual Draining, are many
and

and great. It was with pleasure the Society received so many claims this year for the Premiums offered for that article; and it cannot be doubted, that the Papers of those Candidates to whom the Society adjudged rewards in this class, will prove highly entertaining and satisfactory to the reader. Should further information be wanted, the papers and plans are reserved in the Society's Repository, and are open to the inspection of the Members and the Public.

Under the head of CHEMISTRY, a Paper is inserted on the use of Oak Leaves in tanning Leather, and relating some experiments intended to ascertain the value of the Leaves, when compared with Oak Bark. The art of tanning leather is of so much consequence, that many trials have been made to discover such cheap materials as would supply the place of Bark; and a handsome reward was given many years since, by the Society, to Mr. John Eldridge, for proving, by fair trial, the use of Oak

Saw-dust for that purpose, which, though attended with some inconveniences, proved that every part of the Oak contained the astringent matter, by the introduction of which into the pores of the hide, leather is formed. All these facts will probably be found of very great utility to the workmen, when the Legislature shall be pleased to revise and alter those laws which confine the Tanner to the use of certain materials *only* in his business, and may be said by that means to prevent any improvements in that branch of manufacture.

In the Class of POLITE ARTS will be found some Letters from Miss Greenland, describing a method of uniting Wax or Mastic with Water, by the medium of Gum Arabic, and thus obtaining a Menstruum for Painting in Encaustic, more perfect than that Miss Greenland possessed, when she presented a Picture painted in imitation of the Grecian manner, to the Society, and favoured them with those
Letters

Letters on the subject which are inserted in the Fifth Volume of these Transactions: and it will be considered as a particular favour, by this Society, to receive an account of the success of any trials hereafter made in consequence of these communications.

In the Class of MANUFACTURES a Letter is inserted from the Rev. Mr. Swayne, respecting the culture of Silk in England, and tending to reconcile some seeming differences in opinion among those correspondents whose Papers on that subject have been already printed in these Transactions.

Some Letters are also inserted under this head, which accompanied a Shawl Counterpane, woven by Mr. Philip James Knights, of Norwich, and which being four yards wide, was, in the opinion of many proper judges, of greater breadth than any kind of goods of equal fineness and texture hitherto produced to the Society,

ciety, or to their knowledge manufactured in these kingdoms, and which appeared to be a laudable attempt to improve the manufacture of this country.

Under the head of MECHANICKS, several Plates and Descriptions of Machines are inserted; the first of which is a contrivance by Capt. Edward Pakenham, whose substitute for a Rudder is described in Vol. VII. page 203. He has now obliged the Society with a Drawing and Account of a Method of restoring Masts of Ships, when injured. The great utility of such a discovery must be evident to all those who are in any degree acquainted with the distress attending any defects in the masts of ships, either in the navy, or merchants service.

Notwithstanding the great improvements that have been made in Watches, intended to ascertain the Longitude at Sea; yet, as the principal parts on which their
accuracy

accuracy depends are secured to the inventors by patent, the Society have judged it proper to reward an ingenious Artist for an improved Detached Escapement, of which an accurate plate is given, and which, in the opinion of most of the gentlemen of the profession, promises to be of very great advantage. As all matters for which rewards are given, are intended to be of public utility, the model is reserved in the Repository, and may be inspected by Artists and Workmen at all convenient times.

The being able, with a tolerable degree of accuracy, to ascertain the weight of Goods while they are raising by a Crane, is certainly a very desirable object; and a Plate and Description of a Model for that purpose is inserted in this volume.

In the Ninth Volume of these Transactions is inserted a Print of a Nail or Spike Drawer, which has been found on many occasions very useful; but this year a machine

chine of much more force and efficacy has been produced to the Society, and which, on repeated trials, was found to answer the purposes intended in the most perfect manner. A Plate of this Machine, and a Description of its several parts, will be found in the ensuing pages.

The frequent and fatal accidents that happen to the persons employed in Wheel-Cranes, have induced the Society repeatedly to bestow rewards for the discovering some efficacious method of preventing such mischiefs; and this year a Contrivance, intended to answer that purpose, having been produced, the Premium was adjudged to the Candidate; and a Plate and Description are now submitted to the Public. In this Machine, the effect of the gripe on the periphery of the wheel, when the man ceases to press upon the bar, and the consequent stopping of the Crane, promises to be of great advantage in preserving the men from that imminent danger they have been hitherto

hitherto exposed to in the Walking-wheel Crane, and from which many lives have been lost, besides much injury done to the goods, &c. by the over-running of the load; all which a proper introduction and use of Cranes on this construction, will certainly prevent.

The preserving the lives of such persons as may be on board vessels stranded on a lee-shore, and the saving the valuables on board such vessels, are objects of the highest consideration to a maritime and commercial country; and a contrivance which promises to be of effectual use for those purposes having been produced to the Society, and the most accurate experiments in the power of a Committee to ascertain its utility, having been made, a Reward was given to the ingenious Contriver; and it is believed the Description in the following pages will enable any person to carry it into execution: but if any further information is wanting, reference may be had to a
complete

complete model of the whole apparatus, which is reserved in the Society's Collection.

Under the head of COLONIES and TRADE, are inserted several Papers, proving the advantages that have arisen, and are likely to arise, to the kingdom in general, and the county of Cornwall in particular, from the attention of George Unwin, Esq. to the revival of the Tin-Trade from Great-Britain to India and China; and also some Letters from Jamaica, shewing the state of the Cinnamon-trees in that island, from which there is great reason to expect, at some future period, very considerable advantages will accrue to the commerce of this country.

Having given a short detail of the contents of the several Papers in the following pages, it remains only to mention, that, on account of the present flourishing state of the finances of the Society, several ad-
ditions

ditions are made to the pecuniary rewards in the Book of Premiums, as will appear by the perusal of the book; and some new premiums are offered; as in AGRICULTURE, Class 15 and 17, for ascertaining the best method of raising Oaks, and securing plantations of Timber-Trees. The advantages that would arise to the Public by having these objects clearly determined, are too obvious to need expatiating upon. Class 106, a premium is inserted for discovering a method of making Hay in wet seasons. The benefit of such a discovery is universally allowed; and however difficult it may appear, yet in an age of improvement, such as the present, it seems remarkably strange that the means of gathering in the produce of the earth, in unfavourable weather, however necessary and important it may be in this climate, has hardly been attended to. It is therefore hoped, that the hint, here given, will stimulate ingenious persons to attempt the discovery of what, when known, would be of universal benefit

fit to all countries subject to such variation of climate as that we live in.

The destruction of those Insects that ravage the Hop, and other plants, has been considered as a proper object of attention; and a Premium for the discovery will be found, Class 146.

A method of separating the Saccharine Substance from Treacle, and of securing Casks, have been judged fit matters for Premiums; and such will appear under the head of CHEMISTRY, Class 151 and 163.

In the Class of MANUFACTURES, Class 212, a Premium is offered for producing the best Plan for the Maintenance of the Poor. This was an early object of the Society's attention, and is now revived in hopes that some mode may be found out, whereby the great load under which the Public labour, may be alleviated, and the real industrious Poor more comfortably provided for.

From

From some trials, there is reason to believe the Stalks or Bines of Hops may be converted into a material fit for the purposes of wicks for candles or lamps; and a Premium for so doing will be found Class 209.

An Honorary Reward is offered, Class 241, under the head of COLONIES and TRADE, to the person who shall discover a North-west Passage to the South Sea, which it is presumed may prove of very great advantage to the commercial interests of this kingdom; and a Premium is, in this Class, also offered for producing to the Society an effectual method of destroying the insect called the Borer, so destructive to the Sugar-Cane.

As it is the intention of this Institution to encourage, by every means in its power, all attempts to promote the Arts, Manufactures and Commerce of this country, the ingenious are invited to produce whatever may have a tendency so to do, whether

mentioned in the Book of Premiums or not, as full attention will be paid to every work of merit, and the Artist rewarded in as ample manner as the Society are able, according to his desert, whereby he will not only secure honour and profit to himself, but will contribute to advance and increase those objects which are the immediate subjects of the Society's attention, and the undoubted causes of the present flourishing state of this Island.

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P A P E R S

IN

A G R I C U L T U R E.

A G R I C U L T U R E.

THE GOLD MEDAL, being the Premium offered for raising Oaks, was this year adjudged to LEWIS MAJENDIE, of Hedingham Castle, Essex, Esq. from whom the following Paper and Certificates were received.

S I R,

I BEG leave to trouble you to present to the Society for the Encouragement of Arts, Manufactures, and Commerce, the enclosed Certificates: they attest my having planted five thousand three hundred Oaks in two separate inclosures in this parish. To these Certificates, in conformity with the directions of the Society, I also add an account of the methods pursued by me in making and managing these plantations.

The first plantation, containing four thousand six hundred Oaks, was formed on part of the ancient Home Park, surrounding this Castle: the soil was dug one full spit, and the turf inverted; the plants were two-years-old seedlings, removed with the greatest care from the seed-bed, by undermining the roots, so as to bring them up undamaged and entire in the strictest sense: the sub-soil of the intended plantation being a rich tender loam, holes were bored into it with an iron instrument, used in this country for fixing hop-poles into the earth: into these the trees were planted, using great caution that each seedling should have a hole suitable to the length of its tap-root, which we were careful to set upright, and without doubling it: the tap-roots of these plants were from eighteen to thirty-six inches in length.

My motives for planting the trees without shortening their tap-roots, were these: it has long been asserted, that the Oak suffers

fers greatly in value from transplanting, and that the timber of such trees is of an inferior quality to that produced by sowing the Acorn*.

A common practice in planting Oaks, is to sow the Acorns in a bed; and, after one or two years, to transplant the seedlings into rows in a nursery, where they remain two or three years longer; when the young trees are taken up, and their tap-roots being pre-

B 3 viously

* Whoever designs to cultivate the Oak for Timber, should never think of transplanting it, but sow the Acorns on the same ground where they are to grow; for the timber of all those trees which are transplanted, is not near so valuable as that of the trees from the Acorns.—MILLER's *Gardener's Dictionary*, fol. edit. 1739. Art. *Quercus*.

Oaks raised from the Acorn, without removing, on account of the tap-root striking down into the ground, where there is less nourishment, grow slowly; but are, when they arrive at timber, the best, being generally fuller at heart, and more compact, strong, and lasting.—HANBURY's *Body of Planting*, fol. 1770, Vol. I. page 5. Art. *Quercus*.

6 AGRICULTURE.

viously shortened, are finally planted out. Now, by this process, it is plain the tree undergoes two removals before it is finally planted. To avoid this, I determined to plant out my Oaks at once from the seed-bed, with an idea that, by their receiving only one check instead of two, and this at so early an age, they would soon recover it, so as in the end to suffer no sort of detriment; more particularly as by preserving their tap-roots entire, the trees were planted as much as possible in a natural state.

With some it is not unusual to plant out young Oaks immediately from the seed-bed, but they are for the most part *tapped* at the time of removal; or, this operation is previously effected by an instrument introduced beneath the soil that divides the root, whilst the tree is still growing; after which it is suffered to remain in the ground several years before it is finally removed: but in both these instances the intentions of nature, in respect to this tree, seem to be violated.

violated. — Would it not be preferable, upon all occasions of transplanting, with a view to timber, to remove the trees at as early an age as possible, and without any mutilation, from the seed-bed to the soil where they are to grow? By which, if the seminary (as it ever should be) is at no great distance from the land intended to be planted, and that the essential requisite of taking up the trees with the utmost care, is attended to, the removal will be hardly, if at all, felt; and, at all events, until the question is decided, whether it is best, in order to procure timber of the first quality, to sow Acorns where they are to remain, or to transplant Oaks, it is but reasonable that the practice of transplanting (generally considered as inferior to that of sowing), should be conducted with as few deviations from nature as possible.

At the time of forming this plantation (December, 1786), I made the following experiments, with a view to a comparison

B 4

between

between young Oaks planted with their roots entire, and those whose roots had been *tapped*. On the 5th of that month, I selected from my seedling Oaks twenty-four of the straightest, and which were of an equal length, namely, three feet six inches from the extremity of the tap-root to the top of the plant, the root alone being twenty-seven inches, and the plant fifteen inches in length: twelve of these were planted in the same manner as the rest of the Oaks in the inclosure with entire roots, and at the distance of five feet from each other: contiguous to these, and at the same time and distance, the remaining twelve were planted, taking off previously eighteen inches from their tap-roots, so that nine inches only of root remained.

I wished to observe the progress of these trees, at the expiration of a few years: accordingly, on the 6th of December last, 1791, I caused one of each to be carefully dug up, which I take the liberty of transmitting to you for the Society's inspection.

I do

I do not pretend at present to draw any accurate conclusion from this experiment; for indeed it must require long experience, and a course of years, to form decided opinions concerning a tree of such slow growth as the Oak. I purpose, however, continuing my remarks upon these trees thus experimentally planted, by digging up others from time to time, in order to observe the comparative progress of their roots.

My intention in thus planting these trees, and remarking at various periods the degrees of difference between their growths, was with a view of ascertaining hereafter, whether the planting of perfect oak-feedlings, without dividing their tap-roots, might not be the means of insuring better timber than by the usual method of planting those which have been previously *tapped* for admitting the Oak, from the unremoved Acorn, in all cases, to arrive at a superiority of timber to that of the transplanted tree, at however early an age it is removed: still,

as long as the practice of transplanting Oaks is in use, it may be presumed, that a seedling removed with proper care from the seminary, and planted entire, will prove superior to one whose root has been mutilated; as having sustained in its treatment a less deviation from nature.

The Society will remark that, in the perfect tree, accompanying this, the tap-root has acquired a regularity of thickness in its general growth, and that its lateral shoots are mostly fibrous; because the tree, having remained in possession of its natural source of nourishment, was enabled, soon after being transplanted, to vegetate as before: on the other hand, the mutilated tree has thrown out a number of thick woody horizontal roots near the place where the tap-root was shortened, as if nature, to preserve her produce, had been intent on repairing the damage she had sustained; after which, the root resumes its natural downward tendency, with a regularity that
might

might almost induce an idea that the root had never been at all divided. But, to remove the most distant doubt on this head, others of these trees have been taken up, in which, after the most careful examination, the same distinct modes of growth appear, as in those now presented to the Society. It may be farther remarked, that these trees have not succeeded ill with me, when it is considered they have only been planted five years, and were at that time only fifteen inches in height from the ground*. I could have selected larger trees from my plantation,

* When the trees were dug up, I took the following measurements of each.

<i>Oak planted with an entire Root.</i>	Feet Inches	<i>Oak planted with a tapped Root.</i>	Feet Inches
Extreme height from the bottom of the tap-root -	11 2½	Extreme height from the bottom of the tap-root -	10 3
Height from the ground -	7 7	Height from the ground -	6 9
Circumference close to the ground -	0 6¼	Circumference close to the ground -	0 6½

plantation, for the Society's inspection, but preferred sending the above, for the sake of accuracy, as they were both planted the same day.

The second inclosure, at some considerable distance from the former, and part of the ancient great park of this estate, was planted with seven hundred Oaks; and having in all respects received a similar treatment with the first, it will be unnecessary to trouble the Society with any farther account of it. Both plantations are securely fenced, and in a very flourishing condition, the trees seeming suited to the soil. They have been carefully attended, and judiciously pruned; whereby they have acquired an upright growth, which, together, with their being planted tolerably thick, will insure a length of stem.

I have only to add that, under a continuation of the present treatment, I can have no room to doubt the future success of these plantations;

plantations; and that if the observations upon them, which I now have taken the liberty of troubling you to present to the Society, shall be found worthy their notice, it will add considerably to the pleasure I have experienced in forming them. With these sentiments, I have the honour to remain,

S I R,

Your most obedient,
and very humble servant,

LEWIS MAJENDIE.

*Hedingham Castle, Essex,
January 1, 1792.*

Mr. MORE.

I JAMES MONTGOMERIE, servant to Lewis Majendie, of Hedingham Castle, in the county of Essex, Esq. do hereby certify, That, with proper assistants, I planted five thousand three hundred Oaks, in two separate inclosures, in the parish of Castle-Hedingham, at the distance of about six feet between the plants. The Oaks were
two-

two-years-old seedlings, and, excepting a very small number, were planted without cutting, or in any way shortening the tap-roots. The aforesaid trees are, at this time, in a most promising state, having grown with unusual luxuriance. They are securely fenced, and bid fair to become, in due course of time, very profitable Timber-trees.

I further certify, that there are five thousand two hundred healthy Oaks now growing in the above two inclosures.

JAMES MONTGOMERIE,

Gardener to Lewis Majendie, Esq.

*Castle-Hedingham,
November 2, 1791.*

I DO hereby certify, That I have this day visited the above-named plantations of Oaks, which are in a most healthy state; and I do verily believe the facts, as stated
by

by James Montgomerie in the above Certificate, to be true.

GEORGE CASWELL, Curate of the
parish of Castle-Hedingham.

Castle-Hedingham,
November 12, 1791.

THIS is to certify, That I have this day, as well as frequently at different other times, visited two inclosures planted with Oaks, by order of Lewis Majendie, Esq. in this parish; that they are in a very thriving state, and securely fenced. I also further certify, That, having been witness to the forming these plantations, I believe the above Certificate, signed by James Montgomerie, to be strictly true.

BARKER MYALL, Churchwarden
of the parish of Castle-Hedingham,
in the county of Essex.

November 7, 1791.

The

The GOLD MEDAL, being the Premium offered for planting Mixed Timber-Trees, was this year adjudged to JOHN HOLLIDAY, of Dillorn, Staffordshire, Esq. from whom the following Letters and Certificates were received.

S I R,

YOU, who have been an eye-witness of the barren appearance of the Moorland Hills of Staffordshire, will be particularly pleased to hear of any attempt to ornament them with plantations. If the enclosed reflections on the planting Mixed Timber-trees on mountainous and unprofitable situations, should prove acceptable to the Society of which I have the honour to be a Member, it will give real pleasure to,

S I R,

Your humble servant,

JOHN HOLLIDAY.

Lincoln's-Inn,
January 18, 1791.

Mr. MORE.

SIR,

SIR,

THE Society for the Encouragement of Arts, Manufactures, and Commerce, have of late years, in an eminent style, promoted the growth of Mixed Timber-trees. Their early and laudable attention to the Oak, at a period when the officers and artificers of our royal dock-yards, lamented that the supply of ship-timber had diminished, is worthy to be honourably recorded. But as every soil is not congenial to the Oak, planters of every denomination should embrace the opportunity of giving beauty to their grounds, of profiting by experience, and attentively considering what particular kind of wood is adapted to, or flourishes best in any particular soil. The advantages which may naturally be expected to flow from this attention, are numerous, permanent, and solid: numerous, in regard that the planter who attends to the different kinds of soil in his nurseries, may alone be said to let his seed fall on good ground.

C

The

The produce will amply reward his judgment, and crown his labours with success. The seedlings will be vigorous, as well as innumerable. I beg leave to produce the following instance:—The Beech Mast, of the year 1786, was uncommonly fine; from one bushel and a half, kept in sand till the spring following, not less than one hundred and fifty thousand young beech were raised; and, in the course of three years, the planter can certify that, in transplanting about one hundred thousand, not one hundred sickly plants were to be found. Specimens of the healthy plants might be produced, to prove that Moorland Hills, which for ages have not been deemed worth cultivating, may be converted to very useful and profitable purposes. The solid advantages may also be evinced from the vigorous leading shoots made by healthy plants from year to year, when they are placed in a proper soil. Here, if the reference to a single Spruce Fir may be pardoned; if one may be presented as a picture
of

of the rest;—the fact can be ascertained by twenty credible witnesses, that, in the summer of 1789, the leading shoot of a Spruce Fir actually measured two feet eleven inches and a half, bold and tapering, crowned with seven balls, to form the horizontal branches of the succeeding year.

But, to return to the subject of Mixed Timber-trees, from which I have a little digressed—the increased beauty of woods, in consequence of the culture of mixed Timber-trees is evident to every discerning eye. Whoever beheld the autumnal garb, wherewith a flourishing wood is gracefully robed by the hand of nature, without admiring the variety of light and shade it presents? And if this discrimination is pleasing in the sober autumn, when reflexion is awake, when the joy is damped by the falling honours of the forest, reminding us of the approach of winter, how superlatively pleasing must be the vernal tints, dressed in all the gay appearance of

C 2 spring!

spring! But, in this beautiful scenery, Prudence seems to whisper, "Be sparing of these agreeable tints, and scattered beauties; let not these ornamental, or shade trees, if I may be allowed the expression, be either too numerous, or unskilfully placed." Disappointment will evidently flow from the mistake; will greatly diminish, if not destroy, the pleasing effect they were intended to produce. The planter should cautiously avoid sacrificing profit to the pleasure of variety in his woods. Art should ever be the hand-maid of Nature; and the planter cannot too attentively study the quality of the soil: the leading features of his woods should be true to nature; and while the Scyon Oak superabounds and strikes deep into clay; while the Larch loves a light loam, or gravelly soil; while the more hardy northern Firs will shoot their fibres through the interstices of barren rocks; while the beautiful Beech is modestly disposed to flourish in a poor sandy waste; in these and many other instances
let

let Experience lead the way; she will promote the culture of, and rejoice to see those trees predominate, which are most congenial to each different soil. I am with respect,

S I R,

Your sincere humble servant,

JOHN HOLLIDAY.

Mr. MORE.

P.S. Planting, I will readily own, is my favourite and principal amusement in the country; yet it by no means shuts out other improvements: the cultivation and improvement of commons or waste land, have engaged my attention several years; and I have the pleasure to add that, by means of ploughing deep, burying the goss or furze, the principal produce of these Moorland Hills, and cross-ploughing the following year, to kill more effectually the roots and fibres, a very few years ago I let to a tenant, Mr. James Dunn, twenty acres

of this new-improved land, meliorated with a good white coat of lime, at the rent of fifteen shillings per acre, which in its pristine state was not worth two shillings and sixpence per acre. It was very pleasurable to me, in the succeeding year, after the tenant had reaped a heavy crop of fine oats, to receive his application for some additional acres of the common, at fifteen shillings per acre. I could not in prudence comply with his request, by reason the land that he petitioned for, gave me the command of a fine road; yet I could not avoid replying, that I was very glad to find he was in love with Dillorn Common at fifteen shillings an acre, which, ten or a dozen years ago, was not considered worth a tithe of that sum.

This is a true account, which can be certified by the tenant of the land at this day: so diffusive and so general are the national benefits which flow from the exertions of individuals patronised and encouraged by
the

the Society for promoting Arts, Manufactures, and Commerce, who may be said to make the barren wilderness to smile, and the stony rough places, by planting, to become not only picturesque and ornamental, but ultimately of great national benefit.

WE, the Rev. John Woolfe and James Dunn, of Dillorn, in the county of Stafford, do hereby certify, That the annexed account is very correct, he the said James Dunn being the person who desired to have more ground at the rate of fifteen shillings an acre.

JOHN WOOLFE,
JAMES DUNN.

THIS is to certify, That John Holliday, Esq. has planted, on twenty-eight acres three roods and twenty-eight poles of land, well enclosed with good hedges, at Dillorn, in Staffordshire, one

C 4 hundred

hundred and thirteen thousand five hundred Mixed Timber-Trees, between the 1st of October 1789, and the spring following, at three feet distance on the average, and that they are now in a thriving state.

Certified by us, this 14th of December, 1791, who remember the above plantations being made, and have lately seen them in a thriving and healthy state.

B. WOOLFE, Vicar of Caverswall.

J. WOOLFE, Minister of Swinnerton.

THOMAS STEEL.

WE, whose names are hereunto subscribed, are well acquainted with and have viewed the extensive plantation of John Holliday, at Dillorn, in the county of Stafford, Esq. and certify the same appear to us to be well fenced, and in a very flourishing state at the end of two years after the ninety-five thousand Beech, and other Mixed Timber-trees, particularised in the
annexed

annexed paper, were to our knowledge planted out.

B. WOOLFE, Minister of Caver-
fwall, and Master of the Gram-
mar-School at Dillorn.

THOMAS STEEL, Land-Steward
to John Holliday, Esq. and As-
sistant in these Plantations.

Dillorn,
October 10, 1791.

A List of the Trees planted at Dillorn,
Staffordshire, on the Estate of John Hol-
liday, Esq.

10,000 Oaks
500 Ever-green Oaks
600 White Spruce
94,000 Beech
7,900 Larch
100 Lombardy Poplars
100 Black Italian ditto
50 Weeping Willows
25 Hemlock Spruce
25 Cypress
200 White Spruce

113,500

The

The method used in making the Plantations was, with respect to the Beech, by digging a roundish hole, about the diameter of two spades, by preserving the best turf, and placing it on the south-west; which, by experience, has been found to answer two useful purposes, first, that of protecting the young plant from our greatest storms in winter; secondly, in shedding the best soil in the bed of the hole, both winter and summer.

The nature of the Beech soil is light, with sharp gravel; of the Oaks, fine deep clay.

Thanks

Thanks were returned to NATHANIEL KENT, Esq. for the following Communication respecting the Uses and Value of the Chesnut-tree.

S I R,

SINCE I have had the honour of becoming a Member of the Society for the Encouragement of Arts, Manufactures, and Commerce, I have read with great satisfaction Mr. Majendie's judicious remarks upon the Spanish Chesnut, in the Ninth Volume of their Transactions, page 17; and observation and experience have long convinced me, that it is the most profitable tree that can be planted. Although the character which he gives of it, has in a great measure anticipated what I had to say in its favour, still I am persuaded a few more particulars relative to it, will not be considered impertinent or ill-timed, though

though it may in some instances carry the appearance of repetition.

I entirely agree with Mr. Majendie, that, for hop-poles and stakes, it has no equal, in point of durability, and consequently no underwood can be applied to those purposes with equal profit. He seems to think, indeed, that it is not so quick in its growth as Ash, upon a moist soil: I think it is not; but, upon a sand or loam, I apprehend it will keep full pace with the Ash, and attain sufficient size for hop-poles, in fourteen years, and be worth at that age two guineas a hundred, and last, with proper care, twenty years; whilst Ash, which seldom comes to sufficient size in less than twenty years, will only bear two thirds of the price, and decay in half the time.

For gates and hurdles it is equally good; and being less heavy than Oak, is another

ther great recommendation to it; as it is removed from one place to another with greater ease. To these and many other purposes, Chesnut, trained and cut as Underwood, is peculiarly adapted; and, in point of beauty, no wood surpasses it; as it admits of close planting, runs strait in its branches, and always appears florid and healthy.

I shall next consider the value of the Spanish Chesnut for timber, in which (except for the unrivalled purposes of ship-building) it will be found for most uses equal to the Oak, and in buildings and out-door work much superior.

In 1676, an ancestor of the present Mr. Windham, of Felbrigg, in Norfolk, had the merit of being a considerable planter of Chesnut. In the space of fifty years, it is presumed these plantations required thinning, as his successor, about that time, began

began to apply this timber to useful purposes upon his estate.

The first account is, of the branch or limb of a Chesnut, about thirteen inches square, which, in the year 1726, was put down as a hanging post for a gate, and carried the gate, without alteration, fifty-two years, when, upon altering the inclosures of the farm, where it stood, it was taken up under my direction, and, appearing to be perfectly sound, was put down for a clapping-post in another place.

In 1743, a large barn was built with some of this timber, and is now as found in every part, beams, principals, and spars, as when first the barn was built: about the same time several Chesnut posts and rails were put down, which I have since seen removed; and, after standing thirty or forty years, generally appeared so sound, as to admit of being set up in some other place.

The

The last instance I shall mention, though not of long date, will shew the great superiority of this timber over oak in fences. In the year 1772, the present Mr. Windham made a large plantation in his park, which was fenced with posts and rails, converted from young oaks and chefnuts of the same age and scantling, such as were picked out of a place where they stood too thick. Last year, upon Mr. Windham's enlarging this plantation, it was necessary to remove this fence; when the Chesnut posts were found as sound as when they were first put down, but the Oak were so much wasted just below the surface of the ground, that they could not be used for the same purposes again, without the assistance of a spur to support them.

To these modern proofs of the utility and durability, we may join the authority of Evelyn, an author of established reputation, who asserts, it is good for " mill-
" timber

“ timber and water-work, and that great
 “ part of our ancient houses in the city of
 “ London were built with it, and that
 “ it does well for table and other furni-
 “ ture.”

As a candid quoter of Evelyn however,
 I admit that he says, in another place, that
 he “ cannot celebrate this tree for its fin-
 “ cery ; it being found (contrary to Oak)
 “ it will make a fair show outwardly, when
 “ it is all decayed and rotten within ; but
 “ that this is in some sort recompensed, for
 “ the beams have the property of being
 “ somewhat brittle, of crackling, and
 “ giving warning of danger.”

To account for this drawback in Mr.
 Evelyn's opinion, it will be proper to ob-
 serve, that this certainly is the case with
 old Chesnut, that has been suffered to stand
 beyond the time of its attaining its full
 growth : it is then the worst of all timber,
 being more brittle and more apt to crack,
 and

and fly into splinters than any other: but I have never known this to be the case with young Chesnut; and therefore, in point of œconomy, it should never be suffered to stand longer than the points of the branches, and the complexion of the bark, indicate it to be in a growing or healthy state; which is not very difficult to ascertain, by a person accustomed to make observations upon timber. And it is this very circumstance, when properly attended to, that makes this timber more profitable than most others; for it is so early useful, that if it be cut when it squares only six inches, it will be as durable as an Oak of six times its size and age. This is in a great measure accounted for, by its having so little sap in proportion to other trees, as it will seldom exceed in thickness the breadth of the bark; whereas the sap of an Oak will often be from an inch to two inches thick, which is not only useless, but, if suffered to remain, tends very much to the destruc-

D

tion

tion of the timber: in other respects, the duration of the Chesnut may be accounted for, from its being less affected by worms or insects, than other timber; otherwise it would be impossible that such roofs as King's-College, Cambridge, built in the reign of Henry VI. with Chesnut, and many other equally ancient buildings, should have lasted so long, and be still in such a perfect state as many of them are.

Therefore, like Mr. Majendie, I earnestly wish to see the culture of this most valuable plant, extended over every part of the kingdom, as it must prove highly beneficial to the public.

But let no one be afraid of cutting it too young; for, let this tree be ever so small, if it is large enough for the purpose for which it is wanted, it will be the less liable to decay, from its youth; and, if underwood
be

be the object, the proverb, in Beech countries, will be fully verified, "Cut wood
" and have wood."

I am, SIR,

Your obedient humble servant,

NATHANIEL KENT.

*Ripon-Hall,
(Near Aylsham,) Norfolk,
January 16, 1792.*

The GOLD MEDAL, being the Premium offered for planting the Upland or Red Willow, before the end of April, 1789, was adjudged to WILLIAM PATTENSON, of Ibornden, in Biddenden, Kent, Esq. from whom the following Papers were received. See Vol. IX. page 200.

S I R,

THE Society for the Encouragement of Arts, Manufactures, and Commerce, having offered a Gold Medal for the planting of Upland or Red Willow, not less than three acres, I hereby take the liberty of acquainting the Society that, in the year 1785, I planted about a quarter of an acre of dry land with Willow. I sent to a nurseryman who had raised Willows for many years, for some Upland-Willow plants. He sent them by the name of the Scotch Red Willow, and assured me it was the best kind of Willow he knows. I think this is not the sort that

is

is generally called the Red Willow, but it is undoubtedly an Upland Willow, and is nearly, I believe, the same as the twelfth sort, described by Miller, in his abridged Dictionary, fourth edition, 1754, which he there calls the *Mountain Willow*. This small plantation made so fine and advantageous an appearance, that it encouraged me to proceed on a larger scale; and, in the spring, 1789, I finished two plantations with the same sort of Willow, one thousand seven hundred and forty-two plants on an acre. One plantation contains three acres and a half, the other four acres: they are secured by a proper fence, and the plants are in a growing state: the first summer they grew very well; the second year they shot from eight to eleven feet in height. Since I made the plantation, several persons in my neighbourhood have planted the same kind of Willow in small quantities; and one gentleman is now making a plantation of two acres and a half with it.

If the Society, on this occasion, think me deserving their attention, I shall esteem myself highly honoured, and am their

Most obedient humble servant,

WILLIAM PATTENSON.

Ibornden, in Biddenden, Kent,
March 11, 1791.

WE whose names are undersigned, live in the parish of Biddenden, and certify the above facts.

JOHN MATHER, Rector.

THOMAS KIRKBANK, Curate.

R. PULLEN, jun. &c.

In the Ninth Volume of these Transactions, page 38 to 44, is inserted an Account given by SAMUEL DUNN, Esq. of an Experiment made on one acre and a half of Land, which was cultivated by him with Potatoes, instead of lying under a Summer Fallow; and the Society having this year received the following Account from Mr. DUNN, stating the advantages resulting from that practice, the SILVER MEDAL was voted to him for these communications.

DEAR SIR,

I READILY comply with the wish of the Society, that I would inform them of the quantity and value of the Wheat which grew upon the acre and a half of land that I set with Potatoes in the spring of 1790, instead of having a summer fallow to kill weeds and quick grass, as I had been advised to do; and which Wheat

D 4

was

was sown on that same land from whence the Potatoes were taken in the month of October following, with only one ploughing, and no fresh manure.

The account will, I doubt not, be very pleasing to the Society, as well because of its extraordinary value, as that it will further prove how beneficial the growth of Potatoes is, and the easiest and most advantageous way of bringing land into order, when filled with noxious weeds, as mine was.

The Wheat has been all threshed out, and measured under my own inspection, and produced eight quarters and a half of clean Corn.

	<i>£. s. d.</i>
Six quarters, sold for seed, at 44s.	13 4 0
Two quarters and a half more, not sold, 14 bushels of which we kept for our own seed (the	price

A G R I C U L T U R E. 41

price of wheat is fallen): there-	—	—	£. s. d.
fore say, at 41s.	—	—	5 2 6
Hinder ends from ditto, 2 bushels,			
at 3s.	—	—	0 6 0
Straw from do. 16 threave, at			
1s. 6d.	—	—	1 4 0
Short straw from ditto, worth			0 5 0
			20 1 6

*Expences attending the growth of the
Wheat, &c.*

			£. s. d.
Ploughing an acre and a half of land	—	—	0 5 3
Paid for seed	—	—	1 6 6
Sowing and harrowing	—	—	0 4 0
Weeding	—	—	0 2 8
A boy to guard the wheat from the birds, 30 days, at 4d.	—	—	0 10 0
Reaping the corn, being very thick grown and strong			

corn

corn, two men, two days,	£.	s.	d.
at 2s. — —	0	8	0
Waggon, horses, and men, to bring it home —	0	4	9
Threshing 15 days in harvest time, at 2s. — —	1	10	0
Dressing the corn —	0	2	3
Rent for one year, at 20s. per acre, being the most it has been let for, though worth more — —	1	10	0
Taxes on ditto, about —	0	3	10
	<hr/>		
Total —	6	7	3

This sum, deducted from the total value as above, leaves thirteen pounds fourteen shillings and threepence, clear profit, the rent and taxes being accounted for.

I must beg leave further to observe to the Society, that this experiment of mine, made in some degree under their sanction, will appear to have completely answered
the

the end proposed: the land is freed from the weeds and the quick grafs, with which it was overrun; the owner of it is very much benefited, in point of profit; and the country farmer convinced at least, if not informed, that this method of tillage may very prudently be practised in future. I am, with great regard,

Your most obedient,
and very humble servant,

SAMUEL DUNN.

Adelphi Buildings,
17 Oct. 1791.

Mr. MORE.

The

The Thanks of the Society were given to Mr. THOMAS ROGERSON, of Narborough, for the following Communication relative to the comparative advantage of the Drill and Broad-cast Method in the Culture of Wheat.

