

Directions for bringing over seeds and plants, from the East Indies and other distant countries, in a state of vegetation: together with a catalogue of such foreign plants as are worthy of being encouraged in our American colonies, for the purposes of medicine, agriculture, and commerce. To which is added, the figure and botanical description of a new sensitive plant, called Dionoea muscipula: or, Venus's fly-trap / By John Ellis, F.R.S.

Contributors

Ellis, John, 1710?-1776.

Publication/Creation

London : Printed and sold by L. Davis, 1770.

Persistent URL

<https://wellcomecollection.org/works/mnqmmmb4y>

License and attribution