S I R,

HAVING been honoured last year by the Society for the Encouragement of Arts, Manufactures, and Commerce, with a Medal for drilling the greatest quantity of land, (See Vol. IX. p. 25), it does not appear to me that I can make any claim this year (having reason to believe that some of my neighbours have drilled a larger quantity than myself): still I am desirous of laying before the Society, the following account; and should it prove the least worthy their attention, I shall esteem it an honour conferred on me.

I ob-

I observed in my last year's account of drilling, that, in a field containing forty-eight acres, I drilled part thereof, viz. twenty-one acres, and sowed broad-cast the remaining twenty-seven acres, and that I had made a small comparison of the difference of the Crops, which proved in favour of the drill; and on thrashing of each stack, it proved as follows:

	Load	Comb	about	Per Acre.		
				Comb	Bush.	Pecks.
Drill 21 acres, produce	4	18	about	4	3	0
Broad-cast 27 acres	5	7	————	4	0	$2\frac{3}{4}$
				————		
				0	2	$1\frac{1}{4}$
To which add 1 bushel per acre difference in feed	————		————	0	1	0
				————		
In favour of the Drill				0	3	$1\frac{1}{4}$

In the year 1791, I drilled only four hundred and fifty-one acres, including two hundred and two acres of Wheat, drilled in 1790. It being the last year of my term in the Narford farm, my successor had a right to sow small seeds with the summer-corn-

corn-crop; and he wishing to sow them broad-cast immediately after the drill, prevented my drilling the quantity I otherwise intended, as I must have been deprived of hoeing: therefore for that reason I preferred broadcast.

The two hundred and two acres of Wheat I drilled in a variety of ways, viz. one field containing sixty acres of light soil, on a one-year's layer, as follows: part manured with dung, ploughed one earth, and drilled with six pecks per acre; part thereof top-dressed with rotten dung at the time of drilling; one other part ploughed, one earth top-dressed, and the dung drilled in with the roller, and sowed broad-cast with two bushels per acre; the remainder of the field was dunged, ploughed one earth, and sowed broad-cast with two bushels per acre. The summer proving remarkably dry, the top-dressing appeared to be of little use: that part of the field where the manure was ploughed in and drilled

drilled with the machine, was by far the best crop: the whole field was well hoed by hand, with double triangular hoes (the drill-rolled wheat excepted), which I prefer to horse-hoeing on very light soils, as they enter the earth sufficiently deep both for the benefit of air and moulding-up the Corn; and the person who uses them, can cut away many weeds which stand too near the rows of Corn for the horse-hoe: besides, I have often remarked, after horse-hoeing, some of the light fields in which it sinks deep, and raises so much mould as to nearly cover the blades of the Corn, that heavy showers of rain have followed, which has drabbled the Corn, made it turn yellow, and injured it much.

One hundred and forty-two acres being the remainder of the Wheat drilled, was part after wheat, part after barley, and part after oats, ploughed only one earth, and without manure, drilled with six pecks per acre, and all either scarified or hoed;
and

and as the season proved unfavourable for our light soils, it was a better crop than I could have expected from summer Corn, sown with the same prospect.

The remaining two hundred and forty-nine acres of drilled Corn, consisted of Barley, Oats, Peas, and Tares. What was drilled early, was a tolerable crop; but that drilled late (viz. May), was very indifferent. I therefore recommend early drilling, especially on light soils, that the Corn may be hoed in proper time, and the rows meet before the dry weather affects it too much.

The Tares were drilled on Pea stubble, the beginning of April, at nine inches, with two bushels per acre; and, by scarifying them the latter end of April, and hoeing them twice in May, they grew fast, and proved a great relief to my horses during the Turnep-sowing season, when I cut them and fed my horses in the stables.

Since

Since Michaelmas 1791, on the farm I now occupy at Narborough, I have drilled and sowed alternately a piece with Wheat, containing nearly eighty acres, thorough summer-tilled, part manured with oil-cakes, nearly half a ton per acre, and part teathed with sheep. I have likewise dibbled another field, on a farm in an adjoining parish, of one-year layer, part in the common mode, viz. two rows on a flag or furrow; the other part, one row on a flag, at nine inches asunder.

And I shall be happy if they afford me an opportunity of laying before the Society any account that may prove satisfactory to them. In the mean time, I remain,

SIR,

Your obliged humble servant,

THOMAS ROGERSON.

*Narborough,
January 29, 1792.*

Mr. MORE.

E

The

The GOLD MEDAL, or the SILVER MEDAL and TWENTY GUINEAS, at the option of the Candidate, being offered for the best Set of Experiments to ascertain whether it is most advantageous to cultivate Wheat by sowing it in the common Broad-cast way, or by Drilling it; the Premium was this year adjudged to Mr. PETER SMITH, of Hornchurch, Essex; whose Letters are here inserted, and who made choice of the Silver Medal and Twenty Guineas.

S I R,

HAVING heard much said in favour of Cooke's Drill and Horse-hoe, I was determined to make a comparative Experiment on a twelve-acre Piece, one half of which was drilled, the other half sown broad-cast. In June, 1790, the above piece, a mixed soil or gravelly loam, was ploughed one furrow from a two-years grass layer,

layer, and sown with Turneps. The Turneps being taken by the fly, I converted the whole twelve acres into a fallow for Wheat, by twice ploughing, three times harrowing, and once rolling. On the 12th of October, the land was measured and equally divided; on the 14th, began to sow broad-cast under furrow, with the usual quantity of this country, viz. two bushels and a half per acre (our bushel is eight gallons and three quarts measure): on the 15th, finished the broad-cast: the two following days, the six acres intended to be drilled, were ploughed (in order to give both an equal quantity of work) into lands nine feet six inches wide, a proper width for Cooke's Drill, and drilled accordingly, a few days after, with one bushel per acre of the same measure as above. To do the Drill justice, I must observe that the young plants suffered very much from the rooks picking the grain out of the drill, which left so thin a plant, that some of my neighbours went so far as to say, I

should have no crop: it was also, I believe, injured, one acre in six, by a leading land-ditch stopping, which overflowed that part of the field with water for some time, and being directly across the lands, hindered me from scarifying so soon as I would have done.

During the Winter, the broad-cast had by a great deal the best appearance; but in a little time, after the drilled Wheat was scarified, which was done the second week in March, it evidently got the lead, being then of a darker green, and more healthy colour. In April the drilled Wheat was horse-hoed; at the same time the broad-cast was hand-hoed; and in May the drilled Wheat was hand-hoed, as at that time I had not a drill of my own, nor could I at that time borrow. The drilled now beat the broad-cast much; it tillered well: I told from twenty to thirty stems from a single plant with wonderful ears, containing from ninety to one hundred kernels in
one

one ear. The broad-cast became ripe first; but both were cut at the same time, that is, the same men cut the drilled immediately after it: the broad-cast was carted two days before the drilled; but both were got without any rain, and laid in the same barn, with a layer of drag rakings between them, in order to thresh them separately.

Both crops were threshed by the same men with great exactness. The produce of the six acres drilled, was twenty-five quarters, six bushels; the produce of the broad-cast, twenty-four quarters, one bushel and a half. Produce of the drill per acre, thirty-four bushels, one peck, and four quarts; produce of the broad-cast per acre, thirty-two bushels, one peck: that is, two bushels and four quarts in favour of the drill, which, with one bushel and a half of seed sowed, is three bushels and a half and four quarts, which may be estimated at about twenty shillings per acre, in favour of the drill. This, though considerable, is but

trifling, compared with the benefit the land has received from being scarified and horse-hoed, which was very visible when the crops were cut, the drilled stubble being very clean, and the broad-cast foul.

The expence in the cultivation of the two crops was nearly the same. The drilled Wheat was once scarified, and once horse-hoed, at eight-pence per acre each time; also hand-hoed at three shillings and six-pence per acre. The broad-cast was hoed at five shillings per acre. I must here observe, that it is not usual to hand-hoe broad-cast Wheat in this part of the country, though practised in some parts; but, in order to be satisfied and to make up my mind about drilling, I determined to run the drill hard, by doing what I could to the broad-cast; and I am decidedly of opinion, that if I had not hoed the broad-cast, and if the drill had not suffered by the rooks, and by being overflowed with water as before mentioned, the drill would
have

have beat the broad-cast at least one fourth part; and, as the best proof I can give of my opinion as above, I have drilled all my Wheat, viz. forty acres.

If this statement of my experiment shall meet with the approbation of the Society, it will afford much pleasure to

Your most obedient,

humble servant,

PETER SMITH.

Hornchurch, Essex,
Feb. 5, 1790.

Mr. MORE,

The GOLD MEDAL, being the Premium offered for an Account of the comparative Advantages of the Drill and Broadcast Methods in the Cultivation of Turneps, was adjudged to Mr. WILLIAM DANN, of Gillingham, Kent (see Vol. IX, page 202), from whom the following Papers were received.

S I R,

PRESUMING, by the Society's continuation of the Premium for the comparative advantage of the Drill or Broadcast Method in the Cultivation of Turneps, that they are not satisfied on the subject, I am induced to request you will do me the favour to lay the following before them; and if it should in the least tend to clear up a doubtful point in their minds, it will give great pleasure to,

S I R,

Your most obedient servant,

WILLIAM DANN.

*Gillingham,
March 27, 1791.*

Mr. MORE.

Comparative

Comparative Culture of Turneps.

Seven acres of thin, light, stony land, on a chalk bottom, worth about eleven or twelve shillings per acre, were prepared, principally in May and June, 1790, for Turneps, by four ploughings, with proper harrowing and rolling. After the second ploughing and working, a considerable quantity of grass was raked up by hand, carted together and burnt, which, and the earth that was collected with it, produced almost twenty-four cart-loads (of twenty-five bushels each) of ashes: these were spread over about four of the seven acres. After the third ploughing, harrowing, &c. two hundred and thirteen loads of compost manure were carried out, and spread over the whole of the seven acres, making a difference of three or four loads less per acre on that part where the ashes were spread: it was then ploughed the fourth time, and finished the 7th of July. It rained the 5th and 6th; and, on the 8th, when the
ground

ground was just dry enough to roll properly, I had it rolled with a light roller; sowed three acres in the common broadcast method, with five quarts of seed; and drilled the remainder with four quarts of seed, the drills at ten inches and a half asunder: the whole was then harrowed once, and the light roller again drawn over it, which made the earth properly fine.

But as I conceived it probable that the ashes might have an effect on the Turneps, I sowed the field in stripes, giving to each a part of the ground on which they were spread, that each might partake of the advantage, if any.

The weather being showery for several days after they were sown, there was no visible difference in their coming up: indeed none in that case was to be expected; for it is not in such seasons, I conceive, that the Society, or others, suppose any
great

great benefit will arise from the drill, with respect to the early appearance of the plants, but more particularly in dry seasons, when, in the broad-cast method, the plants suffer from not having sufficient hold or depth in the soil; while those drilled, by having proper hold or depth in the soil, will flourish; yet even then the regular distribution of the seed, is, in my opinion, an object worth the practice of the Drill System.

The plants were up in general by the 15th of July, between which time and the 30th, I frequently observed them, but could perceive no difference in their appearance. About half an acre (part of each) was materially injured by the wire or red worm, which I have very frequently suffered by.

August the 5th, harrowed them; the 6th, began to hand-hoe them: from the moist weather, the broad-cast were ready as soon as the drill, the reverse of which
I have

I have heretofore found in dry seasons, by several days. The weather had been cold and unkindly from the time they were sown; otherwise I have no doubt they would have been ready for hoeing much sooner. The 10th, finished hoeing at six shillings an acre, at which the labourers earned near five shillings a day (certainly no great proof of œconomy or oppression). I purpose in future drilling at twelve inches instead of ten inches and a half; when I have no doubt of having them hoed from four to five shillings per acre. The general practice here is to hoe but once, which probably may be wrong. I have not yet perceived any difference in the plants where the ashes were spread.

On the 24th, I first perceived a difference in favour of the drilled crop; and, on the 6th of December, to prove the comparison, I weighed ten perches, five of the broad-cast and five of the drilled, at different parts of the field, as nearly equal
as

AGRICULTURE. 61

as possible, the same number of each being adjoining, except a few feet on the edge of each stripe, to avoid error, and found as follows :

<i>Broad-cast.</i>		<i>Drilled.</i>						
No.	lb.	No.	lb.	Ton Cwt. Qrs. lb.				
1 weigh ^d	243	1 weigh ^d	264	Per Acre drilled	20	8	2	8
2 ———	298	2 ———	276	Ditto broad-cast	19	4	1	4
3 ———	272	3 ———	303					
4 ———	286	4 ———	291	Diff. per Acre	1	4	1	4
5 ———	246	5 ———	296					
	1345		1430	<i>N.B.</i> There has been no visible difference in the Turneps, where the Ashes were spread.				
			1345					
			5) 85					
Diff. per Perch, 17lb.								

I here beg leave to state the result of a second experiment, with a view of endeavouring to give the Society further information on the comparative culture of Turneps, drilled and broad-cast.

The 17th of July 1790, I repeated the experiment on near seven acres more, that had been prepared nearly as in the case before mentioned, except that no grafs had been burnt, and of course no ashes spread, but

but on better land, being a good friable sandy loam, worth seventeen or eighteen shillings an acre: after the third ploughing it was manured with thirty-three loads of dung and mould per acre, most part of the dung brought from London, by water (which I found too expensive to continue): it was then ploughed again, and rolled with a light roller, and sown in stripes, as in the other case, three acres broad-cast, and near four acres drilled, harrowed once in a place and left rolled; the ground still moist, from frequent showers, but dry enough to work properly. Nearly two quarts of seed were sown per acre, broad-cast, and one in the drill: most of the plants were up in seven days, as the ground was worked very fine, and not yet affected by drought; so that here also no difference appeared in favour of the drill, which, as I before observed, is to be expected only in dry seasons, in that particular.

August 9, I observed that the wire-worm had destroyed many of the plants in patches,

but most on a part that was rather too wet when ploughed; indeed, I have frequently perceived the ground unkindly, sometimes for several years, by being ploughed when too wet. The 14th, harrowed those sown on the 17th of July; and horse-hoed, cross the drills, the other part of the field; the whole eleven acres, with Mr. Cooke's hoes, about three inches wide, which are used between the drills when at seven or eight inches. To bring the comparison to the test, on the 29th of November I selected and weighed, at four separate parts of the ground sown on the 17th of July, eight perch, four of each as impartially as possible, and found as follows:

<i>Broad-cast.</i>		<i>Drilled.</i>						
No.	lb.	No.	lb.	Ton Cwt. Qrs. lb.				
1 weigh ^d	335	1 weigh ^d	361	Per Acre drilled	25	1	3	4
2 ———	338	2 ———	360	Do. Broad-cast	22	16	1	20
3 ———	299	3 ———	323					
4 ———	311	4 ———	361	Diff. per Acre	2	5	1	12
	<hr/> 1278		<hr/> 1405					
	Broad-cast		1278					
			4) 127					
			<hr/> 31 $\frac{3}{4}$					
	Diff. per Perch							

As the produce above stated, may be thought great, I beg to observe, that the frost had not then injured the tops.

In

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In a field of three acres, sown the 7th of July, 1790, I made the following experiment, which perhaps may add to the satisfaction of the Society on the subject. About half an acre in the middle of the field was sown broad-cast; on the one side of this, the ground drilled at ten inches and a half, and on the other side at nine inches. The 4th of December I weighed one perch of each, and found

	lb.		Ton	Cwt.	Qrs.	lb.
On the Drilled, at $10\frac{1}{2}$ inches,	288	} per Acre	{	20	11	1 20
On ditto, at 9 inches	272			19	8	2 8
On the Broad-cast -	238			17	0	0 0
The average difference per Acre				3	0	0 0

I fear the Society will think me troublesome; but I cannot avoid saying that, on the 10th of July, 1790, I sowed broad-cast half an acre, in the middle of another three-acre field, and drilled on each side at ten inches and a half; and, on the 30th of December, had three perch weighed, one of the broad-cast, and on each side one of the

the

A G R I C U L T U R E. 65

the drilled: the account given me was as under.

	lb.	lb.	Per Acre.						
			Ton	Cwt.	Qrs.	lb.			
The first Perch, drilled, weighed -	298	}	average	307	$\frac{1}{2}$	21	19	1	4
The second ditto	317					20	15	2	24
The second Perch, broad-cast	291								
Difference per Perch									
	16					1	3	2	8

If what I have stated should prove satisfactory to the Society, it will give me pleasure; but much more, if they should have met with an account more agreeable to their ideas, and better deserving public imitation. I am,

S I R,

Your humble servant,

WILLIAM DANN,

Gillingham,
March 27, 1791.

Mr. MORE.

P. S. It was not in my power to attend; but they were weighed by the persons that assisted me in the other three cases; and I have no doubt of their account.

F

The

The SILVER MEDAL and TEN GUINEAS, being the Premium offered for the best Account of Experiments made on at least Six Acres of Land, to determine the comparative advantages of the Drill or Broad-cast Method in the Cultivation of Turneps, was this year adjudged to Mr. JOHN AMBROSE, of Copford, near Colchester, Essex, from whom the following Papers were received.

MY LORDS AND GENTLEMEN,

I DO myself the honour of transmitting you an account of an Experiment I have made to determine the comparative advantages of the Drill and Broad-cast Method in the cultivation of Turneps, made on two fields, each consisting of six acres; the result of which, I flatter myself, will not be unworthy your notice and regard.

In August, 1790, Barn Field, and a field called Stone Croft (the former of which had

had produced me a crop of Oats, the latter a crop of Wheat, the preceding harvest), were both ploughed up. In September I sowed them with Rye and Tares, for spring-food for my Suffex-down sheep; and they both produced a great quantity of feed. After the feed was off, each field had four tilthes and a half, and ninety loads of farm-yard and town dung were put upon them: both fields were manured and tilled alike.

On the 4th of July, 1791, and the following day, Barn-Field was drilled with Turneps, with the Rev. James Cooke's Drill Machine; and, on the 6th, and the following day, Stone Croft was sown broad-cast. Both were sown with Kendle's Round White Stock, which generally run pretty large, if the land is in any thing of heart.

By horse-hoeing those Turneps that were drilled, with the scarificator, (one foot di-

stance from row to row) as soon as they got their four leaves, they in course came soonest ready to be set out by the hand-hoe, and always promised to be the best field of Turneps; yet the other field had a good broad-cast plant, and was very productive.

The drilled were horse-hoed twice; once previous to their being hand-hoed, which was done at six-pence three farthings per acre each time, the three farthings being an allowance for beer (as our custom is in this country to allow three halfpence in a shilling for that purpose); and once hand-hoeing, at three shillings per acre, and four-pence halfpenny for beer: which makes, for horse and hand hoeing, and beer, four shillings and six-pence per acre.

The broad-cast was twice hand-hoed, at three shillings and four-pence halfpenny each time, beer included; which makes the expence six shillings and nine-pence per acre.

acre. Expence of labour faved by the drill, is two shillings and three-pence per acre: besides, I find, by horse-hoeing twice, and hand-hoeing once, the land is better cleaned and tilled, and the plant vegetates better, than by the more common practice of hand-hoeing twice.

On the 26th of December, 1791, I had ten rods of the drilled Turneps weighed under my direction and superintendance, taking one at the distance of every five rods; and, on the 27th, weighed ten rods of those sown broad-cast, taken in the same manner: both parcels were weighed by the same persons with great accuracy, and produced as follows:

	<i>Drilled.</i>				<i>Broad-cast.</i>			
No.	Ton	cwt.	qrs.	lb.	Ton	cwt.	qrs.	lb.
1	—	0	2	3 16	—————	0	2	2 20
2	—	0	3	0 16	—————	0	2	2 12
3	—	0	3	0 18	—————	0	3	0 15
4	—	0	3	0 15	—————	0	2	2 25
5	—	0	2	2 2	—————	0	2	2 15
6	—	0	2	3 12	—————	0	2	3 2
7	—	0	3	0 2	—————	0	3	0 15
8	—	0	3	0 8	—————	0	2	3 15
9	—	0	2	3 19	—————	0	2	1 27
10	—	0	3	0 9	—————	0	2	2 23
				—————				
Total of 10 rods drilled	—	1	9	3 5	Ten rods broad-cast } —————	1	7	3 1
		F	3				Weight	

	Per Acre			
	Ton	Cwt.	Qrs.	lb.
Weight of the drilled Turneps	23	16	2	24
Weight of the Broad-cast Turneps	22	4	0	16
Diff. per Acre, in favour of the drilled,	1	12	2	8

	Ton	Cwt.	Qrs.	lb.
Weight of the Six Acres drilled	—	143	0	1 4
Weight of the Six Acres broad-cast	—	133	4	3 12
Difference in favour of the drilled in the whole crop	—	—	—	9 15 1 20

Good Turneps, such as these crops, will sell, one year with another (but this year for considerably more), for three pounds per acre; which is four-pence halfpenny per rod, or three halfpence per hundred nearly.

	£.	s.	d.
The drilled Turneps have the preference, at the above value per Acre	—	—	0 4 0 $\frac{3}{4}$
Expence saved in hoeing and beer	—	—	0 2 3
Preference in favour of the drilled per Acre	—	—	0 6 3 $\frac{3}{4}$
In favour of the Six Acres drilled	—	—	1 17 10 $\frac{1}{2}$

The quantity of seed sown, much the same, about two pints per acre.

For

For your further satisfaction, I beg leave to inform the Society, that I have drilled Turneps for the last two seasons, and this last eighteen acres, besides the six acres above mentioned; and also grain for the last three years. Last autumn I had drilled upwards of one hundred and twenty acres of Wheat, which is a very pleasing and beautiful plant; and I have likewise drilled all my peas and beans; and hope the above will afford me an opportunity to make several experiments, of the success of which shall be happy in having the honour of transmitting you an account at some future time. I remain,

MY LORDS AND GENTLEMEN,

Your most obedient
humble servant,

JOHN AMBROSE.

*Copford, near Colchester,
April 9, 1792.*

To the Society for the Encouragement of Arts, Manufactures, and Commerce.

P. S. The foil of the two pieces of land much the same, being a good, mixed, middling, dry turnep foil, with a rich pliable loam below, very little stony, worth about sixteen shillings per acre.

WE, the underwritten, do certify, That Mr. John Ambrose, of Copford, near Colchester, in the county of Essex, has made a just statement of the experiment, on six acres of Turneps, of the Drill and Broad-cast method of sowing and growing them; as witness our hands, this 9th day of April, 1792,

CHARLES HAYWARD } Minister of the Pa-
rish of Copford.

JOHN BAKER, }
JOHN POULTON, } Churchwardens.

WILLIAM HAYLES, }
JOHN CHRISTMASS, } Servants of Mr. Am-
brose, who weighed
the Turneps.

The Thanks of the Society were this year voted to Mr. WILLIAM DANN, of Gillingham, in Kent, for his Account of Turneps and Wheat, drilled by him, as mentioned in the following Letter.

And Mr. DANN appearing as a Candidate for the Premium, the GOLD MEDAL, or TWENTY GUINEAS, offered for feeding Cattle and Sheep with Potatoes, in the year 1790, the said Premium was adjudged to him; when Mr. DANN was pleased to make choice of the Honorary Reward, as appears by his Letter annexed.

S I R,

I RECEIVED your letter of the 30th ult. with the Ninth Volume of the Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, on the 9th inst. and beg you will

will do me the favour to present my most grateful acknowledgements to the Society for this further mark of their approbation. Permit me to add, that I have this year drilled the whole of my Turneps, which, notwithstanding the unfavourableness of the season, have flourished beyond my most sanguine expectation.

And I beg leave to say, that I have this year also made an experiment on half an acre of Wheat, drilled at seven inches, and half an acre sown broad-cast, adjoining, with exactly the same soil and cultivation, and found a difference in favour of the drilled, of two bushels and six quarts per acre. With the greatest respect for the Society, I remain,

S I R,

Your obliged and obedient servant,

WILLIAM DANN.

Gillingham,
September 11, 1791.

Mr. MORE.

SIR,

S I R,

THE Society for the Encouragement of Arts, Manufactures, and Commerce, having offered a Premium for the Cultivation of Potatoes for feeding Cattle and Sheep, in the year 1790, I am induced to transmit you the following account, which I request you will do me the favour to lay before them; and am,

S I R,

Your most humble servant,

WILLIAM DANN.

Mr. MORE.

The Land under mentioned, was cultivated with Potatoes in the year 1790.

No. I.

Two acres, part of Little Court-Field, a sandy loam, that was once ploughed in the winter, harrowed in the spring, and and twenty cart-loads of short rotten dung spread over it. Furrows were then drawn
with

with a plough, to receive the sets which were dropped in, and the ground harrowed on the 20th and 21st of April: the expence and produce were as follows.

Expence per Acre.

	£.	s.	d.
Rent	0	18	0
Ploughing, harrowing, and furrowing	0	15	0
Ten loads of rotten dung	1	0	0
Twenty-two bushels of seed	1	2	0
Cutting ditto, at 2d. per bushel	0	3	8
Dropping sets	0	7	0
Hoeing by hand, once	0	3	0
Once hoeing and earthing with a horse	0	4	0
Tithe	0	7	0
Rates and fences	0	4	6
	<hr/>		
	5	4	2
The same for the other acre	5	4	2
	<hr/>		
	10	8	4

Produce,

Produce, 687 bushels, which were dug up by hand, between the 18th and 22d of October;—a bushel weighed 73lb.

N.B. The expence of digging, picking up, carting home, and stowing away (in a barn), will be brought to account at the conclusion. This part was clean, and in proper order for any crop.

No. II.

The remainder of Little-Court Field, two acres and three quarters, which was in a foul state, and intended for Turneps: the soil different, a tolerably good mould, with many stones. It was ploughed in the autumn, harrowed in the spring; and twenty-two loads per acre of long dung were spread over it, which I conceive is preferable to the rotten dung, for Potatoes.

Expence per Acre.

			£.	s.	d.
Rent	—	—	0	17	0
Tithe-rates and fences		—	0	11	6
			<hr/>		
Carried forward			1	8	6

	£.	s.	d.
Brought forward	1	8	6
Ploughing in the autumn, and harrowing in the spring —	0	10	6
Spreading the dung, ploughing when planted, and planting	0	11	6
Twenty-two loads of dung, at 1s. 4d. — —	1	9	4
Hoeing by hand, twice — —	0	8	0
Horse-hoeing and earthing, once each — — —	0	4	0
Seed and cutting, as before	1	5	8
	<hr/>		
	5	17	6
The same for one acre and three quarters more — — —	10	5	7 $\frac{1}{2}$
	<hr/>		
	16	3	1 $\frac{1}{2}$

Produce, 1298 bushels, dug up between the 22d and 26th of October.

I beg leave to observe, that the cheapest and most expeditious method of planting (and I have tried several), is two ploughs following each other, the horses not going
in

in the furrow, which wait at the ends till the seed is dropped in. I find, four women and four children are sufficient to drop after the two ploughs, which, as they return, of course cover the sets, and leave a fresh furrow open for the next row: the rows are about twenty-two inches from each other: by this method I plant two acres and a half in a day, and at the expence of eleven shillings and six-pence per acre. A proper opportunity, after planting, should be taken, to draw a harrow over the ground; which expence, I observe, I have omitted to bring forward above.

No. III.

Three quarters of an acre, part of Court Dale, that had been laid down three years with Lucerne, which was destroyed by rabbits; on which spread fourteen loads of dung on the ley, previous to ploughing, and planted with Potatoes the 24th of April.

Rent

Expence.

	£.	s.	d.
Rent, tithe, rates, and fences	1	2	1 $\frac{1}{2}$
Dung — —	0	18	8
Ploughing (very hard work), spreading dung, and plant- ing — —	0	15	0
Thirteen bushels of feed, and cutting — —	0	15	2
Hoeing by hand, twice —	0	8	0
	<hr/>		
	3	18	11 $\frac{1}{2}$

Being a ley, could not horse-hoe so well as elsewhere.

Produce, 196 bushels, dug up the 29th and 30th of October: the crop here was at no time promising; being, as I conceive, planted too deep.

No. IV.

Two acres one rood and twenty perches, part of Court Field: the soil tolerably good
2 mould,

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mould, but stony, on a chalk bottom, intended for turneps, but not so grassy as No. II. It was ploughed once in the winter, and afterwards treated the same as No. II. and planted on the 29th of April.

Expence per Acre.

		£.	s.	d.
Rent	—	0	16	0
Tithe, rates, and fences	—	0	11	6
Ploughing in the winter, and harrowing twice	—	0	11	0
Twenty-two loads of dung		1	9	4
Spreading ditto, ploughing when planted, and planting	—	0	11	6
Seed, 22 bushels, at 1s. and cutting ditto, at 2d. per bushel		1	5	8
Hoeing by hand, twice	—	0	8	0
Horse-hoeing and earthing, once each	—	0	4	0
		5 17 0		
The same for one acre one rood twenty perch more	—	8	0	10 ¹ / ₂
		13 17 10 ¹ / ₂		
G		Produce,		

Produce, 877 bushels, dug up the 26th, 27th, and 28th of October.

No. V.

Two acres computed, other part of Court Field; a good sandy loam, planted between the 3d and 8th of May, amongst hops; two rows of Potatoes between each row of hops: no ploughing here of course, nor charge for manure, as the ground was dug on account of the Hops, and no manure applied. The whole expence incurred in consequence of the Potatoes, was drawing furrows with a plough, dropping in the seed, and covering it with the hoe by hand.

But, lest I should mislead others, I beg to observe, that the Potatoes certainly injured the Hops; so much, that it was perceivable at a considerable distance. The Hops were of a much paler colour, where the Potatoes were planted, and I have no doubt but the produce was much less thereby:

thereby: for which reason, I will charge the rent to the Potatoes.

Expence per Acre.

			£.	s.	d.
Rent	—	—	0	18	0
Tithe, rates, and fences	—	—	0	11	6
Drawing furrows, planting, and covering	—	—	0	12	0
Seed, and cutting, as before	—	—	1	5	8
Hoeing by hand, once	—	—	0	3	0
Horse-hoeing and earthing, once each	—	—	0	4	0
			<hr/>		
			3	14	2
The same for the other acre			3	14	2
			<hr/>		
			7	8	4

Produce, 674 bushels, dug up the 30th of October, and the 1st and 2d of November.

No. VI.

Part of Great Court Field. April the 30th, planted ten rows of Potatoes, between twenty rows of beans that were drilled at about twenty-one inches. The beans were good; of course the Potatoes deprived of proper air, and the produce, as I expected, not worth digging.

RECAPITULATION.

No.	Quantity of Ground.			Expence.			Produce.	OBSERVATIONS.
	A.	R.	P.	£.	s.	d.	Bushels.	
I.	2	0	0	10	8	4	687	By this account, it appears that the prime cost of the Potatoes was £. 1 : 12s : 2½d. more than 5d. per bushel; but the whole charge of the manure is included, the half of which might very fairly be carried to succeeding crops, and would consequently reduce the price greatly. They were cultivated with the sole view of feeding Cattle and Sheep with them; but, for the reasons hereafter stated, about a tenth part were sold.
II.	2	3	0	16	3	1½	1298	
III.	0	3	0	3	18	11½	196	
IV.	2	1	20	13	17	10½	877	
V.	2	0	0	7	8	4	674	
Total	9	3	20	51	16	7½	3732	
My Bailiff's account for digging, picking up, carting home, & stowing away				27	10	7		
Total Expence				79	7	2½		

No.	When bought.	When fold.	Expences of keeping, at 11d. per day.		Prime-coft.		Sold for		Gain by each.		OBSERVATIONS.
			£.	s.	£.	s.	£.	s.	£.	s.	
1	1790	1791	6	4	17	16	25	4	7	7	Each Ox eat one bushel and a half of Potatoes a day, which I value at 6d. per bushel, and eight pounds of hay, value 2d. together 11d. a day. No. 9 was very poor when bought; from which I conclude that Cattle, put to Potatoes in a low state, will not pay so well as when they are a little forwarder in flesh.
2	Nov. 8	Mar. 24	4	19	15	11	20	9	4	8	
3	do.	Feb. 24	5	5	15	11	21	13	6	2	
4	do.	Mar. 3	6	12	14	6	21	15	7	8	
5	Dec. 11	Apr. 1	4	1	16	11	20	9	3	18	
6	do.	— 17	4	8	18	1	23	14	5	12	
7	do.	Apr. 22	6	1	16	11	22	7	5	15	
8	do.	— 8	5	8	16	1	20	17	4	16	
9	do.	— 15	5	14	16	1	19	16	3	14	
10	Oct. 30	Mar. 25	6	13	11	0	19	13	8	13	
11	Nov. 27	Jan. 19	2	8	14	11	16	10	1	18	
12	do.	do.	2	8	13	0	15	0	2	0	
13	1791	Apr. 22	3	16	19	11	24	2	4	10	
14	Jan. 22	do.	3	16	19	11	24	11	5	0	
			67	17	224	8	296	4	71	16	
			5	0	6	6	11	5	5	0	

The following is supposed profit, as they were part of my own Stock; the first a Heifer, the other two working Oxen, very poor, put up for experiment, to prove if Potatoes would answer for Oxen in that state. I think they do not; for, according to my estimate, they did not pay more than £.4: 10s. each, for keeping 134 days.

No.	When bought.	When fold.	Expence of keeping at 11d. per day.		Prime-coft.		Sold for		Gain by each.		OBSERVATIONS.
			£.	s.	£.	s.	£.	s.	£.	s.	
15	Nov. 1	Jan. 12							2	10	The Potatoes to both Sheep and Oxen were given unwashed, but the earth was mostly rubbed off from them, when they were picked up; and some were cut for the Sheep.
16	Dec. 28	May 10							4	10	
17	do.	do.							4	10	
Total days kept			1822		which, at 1½ bushel, is 2733 bushels eat by Bullocks.						

I also put up six four-years-old Wiltshire Wether Sheep to Potatoes, on the 18th of November, 1790, and gave them no other food. It was near three weeks before they would eat them: they eat the thatch from the shed within their reach, and the straw they were littered with, rather than the Potatoes; by which of course they were worse at the expiration of that time, than when first put up; and therefore I make no charge for Potatoes till fourteen days after. I sold them the 26th of March, 1791, at full ten shillings each more than they would have sold for when put up. Each eat about eight pounds per day, which, for 114 days, the time they were up, is equal to about seventy-five bushels. The whole consumed by the above, is two thousand eight hundred and eight bushels, which is all that were given to Cattle or Sheep, that I can state a profit on with any precision.

The

The remainder were given to my working Oxen, Cows, Horses, &c. except three hundred and sixty-seven bushels, that were sold late in the spring, and three hundred and twenty bushels that I had cut to plant.

Having observed that Turneps, when they remain on the ground longer than about the middle of March, generally prove injurious to the succeeding crop, particularly if the spring should be a dry one, I reserved a few hundred bushels of Potatoes for my Ewes and Lambs, after the Turneps were finished, which I intended should have been by the time above mentioned (for the purpose of sowing Barley early, as well as the reason before stated); but the winter proving so uncommonly mild, the Turneps afforded such an abundance of feed, that I was not able to get them consumed until the middle of April, when the grass and clover were so very forward, that it would have been highly improper to have

kept Sheep on Potatoes. However, I shall not lose sight of the idea for future practice.

A much greater immediate profit would no doubt arise, by selling the Potatoes, than by feeding Cattle with them; but the manure that is made thereby, is, I conceive, nearly equal to the difference, and should be the grand object with every farmer.

HAVING read Mr. Dann's Account of his cultivation of Potatoes, for the purpose of feeding Cattle, I do hereby certify, That I believe the same to be strictly true, as witness my hand,

HOUST. RADCLIFFE,
Vicar of Gillingham, Kent.

I DO hereby certify, That Mr. William Dann, of Gillingham, in Kent, cultivated nine acres three roods and twenty perches of land with Potatoes, in the year

1790;

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1790; and they were applied as he has stated in an account which I have read, that he intends to send to the Society for the Encouragement of Arts, &c. in claim of the Premium they have offered for feeding Cattle and Sheep, viz.

	—	Bushels.
To 17 Bullocks	—	2733
6 Sheep	— —	75
Horses, Oxen, Cows, &c.		237
For feed	— —	320
Sold	— —	367
		<hr style="width: 10%; margin: 0 auto;"/>
Total	—	3732

JOHN CARMAN,
Bailiff to Mr. Dann.

Gillingham,
Oct. 19, 1791.

S I R,

I HAVE read Mr. Dann's account of his cultivation of Potatoes, for the purpose of feeding Cattle, and do certify, That I attended at the planting, and was an eye-witness of their effects on the Oxen
fatted

fatted with them; and must declare, that I never saw beasts fatter than they were. I also eat of the beef, which was as good as I ever tasted. I beg leave to observe, that my reason for paying such particular attention to the effects of the Potatoes cultivated by Mr. Dann, in the year 1790, was in consequence of experiments he had made for two or three years on a smaller scale, which gave every reason to hope that they would be of infinite advantage as a winter food for stock; and I am so well satisfied with what I have seen of the effects of the Potatoes, that I have near two acres of them now digging up, for the sole purpose of feeding my Milch Cows in the winter. I have the honour to be,

S I R,

Your very humble servant,

B. DOUGLASS.

Gillingham, Kent,
20 Oct. 1791.

Mr. MORE.

SIR,

S I R,

I RECEIVED your letter of the 24th, written by the desire of the Society, and have, agreeable to the request, looked at the copy of the account I sent you respecting feeding Cattle and Sheep with Potatoes; and find the expence of keeping stated at £.67 : 17s : 7d. But suffer me to say, the charge is high, viz. 6d. per bushel for the Potatoes, which, give me leave to observe, is near a penny per bushel more than the whole expence of raising them, and the land left in an improved state; and two guineas per load for the hay, which was very indifferent; and both, at this high price, consumed on the farm. If only the difference between £.67 : 17s : 7d. and £.71 : 16s : 5d. is considered, undoubtedly the profit will appear small; but when it is proved, that each Ox increased in value one shilling per day, by Potatoes, surely it proves a great deal.

I fear

I fear the Committee think the account I have already sent, too prolix; and what I shall add hereto, will certainly render it much more so; for which reason perhaps it should be abridged.

After the particulars of the profit on the fourteen Bullocks, stated as amounting to £.71 : 16s : 5d. I conceive should be added £.12 : 10s. for two hundred and fifty loads of dung, which, at the least, were obtained by them, and will make the sum gained, to pay for their keep, £.84 : 6s : 5d.

The Hay given, was in equal portions, at noon and night: they were twice in the day loosed to drink, which in general was but little. Strict orders were given to the servant that attended them, not to leave any Potatoes in the troughs, when he left them at night; for, twice or thrice, an Ox was nearly choaked by a Potatoe: therefore I had always a large stiff rope ready (soft at one end) to force down the throat,

in

in case of such an accident; and certainly it was very necessary.

It may be observed, that I have not brought forward any charge for attendance; but I consider the improvement of fifteen Pigs, that were supported by the refuse in the troughs of the Oxen, to have been equal to the expence of a man attending them. I am,

S I R,

Your obliged humble servant,

WILLIAM DANN.

Gillingham,
November 27, 1792.

Mr. MORE.

S I R,

THE account I sent you in October last, on feeding Cattle and Sheep with Potatoes, to be laid before the Society for the Encouragement of Arts, Manufactures, and Commerce, having been favourably received, I think it my duty to inform them, that I have, in a small degree, lately carried the idea there mentioned, into effect,
viz.

viz. of a reserve of Potatoes for Ewes and Lambs, in the spring, that Turneps may not remain to exhaust the land, to the injury of succeeding crops, &c.

The difficulty I before experienced in the Sheep taking to eat the Potatoes, made me fearful of accomplishing it; but, by placing troughs in the field some days before the Turneps were finished, and frequently cutting into them a few Potatoes, the most part of the Ewes, and some of the Lambs, were brought to eat them, even when they had plenty of Turneps.

From the 2d to the 14th inst. inclusive, one hundred and fifty-six Ewes, and one hundred and fifty-five Lambs (from three to eleven weeks old) were kept in a meadow of five acres and three quarters, on Potatoes and Clover Hay. I weighed what was given them for two days, and found they eat each day, of Potatoes, six hundred and sixteen pounds, and, of Hay, two hundred and seventy-

seventy-nine pounds. Although the period was short, it was highly valuable; for, if I had been compelled to have put them on my Clover, when the Turneps were finished (April 2), there was very little for them; and besides, it would have occasioned the produce to be less afterwards, by being fed when so very young.

But I beg leave to observe, that I have an idea of extending the use of Potatoes for Sheep much farther*, viz. till Lucerne and Clover may be mown for them, in lieu of pasturing the Clover; conceiving that the produce will be considerably more, if mown, than fed; for it appears to me, that Clover, wounded repeatedly by the bite, must produce much less than when cut once with the scythe.

In

* The high price of Potatoes this spring, induced me to dispose of several hundred bushels, which otherwise would have been applied in support of this idea.

In the last summer, I kept my Ewes and Lambs near a month on Clover mown, and given to them in a pasture-field near; on which they did well; and this will serve as a proof to me, of the practicability of the idea, as far as concerns the keeping Sheep on fresh-mown Clover.

I also beg leave to add, as an additional proof of the utility arising from the cultivation of Potatoes, that I have this winter fed many Oxen with them, and that they did well.

As one of the many who suffer considerably by the effect of the grub, I beg the Society to accept my most grateful thanks, as well for their views in general, as for their offer of a Premium for the means of destroying that injurious insect; although I fear it will remain for the seasons to correct. The only partial relief that has occurred to me is,—Persons following and picking them up as the ground is ploughed.

With

AGRICULTURE. 97

With the most profound deference and respect for the Society, I remain,

S I R,

Your most humble servant,

WILLIAM DANN.

Gillingham,
April 18, 1792.

Mr. MORE,

H

Thanks

Thanks were given to JOHN HUNTER, Esq. of Gubbins, in Hertfordshire, for the following Communication relative to the feeding Cattle with Potatoes, and the advantages that will arise from that practice becoming general.

S I R,

I OBSERVED in one of the daily papers some days ago, that the Society for Encouragement of Arts, Manufactures, and Commerce, of which I have the honour to be a member, had given a reward to Mr. Bucknell, of Knowlton, in Devon, for cultivating Potatoes for feeding Cattle and Sheep. I beg to inform the Society, without the least intention to derogate from the merits of Mr. Bucknell, that this operation in Husbandry is not altogether new: I have practised it for two years. The last year I fattened one hundred and three Oxen, principally with that food; and, at this season,

season, and at this hour, I have no less than seventy capital Cattle feeding on that provision, which I find wonderfully nutritive; but will not fatten an Ox in any reasonable time, without the assistance of Hay. Potatoes are certainly a great help to a Cattle-fattener, and well worthy a general practice over all the kingdom; because, after any crop of the former year, plough your land in boughs, to be bit by the frost in winter, and make it ready to receive the crop in April: sow then the eyes of the Potatoes in lines, following the plough, and leave a space between each furrow, of about four feet, in order that the plough may pass in this space to kill weeds in summer, and turn the mould up to the root of the haulm on either side, going up and down. From proceeding thus in any dripping year, you will not fail of two hundred bushels to an acre, which, at one shilling per bushel, is a great return. But the greatest advantage of all, is, that the crop has so cleaned and meliorated the land,

equal to any summer fallow, that it becomes perfectly fit, in good time, say the month of October, to sow Wheat. Thus have I done this year, in a field of thirty-eight acres, where Potatoes grew, that were ploughed out, and gathered by women, at a penny a bushel; and the land brought into such excellent order, that I made use of the drill-plough to sow Wheat, and quickly finished the business with a bushel and a half of seed as usual. The haulm of the Potatoes, as litter, was nearly worth as much as the expence of gathering them. I am,

SIR,

Your most obedient servant,

JOHN HUNTER.

*Gubbins, Herts,
Dec. 1, 1791.*

Mr. MORE.

The

The GOLD MEDAL, being the Premium offered for the cultivating Rhubarb, in the year 1791, was adjudged to Sir WILLIAM FORDYCE, M. D. F. R. S. from whom the following Letter and Certificates were received.

S I R,

HAVING observed in the List of Premiums offered by the Society for the Encouragement of Arts, Manufactures, and Commerce, that a Gold Medal is offered for raising in the year 1791, not less than three hundred plants of the true Rhubarb, the *Rheum Palmatum* of the London Pharmacopœia, 1788 (*L. Spec. Plantar.*); I take the liberty to send herewith the Certificate of the Minister of the parish, where my Gardener raised from the seed, this last spring, many more than three hundred plants; and the Gardener's Certificate, that he transplanted, in the second and third

H 3

weeks.

weeks of October last, more than three hundred plants, into a piece of ground of mine, in a deep loam, at four feet distance from each other, complying in every respect with the rules and orders laid down in the last Volume of the Transactions of your most useful and public-spirited Society. I am,

S I R,

Your humble servant,

W. FORDYCE.

January 24, 1792.

Mr. MORE.

THESE are to certify whom it may concern, that I, in company with Sir William Fordyce's Gardener, have this day seen and counted upwards of three hundred Rhubarb plants, all in good health, and growing in a garden belonging to Sir William Fordyce, in the parish of Paddington, Middlesex. Witness my hand, this 14th of October, 1791.

J. SHEPHERD,

Minister of Paddington.

THESE

THESE are to certify whom it may concern, that I sowed, in the middle of March, April, May, and June, of this present year, seeds of Rhubarb (*Rheum Palmatum Pharmacopœiæ Londinensis*, 1788), on the north-east, east, and south-east aspect borders of his gardens in Edgware Road, by Paddington, in Middlesex; of which plant, in a healthy state, I transplanted three hundred and twenty into a piece of ground occupied by my master in Brompton, of two and three feet depth of fine loam, in the second and third weeks of October, at the distance of four feet, as proposed and ordered by the Society for the Encouragement of Arts, Manufactures, and Commerce. By me,

WALTER SCOTT,
Gardener to Sir William Fordyce.

London,
October 22, 1791:

The GOLD MEDAL, being the Premium offered for gaining Land from the Sea, was this year adjudged to Mr. G. POYNTER, of Canewden, near Rochford, Essex, from whom the following Papers and Certificates were received.

To the Society for the Encouragement of Arts, Manufactures, and Commerce.

MY LORDS AND GENTLEMEN,

HAVING within these few years hired a Marsh Farm in Wallis's Island, called Tyle Barn, lying open to the German Ocean, or that part of the Sea called the Swin, to the eastward; bordering upon the River Crouch, or Burnham River, to the north; upon the river running between the said Island and Foulness, to the south; I had, at various times, an intention of enclosing

closing part of the Saltings attached to the said Farm, which were then overflowed by the Sea; and, indeed, contrary to the advice of my friends, and such persons whom I consulted upon the occasion, resolved to make the attempt; and accordingly advertised for Wallers, and engaged with two companies from the Isle of Ely and Northamptonshire, besides one company I had in the neighbourhood, amounting in the whole to seventeen persons. On the 22d of March, 1790, began to embank the said Saltings, by making a delf-ditch, twelve feet wide: the feat of the wall is twenty-one feet wide, six feet high, and five feet wide on the top. On the 13th of May following, the tide was observed to be turned from the said wall. The length of the new wall is two hundred and eighty-six rods, allowing twenty feet to the rod. On the 17th of July, 1790, the new wall was entirely completed; and, to my great satisfaction, I found myself in possession of seventy acres and upwards of Land, equal in quality to
any

any in the Island, and likely to turn out very valuable.

As an additional advantage arising from this new embankment, there is no doubt, had it not been done, but the whole Island of Wallis, containing between two and three thousand acres of land (all of which is at this time in high cultivation) must have been inundated by the extraordinary high tide in February last; but, owing to the new wall being upwards of two feet higher than the old one, two hundred and twenty-one feet of which was entirely defended by the new, and which is now the outer wall, the water was prevented injuring the landholders in the island, although the tide was, during two hours, nearly over the new wall; and the consequence must otherwise have been very serious indeed, as it was computed that two thousand sheep, exclusive of a variety of other stock, must otherwise have perished.

Annexed

Annexed you have a particular account of the Expences; and I am,

MY LORDS AND GENTLEMEN,

Your most humble servant,

G. POYNTER.

*Canewden,
May 13, 1791.*

THIS is to certify, That the foregoing statement is true.

HERBERT RANDOLPH,
Vicar of Canewden,

ROBERT TABRUM,
Churchwarden.

*Account of the Expences attending the Em-
bankment.*

	£.	s.	d.
Length of wall, 286 rods,			
at 20s. — —	286	0	0
Barrows — —	10	0	0
Planks and gang-ladders	14	9	0
	<hr/>		
Carried forward	310	9	0

	£.	s.	d.
Brought forward	310	9	0
Gutter — —	10	0	0
To the overlooker of the three companies —	13	13	0
Extra expences —	10	0	0
Total Expence	£.344	2	0

G. POYNTER.

S I R,

IN addition to what has already been transmitted to the Society, relative to the Saltings lately embanked and taken in from the Sea, by me, I beg leave further to add that, about four months after the wall was completely finished, being as soon as it would admit the weight of horses upon it, I thought it adviseable, in order to strengthen its solidity, to have it constantly rolled with the heaviest stone roller I could procure; which I put in force, and con-
tinued

tinued practising, for the space of eight or nine months, with a roller weighing between five and six and twenty hundred weight, and which was drawn by four horses. I was astonished, and so were my neighbours, at the efficacy of this plan; for, owing to the wall consisting of nothing more than the oozy earth thrown up from the outer side, it would have been some time before it would have thoroughly adhered to the bottom: and by this means I am confident the wall was made much more durable, and in a shorter time defended from the sea; and I could at all times observe, when rolling it, that the pressure affected the earth more than five feet from the surface of the wall. At the time of doing this, I sowed twitch-grass and rye-grass on the inward part of the wall, which throve beyond my expectation, particularly the rye-grass, of which I have, at this time, a good plant; and the roots, by entwining into the bank, add strength thereto, and the grass
itself

110 AGRICULTURE.

itself serves as a pasturage for my Cattle.
I am,

S I R,

Your very obedient servant,

G. POYNTER.

*Canewden,
January 5, 1792.*

Mr. MORE.

THIS is to certify, That the foregoing
statement is true.

HERBERT RANDOLPH,
Vicar of Canewden.

ROBERT TABRUM,
Churchwarden.

The

The GOLD MEDAL, being the Premium offered for draining the largest Quantity of Land, was this year adjudged to JOHN KEYSAL, Esq. of Morton-upon-Lugg, near Hereford; but the Society, in consideration of the valuable information sent by two other Candidates, GEORGE PEARSON, Esq. of Harperley, in Durham, and Mr. JOHN WEDGE, of Bickenhill, near Coventry, Warwickshire, voted to each of those gentlemen, a SILVER MEDAL, as tokens of approbation of their spirited exertions in that necessary and useful branch of Agriculture.

An Abstract of these Papers is here inserted; and the Originals, with Plans of the several Estates mentioned in the accounts, are reserved in the Society's Repository, for the inspection of the Public.

SIR,

S I R,

I TAKE the liberty of sending you the particulars of improvement on my estate in Herefordshire, which I beg you will lay before the Society for the Encouragement of Arts, Manufactures, and Commerce.

The whole quantity of Under-draining done, is thirty-one thousand yards: the shallowest of the drains are a yard deep; many of them much deeper: the materials stone. The expence of doing it, two-pence per yard forward; one penny for workmanship; raising the materials, and hauling to the place, one penny more. Thirty-one thousand yards, at two-pence per yard, comes to two hundred and fifty-eight pounds six shillings; for which two hundred and seventy-two acres and two roods of Land are effectually drained. Its annual value is, by this means, increased from one hundred and sixty-three pounds, seventeen

seventeen shillings and six-pence, to two hundred and thirty-eight pounds, twelve shillings. Twenty-three thousand three hundred yards of the under-draining was done in the year 1791; the remaining seven thousand seven hundred yards was done in the years 1790 and 1792.

Open-draining, &c. at Moreton.

There is a new water-course cut through the estate, to take the brook down the lowest part of the land: the winding, irregular course of the old brook, was two thousand seven hundred and seventy-two yards; the new course is two thousand two hundred yards only. Part of the new brook is about eight feet wide, and four feet deep: it afterwards deepens gradually to about six feet: the new line being much shorter, as well as more regular, its relative fall is greater, and consequently its rapidity is much increased.

The soil is principally clay or marl, and lies rather flat; but in some parts it is a gravelly soil, and has a good descent. The surface of the water in the old brook, was generally higher than the land, at a few yards distance from its sides; whereas the surface of the water in the new course, is generally a yard below the adjoining land, which it drains for a very considerable distance on each side, particularly in the gravelly part. About sixty acres of land is become nearly double its original value, by this improvement.

Besides the new brook, there are many large open water-courses all over this estate, which, though not entirely new, are principally so, particularly one branching out of the new brook, and extending two thousand two hundred yards, and bounding the estate on the north side: this course is in general about five feet wide, and five feet deep: this was only a common ditch, as
was

was likewise a collateral branch extending from this cut five hundred yards.

There is likewise another branch sets out of the new brook, and extends five hundred yards, and, for some distance, bounds the west side of the estates: this is wholly new. Also, the old boundary fence, extending from the Wister brook up the south side of the estate, has had its ditch made very wide, deep, and regular; and it now gives a ready discharge to a vast quantity of water.

There are a great number of other open drains, and deep ditches, made to convey the water from the under-drains to the main brook; and these open drains have effected a very great improvement upon the whole estate. The expence of the open courses amounts to one hundred and ninety pounds.

The road through this estate was exceeding bad and inconvenient: it is now made very good and commodious, to the great benefit of the estate and neighbourhood, and which cost the proprietor one hundred and ninety-six pounds. There are likewise two new bridges built over the cuts, which cost forty-one pounds eighteen shillings.

*Summary of the Expence of the Improvement
done at Moreton, 1790.*

	£.	s.	d.
Cutting the new brook, different water-courses, and open drains — —	190	0	0
Under or hollow drains, made with stone, 7700 yards, at 2d. per yard — —	64	3	4
New road through the estate	196	0	0
New bridges — —	41	18	0
	<hr/>		
	492	1	4
	<hr/>		

Expences

Expences in the year 1791.

	£.	s.	d.
1200 Yards of open drain- ing, part at 3 <i>d.</i> and part at 1½ <i>d.</i> per yard —	12	7	0
23,300 Yards under-drain- ing, made with stone, at 2 <i>d.</i> per yard —	194	3	4
	206 10 4		
	£.	s.	d.
Expences in 1790	492	1	4
Expences in 1791	206	10	4
	698 11 8		
Total Expence	698	11	8

which has improved two hundred and twenty acres, two roods, and thirty-two poles of land, and increased its yearly value fifty-six pounds, eight shillings, and sixpence. I am,

S I R,

Your very humble servant,

JOHN KEYSALL.

Temple-Bar,
February 14, 1792.

Mr. MORE.

I 3

SIR,

S I R,

I NOW send you, agreeably to the request of the Committee of Agriculture, a more particular account of the improvements lately made upon my estate at Moreton, near Hereford; for which the Society have done me the honour to adjudge me the Gold Medal.

In November, 1789, I bought the estate; and, soon after that period, I went over it with my steward, Mr. Wainwright, who is a land-surveyor, at Hereford, and found that the land, though good in its nature, was rendered of small value, from its being often overflowed; and, instead of producing good grass for feeding and mowing, was almost covered with sedges and rushes.

We then considered what method ought to be adopted for the improvement of it; and it appeared to us, that nothing could remedy the evil, but draining. The first

step was to take a level, in order to find out the lowest part; and as no person in that country had been used to a business of this kind, I sent for a man out of Staffordshire, who had been employed there by the proprietors of canals.

The first thing he advised, was, to cut a large open drain through the whole of the land; which was ordered to be done, being about one mile and a half long; the lower part of which is nine feet wide, and seven feet deep; and the upper part, five feet wide, and about four feet deep; which occasioned a fall for the water to run off, and prevented its being pounded up.*

By this means we were also enabled to procure a fall for the under-drains to empty themselves into: besides this, we cut several other large open drains, not only across the land, but also one on each side the

I 4 boundary

* My drain runs into other drains, which, at a considerable distance, discharge themselves into the the river.

boundary of the estate, which has had the effect, not only of improving my own land, but also a considerable quantity of other people's adjoining thereto; and, I flatter myself, the truth of what I assert is so visible, that it will induce others to adopt the like method of improvement. Some gentlemen have, indeed, already begun so to do.

Another great use of the large open drain, is, that the river Lugg, which bounds the one end of my estate, often overflows; and from the meadows being lower than its banks, and the old courses nearly filled up, the water could not return, but remained on the land; but by this new cut it is now taken off.

This, though a very expensive work, did but in part effect the remedy; and although the land was much improved near the drains, that at a distance did not reap an equal benefit: it was then we were determined to have under-drains cut where
they

they were found necessary: we surveyed the land; and wherever the water forced its passage to the surface of the earth, and thereby prevented the growth of grafs or corn, we cut under-drains, to the quantity laid before the Society; and by that means have now made the whole perfectly dry and sound, and of nearly double the value it was before.

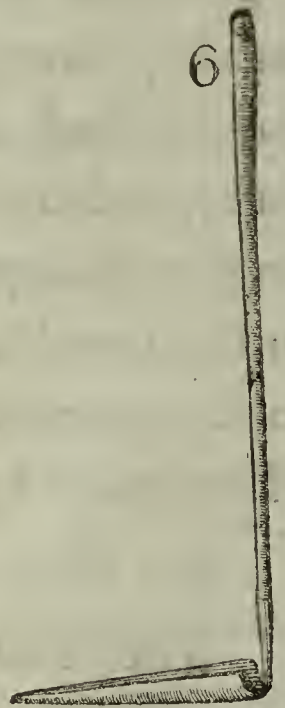
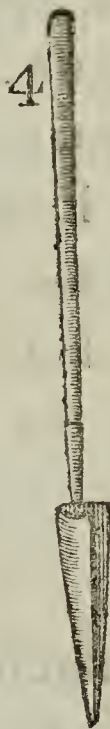
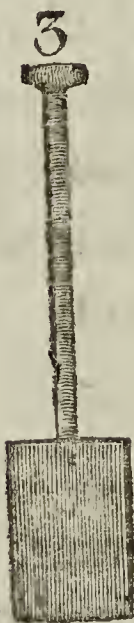
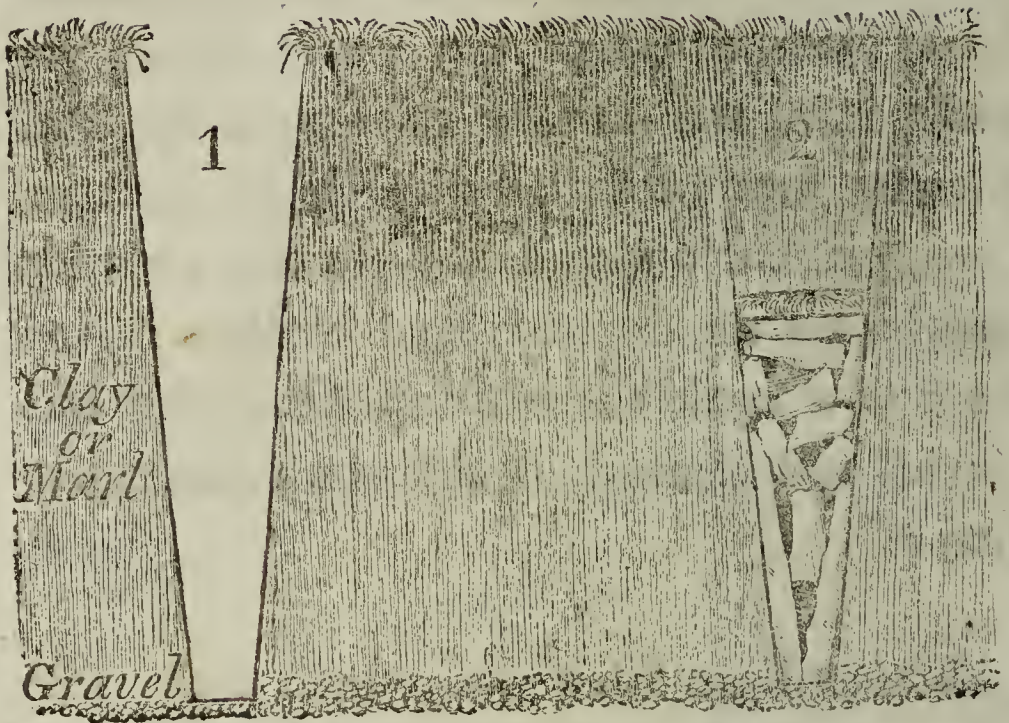
The village itself (of which I am sole proprietor) used to be called *Dirty Moreton*. I have now got rid of that appellation, by making through it, at my own expence, as good a road as any in the county of Hereford; and have rendered it not only pleasing to the eye, but safe and commodious to the traveller: it now affords one of the most agreeable rides in the vicinity of Hereford. I am,

S I R,

Your most obedient humble servant,

JOHN KEYSAL.

Temple-Bar,
May 1, 1792.



Explanation

Explanation of the Cut.

Fig. 1.—Represents the trench, when made, prior to its being filled with stone. This trench is generally three feet six inches deep, one foot wide at the top, and about four inches wide at the bottom. It is made at three operations, in the following manner: the turf is first taken off, about four inches thick, and laid by, to be put on the top of the stone: the soil is then taken out, about a foot deep, with a spade: they next dig another foot, with the instrument, *fig. 4*, tapering from the top downwards, and curving a little; and, finally, it is sunk to its proper depth, with the instrument, *fig. 5*, similar to the last, but smaller in its dimensions. After it is sunk to a proper depth, it is cleared and smoothed, by drawing the instrument, *fig. 6*, along the bottom, which cleans the sides and the bottom, and brings out the loose mould which may have accumulated in the working.

Fig.

Fig. 2 — Represents the drain when filled, which is done by placing two of the widest and flattest of the stones, edgeways, on the bottom of the drain, and rearing them against the sides, and afterwards throwing the rest of the stones in promiscuously, generally observing to put the largest uppermost. Upon the stones is placed the turf, which was taken from the surface: this is inverted, and the grass side put downwards upon the top of the stone, to prevent the mould from falling into, and filling up the vacuities. In arable land, straw or stubble is made use of as a substitute for the turf. The stones in the drains usually take up about two feet of the depth, and the earth on the top, about eighteen inches.

In boggy parts, where the bottom is un-
found, it is necessary to place a small alder
pole along the bottom of the drain, to pre-
vent the stone sinking into the soil. In
wet springy land the water runs through
different

different strata of soil, and at different depths in the earth; so that a drain, filled two feet high with stone, is much more certain to drain land, than a hollow drain made with brick, which is seldom more than ten or twelve inches, and is made at a much greater expence.

With these Papers came a Certificate, signed by the Rev. FRANCIS WOODCOCK, Rector of Moreton, and WILLIAM WAINWRIGHT, Surveyor of the premises; by which it appears, that, before the improvements took place, the lands were in a very wet state, and that they are greatly amended by the draining.

The following Letter contains an Abstract of the Account of the Improvements made on the Lands at Harperly, in Durham, by Draining, for which the SILVER MEDAL was voted to GEORGE PEARSON, Esq.

HARPERLY Estate is situated about fourteen miles to the westward of Durham, and five miles from Bishop Auckland: the greatest part of the soil whereof, is of a loamy quality, with a clay bottom; but the other part, contiguous to the river Wear, is a deep rich soil, mixed with gravel.

About five hundred acres of this estate form a hill-side, or declivity, which generally falls to the south-westward, at the rate of one foot in twenty. The strata near the top of the hill, where a coal-mine has been opened and worked, are as follows, viz.

moorish

moorish earth, mixed with loose stones, slate, &c. for about four fathoms; loose earth and running or quick sand, two fathoms; free-stone, five fathoms; black shale and stone, two fathoms; and coal, two fathoms.

This ground declining, or dipping south-westward, the whole of the water which ran in the bowels of the different strata above mentioned, at different degrees of the declivity, discharged itself on the surface of various parts of the ground, by which one hundred acres of it were rendered entirely a bog, and whereof about two-thirds would hardly bear an animal, and were of no value; and the other third, of the value of three shillings per acre.

The produce, before draining, was wild marshy grass, rushes, sparts, bent, brambles, and brushwood. In situations like this, there is much more difficulty and expence in draining the ground, than where it liēs
more

more upon a level, because the internal springs arise to the surface in so many different places, and must be taken off and conveyed away in so many separate cuts or sewers.

In the year 1791, the one hundred acres of land above mentioned were drained by hollow drains of free-stone: the drains were cut two feet wide, and from three to five feet deep; and where they were made in a running or quick sand, the sole, or bottom, was laid with flag or flat stones, to prevent the passage from being filled or choaked up by the sand. These drains contain in the whole, by an actual admeasurement, seven thousand seven hundred and thirty-five yards; and the expence of making them amounted to sixpence-half-penny per yard, upon the average.

It is supposed that the drains discharge, in dry weather, as much water from each

each acre, upon an average, as is capable of being passed through a tube of two inches diameter; and, in wet weather, when the water has sunk from the surface into the bowels of the different strata, a great deal more. By means of draining the above-mentioned one hundred acres of land, in the manner before described, the same are rendered fit for cultivation, and supposed to be of the yearly value of fourteen shillings an acre, upon the average; and are capable, by proper manuring and husbandry, of further improvement.

Durham,
Jan. 20, 1792.

The above account is signed GEORGE PEARSON, and certified by the Rev. JOHN FARRER, Curate of Witton Le Wear, in the county of Durham; ARTHUR MOWBRAY, Agent to George Pearson, Esq. and several Inhabitants of the neighbourhood.

The following is an Abstract of the Papers sent by Mr. JOHN WEDGE, and describing his manner of draining Land, at Bickenhill, near Coventry; for which the SILVER MEDAL was voted to him.

SIR,

I HAVE the honour to be employed by the Earl of Aylesford, in taking care of several estates; and have, in this and former years, encouraged by his liberality, drained large portions thereof: part of which is in his Lordship's occupation, and part of it, as tenant to him, in my own.

From a consideration, that the manner in which this has been done, may not be unworthy of the notice of the Society for the Encouragement of Arts, Manufactures, and Commerce, I beg the favour of you to lay the account thereof before them. Should any of the facts be worth communicating

nicating to the public, I beg that the Society will fend them out in such manner, or in such words, as may best suit the purpose; and should the least information be conveyed, or benefit derived, to the public, from this feeble communication, my gratification will be complete.

I have little time to read; but in the few treatises on husbandry which I have seen, draining Land, though mentioned as one of its most essential improvements, seems not to be well explained. It is not my intention to obtrude much theoretic speculation on the object of Draining: the learned Society to whom the following practical facts are humbly submitted, do not, I am certain, want any information in matters of theory; yet those practical facts will, I hope, justify my presumption in making some short observations, to point out what have been leading principles to me, in my late undertakings

of this sort. In every country there are large portions of land that, in wet seasons, have always what may be called a dry surface, and other portions of land that have always a moist or wet surface: the former of those admitting all the water which falls upon them, to sink freely through their pores, to various depths, till falling on clay or some other unctuous earth, whose pores will not permit it to pass through, it is there held up, to a height proportioned to the quantity of water which comes upon it, and the facility with which that water is discharged: thus held up to various heights, it serves as a fountain to distribute its water (either by veins of sand, pebbles, or rocks), according to the formation of the different under-strata on the neighbouring lands, and there forms bogs and other varieties of wet surface, on a basis that will, I believe, be always found to consist of marl, clay, or some mixture thereof. The effect of water thus distributed, may be divided into two classes.—The first class, where

where the water is thrown out by a body of marl or clay, &c. upon the surface of descending ground, and in the valley (there held up by clay also), forms bogs or swamps: the second class, where the water is held up by clay or marl, as before, having, above that marl or clay, a stratum of sand or pebbles, through which the water passes; and, above those sands, or pebbles, another stratum of marl or clay, through the weakest parts of which, the water, by a continual pressure from its fountain, forces a passage upwards; and thus, through the weakest parts of the marl or clay, furnishes a continual supply of water, on the surface, for the formation or growth of bogs, &c. in proportion as this water is more or less abundantly supplied by its fountain or head, namely, the higher lands, into which rain-water freely passes, as before described. There are also different soils, under different circumstances, which may form a third class of land for draining; such as strong deep soils, or open light soils, having near

the surface a body of marl or clay: in either of these cases, the water which falls on the surface must, for reasons which are self-evident, keep such lands, in rainy seasons, constantly wet and cold; and it should be observed, that a mixture of all the three before-described classes of wet land, sometimes occur in one field, by sudden alterations of the under-strata, and thereby perplex the operator, by requiring all the different modes of draining in the same field.

If it be admitted that bogs are thus formed and fed, their cure may be effected with certainty.—The first class, by cutting through the stratum (be it sand, pebbles, or rock) that conveys the water to the bog, and carrying off that water by a close drain, to some proper place, where the level admits of its discharge: the second class, by sinking a drain to any convenient depth in the upper clay; then, at a small distance, on one side of this drain, dig, or, with

with a large auger, bore through the remaining part, be it (the upper clay) ever so deep, into the under-stratum of sand, pebbles, or rock, through which the water passes; and it will then rush up into the drain so made, with a velocity proportioned to the height of the land, or fountain, from whence it is supplied. As this drain advances through the land, holes must be dug or bored, as before, every seven yards, or at such distance as the strength of the springs may require; and the whole of the water thus brought up by tapping the springs, is carried off by the drain, made in the upper clay, which must be a close one, to its proper level, and there discharged.

By both these methods of draining, large tracts of land, under favourable circumstances, may be cured with one drain. The best place for fixing these drains, is where the stratum that conveys the water comes nearest to the surface; and the best method

of ascertaining that, is to bore, or dig, in different parts, through the different understrata.

The third class may be easily cured by close drains, at such distances and depths as will best carry off the surface water. It may not be improper to observe, that where the different strata or measures *crop out*, that is, become gradually more and more shallow in some certain direction, as is often the case, till, one after the other, they all present themselves in succession, on the surface of the earth; in such cases draining may often be much more easily and better effected by crossing, with the drain, the different strata or measures, where the levels and other circumstances will admit.

Some of the land drained, was part of a common, in the parish of Church Bickenhill, in the county of Warwick: a part of it was covered with moss and ling, has a peaty surface, about six inches deep, and
produced

produced little or no grafs. In all wet feafons, it was filled quite to the furface, and often overflowing with water. Some of the land was much more unfound, deeper of peat, and covered with mofs in moft parts, nine inches long; another part was an abfolute bog in all feafons.

Having dug or bored, with a large auger, into feveral parts of the land, I found peat, gravel, and fand, mixed, and a quick fand almoft uniformly. The quick fand, in every part, after getting an inch or two into it, feemed almoft as fluid as water: judging from thence that no materials for a drain could be laid in the quick fand, but what it would immediately bury, I dug a trench almoft to the quick fand, leaving gravel, &c. of fufficient ftrength to bear up the materials for a hollow drain: thefe materials were two fides and a coverer of ftone, with a peat turf on the top, to keep out the foil. At every feven yards forward, by the fide of this drain, I dug a hole into
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the quick sand, as deep as it would permit: from these holes the water rose freely into the hollow drain, and was by it discharged at a proper level. It may be proper to remark, that the stone made use of for this drain, and all others here mentioned, is a red sand and rag stone, from Meriden Quarry, about four miles from this place, which easily splits into proper sizes for the purpose, and is very durable: it costs about sixpence per ton getting, exclusive of carriage. The drain thus formed, ran on the whole rather freely, and made the land dry for a few yards on each side thereof, but was far from having the effect I improperly expected; for it evidently appears, the drain could only take a very small portion of the water from so large a quick sand, which it did not penetrate more than two inches; and that it could drain only to its own depth, or, at most, to that depth in the fountain which supplied the quick sand. My purpose was then defeated; and my motive
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for mentioning this error, cannot, I hope, be mistaken.

I now did what I ought to have done before, that is, examined the different strata to a greater depth, particularly on the bog, and at the upper edges thereof, and found the bog to be what has been described under the first class. I therefore determined to attempt the cure in the manner before prescribed for that class, namely, to cut through the whole of the stratum, in this instance of quick sand, through which I found the water pass: this I effected as follows.—The summer being dry, and favourable for the purpose, and having previously made my main open drain, I began my main close drain, the first week in June, 1791, three feet wide on the declivity near the edge of the great bog: in the first operation, we dug through the peat, the hard sand, and gravel, and one spade's graft (about nine inches deep, and seven inches wide) into the quick sand, the whole
length

length of this drain, which is seventy-three perches of eight yards to the perch in length. The drain thus dug, ran copiously, not less than sixty gallons per minute: in this state I left it about nine days; the effect of it was rapid, both above the drain, and on the bog below. Upon examination, I now found about three inches on the top of the spade's graft, which had been made into the quick sand perfectly dry: we then dug out this three inches of dry sand, to nearly the whole width of the drain, three feet; and at the same time dug out, as before, another spade's graft from the top of the quick sand, as near the middle of the drain as possible; this was left to run a few days as before, and had the same effect, namely, three or four inches more of the top of the quick sand became dry and hard: the same operation was repeated again and again, with the same effect, till the purpose of getting through this quick sand was completed, so far at least as the level of the main open drain

drain

drain would permit. The stream of water continued increasing during the whole operation: the bog below the drain was quite dry, and the land above perfectly so: the drain which was first made, and continued running for some time, during the progress of the main close drain, became gradually dry; and has not, since that drain was finished, discharged one single drop of water. Great care was necessary in making the main close drain to keep the stream of water in the *middle* of it, otherwise the current would have undermined the sides, as it sometimes had done, and caused them to fall in: for this reason, it was necessary, when the dry sand was taken from the top of the quick sand, *immediately* to take out a spade's graft from the *middle* thereof, in order to divert the current from the sides.

The main close drain thus made, was three feet wide at top, about nine feet deep on the average; and bevelling a little from
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the top, it was about one foot ten inches wide at bottom. The stone and other materials were put into this drain in the following manner.

Where the drain went through the quick sand into the stratum of clay below it, as in most places it did, the bottom, and in some instances the sides, wanted no particular security; but where it did not go quite through the quick sand, which the level of my main open drain in some places would not admit, the bottom of the drain was covered half an inch thick with ling; then peat-turfs, one foot wide, and three or four inches thick, were cut in convenient lengths, and placed on their edges, on each side the bottom of the drain, forming two sides of a trough of peat: then side stones, about eight inches high, and a stone coverer, were put in upon the ling, between the peat turfs: a large peat turf, near two feet wide and four inches thick, was then cut, and firmly placed

placed over the whole: this left, in the bottom of the drain, an open space of more than six inches square, for the water to pass. The whole was then completed by filling-in the upper part of the drain.

Fifteen acres are now ploughed for a fallow: the bog (nine acres) will now bear a horse; but as it was, before draining, quite a pulp, I shall let it harden during the next summer, before it is ploughed.

Another part of the bog is laid dry in the same manner as that before described, by drains; with this difference, that the quick sand lay nearer the surface of the land, and was much thinner; therefore the drain went through it so far into the clay, as to render side-turfs in most places unnecessary, its depth on the average not being more than five feet: the last-described land, about eight acres, I intend to plough in March for oats. I have this day, the
20th

20th of January, 1792, measured the quantity of water discharged through these drains, by sinking a hole near the side of the main open drain, and placing a cask of known dimensions therein, and find the discharge to be $50\frac{4}{10}$ gallons in one minute, or 72,576 gallons in twenty-four hours. The land, thus drained, will, with proper cultivation, be worth at least fourteen shillings per acre. The draining of these thirty acres of land cost me about eighty pounds, exclusive of the superfluous drain. The whole length of these close drains, is sixteen hundred and fifty-five yards.

I have also hollow-drained nine acres of my farm, in the bottoms of three pieces of enclosed land, called Small Leafield, Old Land, and Holywell, by the method prescribed for the third class of wet land. These drains were made a few yards below that part of each field where the dry and wet land separate, about twenty-two inches deep,
with

with fides, and a coverer of stone, and ling on the top of it, to keep the earth from running in. The length of these drains is eight hundred and eighty yards, and the expence of labour and materials, three half-pence per yard: the drains, in wet weather, discharge a large quantity of water, and will, I have no doubt, answer the intended purpose.—Thus far relates to land in my own occupation.

Nine acres of the land, in the Earl of Aylesford's own occupation, was almost an entire pulp. This bog was of the second class, namely, water passing through a quick sand, and confined by a stratum of clay below, and another stratum of clay above it. The water, thus confined, by being pressed by its fountain, and forced up through the weakest parts of the clay, had formed a bog of irregular thickness, on the surface, in some places, six feet deep, and in others not more than two. As there is a considerable fall in this land, from east

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to west, I thought it expedient to put two drains into it; and this appears to me to have been necessary, from a consideration that both these drains continue to run in the same proportions as when first opened. The manner in which these drains were executed, was, by digging through the different upper strata, and as deep into the clay as the main open drain would admit; then digging or boring through the remaining part of that clay into the quick sand, at the distance of about six yards, in a progressive manner.

The water rising rapidly, through these holes, into the close drains, has effected a compleat cure of this land, every part of which will now bear a horse to gallop upon it. These drains discharge three thousand six hundred and sixty gallons an hour, which is much less than they did at first, as must be the case in all bogs. This land will be worth twenty shillings per acre. The draining cost twenty-five pounds: and
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the length of the under-ground drains is eight hundred and fourteen yards.

I have just now finished draining another piece of land, about forty-three acres; and as this was intended to answer two purposes, one to drain the land, and the other to give an additional supply of water to a mill-pool; and, as a circumstance arose in the execution of this work, which frequently happens in draining land, namely, a sudden alteration in the position of the under strata, a description thereof will not, I hope, be thought tedious. This draining was begun at the level of a mill-pool, and continued without any great difficulty to the distance of about thirty-two chains, in the manner before described as a cure for the second class of boggy land: but, at or near that place, the under strata altered their position; the quick sand which conveyed the water, now became of twice its former thickness; and the clay which had hitherto been above

that quick sand for some distance, disappeared. From the quick sand thus becoming so much deeper, we could not, with the level of the mill-pool, cut through it; nor, indeed, from the wetness of the season (November 1791), would such an operation have been proper. I therefore continued a shallow drain to some distance making side holes into the quick sand, which ran freely; but as this could not cure the whole of the bog below, we branched out another drain, which was made by the method described for curing the second class of wet or boggy land, by sinking a close drain, through the upper strata, into the upper clay, and then, at a small distance, on one side of this close drain, boring a hole, with an auger, through the remaining part of that clay into the quick sand, and, at every eight yards, as this close drain advanced, still boring other holes, in the same manner as before described: through many of these holes, the water rushed with great rapidity.

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The water discharged by these drains into the mill-pool, is one hundred and sixty-eight gallons per minute, or three thousand seven hundred and eighty hogsheads in a day, which is after the rate of one million three hundred and seventy-nine thousand seven hundred hogsheads in a year.

About six acres of this land were always found; about twelve acres on the north side were an absolute pulp, and the remaining twenty-six acres very unsound.— The whole is now found, and will, when cultivated, be worth sixteen shillings per acre. This land would have been drained at a much less expence, into the main open drain; but then the water, which was much wanted for the mill, would have been lost. These close drains are in length one thousand four hundred and fifty-two yards, and cost one hundred pounds, of which about thirty pounds ought to be charged to the mill.

If any part of the foregoing account should want further explanation, it will be gladly given by,

S I R,

Your very humble servant,

JOHN WEDGE.

Bickenhill, near Coventry,

January 28, 1792.

Mr. MORE.

WE do hereby certify, That the facts stated in the foregoing Paper are true, with this reservation on the part of Mr. Jaques; that he was not present when the quantity of water was measured: but, as Mr. Jones was present, and he (Mr. Jaques) also knowing that great streams of water are discharged by the different drains, has not the least doubt of the fact.

JOHN JAQUES,
Rector of Packington,

JOHN JONES.

Packington, Warwickshire,

January 30, 1792.

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C H E M I S T R Y.

The Thanks of the Society were given to the Rev. Mr. SWAYNE, of Pucklechurch, near Bristol, for the following Communication relative to the use of Oak Leaves, in Tanning.

S I R,

KNOWING that the Bark of the Oak was a chief material in the art of tanning Leather, and conceiving that every other part of that tree was fraught with the same astringent principle, through which the bark becomes so efficient in that art; the thought had often occurred, that the leaves might be advantageously applied for the same purpose. Having in my possession a quantity of those leaves, which had been collected on account of the galls attached to them, I was desirous of ascertaining the proportion of astringent matter contained in them, and of comparing it with that contained in the bark. It was
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some time before I could think of a method of doing this; and whether the method I at length used was fully adequate to the intention, must be left to the determination of those who have more knowledge in chemistry than I can pretend to.

The well-known property which this astringent matter possesses, of uniting or striking a black colour, with the calx of iron, suggested to me that its quantity might probably be ascertained, by extracting this matter, through the medium of hot water in which it is known to be soluble, saturating the extract with a known weight of the calx of iron, and afterwards filtering, drying, and weighing it. Supposing martial vitriol to contain iron in a very proper state for this experiment, the first thing I had to do, was, to ascertain the weight of iron in a given weight of vitriol; and this I attempted by the following process: I weighed five pennyweights of vitriol; dissolved it in
water;

water; and added a like weight of vegetable fixed alkali; which immediately precipitated the iron: the mixture was then thrown on a paper filtre, the weight of which was noted down; and, after being plentifully elutriated with hot water, the residue was dried and weighed. Its weight, exclusive of the filtre, was two pennyweights thirteen grains. This proportion of iron in martial vitriol, differs from that given by Professor Neumann, from his Analysis (See Lewis's translation of Neumann's Chemistry, Vol. I. p. 278); but it is necessary to mention, that the vitriol which I made use of had been kept in a dry place, uninclosed in a glass vessel, by which it had lost much of its water of crystallization; and this accounts for the difference. At the same time, and from the same parcel of vitriol, I weighed several other portions, for after-experiments.

The weight of iron, in a given weight of vitriol, being known, I then attempted
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to follow the process above suggested; but, upon trial, found that the coloured particles were so minute or so intimately mixed, that they passed with the fluid through the filtre: this I attributed to the presence of the vitriolic acid, and its close attachment to the coloured particles. With a view, therefore, to destroy this suspected combination, by presenting to the acid a substance with which it has a nearer affinity, I added some mild salt of tartar, which instantly produced the desired effect, and brought on an entire separation of the coloured mass. I then went on with my intended experiments, in the following manner.

I took a half-peck measure full of dried oak leaves, well pressed down, from which I had before separated several ounces of mushroom galls, and having put them in a brass kettle, with a sufficient quantity of water, boiled them therein for two hours. The decoction was then poured from the leaves,
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and fresh water added to them; this was likewise boiled for a considerable time, till it was judged that the water had extracted all the astringent matter: both decoctions were then boiled down, in the same kettle, to one gallon. In a certain measure of this concentrated extract, I dissolved five pennyweights of green vitriol, and afterwards added the like weight of salt of tartar: this mixture was then thrown on a filtre of sinking paper, (the weight of which was three pennyweights); and, after being perfectly elixated with hot water, the residuum was dried and weighed.

		Dwts.	Grs.
The filtre, with its contents,			
weighed	—	6	14
Subtract the weight of the			
filtre	—	3	0
		3	14
Subtract the calx of iron		2	13
		1	1
There remains of astringent			
matter	—	1	1
			Two

Two pints of this reduced extract were still farther evaporated to one pint; and a like measure of this was treated as the former.

	Dwts.	Grs.
The filtre, with its contents,		
weighed — —	7	1
Subtract the filtre, which		
weighed — —	2	15
	<hr/>	
	4	10
Subtract the calx of iron	2	13
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Remainder of astringent matter	1	21
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I then obtained from a tanner two pounds of oak bark, which was perfectly dry, and, after cutting it into thin shavings with a plane, boiled it in three portions of water for several hours, till, from the colour as well as the taste of the last decoction, the astringency seemed to be perfectly extracted. These several decoctions were added together, and evaporated to the same quantity as those of the leaves, namely,

one

one gallon. An equal measure of this, as above, produced by the like treatment, a residuum which, with its filtre, Dwts. Grs.

weighed — — 7 10

Subtract the filtre, which weighed — — 2 19

4 15

Subtract the calx of iron 2 13

Remainder of astringent matter 2 2

A quart of this reduced extract was further concentrated to a pint, and an equal measure of this was treated as before.

Dwts. Grs.

The filtre, with its contents, weighed — — 9 12

Subtract the filtre, which weighed — — 2 15

6 21

Subtract the calx of iron 2 13

Remainder of astringent matter 4 8

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These experiments do not exactly tally; since, in those with the leaves, the amount of astringent matter, in the second experiment, ought to have been double that of the first; and, in those with the bark, the astringent matter of the first experiment ought to have been half as much as that of the second. The supposition of a small inaccuracy in the weighing, or a small loss in the process of these experiments, will tend to reconcile them: where the error lay, in the first instance, I cannot pretend to guess. In the first experiment with the bark, the filtre caught fire while it was drying; and although it was extinguished almost immediately, yet there must have been a loss of some grains from it. Notwithstanding the experiments do not perfectly accord, yet I think we may fairly deduce from them, provided the method of trial be not objected to, that half a peck of leaves contain nearly as much astringent matter, as one pound of bark. Oak Bark was sold in this neighbourhood, last season,

son, for five guineas a ton. In its marketable state, it is by no means sufficiently dry for preservation; and the tanners are obliged to dry it more perfectly; and, at a considerable trouble and expence, they likewise get it cleaned from much extraneous matter. The loss of weight, from these operations, cannot, I should suppose, be estimated at less than twenty shillings per ton. What I mean is, that, if a ton of bark cost the tanner, in the first purchase, five guineas, the same weight of bark, when properly dried and cleaned, will stand him in six pounds five shillings: for the sake of easier calculation, we will say six pounds. I have heretofore had oak leaves collected for the purpose of making hot-beds for melons (for which they are excellent), at three-pence and four-pence per sack of four bushels, or thirty-two half pecks, which, according to the conclusion above, are equal to thirty-two pounds of bark. Thirty-two pounds of bark, at six pounds per ton, come to one shilling and

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eight-pence halfpenny and a fraction. If then my premises stand unimpeached, it will follow that the tanner might obtain as much astringent matter in leaves, for four-pence, as costs him in bark five times that sum : whether it would equally answer his purpose, remains to be proved. There would be undoubtedly much trouble, and some expence, in drying the leaves, which would be necessary, in order to preserve them; and they would occupy much room. Perhaps for these reasons, the most œconomical plan would be, to obtain a concentrated extract from them, on or near the place where they should be collected, which might be conveyed and afterwards stored in casks. This likewise remains as the subject of experiment; but, before leaves can in any way be legally used by the tanner, it is necessary that the act of parliament be repealed, which confines him to the use of Ash and Oak Bark : this restriction was probably laid, not solely from the belief that those substances were the most proper for
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the purpose of tanning leather, but likewise to encourage the planting and nurturing of those valuable timber-trees. Be this as it may, at present it rather operates to their destruction, than preservation or increase; since the high price which oak bark now bears, proves an irresistible temptation with needy proprietors, to cut down their oaks before they arrive at a proper age for timber. Should oak leaves ever come in much request for tanning, this doubtless would prove an antidote to the rage of felling, and an effectual preservative of timber; since no one surely would ever think of felling his oaks prematurely, whilst they yielded him an annual profit by standing.

I am,

Your most obliged humble servant,

GEORGE SWAYNE.

N.B. The vitriol was in every case sufficient to saturate the astringent matter, and the quantity of salt of tartar sufficient for the acid.

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P O L I T E A R T S.

P O L I T E A R T S.

In the Fifth Volume of these Transactions, page 104, an account is given of a method of Painting in Wax, in imitation of the Ancient Encaustic, by Miss GREENLAND: and that Lady having this year obliged the Society with the following Description of her Method of uniting Wax and Mastich with Water, to serve as the vehicle for the Colours used in her manner of Painting, Thanks were returned to Miss GREENLAND for this communication.

S I R,

I SHOULD not have taken the liberty of offering to the Society for the Encouragement of Arts, Manufactures, and Commerce, the enclosed account of the result of a great number of experiments I made last winter with a variety of gums,

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relative

relative to an imitation of the ancient Grecian manner of Painting, had you not assured me, that the Society would not think impertinent my doing so.

Should the account I have sent, not be thought sufficiently explicit, I would with great pleasure communicate any other particulars which may be desired.

I am, SIR,

Your obliged and obedient
humble servant,

EMMA JANE GREENLAND.

*Carshalton,
April 26, 1792.*

Mr. MORE.

Method of making a Composition for Painting, in imitation of the ancient Grecian manner.

PUT into a glazed earthen vessel, four ounces and a half of gum arabic, and eight ounces of cold spring water : when the gum is dissolved, stir in seven ounces of gum mastich,

maſtich, which has been firſt waſhed, dried, picked, and beaten fine, which is very ſoon done: ſet the earthen veſſel, containing the gum water and gum maſtich, over a moderate fire, continually ſtirring and beating them hard with a ſpoon, in order to diſſolve the gum maſtich: when ſufficiently boiled, it will no longer appear transparent, and will be ſtiff, like a paſte. So ſoon as this is the caſe, and that the gum water and maſtich are quite boiling, without taking them off the fire, add five ounces of white wax, broken into ſmall pieces, ſtirring and beating the different ingredients together, till the wax is perfectly melted, and has boiled: then take the compoſition off the fire; as boiling it longer than neceſſary, would only harden the wax, and prevent its mixing ſo well afterwards with water. When the compoſition is taken off the fire, and in the glazed earthen veſſel, it ſhould be beaten hard; and, whilſt hot, but not boiling, mix with it, by degrees, ſixteen ounces of cold
ſpring

spring water: then strain the composition, as some dirt will boil out of the gum mastich, and put it into bottles.

The composition, if properly made, should be like a cream, and the colours, when mixed with it, as smooth as if with oil. The method of using it, is, mixing the colours with it as with oil; then paint with fair water. The colours, if grown dry, when mixed with the composition, may be used by putting a little fair water over them; but it is less trouble to put some water, when the colours are observed to be growing dry.

In painting with this composition, the colours blend without difficulty, when wet; and even when dry, the tints may easily be united by means of a brush, and a very small quantity of fair water.

When the painting is finished, put some white wax into a glazed earthen vessel, over
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a slow fire; and, when melted, but not boiling, with a hard brush, cover the painting with the wax; and, when cold, take a moderately hot iron, such as is used for ironing linen, and draw it lightly over the wax. When the picture is nearly cold, rub it with a fine linen cloth, to make it entirely smooth; and, when quite cold, rub it again, to make it shine.

Paintings might be executed, in this manner, upon wood, or plaster of Paris, without requiring any other preparation, than mixing some fine plaster of Paris in powder, with cold water, the thickness of a cream; then put it on a looking-glass; and, when dry, take it off; and there will be a very smooth surface for painting upon.

Paintings may also be done in the same manner, with only gum water and gum mastich, prepared the same way as the mastich and wax; but, instead of putting seven ounces of mastich, and, when boiling, adding
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ing five ounces of wax, mix twelve ounces of gum mastich with the gum water, before it is put on the fire; and, when sufficiently boiled and beaten, and is a little cold, stir in twelve ounces of cold spring water, and afterwards strain it.

It would be equally practicable painting with wax alone, dissolved in gum water, in the following manner.

Weigh twelve ounces of cold spring water, and four ounces and a half of gum arabic: put them into a glazed earthen vessel; and, when the gum is dissolved, add eight ounces of white wax. Put the earthen vessel, with the gum water and wax, upon a slow fire, and stir them, till the wax is dissolved, and has boiled a few minutes: then take them off the fire, and throw them into a basin, as, by remaining in the hot earthen vessel, the wax might become rather hard: beat the gum water and wax till quite cold. As there is
but

but a small proportion of water, in comparison to the quantity of gum and wax, it would be necessary, in mixing this composition with the colours, to put also some fair water.

It should be observed, that the water used by Miss Greenland, in these preparations, came from a chalk rock, and remarkably soft: possibly any other water might answer equally well.

P A P E R S

I N

M A N U F A C T U R E S.

M A N U F A C T U R E S.

The Thanks of the Society were given to the Rev. Mr. SWAYNE, for the following Communication relative to the Culture of Silk in England.

S I R,

I BEG leave to address you once more, on the subject of Silk-worms; not that I have the result of much additional experience in breeding them, to offer you, but chiefly to prevent discouragement to the undertaking, which I think not unlikely to arise, from a circumstance attending the successful experiment of Mr. Bertezen, of which an account is given in the VIIIth Volume of these Transactions. It had gone abroad, and, I believe, was not discountenanced by Mr. Bertezen, that he was possessed of a very extraordinary and superior

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rior breed of worms, as well as a secret art of managing them: the former he refused to impart,* and likewise to disclose the latter. The account in the VIIIth Volume, that he obtained the five pounds of silk, for which he claimed the Society's premium, from twelve thousand worms, compared with the calculations of Miss Rhodes, in a former volume, that thirty thousand would be necessary to produce that quantity, seems to confirm the fact of his having a very superior breed of worms. And as he has now, I presume, left this country, and taken his breed and his secret with him, some will be ready to object that, if there be a doubt whether so superior a breed would have succeeded in this climate, much less is there any probability that any inferior breeds, particularly such very inferior ones, it will be taken for granted,

* A friend of mine applied to him for a few eggs, and offered him his price, but could not obtain a single grain.

granted, as we are at present in possession of, will be attended with success.

The difference between Miss Rhodes's calculation, and the statement given by Mr. Bertezen's actual produce, is, in appearance, amazingly great; but perhaps it may be greater in appearance than in reality. As silk is sold by troy weight, Mr. Bertezen's pound was probably no more than twelve ounces. Miss Rhodes very evidently calculated by averdupoise weight: had Miss Rhodes's been adjusted by the former weight, the number of cocoons, for five pounds of silk, had been twenty-one thousand six hundred. Still the difference is very considerable. Mrs. Williams, in her letter, (Vol. II. of these Transactions) has mentioned two hundred and forty-four cocoons producing nearly an ounce and a half: a calculation, by this rule, extended to five pounds troy weight, would give fourteen thousand six hundred and forty. But Miss Rhodes supposes that

Mrs. Williams includes the whole of the waste filk, as well as that reeled off. I do not see any reason for such a supposition. I last year bred fewer than one hundred worms (merely for the sake of experiments, and continuing the breed); and suffered them all to perforate their cocoons. Only fifty of these could be wound off, which was done in the method described in a former letter. The reeled filk produced from these fifty cocoons, weighed exactly one hundred grains: if from this we calculate the number sufficient for five pounds troy, we shall have fifteen thousand five hundred and fifty. As these were wound off dry, so much of the filk could not be taken from them, as is generally done when reeled in hot water, where oftentimes nearly the whole of the filk is reeled. The filk which remained on those fifty cocoons, after reeling, weighed thirty-three grains. If we only allow half of this weight to be added to that reeled off, it will reduce the number necessary for five pounds,

pounds, to thirteen thousand four hundred and five. Here the difference, when compared with Mr. Bertezen's, is not very considerable.

But it is possible that Mr. Bertezen's silk might have been weighed by averdupoise weight; in which case I am inclined to think, as the round number twelve thousand is given, that he might have calculated, without any actual enumeration, according to a rule mentioned in the pamphlet which he published on the subject of Silk-worms, by allowing one hundred and fifty cocoons, of the average weight of five grains, to produce one ounce of organzine, which, at sixteen ounces to the pound, gives exactly twelve thousand for five pounds. The passage which contains this rule, I beg leave to transcribe from Mr. Bertezen's book.—“ These cones,” meaning those which he obtained from worms bred in England, the year before he published his account, “ weighed, after the gathering, six grains each: some weighed

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“ five,

“ five, and the weakest four, though the
 “ worms were not of the first class. It is
 “ easy to calculate that, in order to have
 “ one ounce of organzine from such cones,
 “ one with another, one hundred and fifty
 “ may be sufficient.” In this account I
 do not understand the meaning of the ex-
 pression, *after the gathering*. On the first
 reading, it should seem to mean immediately
 after the gathering or collecting them from
 the broom, heath, or other twigs they were
 spun in: but this cannot be the intention,
 as, in this case, with the crysalids included,
 they must have weighed a vast deal more;
 neither can it mean after the crysalids were
 killed and become dry, as, even in this case,
 they must have weighed considerably more,
 since the dried crysalids, even of the common
 breeds, weigh on an average four grains:
 it must therefore mean the whole filk pro-
 duced by the worm, without any insect in-
 cluded in it; and, if this is the proper in-
 terpretation, the weight is very extraordi-
 nary indeed. In those cocoons which I
 have

have examined, the reeling filk has, on an average, amounted to about two grains and a quarter from each : the dried crysalis has weighed about double the reeling filk, and the reeling filk has been rather more than double the waste filk.

Mr. Pullein, in his Essay on the Culture of Silk, which is by much the best treatise I have met with on the subject, and which I have but lately had an opportunity of consulting, tells us, that “ three thousand
 “ three hundred filk pods, with the crysalids
 “ in them (that is, alive or unbaked) weigh
 “ about twelve pounds ; these twelve
 “ pounds will make about sixteen ounces
 “ of reeled filk, besides about eight ounces
 “ of flos.” This gives of reeling filk to each cocoon two grains and one third. In a paper containing an account of the management of Silk-worms, published in the Second Volume of the American Philosophical Transactions, communicated to Dr. Morgan of Philadelphia, from Messrs. Hare

and Skinner, of London, and said to be obtained from one of the first houses in Italy, we are told that one hundred and fifty ounces of good cocoons yield about eleven ounces of filk, from five or six cocoons: if you wind coarser, something more. This I calculate to give no more than two grains and one twentieth to each; whereas Mr. Bertezen's worms produced, on an average, three grains and one fiftieth, although the worms, he tells us, were not of the first class.

I have been told by a person who saw them, that Mr. Bertezen's worms and cocoons were amazingly large, and that he even shewed one cocoon very little inferior in size to a common hen's egg.

It is not however always the consequence, that the larger the cocoon the more valuable; since we have it from respectable authority (the paper just mentioned in the American Philosophical Transactions), that

“ the

“ the good cocoons are those which are
 “ brought to perfection strong and little :
 “ that the cocoons of the mountains are
 “ better than those of the plain ; it is true
 “ they are not so large as those of the
 “ plain, but the worm is proportionably
 “ less.” If therefore this extraordinary
 large breed is not to be come at, we surely
 ought to be contented with possessing, and
 the possibility of possessing such breeds as
 we know will produce, in this country, as
 large a quantity of silk, as is, on an average,
 produced by silk-worms in the best silk
 country in Europe. There is likewise ano-
 ther reflexion, from which we may draw
 some consolation, that, the larger the
 worm, the more food must it proportion-
 ably devour. With regard to the importa-
 tion of foreign breeds, it is the opinion of
 Mr. Pullein, “ that neither animals nor
 “ plants, when transported from one cli-
 “ mate to another of a different tempera-
 “ ture, are immediately naturalized ; that
 “ there is some time required, and often
 “ some

“ some succession of generations, before
 “ their nerves and fibres can adapt them-
 “ selves to the different influence of the
 “ air and sun.” The consequence he draws
 from hence is, that it cannot be expected
 by us, that silk-worms, bred from eggs,
 imported recently from Italy or France,
 can immediately thrive: those therefore
 who attempt the breeding of silk-worms in
 England, had better raise their stock from
 eggs, which have, from some preceding
 generations, had their originals among us.
 This opinion, it will be said, Mr. Bertezen’s
 very successful experiment effectually
 contradicts: but Mr. Bertezen’s experiment
 does not apply in this case, as, if I am not
 mistaken, he made use of artificial heat.

As an instance to confirm the above rea-
 soning of Mr. Pullein, I might mention, that
 the worms produced from those eggs you was
 kind enough to favour me with, obtained
 from Turin, proved much more tender and
 delicate than the breed I was before pos-
 sessed

ferred of; nor was the filk they spun, nearly so strong as that spun by the latter. However, it is but just to say, that the Turin worms appeared to be a variety quite distinct from the others; their eggs, when first received, were smaller, and continue to be so in succession: the worms are not so large, and have some peculiar marks on them. The cocoons they spun, were mostly white, or flesh-coloured, of a different and irregular shape, some of them almost globular: the thread of the cocoon seemed smaller and more delicate, and was more firmly stuck together with the natural gluten, so that it could not be reeled off but in very hot water. One peculiarity attending the Turin worms, was, that they refused lettuce leaves, and chose rather to die than to taste them.

In a former letter I informed you, that I procured a quantity of mulberry seed, with an intention of raising a nursery of young trees from it. This was sown in the
month

month of April, 1789; the largest part of it, and the best seed, on a bed of dung, which was intended for a slight hot-bed; but the dung being very stale, and having fermented before, did not heat at all, at least not perceptibly: the remainder was sown on a border, under a south wall. The seed on the dung-bed vegetated rather earlier than the other, and grew very well during the summer, many of the plants rising six inches in height. With a view to prevent the ill effects of the frost, the bed was covered, at the approach of winter, with a coating of moss, which had been immersed in scalding water; this I thought necessary to kill the eggs and larva of insects, as well as the seeds of weeds which it might contain: this precaution, however, with respect to frost, was entirely useless, as the winter proved so exceedingly mild. In the spring, I counted upwards of three thousand apparently healthy plants. In the latter part of the succeeding summer, they were attacked with a disease which shewed

shewed itself in putrid spots on the leaves, which by degrees rotted off: on examining these plants, in the autumn, when about to transplant them, they were almost all of them found to be cankered off just at the surface of the ground. What was the cause of this disorder, I cannot with certainty pronounce; but am inclined to impute it, jointly to the wetness of the season, and the roots of the plants striking into the dung: those which were sown on the common earth, in the south border, were not so much affected by this disease; yet some of them were killed by it. The summer of 1789, as well as the last, was so unfavourable to the ripening of mulberries, that I could get no good seed. I still hope that some effectual method will be found out, of raising them from cuttings; but, however that be, we may be assured that, as soon as there is a demand, mulberry-trees will be multiplied by some means or other. This is not barely my opinion, but the opinion of a person much better worth listening to.

“ It

"It is demonstrable," says the excellent Evelyn, "that mulberries, in four or five
 " years, may be made to spread all over
 " this land; and, when the indigent young
 " daughters, in proud families, are as
 " willing to gain three or four shillings a
 " day for gathering silk, and busying
 " themselves in this sweet and easy em-
 " ployment, as some do to get four-pence
 " a day for hard work at hemp, flax, and
 " wool, the reputation of mulberries will
 " spread in England." The misfortune
 is, we are uncertain which kind of mul-
 berry-trees, whether the white or the
 black, we ought particularly to attend to
 the propagation of; the sentiments of
 writers on this subject, and the practice of
 the different silk countries, according to the
 accounts given us by travellers, are so ex-
 ceedingly various. It is curious to com-
 pare a few of them. From Du Halde we
 gather, that the white mulberry is chiefly
 used in China: Mr. Swinburne tells us
 that, in Calabria, the red sort, I suppose he
 means

means the black, is invariably the food they make use of; and that it is preferred by them to the white sort for several reasons which he mentions; although he informs us in the same page, that he believes it to be the effect of prejudice, as the Chinese, Piedmontese, and Languedocians, prefer the white sort. In his travels through Spain the same Author tells us, that, in Valencia, the trees are all of the white kind. In Grenada, where the best silk is produced, they are all black. Mr. Hanway, in his account of his travels in Persia, mentions a shrub mulberry,* which, being annually pruned, produces the most proper leaves for the silk-worms: he does not say whether the mulberry-trees in that country were in general the black or the white fruited; yet he mentions being treated, on the 17th of May, with large white mulberries, at an entertainment, which, he says,

* Is not this the species of mulberry lately introduced into this kingdom by Mr. Nouaille?

says, are a delicious fruit, at Astrabad. From hence we are certain, that they have the white mulberry in Persia. Mr. Pulein tell us, that the black-mulberry leaves are said to be made use of in Persia for rearing silk-worms; yet he seems rather inclined to prefer the white. Barham and Evelyn are decidedly for the white. Mr. Young writes me, that “it is very singular
 “ that the black mulberries are never used,
 “ I believe. I have seen noble trees of
 “ that sort, in Provence and in Piedmont,
 “ but never stripped, having been planted
 “ merely for the fruit: I made many in-
 “ quiries, and was told, that the silk was
 “ good for nothing. If the leaves would
 “ do, those trees would pay from one to
 “ to two louis-d’or each per annum; yet
 “ no use is made of them.” Mr. Bertenzen allows, “that, in Italy and France,
 “ they make use of the white mulberry
 “ leaf; despising the black so much, that,
 “ in some parts, it is considered as poison
 “ to silk-worms;” yet he assures us,
 “ that

“ that he himself by all means prefers the
 “ black,” and gives his reasons for that
 preference: he adds, however, “ that, in
 “ well-regulated nurseries abroad, on ac-
 “ count of the advantages of the two
 “ kinds of mulberry leaves, they are both
 “ employed.” Had not Mr. Bertezen
 given this information, I should have ima-
 gined that it could seldom happen that both
 kinds should be used in the same nursery
 with advantage.

The black mulberry leaf is evidently much
 more succulent than the white; and there-
 fore I should be ready to conclude, that a
 change at any time, from the white to the
 black; would be very likely to cause the
 worms to burst; chiefly from its containing
 more substance. I once gave my sentiments
 in favour of the black mulberry leaf: since
 that time I have observed that the white has
 seemed more agreeable to the worms, and
 that they have seemed to thrive best with that
 food. In order to have the most agreeable
 and wholesome food for the worms, it is, I
 O presume,

presume, necessary, that the trees which produce that food, should be in the most thriving state: for the trees to flourish, they must grow in such soil as is well suited to their nature: this congeniality of soil may be different, for the different kinds of mulberry. From what I have observed, the white seems to prosper in a moister and stiffer soil than the black would: it should seem therefore, that we should be directed in our choice of the sort to be planted, by the soil we have to plant in. If our soil is dry, sandy, or gravelly, we should make choice of the black; if it be a rich loamy, and somewhat moist soil, we should choose the white. A stiff clay, and a soil that is very wet, is unfit for either; but the surest way would be to try both, and to multiply that sort which throve best.

I am, SIR,

Your and the Society's obliged
humble servant,

G. SWAYNE.

Pucklechurch,
March 25, 1791.

Mr. MORE.

P.S.

P.S. Are there yet those who object the unfitness of the climate to the scheme of raising silk in this country? What would they say, were they to read the under-written communication from a gentleman of credit, on the continent, to a celebrated agriculturist?

“ Not less than five thousand four hundred pounds weight of silk, has been raised last year (1789), in the cold, mostly sandy, territories of Prussia.”
 What could not be raised in the milder regions of Great-Britain and Ireland, under equal encouragement! a product which employs but six weeks of the agricultors and labourers work!

Mr. PHILIP JAMES KNIGHTS, of Norwich, having submitted to the consideration of the Society, a Shawl Counterpane, four yards square, manufactured by him; which, on examination, appeared to be of greater breadth than any goods of equal fineness and texture, hitherto produced to the Society, or to their knowledge woven in this kingdom:

The SILVER MEDAL was presented to Mr. KNIGHTS, as a token of the Society's approbation of his laudable attempt to improve the Manufactures of this Country.

S I R,

I TAKE the liberty to request you will present the Counterpane, sent herewith, to the Society for the Encouragement of Arts, Manufactures, and Commerce: it is made by Mr. Knights, of Norwich, in imitation of the East-India
Shawl

Shawl Counterpanes, and is the first article of so fine a texture that ever was made of so large dimensions, in this kingdom, being four yards square, without any seam.

Mr. Knights is anxious to obtain the approbation of the Society, before he offers it for sale. He has brought the manufacture to so great perfection in shawls, waistcoat shapes, &c. that they can hardly be distinguished from Indian, though they can be afforded at one twentieth part of the price usually given for the same articles that are brought from India. I understand, the largest articles ever attempted to be made in this country, prior to the one now presented, are only one yard and a half wide.

I am, SIR,

Your humble servant,

JOHN HEMMING.

Bearbinder-Lane,

Oct. 22, 1791.

Mr. MORE.

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SIR,

S I R,

YOUR favour of the 21st inst. is now before me, requesting to be informed the price expected for the counterpane; and I find, on calculation, that it cannot be retailed at a lower price than twenty pounds, to be sixteen quarters square, as that is; and fifteen pounds, if twelve quarters, embroidered in the same manner: if plain, with a fringe only, it will come at eight guineas, sixteen quarters; and six guineas, if twelve quarters square, fringed. Please to observe, the middle being left plain, is intended for the coat of arms of the family, who may become the purchaser, to be embroidered in, if they please, and at their own expence, by sending down the drawing and size.

The Counterpane now presented to the Society, for their inspection, is the first ever completed, out of India, in a loom of that width, without a seam, and of that fineness and softness of texture. It is equal
in

in beauty, and far superior in strength, to the India Counterpanes, which are sold so high as two hundred guineas. This manufacture improves every time it is washed; and the colours never stir by washing.

That the principal consumption in this cloth, is in train-dresses for ladies wearing; as likewise for long scarfs, in imitation of the real India scarfs, which are sold from sixty to eighty pounds: whereas, scarfs of this fabric are sold for as many shillings, and the ladies square shawls in proportion.

I am, SIR,

Your most humble servant,

PHILIP JAMES KNIGHTS.

23 Oct. 1791.

Mr. MORE.

MEMORANDUM

TO : [Illegible]

FROM : [Illegible]

SUBJECT : [Illegible]

[Illegible]

[Illegible]

P A P E R S

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M E C H A N I C K S.

M E C H A N I C K S.

IN consequence of the following Letter, received by the Society, from Mr. JOHN BELL, Serjeant of the Royal Regiment of Artillery, application was made to his Grace the Duke of Richmond, Master-General of the Ordnance, requesting his Grace would give directions that proper experiments might be made, before a Committee of the Society, to ascertain the merit of Mr. Bell's invention; and his Grace having given directions accordingly, proper trials were made, by throwing a loaded Shell * on shore, from a small mortar, fixed in a boat, moored in the River, about two hundred yards from the shore. To the Shell was attached a rope, one end of which remained on board

* By a loaded shell, is meant a shell filled with lead, by which means a staple, or ring, may be fixed, to which the rope is to be made fast: the shell, thus loaded, weighed about seventy pounds, and was eight inches in diameter.

board the boat; and the shell falling about one hundred yards within land, buried itself about eighteen inches in the gravel; when Mr. Bell and another person, on a raft, floated by casks, properly ballasted, hauled themselves on shore, in a few minutes, by the before-mentioned rope, These trials having been three times repeated with the desired success; and it appearing that the method proposed by Mr. Bell, of throwing a line on shore, from a ship in distress, either stranded, or in danger of being so, promises to be of infinite advantage in the maritime world, as by means thereof such vessel may obtain relief; any person, when landed, being enabled to secure ropes from the ship; or additional hands may be conveyed thereby from the shore, to assist those on board; and, in cases of imminent danger, where all hopes of saving the ship may be lost, Mr. Bell's method offers the most probable means of saving the lives of the crew.

The

The Society therefore voted a bounty of FIFTY GUINEAS to Mr. Bell, he leaving a complete model of his contrivance with the Society, which model is reserved in the Repository, for the inspection and use of the Public.

S I R,

HAVING conceived, from some successful experiments which I have made, upon a principle designed for troops escalading garrison walls, precipices, &c. that, should a vessel have the misfortune to be stranded near either flat or high grounds; in such case a shell, or grapnel, with a line, might be immediately thrown on shore, and, by the contrivance of a floating machine, there is great reason to think that the people on board the wreck might, with safety, successively haul themselves to land.

The number of melancholy accounts of lives being lost by such accidents, but particularly

ticularly that of the Litchfield man of war, on the coast of Barbary, suggested to me the want of this sort of contrivance, and induces me to send a model of the machine for the inspection of the Society, and to beg the favour you will be pleased to lay the same before them.

Should the principle and design meet with their approbation, I will, if required, attend their pleasure, to give any further explanation.

I am, SIR,

Your obliged humble servant,

JOHN BELL,

Serjeant of the Royal Regiment of Artillery.

Woolwich, April 4, 1791.

Mr. MORE.

Captain

Captain EDWARD PAKENHAM, to whom the GOLD MEDAL was presented, for his invention of a substitute for a Rudder (see Vol. VII, page 205), having this year favoured the Society with a Drawing and Account of a Method of restoring the Masts of Ships, when wounded, or otherwise injured, in an easy, cheap, and expeditious manner; Thanks were ordered to him for this Communication, which the following Letters and annexed Cut will fully explain.

S I R,

THE little plan of a substitute Mast, which accompanies this, was drawn up with no other view than to serve as a resource in case such an accident should ever happen to myself, and without the least intention of being made public; but the advice of many of our first practical seamen
has

has induced me to believe it might, in many instances, prove useful to the maritime part of the community.

I therefore feel a pleasure in submitting it to your notice, convinced that every effort which tends to practical improvement, cannot fail of being highly acceptable to the Society.

To conclude, Sir, I can with truth assure you, that, though not without ambition, I have in this instance neither been seeking for fame or profit; and I hope you will accept this plan as a mark of my respect, and peruse it with a candid allowance for its imperfection. I have the honour to remain, with great respect,

S I R,

Your most obedient humble servant,

EDWARD PAKENHAM.

Mr. MORE.

SIR,

S I R,

AMONG the various accidents which ships are liable to at sea, none call more for the attention and exertion of the officer, than the speedy refitting of the masts; and having observed, in the course of last war, the very great destruction made among the lower masts of our ships, from the enemy's mode of fighting, as well as the very great expence and delay in refitting a fleet, after an action, particularly across the Atlantic;—A very simple expedient has suggested itself to me, as a resource in part, which appears so very speedy and secure, that the capacity of the meanest sailor will at once conceive it. I therefore think it my duty to state my ideas of the advantages likely to result from it; and I shall feel myself exceedingly happy, should they in any wise contribute to remedy the evil.

My plan therefore is, to have the heels of all lower masts so formed, as to become the heads: but it is not the intention of the above plan to have the smallest alteration

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made

made in the heels of the present lower masts; for, as all line-of-battle ships masts are nine inches in diameter larger at the heel than at the head, it will follow, that, by letting in the tressel-trees to their proper depth, the mast will form its own cheeks or hounds; and, I flatter myself, the following advantages will result from the above alteration.

First, I must beg to observe, that all line-of-battle ships bury one third of their lower masts, particularly three-deckers: it therefore follows, that, if the wounds are in the upper third, by turning the mast, so as to make the heel the head, it will be as good as new; for, in eight actions I was present in last war, I made the following observations.

That, in the said actions, fifty-eight lower masts were wounded, and obliged to be shifted, thirty-two of which had their wounds in the upper third, and of course the ships detained until new masts were made. And when it is considered that a
lower

lower mast for a ninety, or seventy-four, stands Government in a sum not less, I am informed, than two thousand to two thousand three hundred pounds,—across the Atlantic, the advantages resulting from the aforesaid plan, will be particularly obvious; not to mention the probability of there being no fit spars in the country, which was the case in the instances of the Isis and Princess Royal; and, as I was one of the lieutenants of the Isis at the time, I am more particular in the circumstance of that ship. The Isis had both her lower masts wounded above the cathar-pins, in her action with the Cæsar, a French seventy-four; and, as there were no spars at New-York, the Isis was detained five weeks at that place. Now, if her masts had been fitted on the plan I have proposed, I am confident she would have been ready for sea in forty-eight hours; and, as a further proof, I beg leave to add, that the whole fleet, on the glorious 12th of April, had not the least accident of any consequence, except what befell their lower

P 2

masts,

masts, which detained them between eight and ten weeks at Jamaica.

The delay of a ship, while a new mast is making, and probably the fleet being detained for want of that ship, which frequently occurred in the course of last war; the taking of shipwrights from other work, with a variety of inconveniences not necessary to mention here; must be obvious to every officer that has made the smallest observations on sea actions.

You will further observe, Sir, that this substitute is formed on the most simple principle, fitted to the meanest capacity, and calculated to benefit all ships, from a first-rate down to the smallest merchantman, in cases of an accident by shot, a spring, a rottenness, particularly as those accidents generally happen in the upper third of the mast, and about the cheeks.

It might probably be objected, that a difficulty, and some danger, might arise from the wounded part of the mast being below ;
but

but this will at once be obviated, when it is remembered that, as the wounded part is below the wedges, it may with ease be both fished, cased, and secured to any size or degree you please, with the addition of its being wedged on each deck.

As the extent of my wish in proposing the foregoing plan, is to be useful to society, I cannot help expressing how highly I shall feel myself flattered, in finding it meet with approbation, or if any hints can be drawn from it, which may ultimately be improved, to add, in the smallest degree, to the welfare and prosperity of the community; having only had in view, its benefit and advancement, which, I trust, will ever be with me the first object of consideration. I have the honour to be, with great respect,

S I R,

Your most humble servant,

EDWARD PAKENHAM.

April 21, 1792.

Mr. MORE.

Explanation of the Cut representing Capt. Pakenham's Method of restoring Masts of Ships.

A. A mast of a first-rate, in its proper state, the figures representing its thickness at the different divisions.

B. The same mast inverted, the heel forming the head, and the tressel-trees let into their proper depth, the additional thickness of the mast forming its own cheeks.

C. The proposed mast, the figures representing the thickness of the mast in the proposed alterations.

a. The heel made square; *b*, the letting in of the tressel-trees; *c*, the third proportion of thickness continued up to where the fourth is in the present mast; or, at least, some little distance above the lower part of the cheeks, which is always looked upon as the weakest part of the mast; and, by its being so proportioned, the mast, when turned, will be nearly as strong in the partners as before.



A Bounty of THIRTY POUNDS was given to Mr. WILLIAM HOWELLS, for his Contrivance of an improved detached Escapement for Watches and Clocks, without Springs, of which a complete model is reserved in the Society's Repository, for the inspection and use of the Public.

Account of an improved Escapement, made by Mr. WILLIAM HOWELLS, No. 15, White-Hart Row, Kennington-Lane, Surry.

THE balance-wheels and verge, were of Mr. Larcum Kendal's invention, as made to a chronometer for the Board of Longitude, the performance of which gave great satisfaction.

My intended improvement on this Escapement, was to get rid of the friction upon the cylindrical part of the verge, and permit the balance to vibrate clear from the
escapement-

A double detached Escapement without Springs by M.^rW.^mHowells.

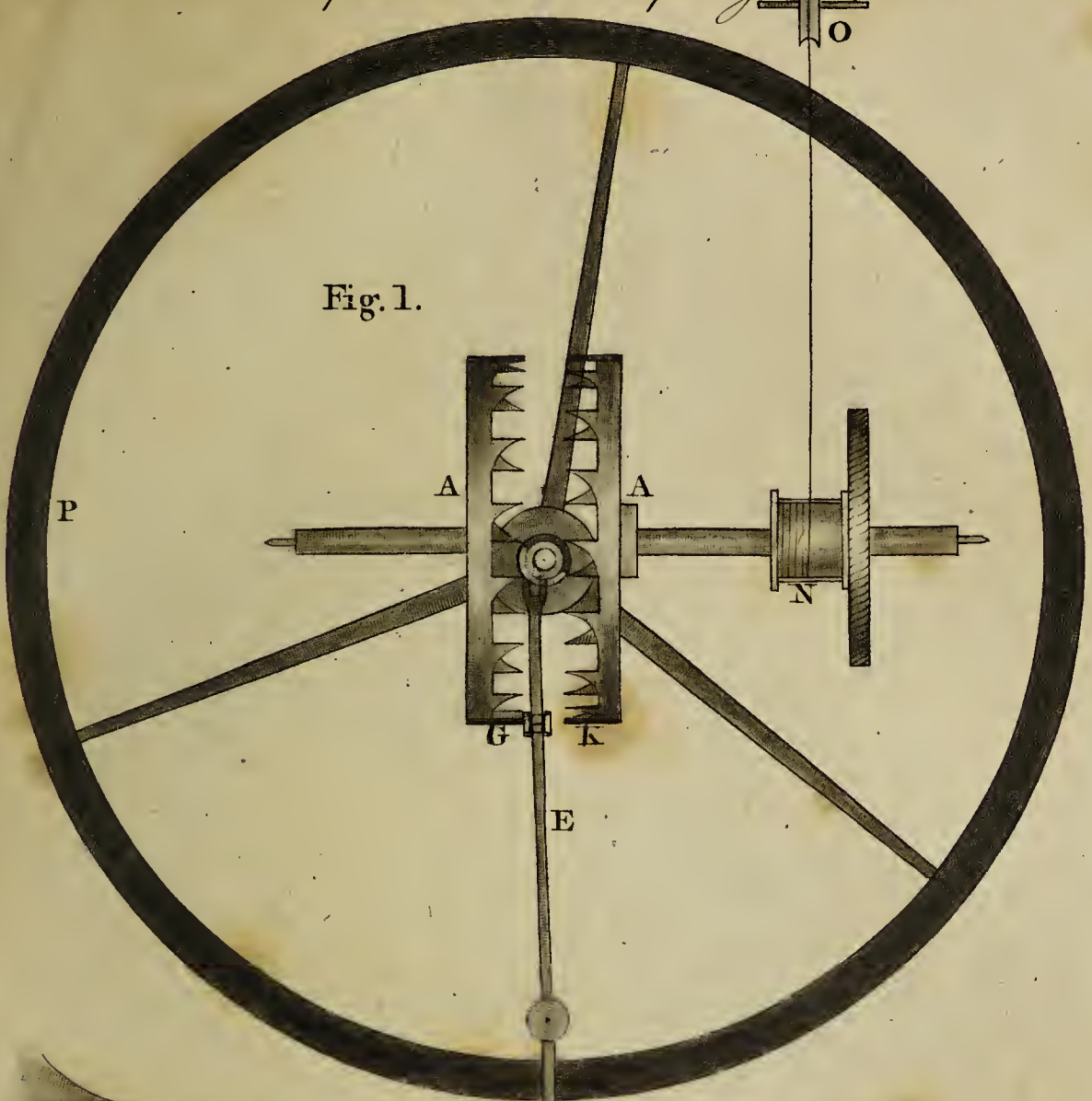


Fig. 1.

P

A

A

N

G

H

E

Fig. 3.

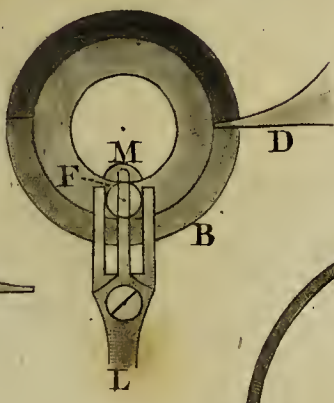


Fig. 2.

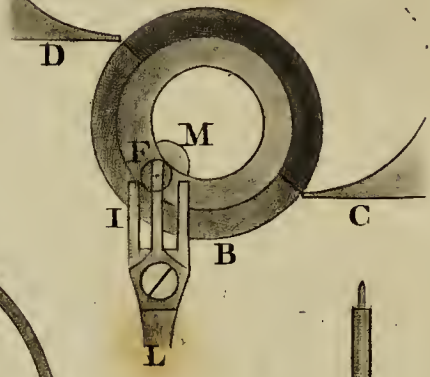
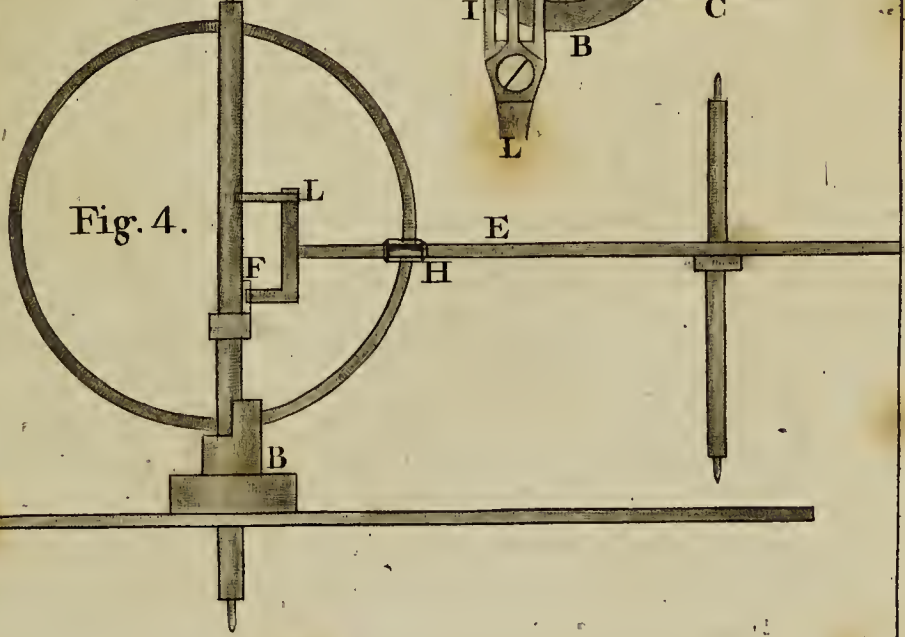


Fig. 4.



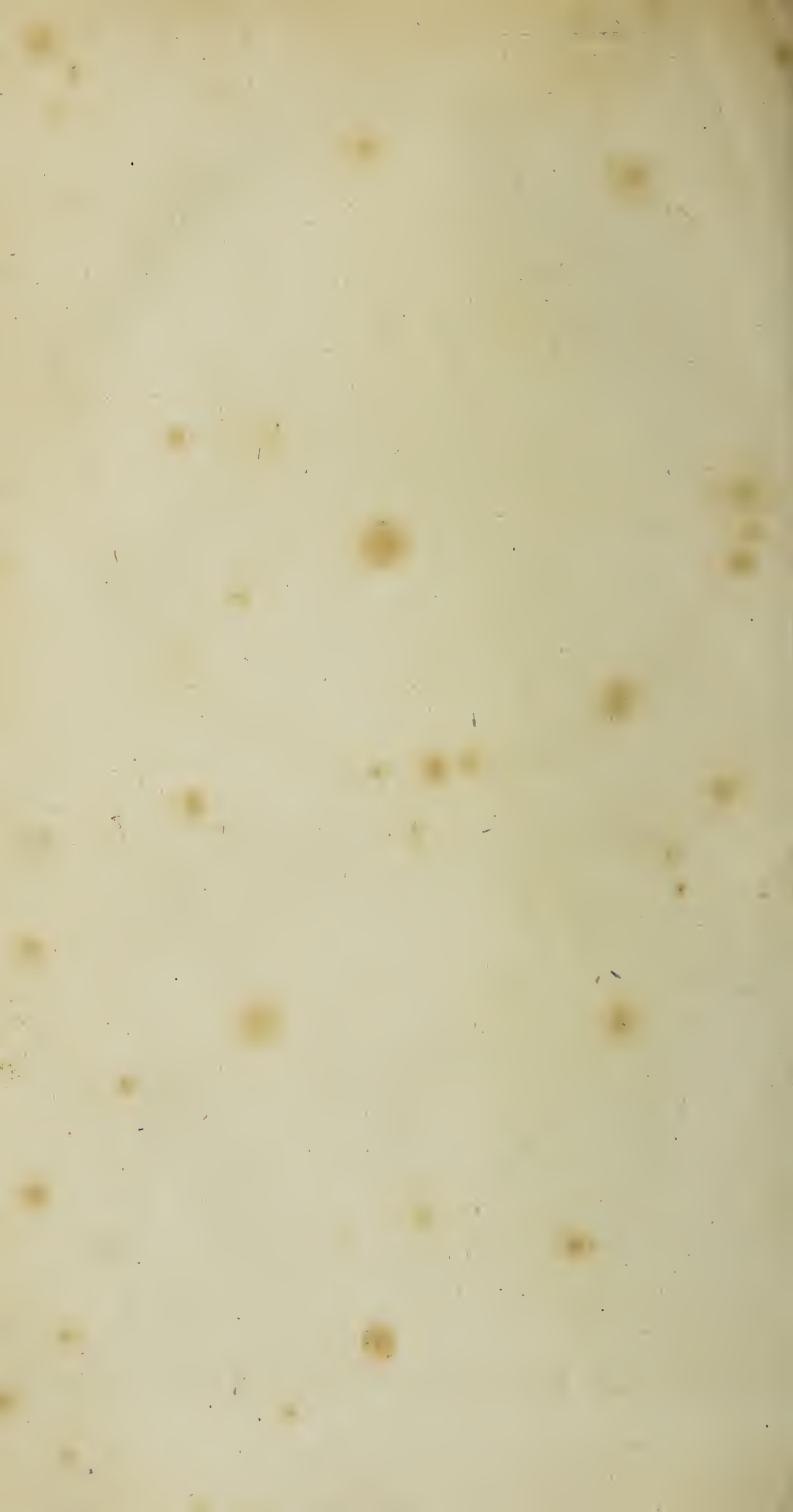
L

F

E

H

B



escapement-wheels; which being done, I found that I had gained properties no other escapement possessed; that is, the balance would vibrate two turns and back safe, against the back part of the fork belonging to the detent; and, by the pallet upon the verge, the detent is driven from one wheel to the other with the greatest ease: the action of the levers on the upper part of the fork is a preventive, so that the detent cannot get clear from the place where the verge left it; this detent being counterpoised, and without springs, makes the work very strong and complete. The wheels are, when the balance is at rest, unlocked; so that the balance cannot move without receiving motion.

Common verge watches have no oil upon the pallets, and my Escapement is in the same state: this makes it more valuable than any inclined plain escapement ever introduced, which requires oil. The balance, situated between the two wheels, will

will always receive the same impulse, in whatever position the watch may be placed; the want of which is the great defect of all detached escapements, and allowed so by Mr. Arnold, in a pamphlet lately published by him.

These, and many other perfections, that practice will bring forward, I hope will procure me the assistance of this respectable Society, so that I may be enabled to prosecute my intentions, and complete a pair of chronometers for the benefit of the Public, and my own private emolument. I beg leave to subscribe myself,

MY LORDS and GENTLEMEN,

Your most obedient
humble servant,

WILLIAM HOWELLS.

November 2, 1791.

To the Society for the Encouragement of Arts, Manufactures, and Commerce.

Description

*Description of the Plate of a Double-De-
tached Escapement, without Springs, by
Mr. William Howells.*

Fig. 1. AA. Two crown wheels fixed upon the same axis, passing near to the staff of the verge, supported by two counter pottances upon the upper plate.

F. The balance, supported by cock and pottance.

E. The detent, that locks the wheels, alternately supported by a cock upon the upper plate, with two screws to bank.

N. A barrel, with click and ratclut, and small thread round it, passing over the pulley O, by which a weight is hung, to set it a going, as shewn in the model.

Fig. 2 and 3, are pallets upon the verge, and the teeth of the wheels drawn larger, in order to make it more distinct. The same letters refer to all the figures.

Fig.

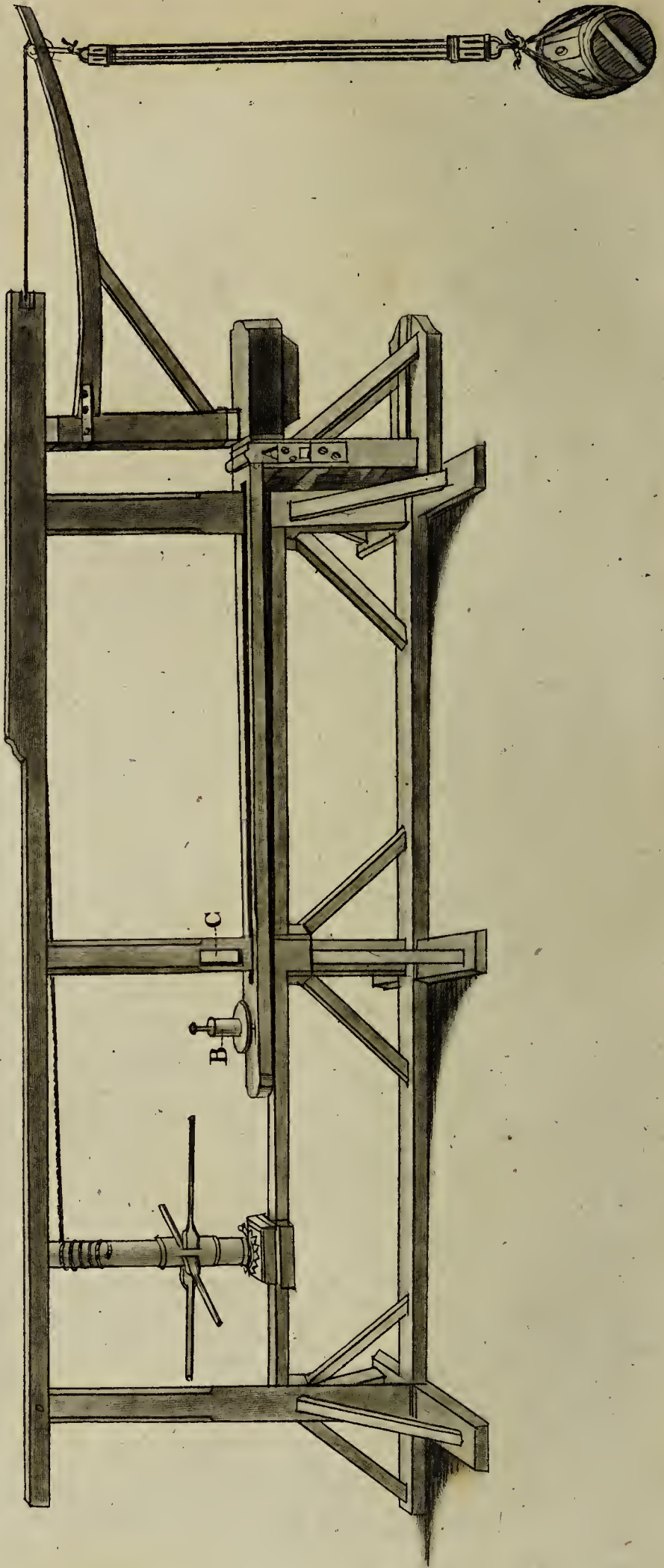
Fig. 2. B. A semi-circular pallet, which the tooth C is just quitting, and the tooth D is going to take: the wheels are locked by the pallet H, upon the detent E (see *fig. 1*), till the pin F (*fig 2*), upon the verge, takes it into the fork, and relieves the tooth G (*fig. 1*) from the pallet, and carries it to I (*fig. 2*); and the pin F will have carried the detent E, with the pallet H, and locked the tooth of the wheel at K.

Fig. 3. is the pallet, &c. at the point of rest: the piece L, which is screwed upon the detent E (*fig. 1*), is to prevent its being moved at any time, but when the pin F takes it; the end of it just clears the verge; and, when the pin F takes into the fork, it passes through the notch M, but is not intended to touch it.—This piece is left out in *fig. 1*.

Fig. 4. is another view of the Escapement, serving to shew the several parts in a different position.

A Bounty

A Weighing Crane by M^r. Ab. Andrews.



A Bounty of FIFTEEN GUINEAS was given to Mr. ABRAHAM ANDREWS, of Higham Ferrers, in Northamptonshire, for his invention of a Crane, whereby the body suspended is weighed, during the time of raising. (See Vol. IX, page 206.)

S I R,

I HAVE sent the model of the Crane for ascertaining the weight of the body suspended; humbly presenting it to the consideration of the Society for the Encouragement of Arts, Manufactures, and Commerce.

I flatter myself, they will consider such a mode of ascertaining weights, very useful on many occasions, particularly in loading and unloading vessels.

The

The proportion of the beam, in the model, is as one to twenty: the large weight is five pounds, and the smaller one a quarter of a pound. The latter, when placed on the beam end, will equipoise the large one, when hung on the pulley, at the end of the gib-beam, which must stand in a right line with the Crane, at the time the weight is adjusted; otherwise it will occasion a friction, which will impede the moveable beam playing freely.

I am, S I R,

Your most humble servant,

ABRAHAM ANDREWS.

Higham Ferrers,
January 27, 1791.

Mr. MORE.

Description

*Description of the Print of a Weighing
Crane, by Mr. Abraham Andrews.*

THE gib of the Crane stands on a horizontal beam, moveable on a centre, at A: and the distance of the centre A, from the bearing of the upright, being, to the distance at B, as one to twenty; the weight placed at B, determines the weight of the body suspended, in the proportion as one is to twenty. C is a stub or projection of wood, serving to prevent the beam rising too high, from the weight hanging at the end of the gib.

A Bounty of FORTY GUINEAS was voted to Mr. HILL, for his invention of a Machine for drawing Bolts out of Ships, as described in the following Papers; and of which a Model is reserved in the Society's Repository.

S I R,

HAVING invented a Machine for drawing Bolts out of Ships Bottoms, when under repair, &c. I have taken the liberty to bring it to the Society, for their inspection and approbation. If you will be so good as to lay the machine, with the enclosed accounts, before them, you will oblige,

S I R,

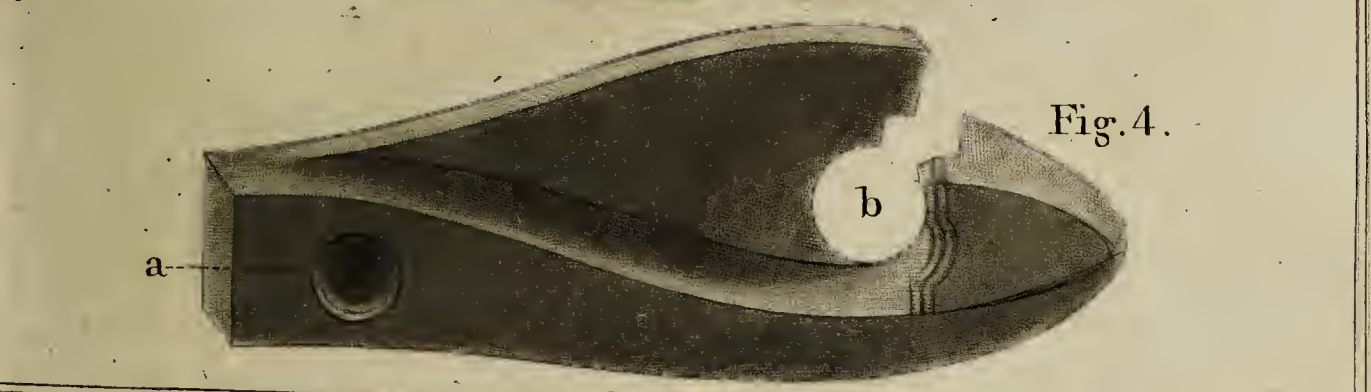
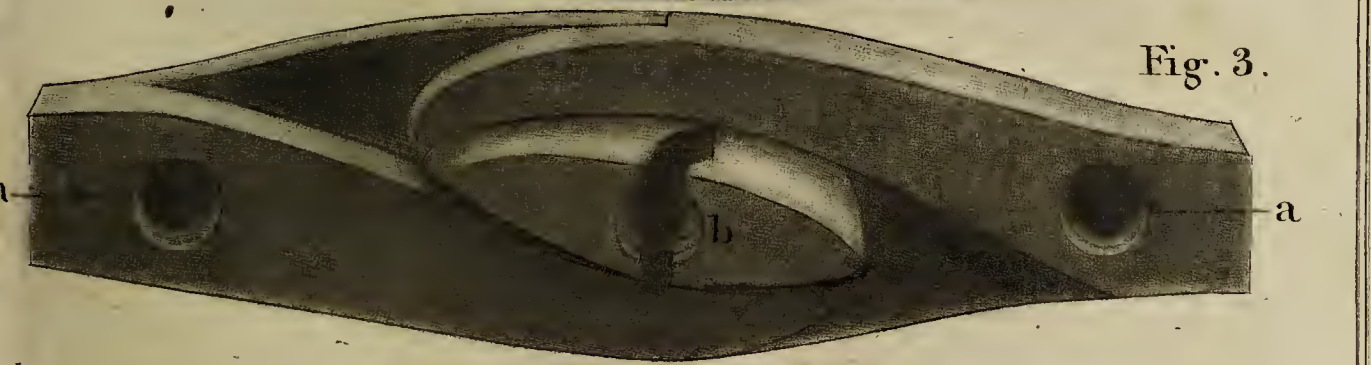
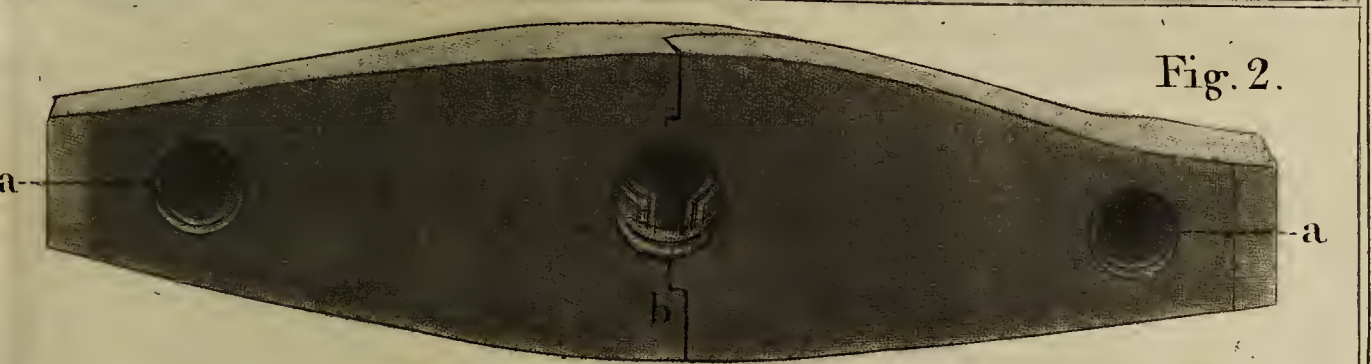
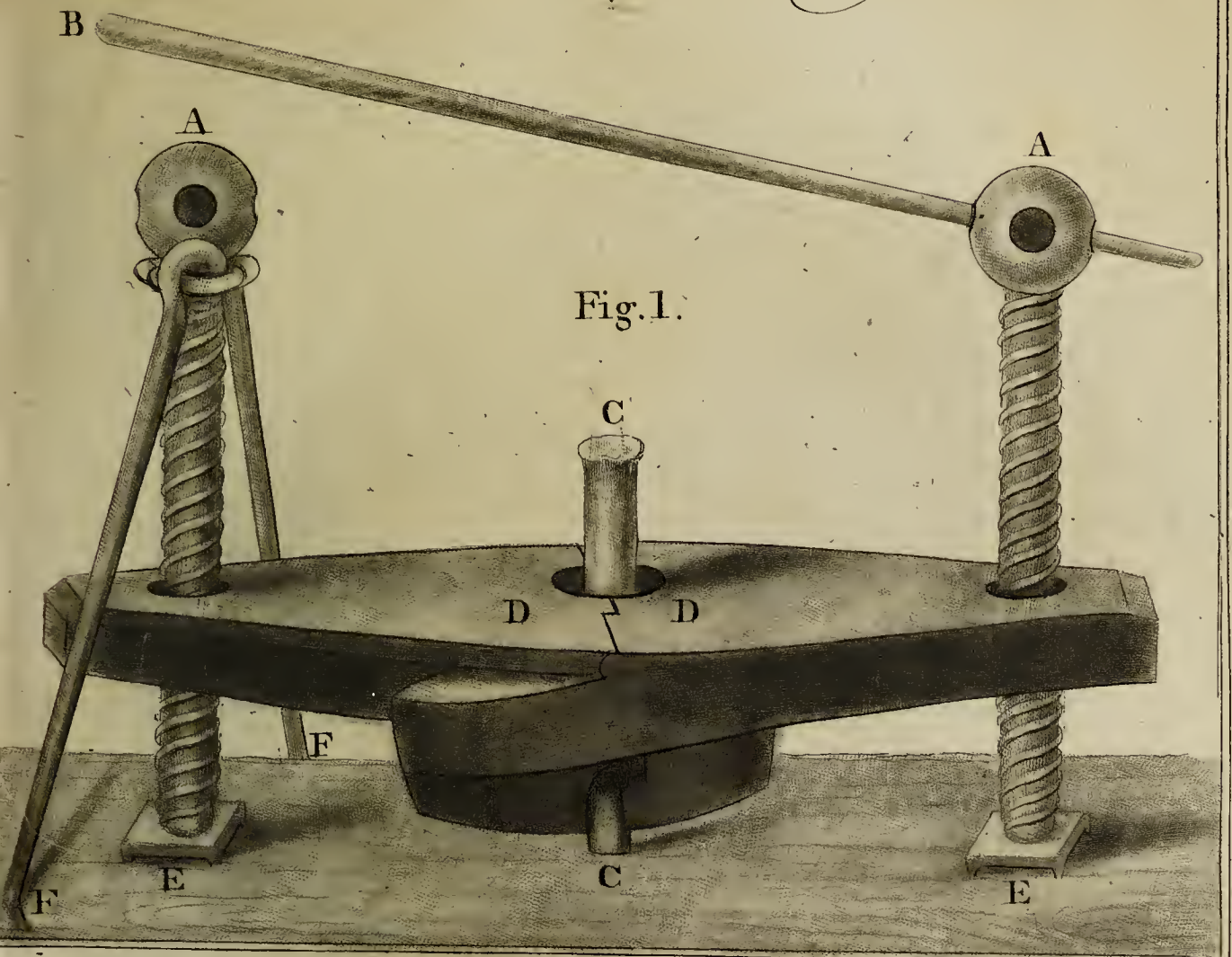
Your most obedient
humble servant,

WILLIAM HILL.

*Butt-Lane, Deptford,
Nov. 7, 1792.*

First,

W. William Hill's Machine for drawing Ship Bolts. Plate 3.



First, The use of this machine is to draw the kelson and dead-wood bolts out, and to draw the knee of the head bolts.

Secondly, The heads of the kelson bolts, heretofore, were all obliged to be driven through the kelson, floor-timbers, and keel, to get them out: by this means the kelson is often entirely destroyed, and the large hole the head makes, materially wounds the floors; and frequently, when the bolt is much corroded, it scarfs, and the bolt comes out of the side of the keel.

Thirdly, the dead-wood bolts that are driven with two or three drifts, are seldom or ever got out, by which means the dead wood is condemned, when some of it is really serviceable.

Fourthly, in drawing the knee of the head bolts, sometimes the knee starts off, and cannot be got too again, but furs up, and

Q

with

with this machine may be drawn in ; for it has been proved to have more power in starting a bolt, than the maul.

THIS is to certify whom it may concern, That Mr. Hill's Machine for drawing Bolts, was tried in his Majesty's Yard at Deptford, and was found of the greatest utility.

First, It drew a bolt, that was driven down so tight, as only to go one inch in sixteen blows, with a doubled-headed maul, and was well clenched below: the bolt drew the ring a considerable way into the wood, and wire-drawed itself through, and left the ring behind.

Secondly, It drew a bolt out of the Venus's dead wood, that could not be got out by the maul. That part of it which went through the keel, was bent close up to the lower part of the dead wood; and the machine

chine drew the bolt strait, and drew it out with ease.

Given under our hands, this ninth day of January, 1792.

M. WARE, Master Shipwright,

J. DANN, First Assistant,

JOHN FRANKLAND, Second Assistant.

THESSE are to certify whom it may concern, That the bolt which accompanies this Certificate, was a kelson bolt in the West-India ship Stanley, Capt. Hayes, in Messrs. Wells's Yard, Deptford; and, being a bolt of two drifts, could not be driven out: it was therefore drawn out by the machine invented by Mr. William Hill, Carpenter of his Majesty's ship Active; as witness our hands, this seventh day of January, 1792,

JAMES HAYWARD, Assistant to
Messrs. Wells,

THOMAS JONES, Foreman.

The bolt is four feet six inches long, and one inch three eighths in diameter.

Explanation of the Plate of Mr. William Hill's Machine for drawing Ships Bolts.

AA. (*fig. 1*) two strong male screws, working in female screws near the extremities of the cheeks, against plates of iron, E E.

CC. The bolt to be drawn, which, being held between the chaps of the machine, at DD, is, by turning the screws by the lever B, forced upwards out of the wood or plank of the ship. FF are two dogs, with hooks at their lower extremities, which, being driven into the plank, serve to support the machine till the chaps have got fast hold of the bolt. At the upper part of these dogs, are rings passing through holes in a collar, moveable near the heads of the screws.

Fig. 2. is a view of the upper side of the cheeks, when joined together; *a a*, the holes
in

in which the screws work; *b*, the chaps by which the bolts are drawn.

Fig. 3. The under side of the cheek; *a a*, the holes in which the screws work; *b*, the chaps by which the bolts are drawn, and where the teeth that gripe the bolt are more distinctly shewn.

Fig. 4. One of the cheeks separated from the other, the letters referring, as in *fig. 2* and *3*.

The GOLD MEDAL, or FORTY GUINEAS, being the Premium offered for Cranes for Wharfs, was adjudged to Mr. JAMES WHITE, who made choice of the pecuniary Reward. An Account of his Crane, and Plate of it, are annexed; and the model reserved in the Society's Repository.

S I R,

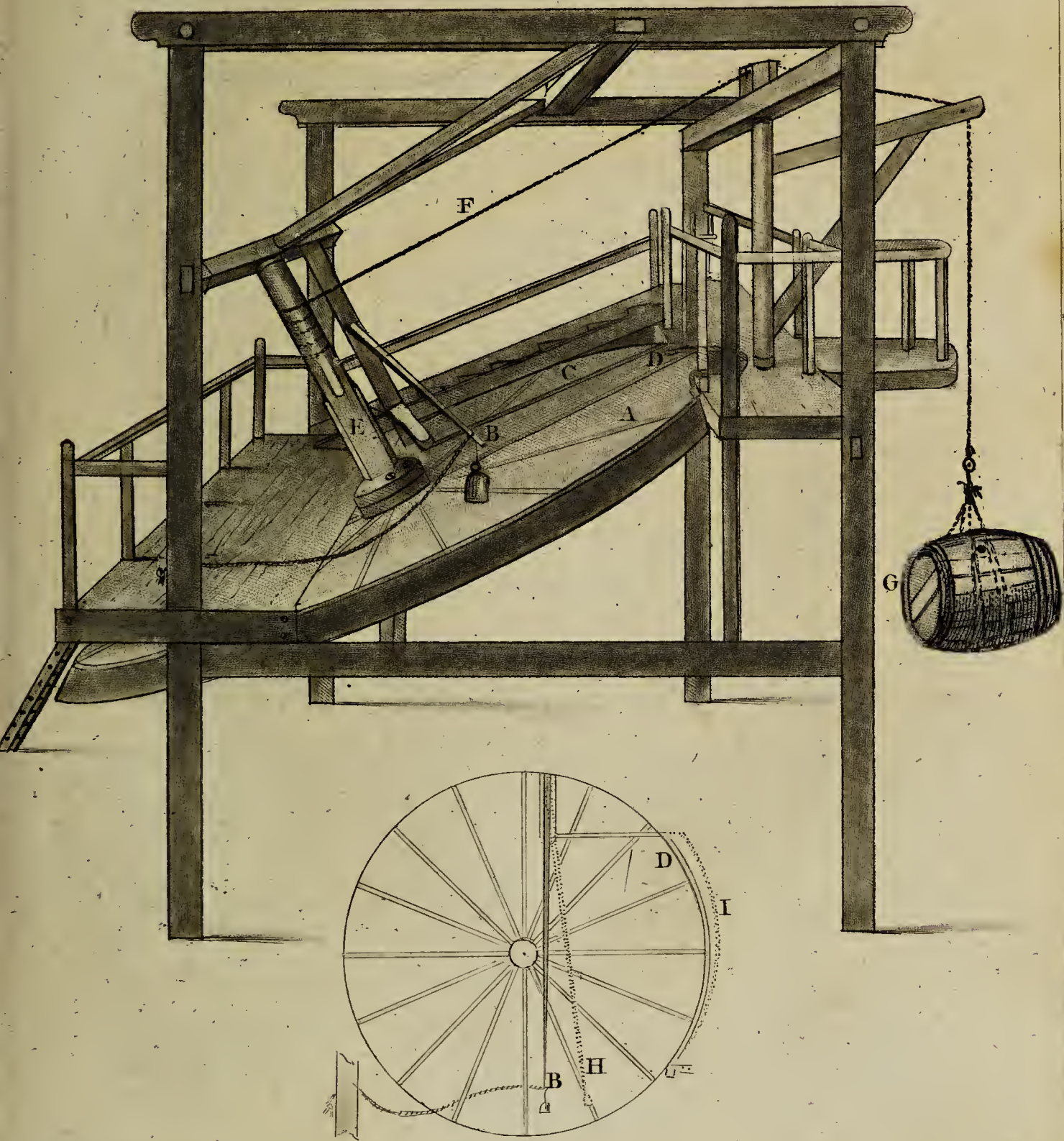
I HAVE to desire you would lay before the Society for the Encouragement of Arts, Manufactures, and Commerce, the model of a Crane, which accompanies this.

Its properties are,

First, Its simplicity, consisting of a mere wheel and axle.

Secondly, Its only friction, exclusive of the pullies, is that on the two gudgeons of
the

A Perspective View of the Model of M^r. J^r. Whites Crane.



the shaft; and one of these supports the weight of the wheel and of the man that works it, nearly in the direction of its point.

Thirdly, It is durable, as is evident from the two properties above mentioned.

Fourthly, It is safe; for it cannot move but during the pleasure of the man, and while he is actually pressing on the gripe lever.

Fifthly, This Crane admits of an almost infinite variety of different powers, and this variation is obtained without the least alteration of any part of the machine.

If, in unloading a vessel, there should be found goods of every weight, from a few hundreds to a ton, and upwards, the man that does the work will be able so to adapt his strength to each, as to raise it in

Q 4

a time

a time inverfely proportionate to its weight, he walking always with the fame velocity as nature and his greateft eafe may teach him.

It is a great difadvantage in fome cranes, the annihilation of which has juftly become an object of the Society's attention, that the fmalleft weight muft be as long in raifing as the largeft, unlefs the man turn or walk with a greater velocity, which tires him in a ftill greater proportion. In other cranes, perhaps two or three different powers may be procured; to obtain which, fome pinion muft be fhifted, or fresh handle applied or reforted to. In this crane, on the contrary, if the labourer find his load fo heavy as to permit him to afcend the wheel, without turning, let him only move a ftap or two toward the circumference, and he will be fully equal to the task. Again, if the load be fo light as fcarcely to refift the action of his feet, and thus to oblige
him

him to run through so much space as to tire him beyond necessity; let him move laterally towards the centre, and he will soon feel the place where his strength will suffer the least fatigue by raising the load in question.

It has been before observed, that, if left alone, this Crane will naturally reduce itself to a state of rest, even though a weight were suspended to it. The means will appear to be, the gripe or brake, at the top, and its lever, which stretches across the diameter of the wheel, at the height of a man's breast, when in an attitude of treading the wheel to the best advantage.

It may be necessary to observe, with respect to the dimensions of the present Crane, and some other peculiarities of its construction, that what is now the frame, and seems to form a part of the crane, must be considered as a part of the house in which
it

it is placed; since it would be mostly unnecessary, should such cranes be erected in houses already built. With respect likewise to the horizontal part, by walking on which, the man who attends the gib occasionally assists in raising the load, it is not an essential part of this invention, where the crane is not immediately contiguous to the gib; although, where it is, it would be certainly very convenient and economical.

In warehouses, and where this should be found unnecessary, together with the framework above alluded to, this crane would be extremely simple and cheap; and this wheel, though of considerable diameter, occupies but little room, from its thinness and inclination. A slit in a floor, about two feet wide, with a support above and below for the axis, is all that is necessary to constitute and contain the crane; for goods may be stowed both under the whole wheel, and above nearly half of it; and
there

there would be ample room to stow a large quantity of goods properly sheltered from the weather. Hence also it appears, that the house would diminish the wharf-room much less than many others, standing, on the whole, on less ground. One man's weight alone, applied at the extremity of the wheel, would raise upwards of a ton; and it need not be added, that a single-sheaved block would double that power. Suffice it to say, that the size may be varied in any required *ratio*; that this wheel will give as great advantage, at any point of its plane, as a common walking wheel of equal diameter, as the inclination can be varied at pleasure, as far as expediency may require. I remain,

S I R,

Your very humble servant,

JAMES WHITE.

Chevening, Kent,
Feb. 6, 1792.

Mr. MORE.

Explanation

*Explanation of the Plate of Mr. James
White's Crane.*

A. a circular-inclined plane, moving on a pivot underneath it, and carrying round with it, the axis E.

A person walking on this plane, and pressing against the lever B, throws off the gripe D by means of an iron rod C, and thus admits the plane and its axis to move freely, and raise the weight G, by the coiling of the rope F round the axis E.

To shew more clearly the construction and action of the lever and gripe, a plan of the circular-inclined plane, with the lever and gripe, is added, where B represents the lever, D the spring or gripe. In this plan, when the lever B is in the situation it now appears, the spring or gripe D presses against the periphery of the plane, as shewn by the double line; and the machine cannot

not move, but when the lever B is pressed out to the dotted line H : the gripe is also thrown off to the dotted line I, and the whole machine left at liberty to move. One end of a rope or cord, of a proper length, is fixed near the end of the lever B, and the other end made fast to one of the uprights, serving to prevent the lever moving too far, when pressed by the man.

In consequence of the Premium offered for taking Whales by the Gun-Harpoon, in the year 1791; the following Certificates were received, and THREE GUINEAS paid for each Fish so taken, viz.

TO THOMAS SINTON;	one Fish,	Three Guineas.
JAMES BROWN,	two,	Six Guineas.
WILLIAM REAY,	one,	Three Guineas.
HENRY ALLISON,	one,	Three Guineas.
JOSEPH HAYES,	one,	Three Guineas.
JOHN BELL,	one,	Three Guineas.
GEORGE SAUL,	one,	Three Guineas.
GEORGE NESBIT,	two,	Six Guineas.
AND. ANDERSON,	one,	Three Guineas.
THOMAS KELICK,	one,	Three Guineas.

In all Thirty-six Guineas.

An Account of the Whales shot with the Harpoon-Gun, by the undermentioned Harpooners, in the Ship Queen Charlotte, of London, under my command, in Davis's Streights, this present year.

May 6, 1791. **T**HOMAS SINTON
 shot a fish at twelve fathoms distance: it took in among a great deal

deal of ice: in the space of an hour and a half, it was up several times, where the boats could not get at it; but at length it came out in clear water, very much spent, and was killed in a few minutes. Length of bone, eleven feet five inches; lat. $68^{\circ} 20'$ N. about twenty leagues from the land.

May 12, same place. James Brown shot a fish at eight fathoms distance; run out three lines, came up blowing blood, and was killed in an hour. Length of bone, nine feet six inches.

May 17. James Brown again shot a fish at nine fathoms distance, in S. E. Bay of Disko, about a mile from the shore: it went right down, two lines in length, and came up in the same place where shot, in twenty minutes, and was killed directly. Nine feet eight inches bone.

June

June 15. William Reay shot a fish in latitude $71^{\circ} 30'$, close to a large pack of ice: it run down three lines, and came up in about half an hour, in the same place, and was killed in a few minutes: it was shot at ten fathoms distance. Bone, ten feet ten inches.

June 17. Henry Allison shot a fish, near the same ice and place as the last, at ten fathoms distance: it run swiftly a line's length, and suddenly turned again into clear water, and was killed in twenty minutes.

THESE are to certify, That the above-mentioned Whale Fish were shot, killed, and taken into the said ship, and that all of them were got by the Gun-Harpoon, as they were at too great a distance to be struck by any other means, and were at the instant of going away; and I hope the above-named persons are entitled to the premiums so generously proposed by
the

your Society, which is the intent of my troubling you with this letter. I am,

GENTLEMEN,

Your most obedient,

humble servant,

JOHN WHEATLEY.

*No. 8, Stepney-Causeway,
November 4, 1792.*

Mr. MORE.

S I R,

BEING informed that the Society for the Encouragement of Arts, Manufactures, and Commerce, have offered a Premium to Harpooners, as an encouragement of the use of the Harpoon-Gun in the Whale Fishery; I beg leave to certify to you the under-mentioned instance, last season, in the ship *Blenheim*, of London, at Greenland, in latitude 76° , longitude 8° east, under my command, in behalf and for the use of the Harpooners, as an inducement for others to follow the example,

R. that

that Joseph Hayes shot a Whale on the 6th day of June, which we got.

I am, S I R,

Your humble servant,

JOHN METCALF,

Master of the ship Blenheim.

Fox-Lane, Shadwell,

Dec. 3, 1791.

Mr. MORE.

S I R,

I HEREBY certify, That the following Harpooners, belonging to the ship Leviathan, of London, under my command, shot with the Gun-Harpoon, two Whales, viz. on the 12th of May, 1791, John Bell shot a Whale; and, on the 15th of June, George Saul shot a Whale. Both these Whales were taken in Davis's Straits.

I am, S I R,

Your humble servant,

WILLIAM STAVERS.

December 20, 1791.

Mr. MORE.

SIR,

S I R,

THE following is an account of Whales shot with the Harpoon-Gun, by the undermentioned Harpooners, belonging to the ship Britannia, under my command, in Davis's Straits, this present year 1791.

May 5. George Nesbit shot a fish at fourteen fathoms distance, in lat. $68^{\circ} 15'$, about fifteen leagues from the land: ran down about four lines, and came up, in half an hour, amongst some loose streams of ice, very much spent by the wound of the Harpoon, and was killed in about an hour and a half.

May 12. Andrew Anderson shot a fish at eight fathoms distance, in latitude $68^{\circ} 20'$, about fourteen leagues from the land: ran down about four lines and a half, and came up in about an hour, much spent, and was killed in twenty minutes.

R 2

June

June 2. Thomas Kellick shot a fish at ten fathoms distance, the Harpoon going quite through her rump, about six feet before the tail, in latitude $71^{\circ} 15'$, about three leagues from the land: she took under a field of ice, and came out at the opposite side, having run out fifteen lines, and was killed in about two hours.

June 4. George Nesbit shot a fish at seven fathoms distance, in latitude $71^{\circ} 5'$, which run down about three lines, and came up in about half an hour, very much spent, by the wound of the Harpoon, and was killed in about fifteen minutes.

THESSE are to certify, That the above-mentioned fish were shot, killed, and taken on board the ship Britannia, at the times and places above named; which I hope will entitle the men to the Premiums offered by the Society, which

which is the occasion of my troubling you
with this Certificate.

I am, S I R,

Your most humble servant,

GEORGE WATSON.

*White-Horse Street,
Stepney Causeway.
December 1, 1791.*

Mr. MORE.

P A P E R S

I N

COLONIES AND TRADE.

COLONIES AND TRADE.

IN the year 1789, some Letters, accompanied with samples of Cornish and Banca Tin, beat into leaves, in order to ascertain the comparative merits of the two kinds, were received by the Society, from GEORGE UNWIN, Esq. and the samples having been examined, and the Certificates sent therewith duly considered, the Society resolved to return their Thanks to Mr. Unwin, for his Communication; and if the speculation relative to the sending the Tin of Cornwall to India and China, as proposed by Unwin, should be hereafter found to produce the desired effect, Mr. Unwin might then be considered as meriting some honorary mark of the Society's attention.

And this year, the following Letters and Certificates having been submitted to
the

the Society, the GOLD MEDAL was voted to GEORGE UNWIN, Esq. for having been instrumental in reviving the Tin Trade to India and China.

S I R,

I HAVE the pleasure to acquaint you, for the information of the Society for the Encouragement of Arts, Manufactures, and Commerce, that my plan for opening the Tin commerce to India and China, has met with most wonderful success, particularly in the latter market, where, last year, between seven and eight hundred tons from Cornwall, met with a ready sale, and produced a balance of about thirty-five per cent. to pay all charges, with a requisition to this country to increase the quantity for the China market to upwards of twelve hundred tons. In consequence of the eight hundred tons sent out in 1789, and twelve hundred tons in 1790, the price of Tin for the European markets has risen from fifty-eight shillings

shillings to seventy-two shillings per cwt. in Cornwall; by which means the county is now enjoying a receipt at the rate of between thirty and forty thousand pounds per annum, the greatest part of which is received from foreigners.

The following statement will prove the assertion; and I am happy to say, from the exports that have taken place beyond the Cape of Good Hope, for these two years past, the Tin Trade of Cornwall is now in the most flourishing state possible; and every man, woman, and child, who can work in tin-works, may find constant employment. So brisk is the home trade, that the East-India Company will not be supplied with the quantity recommended to be sent out this season to the China market alone. I have laboured indefatigably for near three years past to bring about this happy revolution; and I hope the Society will be satisfied that the speculation (termed
so

so in your letter to me, of the 14th of January, 1790) laid before the East-India Company, by me, has produced the desired effect, and that I may be considered as meriting some mark of their approbation.

I have the honour to send you a Certificate of the quantity of Tin shipped for India and China, since the beginning of this plan; also the Calcutta Gazette, by which you will find that the English Tin is approved of in that country; for, be assured, Sir, no one has a more hearty zeal to promote the manufactures and commerce of this country, than

Your very faithful
and obedient servant,

GEORGE UNWIN,
Supervisor of the Exports of Tin
beyond the Cape of Good Hope.

Tin

Tin raised in Cornwall, from Michaelmas, 1788, to Michaelmas, 1789.

Blocks	—	22,132	
Deduct Grain Tin		2,600	
		<hr/>	£.
		19,532, about 3000 Tons, at 58l.	174,050
		<hr/>	

Block Tin raised from Michaelmas, 1790, to Michaelmas, 1791.

Say Tons 3000			£.
	<hr/>		
2200, for the European Market, at 72l.		158,400	
800, for India and China, at 62l.		49,600	
	<hr/>	<hr/>	
3000		208,000	
	<hr/>	<hr/>	

Balance in favour of the county, in 1791,			
more than in 1788 and 1789, at the rate			£.
of, <i>per annum</i>	—	—	33,950

GEORGE UNWIN.

*Stamford-Street, Surry Road,
October 24, 1791.*

Mr. MORE.

SIR,

S I R,

I HAVE the honour to send you, for the information of the Society for the Encouragement of Arts, Manufactures, and Commerce, the accompanying paper, containing the exports of Tin from Great-Britain, from the year 1783, to the 5th of July, 1791; also a comparative statement of the Tin Trade of this kingdom, in the years 1788 and 1791, which has been laid, by me, before the Lords of the Committee of Privy-Council for Trade and Foreign Plantations, who were pleased to signify to me their approbation, by a letter of thanks from Mr. Fawkener, their Secretary, dated the 5th inst. I shall take the liberty to send you annually the state of this trade, with every particular occurrence.

I am, S I R,

Your most obedient servant,

GEORGE UNWIN.

P.S.

P.S. The Agent and the India Company have settled for the supplies of Tin, this season, from eight to twelve hundred tons, at £.71, on board.

*Stamford-Street, Surry Road,
November 6, 1791.*

Mr. MORE.

THIS is to certify, That there has been shipped, by the United Company of Merchants of England, trading to the East-Indies, in the following seasons, the under-mentioned quantities of Tin, the produce of the mines in the county of Cornwall, viz.

1788	—	50 Tons to	China.
1789	—	775 ditto	China.
		5 ditto	Madras.
		10 ditto	Bengal.
1790	—	1200 ditto	China.
		10 ditto	Bombay.
		<hr/>	
		2050	

G. DOMINICUS.

Husband to the said Company.

*East-India Office, Botolph Wharf,
October 25, 1791.*

Mr. MORE.

The Thanks of the Society were ordered to Dr. DANCER, for the following Letters on Cinnamon, and other products of Jamaica therein mentioned ; and it is with particular satisfaction, the Society are enabled to inform the Public, That the Samples of Cinnamon, mentioned in the Doctor's Letter, dated July 12, 1791, having been examined by a Committee, at which were present some of the most eminent dealers in that spice, it was unanimously their opinion, “ That the
 “ Cinnamons No. 2 and 3 are excel-
 “ lent in their kinds, and preferable to
 “ any Cinnamon imported from Ceylon,
 “ both in colour and flavour, and that
 “ all the samples are of a fine flavour.”

S I R,

I AM glad to hear that the Cinnamon, notwithstanding the bad state it was in, (see Vol. IX, page 187) was approved
 of

of, and that the Society are satisfied, from an examination of its leaves, of its being the right species. I am anxious to have this fully ascertained by proofs, not botanical, and to have the comparative quality of the bark fairly determined upon. I have therefore availed myself of the opportunity which offers, by a ship sailing from hence, of forwarding to you, herewith, some specimens, which, I flatter myself, cannot fail of coming safe to hand; and I shall be glad to have the sentiments of the Society thereon, as soon as possible. The specimen marked No. 4, in the strength and fineness of its aroma, exceeds any that I have before taken.

From what you have mentioned, and from what I have besides heard of the Galangals and Turmeric, I shall not think it necessary to trouble you with any specimens of these.

Our pickled Mangoes, when of a due age, are equal to any from India; but we
 S sometimes

sometimes find a difficulty in procuring good vinegar; and I mean therefore to send home a quantity in salt brine, to be cured at home, as I understand many of the Mangoes from India are.

I am much obliged to you for the seeds of the *Oldenlandia Umbellata*, which I hope to receive safe. I had lately some seeds of this plant from Dr. Anderson, at St. Vincent's, but unfortunately they did not grow.

I hope you have received my last, acknowledging my obligations to the Society for the Book and Medal sent me. I shall at all times be proud of having it in my power to furnish the Society with any communications that may be worthy their attention.

I am, SIR,

Your most obedient servant,

THOMAS DANCER.

*Botanic Garden, Jamaica,
April 15, 1792.*

MR. MORE.

SIR,

S I R,

I HOPE you have received my answer to your favour of January last, since which the box of Ché seed,* the Society were so good as to send me, has come to hand; and I have not only made the most careful trials of it myself, but have distributed parcels of it to a number of gentlemen; who, from what I can learn, have all been equally unsuccessful as myself, though I advertised publicly the mode of culture, as described in the paper accompanying your letter. We have large districts on the sea shore, that I apprehend are well adapted to the growth of this plant, provided we could get fertile seed, which I hope you may hereafter be able to procure us; as likewise of the Barilla, than which nothing is likely to answer better in our Salinas.

I enclose in the box a further specimen of Cinnamon for trial: in the quality and strength of its aroma, it will certainly vie

S 2

with

* Oldenlandia Umbellata.

with any Cinnamon I can get here to compare it with; but the colour and grain of the bark varies a good deal from the Ceylon Cinnamon.

I published the communication you favoured me with, respecting the different assortments of Cinnamon, for the information of gentlemen who are making trial of this culture.

I am, SIR,

Your obliged humble servant,

THOMAS DANCER.

Botanic Garden, Jamaica,

July 12, 1791.

Mr. MORE.

R E W A R D S

BESTOWED BY THE

S O C I E T Y,

From OCTOBER, 1791,

To JUNE, 1792.



R E W A R D S

B E S T O W E D I N

A G R I C U L T U R E.

Class 9. **T**O LEWIS MAJENDIE, of Hedingham-Castle, Essex, Esq. for having planted five thousand two hundred Oaks, and effectually fenced and preserved the same, the GOLD MEDAL. See page 3.

Class 64. To JOHN HOLLIDAY, of Dillorn, Staffordshire, Esq. for having planted one hundred and thirteen thousand five hundred Mixed Timber-Trees, and effectually fenced and preserved the same, the GOLD MEDAL. See page 16.

Class 83. To Mr. PETER SMITH, of Hornchurch, Essex, for his account of cultivating twelve acres of land, in order to

determine the comparative advantages of the Drill and Broad-cast method in the culture of Wheat, the SILVER MEDAL and TWENTY GUINEAS. See page 50.

Class 91. To Mr. JOHN AMBROSE, of Copford, near Colchester, Essex, for his account of experiments made on twelve acres of land, to determine the comparative advantages of the Drill and Broad-cast method in the cultivation of Turneps, the SILVER MEDAL and TEN GUINEAS. See page 66.

Class 104. To Mr. WILLIAM DANN, of Gillingham, in Kent, for his having cultivated nine acres three roods and twenty perches of land with Potatoes, for the sole purpose of feeding Cattle and Sheep, and giving an account of the application and use of them, the GOLD MEDAL. See page 73.

TO SAMUEL DUNN, of the Adelphi, London, Esq. for an account of his culture
of

of Wheat on a Potatoe Ley, the SILVER MEDAL. See page 39.

To Mr. BENJAMIN PRYCE, of the Clofe, Salisbury, for his account of the cause of the difeafe called the Curl in Potatoes, the SILVER MEDAL.

Clafs 113. To Sir WILLIAM FORDYCE, M.D. for having raifed, in the year 1791, three hundred plants of the Rheum Palmatum, or True Rhubarb, the GOLD MEDAL. See page 101.

Clafs 126. To JOHN KEYSAL, of Moreton upon Lugg, near Hereford, Esq. for having made thirty-one thousand yards of Hollow Drains, and thereby improved two hundred and feventy-two acres of Land, the GOLD MEDAL. See page 111.

To GEORGE PEARSON, of Harperley, Durham, Esq. for his account of the improvement of one hundred acres of Land, by feven thousand feven hundred yards of
Hollow

Hollow Drains, the SILVER MEDAL. See page 126.

To Mr. JOHN WEDGE, of Bickenhill, near Coventry, for his account of the improvement of ninety-one acres of Land, by four thousand seven hundred and ninety-five yards of Hollow Drains, the SILVER MEDAL. See page 130.

Class 143. To Mr. GEORGE POYNTER, of Canewden, near Rochford, Essex, for having gained and effectually secured seventy acres of Land from the Sea, the GOLD MEDAL. See page 104.

IN POLITE AND LIBERAL ARTS.

Class 182. To Miss MARIA SIMPSON, at Lady Ann Simpson's, Upper Harley-Street, for a Drawing, the GOLD MEDAL. Subject, a Landscape.

Class 183. To Lady CHARLOTTE LEGGE, at the Earl of Dartmouth's, St. James's

James's Square, for a Drawing, the SILVER MEDAL. Subject, Justice, after Sir Joshua Reynolds.

Class 186. To Miss JUSTINA ANNA LEWES, at Sir Watkin Lewes's, King's Road, for a Drawing, the GOLD MEDAL. Subject, the Head of St. Peter, after Rubens.

Class 187. To Miss COMBE, Craven-Hill, Bayswater, for a Drawing, the SILVER MEDAL. Subject, the Silence, after Carracci.

Class 192. To Mr. JOHN BARBER, No. 7, King-Street, Bloomsbury, for a Drawing of Mr. Bunce's Crane, the GREATER SILVER PALLET.

Class 193. To Mr. WILLIAM ORME, No. 14, Old Bond-Street, for a Drawing of Barton-Bridge, the GREATER SILVER PALLET.

To

To Mr. ROBERT CARLILE, for a Drawing of the Choir of Carlisle Cathedral, the SILVER MEDALLION.

IN MANUFACTURES.

To Mr. PHILIP JAMES KNIGHTS, of Norwich, for his improvement of Shawl Weaving, and producing a Shawl Counterpane, four yards wide, the SILVER MEDAL. See page 176.

To Mr. JOHN LOCKETT, of Donington, near Newberry, Berks, for weaving Cloth from Hop-Stalks, FIVE GUINEAS, being part of the Premium offered, Class 210.

IN MECHANICKS.

Class 216. For taking Whales by the Gun-Harpoon, THIRTY-SIX GUINEAS, viz. To THOMAS SINTON, THREE GUINEAS; JAMES BROWN, SIX GUINEAS; WILLIAM REAY, THREE GUINEAS; HENRY ALLISON, THREE GUINEAS; JOSEPH HAYES, THREE GUINEAS; GEORGE

GEORGE NESBIT, SIX GUINEAS; ANDREW ANDERSON, THREE GUINEAS; THOMAS KELICK, THREE GUINEAS; JOHN BELL, THREE GUINEAS; and GEORGE SAUL, THREE GUINEAS. See page 238.

Class 219. To Mr. JAMES WHITE, of Chevening, Kent, for a Model of a Crane for Wharfs, FORTY GUINEAS. See page 230.

To Mr. JOHN BELL, Serjeant of the Royal Regiment of Artillery, for his method of throwing a Line on Shore from a ship stranded, by which means the lives of the persons on board, and effects, may be saved, FIFTY GUINEAS. See page 203.

To Mr. WILLIAM HOWELLS, No. 15, White-Hart Row, Kennington, Surry, for an improved Escapement for Clocks and Watches, THIRTY POUNDS. See page 216.

To

To Mr. WILLIAM HILL, of Deptford, for a Machine to draw Bolts out of Ships, &c. FORTY GUINEAS. See page 224.

IN COLONIES AND TRADE.

To GEORGE UNWIN, Esq. for his having been instrumental in reviving the Trade of Tin from this Country to India and China, the GOLD MEDAL. See page 249.

PRESENTS .

P R E S E N T S

RECEIVED BY THE

S O C I E T Y,

SINCE THE PUBLICATION OF THE NINTH VOLUME
OF THESE TRANSACTIONS.

With the Names of the DONORS.

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A JOURNAL of a Voyage to New South
Wales, Quarto, by John White, Esq.

Mr. JOHN SEWELL.

A View of the Naval Force of Great-
Britain, Octavo; and an Address to the
Public from the Society for the Improve-
ment of Naval Architecture, with their
Rules and Orders.

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Thirty-three Numbers of a Work, entitled, Observations sur la Physique, &c.

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Observations on the Diseases, Defects, and Injuries in all kinds of Fruit and Forest Trees, by William Forsyth, Esq.

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Ten Volumes of the *Annals of Agriculture*, Octavo, by Arthur Young, Esq.

SOCIETY of ANTIQUARIES.

Archæologia, or Miscellaneous Tracts relating to Antiquity, Vol. X, Quarto.

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Mr. JOSIAH TAYLOR.

The General History of Inland Navigation, Foreign and Domestic, by J. Phillips.

P R I N T S.

JAMES BARRY, Esq. R.A. and Professor of Painting to the Royal Academy.

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Sir JOHN SINCLAIR, Bart.

Two Prints of Sheep, with Letter-press; containing Queries to the Manufacturers of Woollen Goods.

MISCELLANEOUS MATTERS.

Monfieur DE LA BLANCHERIE.

A Bust of Benjamin Franklin, LL.D. and a Bust of Monfieur Perronet, with its Pedestal, in Scagliola.

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COUNT BERCHTOLD.

A Model of a Boat and Apparatus for assisting Persons in danger of Drowning, by the breaking of Ice.

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A Syringe for watering Plants or Flowers, in imitation of Rain.

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A Tin Dish, for feeding Bees.

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A Model of a Mast of a First-Rate, shewing the Method of preserving it for use, when damaged or wounded above the deck.

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A small Wheel for winding Silk from the Cocoons, and spinning it at the same time.

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A small Bag of Winter Grass Seed.

Miss GREENLAND.

Three Vials, containing Solutions of Mastich and Wax in Water, for painting in Encaustic. See page 167.

Dr DANCER.

Several Samples of Cinnamon, the produce of the Island of Jamaica.

Lieutenant-General MELVILLE.

A Leaf of the Artocarpus Incisa, or Bread-Fruit Tree, from the Island of St. Vincent's.

A C A T A L O G U E
O F T H E
M O D E L S A N D M A C H I N E S

Received since the Publication of the Ninth
Volume of the Society's Transactions,
with the Numbers, as they are arranged
in the Class to which they belong.

M E C H A N I C K S . C L A S S I V .

No. CXXXIII. **A** MODEL of a Piece of
Ordnance for throwing
a Shell on Shore, with a rope attached to
it, and an apparatus for saving Lives and
Effects, in case of Shipwreck, by Mr. John
Bell, Serjeant of Artillery; for which he
had a Bounty of Fifty Guineas.

CXXXIV. A Model of a Boat, for
assisting Persons in danger of Drowning

by the breaking of Ice, presented by Count Berchtold.

CXXXV. An Escapement for Clocks and Watches, by Mr. William Howells; for which he had a Bounty of Thirty Pounds.

CXXXVI. A Model of a Machine, by Mr. William Hill, for Drawing Bolts out of Ships; for which he had a Bounty of Forty Guineas.

CXXXVII. A Model of a Crane, by Mr. James White; for which he had a Premium of Forty Guineas.

CXXXVIII. A Model, presented by Captain Edward Pakenham, R. N. shewing a Method of restoring Masts when damaged.

CXXXIX. A Syringe for Watering Plants or Flowers, in imitation of Rain, presented by Mr. William Winlaw.

A L I S T

OF THE

OFFICERS of the SOCIETY,

AND

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OF THE SEVERAL

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Elected March 22, 1792.

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T 4

Hugh

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Mr. Joseph Jacob.
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PREMIUMS

P R E M I U M S

OFFERED BY THE

S O C I E T Y

FOR THE ENCOURAGEMENT OF

ARTS, MANUFACTURES,

A N D

C O M M E R C E,

I N

THE YEAR M.DCC.XCII.

T O T H E
P U B L I C.

ADELPHI-BUILDINGS,

April 10, 1792.

THE chief objects of the attention of the Society for the Encouragement of Arts, Manufactures, and Commerce, in the application of their Rewards, are Ingenuity in the several branches of the POLITE and LIBERAL ARTS, useful Discoveries and Improvements in AGRICULTURE, MANUFACTURES, MECHANICKS, and CHEMISTRY, or the laying open any such to the Public ; and in general, all such useful Inventions, Discoveries, or Improvements, (though not mentioned in the Book of Premiums) as may appear to have a tendency to the advantage of Trade and Commerce. The Society therefore, in pursuance of their plan, propose to bestow the following Premiums.

Premiums

Premiums for Planting and Husbandry.

1. ACORNS. For having set, between the first of October, 1791, and the first of April, 1792, the greatest quantity of strong land, not less than ten acres, with Acorns, and seeds or cuttings of other trees, and for the effectually fencing and preserving the same, in order to raise timber and underwood, the GOLD MEDAL.

2. For the second greatest quantity of land, not less than five acres, sown or set agreeably to the above conditions, the SILVER MEDAL.

CERTIFICATES of setting or sowing, agreeably to the above conditions, and that there are not fewer than three hundred young Oaks on each acre, to be delivered to the Society on or before the first Tuesday in November 1792.

3, 4. The same premiums are extended one year further.

CERTI-

CERTIFICATES to be produced on or before the first Tuesday in November, 1793.

5, 6. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in November, 1794.

7, 8. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in November, 1795.

9. RAISING OAKS. To the person who shall have raised the greatest number of Oaks, not fewer than five thousand, either from young plants, or from acorns, in woods, parks, or forests, that have long been under timber, and effectually fenced and preserved the same, in order to secure a succession of oak timber in this kingdom; the GOLD MEDAL.

10. For the next greatest quantity, not fewer than three thousand, the SILVER MEDAL.

CERTI-

CERTIFICATES that there were on the land, upon the first of November, 1792, at least the number of young Oak-trees required, in a thriving condition, effectually fenced and preserved, with an account of the methods pursued in making and managing the plantation, to be produced to the Society on or before the first Tuesday in January, 1793.

11, 12. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in January, 1794.

13, 14. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in January, 1795.

15. ASCERTAINING THE BEST METHOD OF RAISING OAKS. To the person who shall ascertain in the best manner, by actual experiments, the comparative merits

merits of the different modes of raising Oaks for timber, either by acorns set on land properly grubbed and tilled; from acorns sown at random among bushes, fern, or other cover; or by young plants, previously raised in nurseries, and transplanted; regard being had to the expence, growth, and other respective advantages of the several methods; the GOLD MEDAL.

The ACCOUNTS and proper CERTIFICATES to be produced to the Society on or before the first Tuesday in November, 1792.

16. The same premium is extended one year further. The ACCOUNTS and CERTIFICATES to be produced on or before the first Tuesday in November, 1793.

17. CHESNUTS. For having sown or set, between the first of October, 1791, and the first of April, 1792, the greatest quantity of dry loamy land, not less than six acres, with a mixture of Spanish Ches-
U
nuts,

nuts, and the seeds or cuttings of other trees adapted to such soil; and for effectually fencing and preserving the same, in order to raise timber; the GOLD MEDAL.

18. For the second greatest quantity, not less than four acres, the SILVER MEDAL.

CERTIFICATES of sowing or setting agreeably to the above conditions, and that there are not fewer than three hundred Chestnut plants, in a thriving state, on each acre, to be delivered to the Society on or before the first Tuesday in November, 1792.

19. 20. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the first Tuesday in November, 1793.

21, 22. The same premiums are extended one year further.

CERTI-

CERTIFICATES to be delivered on or before the first Tuesday in November, 1794.

23, 24. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the first Tuesday in November, 1795.

25. ELM. For having planted the greatest number of the English Elm, not less than eight thousand, between the twenty-fourth of June, 1791, and the twenty-fourth of June, 1792, and for the having effectually fenced and preserved the same, in order to raise timber; the GOLD MEDAL.

26. For the second greatest number, not less than five thousand, the SILVER MEDAL.

27. For the third greatest number, not less than four thousand, the SILVER MEDAL.

CERTIFICATES of the having planted agreeably to the above conditions, and specifying the distance of the trees, must be delivered to the Society on or before the first Tuesday in November, 1792.

28, 29, 30. The same premiums are extended one year further.

CERTIFICATES of the having planted agreeably to the above conditions, that the plants were in a healthy and thriving state two years at least after making the plantation, and specifying the distance of the plants, to be delivered to the Society on or before the first Tuesday in November, 1793.

31, 32, 33. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in November, 1794.

34, 35, 36. The same premiums are extended on year further.

CERTI-

CERTIFICATES to be produced on or before the first Tuesday in November, 1795.

37. LARCH. For having planted out, between the twenty-fourth of June, 1790, and the twenty-fourth of June, 1791, in a mixed plantation of forest-trees, the greatest number of Larch-trees, not fewer than five thousand; and for having effectually fenced and preserved the same, in order to raise timber; the GOLD MEDAL.

38. For the next greatest number, not fewer than three thousand, the SILVER MEDAL.

CERTIFICATES of the number of plants, that they were in a healthy and thriving state two years at least after they were planted out, with a general account of the methods used in making the plantation, to be delivered to the Society on or before the last Tuesday in December, 1793.

39, 40. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1794.

41, 42. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1795.

43, 44. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1796.

45. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1797.

46. SILVER FIR. For having planted out, between the twenty-fourth of June, 1789, and the twenty-fourth of June, 1790, in a mixed plantation of forest-trees, the greatest number of Silver Firs, not fewer than

than two thousand; and for having effectually fenced and preserved the same, in order to raise timber; the GOLD MEDAL.

47. For the next greatest number, not fewer than one thousand, the SILVER MEDAL.

CERTIFICATES of the number of plants, that they were in a healthy and thriving state two years at least after they were planted out, with a general account of the methods used in making the plantation, to be delivered to the Society on or before the last Tuesday in December, 1793.

48, 49. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1794.

50, 51. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1795.

52, 53. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1796.

52. UPLAND OR RED WILLOW. For the greatest number of acres, not less than three, planted before the end of April, 1791, with Upland or Red Willow, properly fenced and secured, the number of plants on each acre to be at least twelve hundred; the GOLD MEDAL.

CERTIFICATES of the number of plants, and that they were in a thriving state at the time of signing such Certificates, to be produced to the Society on or before the last Tuesday in April, 1793.

It is well known that this species of Willow thrives well on dry sandy land.

54. ALDER. For having planted, in the year 1789, the greatest number of Alders, not less than three thousand, on an estate the property of one person; the GOLD MEDAL.

CERTIFICATES of the number of plants, and that they were in a thriving state two years at least after being planted, to be delivered to the Society on or before the last Tuesday in December, 1792.

55. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1793.

56. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1794.

57. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1795.

58. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1796.

59. ASH. For having sown or set, in the year 1790, the greatest quantity of land, not less than six acres, with Ash for timber, intermixed with seeds, cuttings, or plants of such other trees as are adapted to the soil; the GOLDMEDAL.

60. For the next greatest quantity, not less than four acres, the SILVER MEDAL.

CERTIFICATES of the sowing or setting agreeably to the above conditions, that there
are

are not fewer than one hundred Ash plants on each acre, in a thriving and healthy condition, two years at least after the sowing or setting, with a general account of the methods used in making the plantation, to be delivered to the Society on or before the last Tuesday in December, 1793.

61, 62. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1794.

63, 64. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1795.

65, 66. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the last Tuesday in December, 1796.

67.

67. MIXED TIMBER-TREES. To the person who shall have inclosed, planted, or sown, the greatest number of acres, not less than ten, with the best sorts of Forest-trees, for timber, between the first of October, 1788, and the first of May, 1790; the GOLD MEDAL.

An account of the methods used in making the plantations, and of the nature of the soil, together with proper Certificates that the trees were in a thriving and healthy state two years at least after making the plantation, to be delivered to the Society on or before the first Tuesday in November, 1792.

68. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be delivered to the Society on or before the first Tuesday in November, 1793.

69. The same premium is extended one year further.

The

The ACCOUNTS and CERTIFICATES to be delivered to the Society on or before the first Tuesday in November, 1794.

70. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be delivered to the Society on or before the first Tuesday in November, 1795.

71. SECURING PLANTATIONS OF TIMBER-TREES. To the person who shall give to the Society the most satisfactory Account, founded on experience, of the most effectual and least expensive method of securing young plantations of Timber-Trees, from Hares and Rabbits, as well as sheep and larger cattle, which at the same time shall be least subject to the depredations of wood-stealers, the SILVER MEDAL or TWENTY POUNDS.

The ACCOUNTS and CERTIFICATES of the efficacy of the method, to be produced
to

to the Society on or before the first Tuesday in November, 1792.

72. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be produced on or before the first Tuesday in November, 1793.

73. MULBERRY CUTTINGS, OR TREES. For having planted the greatest number of White or Black Mulberry Cuttings or Trees, not fewer than three hundred, in the year 1790, for the purpose of feeding Silk-worms; the GOLD MEDAL, or TWENTY POUNDS.

73*. For the second greatest quantity, not fewer than one hundred and fifty, the SILVER MEDAL, or TEN POUNDS.

CERTIFICATES of such planting, with the manner of culture, and that the trees
were

were growing in the month of July, 1792, to be produced to the Society on or before the first Tuesday in November, 1792.

** * * The Candidates for planting all kinds of Trees are to certify, that the respective Plantations are properly fenced and secured, and particularly to state the Condition the Plants were in at the time of signing such Certificates.*

Any information which the Candidates for the foregoing Premiums may choose to communicate, relative to the methods made use of in forming the Plantation, or promoting the growth of the several Trees, or any other observations that may have occurred on the subject, will be thankfully received.

74. TREES FOR USE WHEN EXPOSED TO THE WEATHER. To the person who shall send the most satisfactory account and certificate, verified by experiments,

experiments, to determine which of the following trees is of the greatest utility for timber or poles, for use, when exposed to the weather, viz.

Larch,	Black Poplar,
Ash,	Spanish Chestnut,
Willow,	Alder,
Beech,	Silver Fir,
Lombardy Poplar,	

the GOLD MEDAL.

The ACCOUNTS and CERTIFICATES to be produced on or before the second Tuesday in December, 1792,

75. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be produced on or before the second Tuesday in December, 1793.

76. PLANTING BOGGY OR MORASSY SOILS. For an account of the
best

best set of experiments sent by the planter, or his representative, to ascertain the comparative advantages of planting boggy or morassy soils with White Poplar, Black Poplar, Lombardy Poplar, and Willow; the GOLD MEDAL, or TWENTY GUINEAS.

It is required that not less than half an acre be planted with each, and the plants to be not more than four feet asunder.

It is also required that the plantation stand fourteen years, at the end of which to be all cut down and measured, or accurately measured standing; the Certificates of the measure and value, and that the whole is properly fenced and secured, to be produced on or before the first Tuesday in January, 1793.

N. B. Any information relating to the state of the plantation, if sent to the Society between the time of planting, and

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claiming

claiming the premium, will be thankfully received.

77. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in January, 1794.

78. The same premium is extended to the year 1796.

CERTIFICATES to be produced on or before the first Tuesday in January, 1797.

79. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in January, 1798.

80. COMPARATIVE CULTURE OF WHEAT. For the best set of experiments made on not less than eight acres, four of which to be sown broad-cast, and four drilled, to ascertain whether it is most advantageous

advantageous to cultivate Wheat by sowing it in the common broad-cast way, or by drilling it in equidistant rows, hoeing the intervals; the GOLD MEDAL, or the SILVER MEDAL and TWENTY GUINEAS.

It is required that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the Corn, be produced to the Society on or before the first Tuesday in February, 1793.

81. The same premium is extended one year further.

The ACCOUNTS to be produced to the Society on or before the first Tuesday in February, 1794.

82. COMPARATIVE CULTURE OF WHEAT. For the best set of experiments, made on not less than eight acres of land, four of which to be sown

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broad-cast, and four dibbled, to ascertain whether it is most advantageous to cultivate Wheat, by sowing it in the common broad-cast way, or by dibbling it in equidistant rows, hoeing the intervals; the GOLD MEDAL, or the SILVER MEDAL and THIRTY GUINEAS.

It is required that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the Corn, be produced to the Society on or before the first Tuesday in February, 1793.

83. The same premium is extended one year further.

The ACCOUNTS to be produced to the Society on or before the first Tuesday in February, 1794.

84. BEANS AND WHEAT. To the person who shall have planted or drilled, between the first of September, 1790, and
the

the first of March, 1791, the greatest quantity of land, not less than ten acres, with Beans, and shall have sown the same land with Wheat in the same year, 1791; TWENTY GUINEAS.

It is required that an account of the sort and quantity of Beans, the time of planting or drilling, and of reaping or mowing them, the produce per acre threshed, the application of the straw, the expence of planting or drilling, hand or horse hoeing, the distance of the rows, and the quality of the soil, together with CERTIFICATES of the number of acres, and that the land was actually sown with Wheat in the year 1791, be produced on or before the first Tuesday in November, 1792.

N.B. The Society have been informed that Beans may be drilled or planted so early as the month of December, from whence may be derived the advantage of an early harvest; in which case the straw will be

far more valuable than that from a later planting or drilling.

85. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the first Tuesday in November, 1793.

86. DRILL HUSBANDRY. To the person who, in the year 1792, shall have cultivated the greatest quantity of land, not less than four hundred acres, under the Drill system, the wheat sown in the autumn of the year 1791 included, the GOLD MEDAL.

An Account of the quality of the soil, of the various crops, and of the times of drilling and hoeing, with Certificates of the quantity of land, and the general appearance of the crop, to be delivered on or before the third Tuesday in February, 1793.

87. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be delivered on or before the third Tuesday in February, 1794.

88. TURNEPS. For the best account of experiments made on at least six acres of land, to determine the comparative advantage of the drill or broad-cast method in the cultivation of Turneps; the GOLD MEDAL, or the SILVER MEDAL and TEN GUINEAS.

The ACCOUNTS to be delivered in, on or before the third Tuesday in April, 1793.

It is required that one half of the land be drilled, and the other half sown broad-cast.

89. The same premium is extended one year further.

The ACCOUNTS to be delivered on or before the third Tuesday in April, 1794.

90. GREEN VEGETABLE FOOD.

For the best account, confirmed by experiments, of the Vegetable Food (Cabbages and Turneps excepted), growing in the months of March and April, that will most increase the milk in Mares, Cows, and Ewes, at that season; provided such food can be cultivated at an expence that will admit of its being applied to the above purposes; the GOLD MEDAL, or the SILVER MEDAL and TEN GUINEAS.

CERTIFICATES to be produced on or before the second Tuesday in November, 1792.

91. The same premium is extended one year further.

CERTIFICATES to be produced on or before the second Tuesday in November, 1793.

92. COMPARATIVE CULTURE OF THE TURNEP-ROOTED CABBAGE. To the person who shall produce
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duce to the Society the best account of the most satisfactory experiments, made on at least four acres of land, to ascertain the comparative advantages of the culture of the Turnep-rooted Cabbage, by sowing it broad-cast, or in drills, and hoeing out the plants, as is practised with the common Turnep, or by sowing the seed in nurseries, and transplanting the plants at proper distances, hoeing the intervals; the SILVER MEDAL and TEN POUNDS.

It is required that at least two acres be cultivated in each manner, and CERTIFICATES of the culture, with an account of the soil, expence, and produce of each separately, be produced on or before the first Tuesday in October, 1792.

93. The same premium is extended one year further.

CERTIFICATES and ACCOUNTS to be produced on or before the first Tuesday in October, 1793.

94. The same premium is extended one year further.

CERTIFICATES and ACCOUNTS to be produced on or before the first Tuesday in October, 1794.

95. TURNIP-ROOTED CABBAGE.

For having raised and duly cultivated Turnip-rooted Cabbage, in the year 1791, for the feeding Cattle or Sheep, on the greatest number of acres, not less than ten, and giving an account of the soil, culture, time and manner of feeding off, produce, and the effects on Cattle or Sheep fed with it; the GOLD MEDAL.

96. For the next greatest number of acres, not less than five, the SILVER MEDAL and TEN GUINEAS.

CERTIFICATES of the quantity of land, with the accounts, to be produced on or before the last Tuesday in October, 1792.

97. The same premium is extended one year further.

CERTI-

CERTIFICATES to be produced on or before the last Tuesday in October, 1793.

98. The same premium is extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in October, 1794.

99. CURE OF THE CURLED POTATOE. To the person who shall discover to the Society the nature and cause of the disease in the Potatoe-plant called THE CURLED POTATOE, and point out an effectual cure, the whole verified by repeated and satisfactory experiments, the GOLD MEDAL, or THIRTY POUNDS.

The ACCOUNTS to be produced to the Society on or before the third Tuesday in November, 1792.

100. POTATOES FOR FEEDING CATTLE AND SHEEP. To the person who, in the year 1791, shall have cultivated
the

the greatest quantity of land, not less than four acres, with Potatoes, for the sole purpose of feeding Cattle and Sheep, the GOLD MEDAL, or TWENTY GUINEAS.

CERTIFICATES, with satisfactory Accounts of the expence and manner of cultivating the Potatoes, and the application of them to the above purposes, and the success that has attended the use of them, to be delivered to the Society on or before the second Tuesday in November, 1792.

101. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the second Tuesday in November, 1793.

102. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the second Tuesday in November, 1794.

N.B.

N.B. Should any Gentleman have already cultivated Potatoes for the purposes mentioned in the above advertisement, any information from him on the subject will be thankfully received by the Society.

103. CULTIVATING ROOTS AND HERBAGE FOR FEEDING SHEEP AND BLACK CATTLE. For the most satisfactory experiments made between Michaelmas, 1791, and the first of May, 1792, in order to ascertain which of the following plants can be cultivated and housed, or otherwise secured for winter fodder, to the greatest advantage, viz.

Turnep-rooted Cabbage,	Carrots,
Turnep Cabbage,	Parfneps,
Turneps,	Potatoes;

the GOLD MEDAL.

The ACCOUNTS to be produced on or before the first Tuesday in November, 1792.

It is required that the above roots be taken off the land by the last day of October,

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ber, 1791; that a crop of Wheat may be sown in the same ground, and the particulars of the sowing and planting, taking up, produce, preserving, and application to the feeding Sheep and Black Cattle, be specified. The comparative experiments must be made between two or more of any of the above-mentioned plants, and not less than one acre be cultivated with each particular kind of plant.

N.B. Great advantage will arise to the Farmer occupying land in the neighbourhood of extensive commons, from the conveniency of keeping large flocks of Sheep, and herds of Cattle, if the difficulty of supporting them through the winter was obviated by a due knowledge of this practice.

104. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in November, 1793.

105. STALL-FEEDING HORSES WITH GREEN VEGETABLES. To the person who shall keep the greatest number of Horses, not fewer than four, in the Stall or Stable, during the greatest number of months in the year, on Carrots, Potatoes, Lucern, Saintfoin, Clover, Vetches, or any other green vegetable food raised on land in his own possession; the SILVER MEDAL and TEN GUINEAS.

It is required that the number of horses so fed, the quantity of land employed in raising the green vegetable food, the quantity of hay and corn (if any) consumed, the state and condition of the horses, an account of the work done by them, and of the quantity of dung obtained, as near as can be ascertained, be fully and particularly specified.

The ACCOUNTS and CERTIFICATES to be produced to the Society on or before the second Tuesday in February, 1793.

106. MAKING HAY IN WET SEASONS. To the person who shall discover to the Society the best and cheapest method, superior to any hitherto practised, of making Hay in wet seasons, the GOLD MEDAL, or THIRTY GUINEAS.

A full Account of the method employed, and of the expence attending the process, with not less than fifty-six pounds of the hay; and Certificates that at least the produce of fifteen acres of land has been made according to the method described, and that the whole is of equal quality with the samples; to be produced to the Society on or before the first Tuesday in January, 1794.

107. The same premium is extended one year further.

The SAMPLES and CERTIFICATES to be produced on or before the first Tuesday in January, 1795.

108. CULTIVATING THE TRUE RHUBARB. For having raised, before
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less than twenty pounds weight, equal to such as is commonly sold in the shops under the name of Turkey or Russia Rhubarb; five pounds of which, as a sample, with CERTIFICATES that the remainder is of equal goodness, and a particular Account of the manner of culture and cure, to be produced on or before the first Tuesday in November, 1792; the GOLD MEDAL.

113. For the next greatest quantity, not less than ten pounds weight, the SILVER MEDAL.

114, 115. The same premiums are extended one year further.

The SAMPLES and CERTIFICATES to be produced on or before the first Tuesday in November, 1793.

116. ASCERTAINING THE COMPONENT PARTS OF ARABLE LAND. To the person who shall produce to the Society the most satisfactory set
of

of experiments, to ascertain the due proportion of the several component parts of Arable Land, in one or more counties in Great Britain, by an accurate analysis of it; and who, having made a like analysis of some poor land, shall, by comparing the component parts of each, and thereby ascertaining the deficiencies in the poor soil, improve a quantity of it, not less than two acres, by the addition of such parts as the former experiments shall have discovered to be wanting therein, and therefore probably the cause of its sterility; the GOLD MEDAL, or FIFTY GUINEAS.

It is required that the manurings, ploughings, and crops of the improved land, be the same after the improvement as before; and that a minute account of the produce in each state, of the weather, and of the various influencing circumstances, together with the method made use of in analysing the soils, be produced, with proper CERTIFICATES, and the chemical results of the analysis, which are to remain the property of the Society,

on or before the last Tuesday in November, 1792.

It is expected that a quantity, not less than six pounds, of the rich, of the poor, and of the improved soils, be produced with the Certificates.

N. B. Among the methods or processes made use of by Chemists, and called DRY or MOIST, the latter only appears adapted to the ascertaining the respective proportions of the component parts of Arable earth.—Dr. Shaw, in his Chemical Lectures; Dr. Home, in his Principles of Agriculture; Dr. George Fordyce, in his Elements of Agriculture; and Sir Torbern Bergmen, in his “Dissertation sur les Terres Géoponiques;” have treated of these subjects.

117. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the last Tuesday in November, 1793.

118. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the last Tuesday in November, 1794.

119. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the last Tuesday in November, 1795.

120. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the last Tuesday in November, 1796.

121. DRAINING LAND. To the person who, in the year 1792, shall make the greatest number of yards, not fewer than one thousand, of Hollow Drain, of brick, stone, or such like durable materials, for the improvement of Land injured by

water arising from internal springs, the
GOLD MEDAL OF THIRTY GUINEAS.

Particular accounts of the nature, quality, spontaneous produce, and yearly value of the Land before draining, and the supposed value afterwards; the nature and texture of the under-strata whence the springs arise; the depth and width of the drains; the quantity of supposed water discharged, the expence of labour and materials per yard, in length, when finished; a sketch or plan of all the drains, and their several inclinations and distances from each other; with CERTIFICATES of the number of acres drained, and that the land was actually wet and springy before draining, but dry and firm afterwards; to be produced to the Society on or before the third Tuesday in February, 1793.

122. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be produced on or before the third Tuesday in February, 1794.

123. IMPROVING LAND LYING WASTE. For the best Account of a method of improving any of the following soils, being land lying waste or uncultivated, viz. Clay, Gravel, Sand, Chalk, Moor or Peat-earth, and Bog; verified by experiments on not less than fifty acres of land; to be produced on or before the second Tuesday in December, 1792; the GOLD MEDAL, or the SILVER MEDAL and TWENTY GUINEAS, for each.

124. For the next in merit, the SILVER MEDAL.

The soil, manner of improvement, expence, and product, are required to be fully explained.

125, 126. The same premiums are extended one year further.

The ACCOUNTS to be produced on or before the second Tuesday in December, 1793.

127, 128. The same premiums are extended one year further.

The ACCOUNTS to be produced on or before the second Tuesday in December, 1794.

129. MANURES. To the person who shall give the most satisfactory account, verified by accurate experiments, on what soil the application of Marl, Chalk, Lime, or Clay, severally, as manures, be most beneficial; the GOLD MEDAL, or the SILVER MEDAL and TWENTY GUINEAS.

It is required that each experiment be made on one acre, and that they be continued four years, the same kind of grain being sown the same year on the several spots.

It is also required, that, if different manures are compared, the experiments be made on similar soils, lying near each other.

An ACCOUNT of the nature of the soil, manure, and the quantity laid on, with all expences, and crops, to be delivered, with specimens of the soil and manure, on or before the first Tuesday in January, 1793.

130. MANURES. For the most satisfactory set of experiments, to ascertain the comparative advantages of the following Manures, used as Top-dressings, on Grass or Corn Land, viz. Soot, Coal-Ashes, Wood-Ashes, Lime, Gypsum, Night-soil; the GOLD MEDAL, or the SILVER MEDAL and TWENTY GUINEAS.

It is required that not less than half an acre of land be appropriated to each Manure, the soils similar, and lying near each other; and if the Manure be used on Corn Land, then it is required that the same kind of Grain be sown the same year on each spot; the experiments to be continued not less than two years.

An ACCOUNT of the nature of the soil, quantity and expence of the Manure, and
Crops,

Crops, with CERTIFICATES, to be produced on or before the first Tuesday in December, 1792.

131. The same premium is extended one year further.

The ACCOUNT and CERTIFICATES to be produced on or before the first Tuesday in December, 1793.

132. IMPROVING WASTE MOORS. For the improvement of the greatest number of acres of Waste Moor-Land, not less than one hundred, the GOLD MEDAL.

It is required that the land before improvement be absolutely uncultivated, and in a great measure useless; that in its improved state it be inclosed, cultivated, and divided into fields, sufficient for the use and occupation of a tenant.

CERTIFICATES of the number of acres, of the quality of the Moor so improved, of the mode and expence of the improvement, the state it is in as to the proportion of grass
to

to arable, and the average value thereof, to be produced on or before the first Tuesday in February, 1793.

133. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in February, 1794.

134. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in February, 1795.

135. - The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in February, 1796.

136. GAINING LAND FROM THE SEA. To the person who shall produce to the Society an account of the best method,
verified

verified by actual experiment, of gaining Land from the Sea, not less than twenty acres, on the coast of England or Wales, the GOLD MEDAL.

CERTIFICATES of the quantity of Land, and that the experiments were begun after the first of January, 1787, to be produced to the Society on or before the first Tuesday in October, 1792.

N. B. The Society have been credibly informed, that Land has been gained on the coast of Holland, by fixing rows of whisps of straw upright in the sand, at about a foot distant from each other, or by fixing stakes at proper distances from each other, and wattling straw-bands between them.

137. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in October, 1793.

138. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in October, 1794.

139. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in October, 1795.

140. MACHINE TO ANSWER THE PURPOSE OF REAPING OR MOWING CORN. For inventing a Machine to answer the purpose of mowing or reaping Wheat, Rye, Barley, Oats, or Beans, by which it may be done more expeditiously and cheaper than by any method now practised, provided it does not shed the Corn or Pulse more than the methods in common practice, and that it lays the straw in such a manner as that it may be easily gathered up for binding; TEN GUINEAS.

The

The MACHINE, with CERTIFICATES that at least three acres have been cut by it, to be produced to the Society on or before the second Tuesday in December, 1792.

Simplicity and cheapness in the construction will be considered as principal parts of its merit.

141. IMPROVED HOE. To the person who shall produce to the Society the most improved or best constructed Horse or Hand Hoe, superior to any hitherto in use, for the purpose of clearing from weeds, and loosening the Soil in, the intermediate spaces of all Crops of Corn sown in equidistant rows, and which shall earth up the young Plants at the same time; the GOLD MEDAL, or TWENTY GUINEAS.

A HOE, with CERTIFICATES of its having been successfully used, to be produced to the Society on or before the first Tuesday in December, 1792.

142. The same premium is extended one year further.

The HOE, with CERTIFICATES, to be produced on or before the first Tuesday in December, 1793,

143. DESTROYING THE GRUB OF THE COCKCHAFER. To the person who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying the Grub of the Cockchafer, or of preventing or checking the destructive effects which always attend Corn, Peas, Beans, and Turneps, when attacked by those insects; the SILVER MEDAL and TEN GUINEAS.

The ACCOUNTS to be produced on or before the first Tuesday in January, 1793.

144. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the first Tuesday in January, 1794.

145. DESTROYING THE WIRE-WORM: To the person who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying the insect called the Wire-Worm, or of preventing or checking the destructive effects which always attend Corn, Beans, Peas, or Pulse, when attacked by those insects; the SILVER MEDAL and TEN GUINEAS.

The ACCOUNTS to be produced to the Society on or before the first Tuesday in January, 1793.

146. DESTROYING THE FLY ON HOPS, AND CATERPILLARS ON FRUIT-TREES AND CULINARY PLANTS. To the person who shall discover to the Society an easy and efficacious method of destroying the Fly on Hops, and Caterpillars on Fruit-trees and Culinary Plants, superior to any hitherto known or practised, the GOLD MEDAL, or THIRTY POUNDS.

ACCOUNTS

ACCOUNTS and CERTIFICATES that the method has been effectually practised on not less than six acres of Hop Ground, or an Orchard or Garden of not less than two acres, to be delivered to the Society on or before the first Tuesday in February, 1793.

147. CURE OF THE ROT IN SHEEP. To the person who shall discover to the Society the best and most effectual method of curing the disease, called the Rot in Sheep, verified by repeated and satisfactory experiments, the GOLD MEDAL, or THIRTY POUNDS.

It is expected that the candidates furnish accurate accounts of the nature, symptoms, and cure of the disease, together with the imputed cause thereof, and the actual or probable means of prevention, which, with proper CERTIFICATES, must be delivered to the Society on or before the first Tuesday in February, 1793.

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Premiums

*Premiums for Discoveries and Improvements
in Chemistry, Dying, and Mineralogy.*

148. KELP. For the greatest quantity, not less than four tons, of Kelp, containing a much larger proportion of Alkaline Salt than any Kelp now made for sale, **TWENTY POUNDS.**

A specimen of one hundred weight to be produced on or before the first Tuesday in January, 1793; together with **CERTIFICATES** that the whole quantity is equal to the specimen, and made in Great Britain or Ireland of Sea-weed.

149. BARILLA. For the greatest quantity of merchantable Barilla, not less than half a ton, made from Spanish Kali or any other plant raised in Great Britain, the **GOLD MEDAL.**

A Sample of not less than twenty-eight pounds, with a **CERTIFICATE** that half a ton has been made, to be produced on or before the first Tuesday in January, 1793.

150. PRESERVING SEEDS OF VEGETABLES. For the best method of preserving the Seeds of Plants in a state fit for vegetation a longer time than has hitherto been practised, such method being superior to any known to the public, and verified by sufficient trial; to be communicated to the Society on or before the first Tuesday in December, 1792; the GOLD MEDAL.

151. METHOD OF SEPARATING THE SACCHARINE SUBSTANCE OF TREACLE IN A SOLID FORM. To the person who shall discover to the Society the best method of separating the Saccharine Substance of Treacle in a solid form, at such an expence as will render it advantageous to the public, the GOLD MEDAL, or FIFTY POUNDS.

A quantity of the Saccharine Substance, so separated, in its solid form, not less than thirty pounds weight, with an account of the process, and CERTIFICATES that not less than one hundred weight has been prepared,

to be produced to the Society on or before the first Tuesday in February, 1794.

152. PRESERVING FRESH-WATER SWEET. To the person who shall produce to the Society the best account, verified by satisfactory trials, of an efficacious method of preserving Fresh-Water sweet during long voyages, the GOLD MEDAL, or FIFTY POUNDS.

ACCOUNTS and full descriptions of the methods made use of, in order that it may be known that nothing injurious enters therein, to be produced to the Society, with at least thirty gallons of Water so preserved, and proper CERTIFICATES, on or before the last Tuesday in December, 1793.

153. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be produced on or before the last Tuesday in December, 1794.

154. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be produced on or before the first Tuesday in December, 1795.

155. DESTROYING SMOKE. For the best account, ascertained by proper experiments, of a method of destroying or burning the Smoke of fires belonging to Steam-Engines, Furnaces, employed in calcining or smelting Metals, or other large works, in order to prevent annoyance to the neighbourhood; to be produced on or before the first Tuesday in January, 1793; the GOLD MEDAL.

156. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the first Tuesday in January, 1794.

157. CONDENSING SMOKE. To the person who shall invent the best method

thod by which the Smoke of Steam-Engines, Brew-houses, Sugar-houses, or Furnaces, may be advantageously condensed and collected in the form of Tar, or some other useful material, the GOLD MEDAL, or FIFTY GUINEAS.

The ACCOUNTS, with proper CERTIFICATES of the method having been successfully employed, and specimens of the materials produced, to be delivered to the Society on or before the first Tuesday in December, 1793.

158. The same premium is extended one year further.

The ACCOUNTS and CERTIFICATES to be produced on or before the first Tuesday in December, 1794.

159. CANDLES FROM RESIN.
To the person who shall discover to the Society the best method of so reducing the inflammable quality of Resin, as to adapt it to the purposes of making Candles fit for
common

common use, at a price much inferior to that of Candles made of Tallow only ; the GOLD MEDAL, or THIRTY GUINEAS.

Six pounds at least of the Candles so prepared, with an ACCOUNT of the process, to be delivered to the Society on or before the first Tuesday in December, 1792.

160. REFINING FISH-OIL. For disclosing to the Society an effectual method of purifying Fish-Oil from the glutinous matter that encrusts the wicks of lamps, and extinguishes the light, though fully supplied with oil, the GOLD MEDAL, or FIFTY GUINEAS.

It is required that the whole of the process be fully and fairly disclosed, in order that satisfactory experiments may be made by the Society, to determine the validity of the claim ; and that CERTIFICATES that not less than twenty gallons have been purified according to the process delivered in, must, together with two gallons of the

Oil in its unpurified state, and two gallons so refined, be produced to the Society on or before the second Tuesday in February, 1793.

161. The same premium is extended one year further.

CERTIFICATES and Samples to be produced on or before the second Tuesday in February, 1794.

162. SUBSTITUTE FOR, OR PREPARATION OF, YEAST. For discovering to the Society an effectual Substitute for Yeast, or preparation of Yeast, which, after being kept six months, shall be fit for fermenting liquors, and raising bread; the GOLD MEDAL, or THIRTY POUNDS.

Specimens of the Substitute, or of the preparation of Yeast, sufficient for trials, together with a paper sealed up, and containing an account of the composition of the Substitute, or method of preparing the
Yeast,

Yeast, to be produced on or before the last Tuesday in November, 1792.

163. SECURING EMPTY CASKS FROM BECOMING MUSTY OR STINKING. To the person who shall discover to the Society the best, cheapest, and most efficacious method of securing empty Casks from becoming musty or stinking, the GOLD MEDAL, or THIRTY POUNDS.

A full description of the method, with proper CERTIFICATES that it has been efficaciously practised, to be delivered to the Society on or before the first Tuesday in February, 1794.

164. PRESERVING SALTED PROVISIONS FROM BECOMING RANCID OR RUSTY. To the person who shall discover to the Society the best, cheapest, and most efficacious method of preserving Salted Provisions from growing rancid or rusty, the GOLD MEDAL, or THIRTY POUNDS.

A full

A full description of the method, with proper CERTIFICATES that it has been found, on repeated trials, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in February, 1794.

165. INCREASING STEAM. To the person who shall discover to the Society a method, verified by actual experiments, of increasing the quantity or the force of Steam, in Steam-Engines, with less fuel than is usually employed, provided that in general the whole amount of the expences in using Steam-Engines may be considerably lessened; the GOLD MEDAL, or THIRTY GUINEAS.

To be commnicated to the Society on or before the first Tuesday in January, 1793.

N. B. As it is well known there are methods of preventing the ebullition of liquids by the addition of particular matters in the boiling, it is submitted to the consideration of the ingenious, whether, by the addition

addition of some matters, or by some mechanical operations, the boiling and evaporation may not be increased.

166. The same premium is extended one year further.

To be communicated to the Society on or before the first Tuesday in January, 1794.

167. PREVENTING THE DRY-ROT IN TIMBER. To the person who shall discover to the Society the cause of the Dry-Rot in Timber, and disclose a certain method of prevention superior to any hitherto known, the GOLD MEDAL, or THIRTY GUINEAS.

The ACCOUNTS of the cause, and method of prevention, confirmed by repeated experiments, to be produced to the Society on or before the second Tuesday in December, 1792.

168. The same premium is extended one year further.

The ACCOUNTS to be produced on or before the second Tuesday in December, 1793.

169. FINE BAR-IRON. To the person, in England or Wales, who shall make in the year 1792, the greatest quantity of Bar-Iron, not less than ten tons, with Coak, from Coak Pigs, equal in quality to the best Iron imported from Sweden or Ruffia, and as fit for converting into Steel; the GOLD MEDAL.

SAMPLES, not less than one hundred weight, with CERTIFICATES that the whole quantity is of equal quality, to be produced to the Society on or before the first Tuesday in January, 1793.

170. The same premium is extended one year further.

SAMPLES

SAMPLES and CERTIFICATES to be delivered on or before the first Tuesday in January, 1794.

171. METHOD OF PREPARING WHITE LEAD, WHICH SHALL NOT BE PREJUDICIAL. To the person who shall discover to the Society a method of preparing White Lead, in a manner that shall not be prejudicial to the health of the workmen employed either in making or using it, and will answer all the purposes for which White Lead is at present used, FIFTY POUNDS.

A quantity of the White Lead so prepared, with an account of the process made use of, and CERTIFICATES that not less than one ton has been manufactured in the same manner, to be produced to the Society on or before the second Tuesday in November, 1792.

172. The same premium is extended one year further.

CERTI-

CERTIFICATES and ACCOUNTS to be produced to the Society on or before the second Tuesday in November, 1793.

173. SUBSTITUTE FOR THE BASIS OF PAINT. To the person who shall produce to the Society the best Substitute, superior to any hitherto known, for the Basis of Paint, equally proper for the purpose as the White Lead now employed; such substitute not to be of a noxious quality, and which may be afforded at a price not materially higher than that of White Lead; THIRTY POUNDS.

A quantity of the Substitute, not less than fifty pounds weight, with an ACCOUNT of the process used in preparing it, and CERTIFICATES that at least five hundred weight has been manufactured, to be produced to the Society on or before the second Tuesday in November, 1792.

174. The same premium is extended one year further.

CERTI-

CERTIFICATES and ACCOUNTS to be produced on or before the second Tuesday in November, 1793.

175. REFINING BLOCK TIN. To the person who shall discover to the Society the best method of purifying or refining *Block Tin*, in such manner as to render it fit for the finer purposes to which *Grain Tin* is now solely applied, the GOLD MEDAL, or FIFTY POUNDS.

CERTIFICATES that not less than three tons have been refined or purified, with a full detail of the process, and a quantity, not less than one hundred weight, of the Tin so refined, to be produced to the Society on or before the first Tuesday in November, 1792.

176. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in November, 1793.

Premiums

Premiums for promoting the Polite Arts.

177. HONORARY PREMIUMS FOR DRAWINGS. For the best Drawing of any kind, made with Crayons, Chalk Black Lead, Pen, Indian Ink, or Bister, by young Gentlemen under the age of twenty-one, sons or grandsons of Peers, or Peereffes in their own right, of Great Britain or Ireland; to be produced on or before the first Tuesday in March, 1793; the HONORARY MEDAL of the Society IN GOLD.

178. The same IN SILVER, for the second in merit.

179, 180. The same premiums will be given, on the like conditions, to young Ladies, daughters or grand-daughters of Peers, or Peereffes in their own right, of Great Britain or Ireland.

181. HONORARY PREMIUMS FOR DRAWINGS. For the best Drawing of any kind, made with Crayons, Chalk, Black Lead, Pen, Indian Ink, or Bister, by young Gentlemen under the age of twenty-one; to be produced on or before the first Tuesday in March, 1793; the GOLD MEDAL.

182. For the next in merit, the SILVER MEDAL.

183, 184. The same premiums will be given for Drawings by young Ladies.

N. B. Persons professing any branch of the Polite Arts, or any business dependent on the Arts of Design, or the sons or daughters of such persons, will not be admitted Candidates in these Classes.

The two following Premiums (Classes 185 and 186) are offered in conformity to the Will of the late John Stock, of Hampstead, Esq.

185. DRAWING. For the best Drawing, in Indian Ink, of the Equestrian Statue of King Charles the First, at Charing Cross, not less than eighteen inches high, to be produced on or before the third Tuesday in February, 1793, a SILVER MEDALLION, with the following engraved inscription: *The Premium given by the Society for the Encouragement of Arts, Manufactures, and Commerce, in conformity to the Will of John Stock, of Hampstead, Esq. and Five Guineas, in consideration of the Drawing being left with the Society as their property.*

186. PORTRAIT. For the best Copy, in Oil-Colours, of a Portrait of the late
JOHN

JOHN STOCK, of Hampstead, Esq. to be produced on or before the third Tuesday in February, 1793, a SILVER MEDALLION, with the following engraved inscription: *The Premium given by the Society for the Encouragement of Arts, Manufactures, and Commerce, in conformity to the Will of John Stock, of Hampstead, Esq.*

187. DRAWINGS OF OUTLINES. For the best Outline, after an original group or cast, in plaster, of Human Figures, by persons of either sex, under the age of sixteen, the principal figure not less than twelve inches; to be produced on or before the third Tuesday in February, 1793; the greater SILVER PALLET.

188. For the next in merit, the lesser SILVER PALLET.

N. B. These drawings are to be made on Paper, with Chalk, Black Lead, Indian Ink, or Bister; and the originals either to

be produced to the Society, or to be referred to for their examination.

189. DRAWINGS OF MACHINES. For the best Perspective Drawing, by persons of either sex under the age of twenty-one years, of the Model of an inclined Plane by Mr. Leach, in the Society's Repository, the greater SILVER PALLET; to be produced on or before the third Tuesday in February, 1793.

N. B. Such Candidates as propose to make Drawings for this Premium, will be admitted by the Register any day (Sundays and Wednesdays excepted) between the hours of ten and two.

The Drawing to which the premium is adjudged, is to remain the property of the Society.

190. DRAWINGS OF LANDSCAPES. For the best Drawing of a Landscape after nature, by persons of either sex under twenty-one years of age, to be produced on or before the third Tuesday
in

in February, 1793, the greater SILVER PALLET.

191. For the next in merit, the lesser SILVER PALLET.

Each Candidate must mention, on the front of the Drawing, from whence the View was taken; and the Drawings must be made with Chalk, Pen, Indian Ink, Water-colours, or Bister.

192. HISTORICAL DRAWINGS. For the best Historical Drawing, being an original composition, of five or more Human Figures; the height of the principal figure not less than eight inches; to be made with Crayons, Chalk, Black Lead, Pen, Indian Ink, Water-colours, or Bister, and to be produced on or before the third Tuesday in February, 1793; the GOLD PALLET.

193. For the next in merit, the greater SILVER PALLET.

194. ENGRAVING IN THE LINE MANNER. To the Engraver who shall

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produce

produce to the Society the best engraved Plate, executed by himself, of the dimensions of not less than twenty inches by sixteen inches, containing not fewer than three Human Figures, the principal figure not less than twelve inches high; to be engraved in the LINE MANNER, from any old or modern Picture; the GOLD PALLET, and TWENTY-FIVE GUINEAS.

The regular progress of the work, from the first Proof of the Etching, to the finished impression of the Plate, to be produced to the Society on or before the first Tuesday in February, 1793.

The IMPRESSIONS produced to remain the property of the Society.

195. SURVEYS OF COUNTIES.
To the person who, in the year 1792, shall complete and publish an accurate Survey of any one County in England or Wales, on a scale of not less than one inch to a mile, for which rewards have not already been given by the Society, the GOLD MEDAL, or FIFTY POUNDS.

CERTI-

CERTIFICATES of the accuracy of the Survey, and that it was begun after the first of June, 1788, together with the Map, to be produced on or before the last Tuesday in January, 1793.

The Map to which the premium shall be adjudged, to remain the property of the Society.

N. B. The Society are already in possession of Surveys of the following Counties, viz. Devonshire, Derbyshire, Somersetshire, Northumberland, Suffolk, Leicestershire, Cumberland, and Lancashire.

196. The same premium is extended one year further.

The Survey to be begun after the first of June, 1789, and the Map to be produced on or before the last Tuesday in January, 1794.

197. The same premium is extended one year further.

The Survey to be begun after the first of

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June,

June, 1790; and the Map to be produced on or before the last Tuesday in January, 1795.

198. The same premium is extended one year further.

The Survey to be begun after the first of June, 1791; and the Map to be produced on or before the last Tuesday in January, 1796.

199. NATURAL HISTORY. To the Author who shall publish, in the year 1792, the Natural History of any County of England or Wales, the GOLD MEDAL, or FIFTY POUNDS.

It is required that the several natural productions, whether animal, vegetable, or mineral, peculiar to the county, or found therein, be carefully and specifically arranged and described, in order that the Public may be enabled to judge what Arts or Manufactures are most likely to succeed in such County.

The Work to be delivered to the Society
on

on or before the last Tuesday in January,
1793.

200. The same premium is extended one
year further.

The Work to be delivered to the Society
on or before the last Tuesday in January,
1794.

201. The same premium is extended one
year further.

The Work to be delivered to the Society
on or before the last Tuesday in January,
1795.

C O N D I T I O N S.

No person who has gained the first Premium in any Class, will be admitted a Candidate in a Class of an inferior age; and no Candidate shall receive more than one Premium in one year; nor will they who for two successive years shall gain the first Premium in one Class, be ever again admitted as Candidates in that Class.

No person shall ever be admitted a Candidate in any Class, in which he has three times obtained the whole of the first Premium.

No Candidate shall send in more than one Performance in any one class.

All the Claims which are produced each year before the Committee of Polite Arts (to which Premiums or Bounties are adjudged) are to remain with the Society six weeks after the determination, unless
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the Candidates, for particular reasons, do apply to have their performances returned.

No Claim for a Premium in the Polite Arts will be admitted, that has obtained, or has been produced in order to obtain, a Premium, Reward, or Gratification, from any other Society, or any Academy or School.

All Performances that obtain Premiums in the Polite Arts, must be begun after the publication of such Premiums.

Purposely to encourage real merit, and to prevent any attempts to impose on the Society, by producing Drawings which shall have been made or retouched by any other person than the Candidate, the Society is resolved, upon all occasions, with respect to the successful Candidates in Classes 187 to 192 inclusive, to prove their abilities, by requiring a specimen made under the inspection of the Committee of Polite Arts, in every instance where such proof can be obtained.

Premiums

*Premiums for encouraging and improving
Manufactures.*

202. SILK. For the greatest quantity of merchantable Silk, not less than ten pounds weight, produced by any one person in England, in the year 1792, the GOLD MEDAL.

SPECIMENS of the Silk, not less than one pound, with CERTIFICATES that the whole is of equal quality, and produced in England, to be delivered to the Society on or before the first Tuesday in January, 1793.

203. For the second greatest quantity, not less than five pounds weight, the SILVER MEDAL.

204, 205. The same premiums are extended one year further.

The Specimens and Certificates to be delivered to the Society on or before the first Tuesday in January, 1794.

206. MACHINE FOR CARDING SILK. For the best Machine, superior to any now in use, for carding Waste Silk equally well as by hand; to be produced, together with a specimen of the Cardings, on or before the first Tuesday in November, 1792; the GOLD MEDAL, or TWENTY POUNDS.

207. WEAVING FISHING-NETS. For the best specimen of Plain Netting, for Fishing-Nets, superior to any hitherto in use, not less than twenty yards long, and six feet deep, woven in a Loom, or other Machine; to be produced to the Society on or before the second Tuesday in January, 1793; FIFTY GUINEAS.

N. B. It is expected that the Specimen produced be made in such a manner, as to be cut and joined without more loss than usual, that it have such a plain selvage as the common Fishing-Nets, and that the Knot be equally fast with those in Nets in common use, and as easily repaired.

208. CLOTH FROM HOP-STALKS OR BINES. To the person who shall produce to the Society the greatest quantity, not less than thirty yards, of Cloth, at least twenty-seven inches wide, made in England or Wales of Hop-Stalks or Bines, and superior to any hitherto manufactured in England of that material, the GOLD MEDAL, or THIRTY POUNDS.

One pound of the Thread of which the Cloth is made, and thirty yards of the Cloth, together with proper CERTIFICATES that the whole is manufactured from Hop-Stalks or Bines, to be produced to the Society on or before the second Tuesday in December, 1792.

N. B. The Society are already in possession of Cloth made in England from Hop-Stalks or Bines, which may be inspected by application to the Register.

209. WICKS FOR CANDLES OR LAMPS. To the person who shall discover to the Society a method of manufacturing

turing Hop-Stalks or Bines, so as to render them fit for the purpose of supplying the place of Cotton, for Wicks of Candles or Lamps, TWENTY GUINEAS.

SAMPLES, not less than five pounds weight, of the Wicks, so prepared, to be produced to the Society, with CERTIFICATES that the whole quantity is made from Hop-Stalks or Bines, on or before the second Tuesday in January, 1793.

210. The same premium is extended one year further.

SAMPLES and CERTIFICATES to be produced on or before the second Tuesday in January, 1794.

211. PAPER FROM RAW VEGETABLE SUBSTANCES. To the person in England or Wales who shall make the greatest quantity, not less than ten reams, of the best and most useful Paper, from Raw Vegetable Substances, TWENTY GUINEAS:

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CERTIFICATES of the making such Paper, and one ream of the Paper, to be produced on or before the first Tuesday in November, 1792.

N. B. The Society are in possession of two volumes, containing a great variety of specimens of Paper made from Raw Vegetables, viz. Thistles, Potatoe-Haum, Poplar, Hop-bines, &c. which volumes may be inspected by any person, on application to the Register.

212. MAINTAINING AND EMPLOYING THE POOR. To the person who shall produce to the Society, the best practical and most œconomical Plan for the maintenance and employment of the Poor in Parish Workhouses, superior to any hitherto generally known, the GOLD MEDAL, or FIFTY POUNDS.

The Plans to be delivered to the Society on or before the first Tuesday in March, 1793.

Premiúms

Premiums for Invention in Mechanicks.

213. TRANSIT INSTRUMENT.

To the person who shall invent and produce to the Society a cheap and portable Transit Instrument, which may easily be converted into a Zenith Sector, capable of being accurately and expeditiously adjusted for the purposes of finding the Latitudes and Longitudes of places, and superior to any portable Transit Instrument now in use, the GOLD MEDAL, or THIRTY GUINEAS.

To be produced on or before the last Tuesday in January, 1793.

214. GUN FOR THROWING

HARPOONS. To the person who shall produce to the Society the best improvement in the construction of a Gun for throwing Harpoons, so as to render it more manageable than those at present in

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use,

use, the SILVER MEDAL, or TWENTY GUINEAS.

The GUN to be produced to the Society on or before the first Tuesday in December, 1792.

215. TAKING WHALES BY THE GUN-HARPOON. To the person who, in the year 1792, shall strike the greatest number of Whales, not fewer than three, with the Gun-Harpoon, TEN GUINEAS.

Proper CERTIFICATES of the striking such Whales, and that they were actually taken in the year 1792, signed by the Master, or by the Mate when the Claim is made by the Master, to be produced to the Society on or before the last Tuesday in December, 1792.

216. The same premium is extended one year further.

CERTIFICATES to be produced on or before the last Tuesday in December, 1793.

217. DRIVING BOLTS INTO SHIPS. To the person who shall invent and produce to the Society a Model, shewing a method of driving Bolts into Ships, particularly those of Copper; without splitting the Head or bending them, with more dispatch, in all directions, and tighter, than by any means hitherto known or in use, THIRTY GUINEAS.

The Model to be produced to the Society on or before the first Tuesday in February, 1793.

218. CRANES FOR WHARFS. To the person who shall invent and produce to the Society a Model of a Crane for Wharfs, on a scale of not less than one inch to a foot; the construction to be such, that the effect of the power may be varied according to the weight to be raised, in a manner different from any now known or in use, yet more simple and effectual; the GOLD MEDAL, or FORTY GUINEAS.

To be produced on or before the first Tuesday in February, 1793.

219. METAL ROPE OR CHAIN.
To the person who shall have invented a Chain or Rope of Copper, or other Metal, superior to any hitherto made, sufficiently flexible to work well, and IN ALL DIRECTIONS, over pullies, and which shall serve every purpose of a good Hempen Rope of at least two inches diameter, FIFTY POUNDS.

The Candidate to produce to the Society satisfactory CERTIFICATES that such Metal Rope or Chain has been used to advantage in manufactories, or large works, where Hempen Ropes have been hitherto employed.

The CERTIFICATES, and a Sample of the Metal Rope or Chain, not less than ten yards long, to be produced to the Society on or before the first Tuesday in November, 1792.

220. HAND MILL. To the person who shall produce to the Society a better constructed Hand Mill, for general purposes, than any now known or in use, the SILVER MEDAL, or TEN GUINEAS.

To be delivered to the Society on or before the last Tuesday in December, 1792.

221. MACHINE FOR RAISING COALS, ORE, &c. &c. To the person who shall invent a Machine for raising Coals, Ore, &c. from Mines, which shall produce the effect at a less expence than those already known or in use, the GOLD MEDAL, or FIFTY GUINEAS.

A Model of the Machine, made on a scale of not less than one inch to a foot, to be produced to the Society on or before the second Tuesday in February, 1793.

222. MACHINE FOR RAISING WATER. To the person who shall invent a Machine on a better, cheaper, and

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more simple construction than any hitherto in use, for raising Water out of Wells, &c. from a depth not less than fifty feet, **THIRTY GUINEAS.**

CERTIFICATES of the performance of the Machine, and a Model of it, on a scale of not less than one inch to a foot, to be produced to the Society on or before the first Tuesday in February, 1793.

223. MACHINE FOR CLEARING RIVERS. For the best Model of a Machine, superior to any now in use, for clearing Navigable Rivers from Weeds at the least expence, **TWENTY GUINEAS.**

To be produced to the Society on or before the first Tuesday in February, 1793.

224. METHOD OF EXTINGUISHING FIRES. To the person who shall produce to the Society the most speedy and effectual method of extinguishing Fires in houses or other buildings, superior to any hitherto known or in use, the **GOLD MEDAL, or FIFTY GUINEAS.**

To

To be produced on or before the second Tuesday in February, 1793.

225. IMPROVEMENT OF WHEEL CARRIAGES. To the person who shall discover to the Society the principles, and point out the construction, upon which Wheel Carriages may be drawn with the least fatigue to the horse or horses employed, the GOLD MEDAL, or FIFTY POUNDS.

The CLAIMS to be delivered to the Society on or before the second Tuesday in December, 1792.

*Premiums offered for the Advantage of the
British Colonies.*

226. NUTMEGS. For the greatest quantity of merchantable Nutmegs, not less than ten pounds weight, being the growth of his Majesty's dominions in the West Indies, and equal to those imported from the Islands of the East Indies, the GOLD MEDAL, or ONE HUNDRED POUNDS.

Satisfactory CERTIFICATES, from the Governor, or Commander in Chief, of the place of growth, with an account of the number of trees, their age, nearly the quantity of fruit on each tree, and the manner of culture, to be produced on or before the first Tuesday in December, 1792.

227. The same premium is extended one year further.

CERTIFICATES to be produced on or before the second Tuesday in December, 1793.

N.B.

N. B. Any person desirous of information on the subject of Nutmeg-trees, may obtain it from a Memorial on the Fructification of the Nutmeg, and the surest method of cultivating it to advantage, by the King's Gardener at the Isle of Bourbon, inserted in Mr. Maty's Review for August, 1783.

228. CINNAMON. For importing into the port of London, in the year 1792, the greatest quantity, not less than twenty pounds weight, of Cinnamon, being the growth of some of the Islands in the West Indies belonging to the Crown of Great Britain, and equal in goodness to the Cinnamon brought from the East-Indies, the GOLD MEDAL, or FIFTY POUNDS.

SAMPLES, not less than two pounds weight, with CERTIFICATES that the whole quantity is equal in goodness; together with satisfactory CERTIFICATES, signed by the Governor, or Commander in Chief, of the place of growth, with an
account

378 COLONIES AND TRADE.

account of the number of trees growing on the spot, their age, and the manner of culture; to be produced to the Society on or before the first Tuesday in January, 1793.

229. The same premium is extended one year further.

The SAMPLES and CERTIFICATES to be produced on or before the first Tuesday in January, 1794.

230. BREAD-FRUIT TREE. To the person who, in the year 1792, shall convey from the Islands of the South Sea, to any of the Islands in the West Indies subject to the Crown of Great Britain, the greatest number, not fewer than six, of one or both species of the Bread-fruit Tree, in a growing state, the GOLD MEDAL.

CERTIFICATES, signed by the Governor or Lieutenant-Governor of the Island, of the importation of the trees, and of the state they were in at the time of signing such Certificates, to be delivered to the
Society

Society on or before the second Tuesday in October, 1793.

231. The same premium is extended one year further.

CERTIFICATES to be produced on or before the second Tuesday in October, 1794.

232. The same premium is extended one year further.

CERTIFICATES to be produced on or before the second Tuesday in October, 1795.

233. KALI FOR BARILLA. To the person who shall have cultivated in the Bahama Islands, or any other part of his Majesty's dominions in the West Indies, in the year 1791, the greatest quantity of land, not less than two acres, with Spanish Kali, fit for the purpose of making Barilla, the GOLD MEDAL.

234. For the next greatest quantity, not less than one acre, the SILVER MEDAL.

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CERTIFICATES, signed by the Governor, Lieutenant-Governor, or Commander in Chief, for the time being, of the quantity of land so cultivated, and of the state of the Plants at the time of signing such Certificates, to be delivered to the Society on or before the second Tuesday in November, 1792.

235, 236. The same premiums are extended one year further.

CERTIFICATES to be delivered on or before the second Tuesday in November, 1793.

237, 238. The same premiums are extended one year further.

CERTIFICATES to be produced on or before the second Tuesday in November, 1794.

239. GUM CASHEW. To the person who, in the year 1792, shall import into the port of London, from any of the British Islands in the West Indies, the
greatest

greatest quantity, not less than half a ton, of the Gum of the Cashew-tree, which on trial has been found to answer the purpose of Gum Senegal, in Silk-dying, &c. the GOLD MEDAL, or THIRTY GUINEAS.

A SAMPLE, not less than twenty pounds weight, and CERTIFICATES that the whole quantity is of the same quality, and free from leaves and dirt, to be produced to the Society on or before the second Tuesday in January, 1793.

240. COFFEE IN THE PULP. To the person who shall import into the Port of London, in the year 1792, the greatest quantity of Coffee in the Pulp, not less than fifty hundred weight, the GOLD MEDAL, or FIFTY POUNDS.

CERTIFICATES of the importation of the Coffee, and SAMPLES not less than twenty pounds weight, with proof that the whole is of the same quality, to be produced to the Society on or before the last Tuesday in January, 1793.

241. DISCOVERY OF A PASSAGE BY LAND, FROM UPPER CANADA TO THE SOUTH SEA. To the person who shall first discover and open a passage by land, from the north-west parts of Upper Canada to the South Sea, between Nootka Sound and the Straits of Kamchatka, or to the navigable part of any River that disembogues itself into the South Sea within those limits, the GOLD MEDAL.

Such Discovery to be ascertained by a CERTIFICATE under the hand and seal of the Governor, or Commander in Chief for the time being, of the said province of Upper Canada.

242. DESTROYING THE INSECT COMMONLY CALLED THE BORER. To the person who shall discover to the Society an effectual method of destroying the Insect commonly called the BORER, which has of late years been so destructive to the Sugar-Canes in the West India Islands, the GOLD MEDAL, or FIFTY POUNDS.

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The Discovery to be ascertained by satisfactory CERTIFICATES, under the hand and seal of the Governor or Commander in Chief for the time being, and of some other respectable persons inhabitants of the Islands in which the remedy has been successfully applied; such CERTIFICATES to be delivered to the Society on or before the first Tuesday in January, 1794.

243. The same premium is extended one year further.

CERTIFICATES to be delivered on or before the first Tuesday in January, 1795.

Society's Office, Adelphi, May 25, 1792.

Ordered,

THAT THE SEVERAL CANDIDATES AND CLAIMANTS TO WHOM THE SOCIETY SHALL ADJUDGE PREMIUMS OR BOUNTIES, DO ATTEND AT THE SOCIETY'S OFFICE IN THE ADELPHI, ON THE LAST TUESDAY IN MAY, 1793, AT TWELVE O'CLOCK AT NOON, TO RECEIVE THE SAME; THAT DAY BEING APPOINTED BY THE SOCIETY FOR THE DISTRIBUTION OF THEIR REWARDS: AND BEFORE THAT TIME NO PREMIUM OR BOUNTY WILL BE DELIVERED, EXCEPTING TO THOSE WHO ARE OUT OF THE KINGDOM, OR PREVENTED BY UNAVOIDABLE ACCIDENTS.

IN CASES WHERE PERSONAL ATTENDANCE CANNOT BE GIVEN, DEPUTIES MAY BE SUBSTITUTED TO RECEIVE THE REWARDS.

GENERAL

GENERAL CONDITIONS.

NOTWITHSTANDING the Society reserve to themselves the power of giving, in all cases, such part only of any Premium as the Performance shall be adjudged to deserve, or of withholding the whole, if there be no merit; yet the Candidates may be assured the Society will always judge liberally of their several Claims.

It is required that the matters for which Premiums are offered, be delivered in without names, or any intimation to whom they belong; that each particular thing be marked in what manner each Claimant thinks fit, such Claimant sending with it a paper sealed up, having on the outside a corresponding mark, and on the inside the Claimant's name and address: and all Candidates are to take notice, that no Claim for a Premium will be attended to, unless the conditions of the Advertisement are fully complied with.

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386 GENERAL CONDITIONS.

No Papers shall be opened, but such as shall gain Premiums, unless where it appears to the Society absolutely necessary for the determination of the Claim: all the rest shall be returned unopened, with the Matters to which they belong, if inquired after by the Marks, within two years; after which time, if not demanded, they shall be publicly burnt, unopened, at some meeting of the Society.

All Models of Machines, which obtain Premiums or Bounties, shall be the property of the Society.

All the Premiums of this Society are designed for that part of Great Britain called England, the dominion of Wales, and the Town of Berwick upon Tweed, unless expressly mentioned to the contrary.

The Claims shall be determined as soon as possible after the delivery of the specimens.

No

GENERAL CONDITIONS. 387

No person shall receive any Premium, Bounty, or Encouragement, from the Society, for any matter for which he has obtained, or proposes to obtain, a Patent.

A Candidate for a Premium, or a person applying for a Bounty, being detected in any disingenuous method to impose on the Society, shall forfeit such Premium or Bounty, and be deemed incapable of obtaining any for the future.

The Performances which each year obtain Premiums or Bounties, are to remain with the Society until the end of May, except as mentioned in the Conditions annexed to the Premiums offered for promoting the Polite Arts.

No Member of this Society shall be a Candidate for, or entitled to receive, any Premium, Bounty, or Reward whatsoever, except the Honorary Medal of the Society.

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Where Certificates are required to be produced in claim of Premiums, they should be expressed, as nearly as possible, in the words of the respective advertisements, and should not be from the Candidate (solely), but from some other person or persons who have a positive knowledge of the facts certified.

Where Premiums or Bounties are obtained in consequence of specimens produced, the Society mean to retain such part of those specimens as they may judge necessary, making a reasonable allowance for the same.

No Candidates shall be present at any meetings of the Society or Committees, or admitted at the Society's Rooms, after they have delivered in their Claims, until such Claims are adjudged, unless summoned by the Committee.

N. B.

GENERAL CONDITIONS. 389

N. B. Any information or advice that may forward the designs of this Society for the public good, will be received thankfully, and duly considered, if communicated by letter, addressed to the Society, and directed to Mr. MORE, the Secretary, at the Society's Office, in the Adelphi Buildings, London.

* * * In case any person should be inclined to leave a sum of money to this Society, by will, the following form is offered for that purpose :

Item, I give and bequeath unto A. B. and C. D. the sum of _____ upon condition and to the intent that they, or one of them, do pay the same to the Collector for the time being, of a Society in London, who now call themselves the Society for the Encouragement of Arts,

390 GENERAL CONDITIONS.

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may be paid out of my personal estate, and
applied towards the carrying on the laud-
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By order of the Society,

SAMUEL MORE, Secretary.

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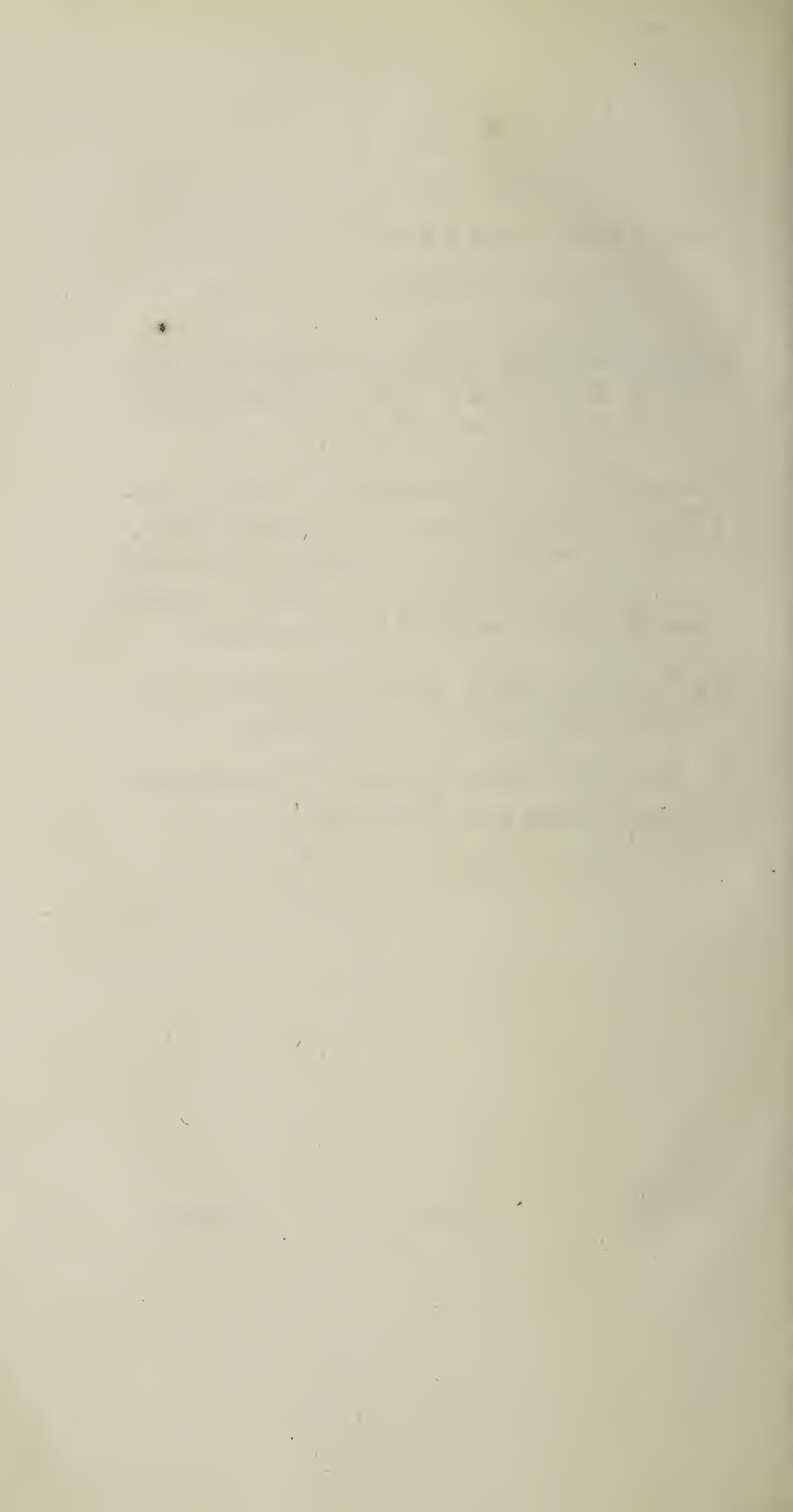
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Duke D'Almodavar, Counsellor of State to the King of Spain, Knight of the Golden Fleece, formerly Ambassador to the Court of Great-Britain, and now Director of the Society for promoting the Arts and Belles Lettres, in Spain.

His Excellency Count Anhalt, President of the Economical Society at St. Peterburgh.

Dr. Matthew Guthrie, Physician to the Imperial Corps of Cadets at St. Peterburgh.



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The Print of Mr. Andrews's Weighing Crane, to face page 221.

The Print of Mr. Hill's Machine for drawing Bolts, to face page 224.

The Print of Mr. James White's Crane, to face page 230.

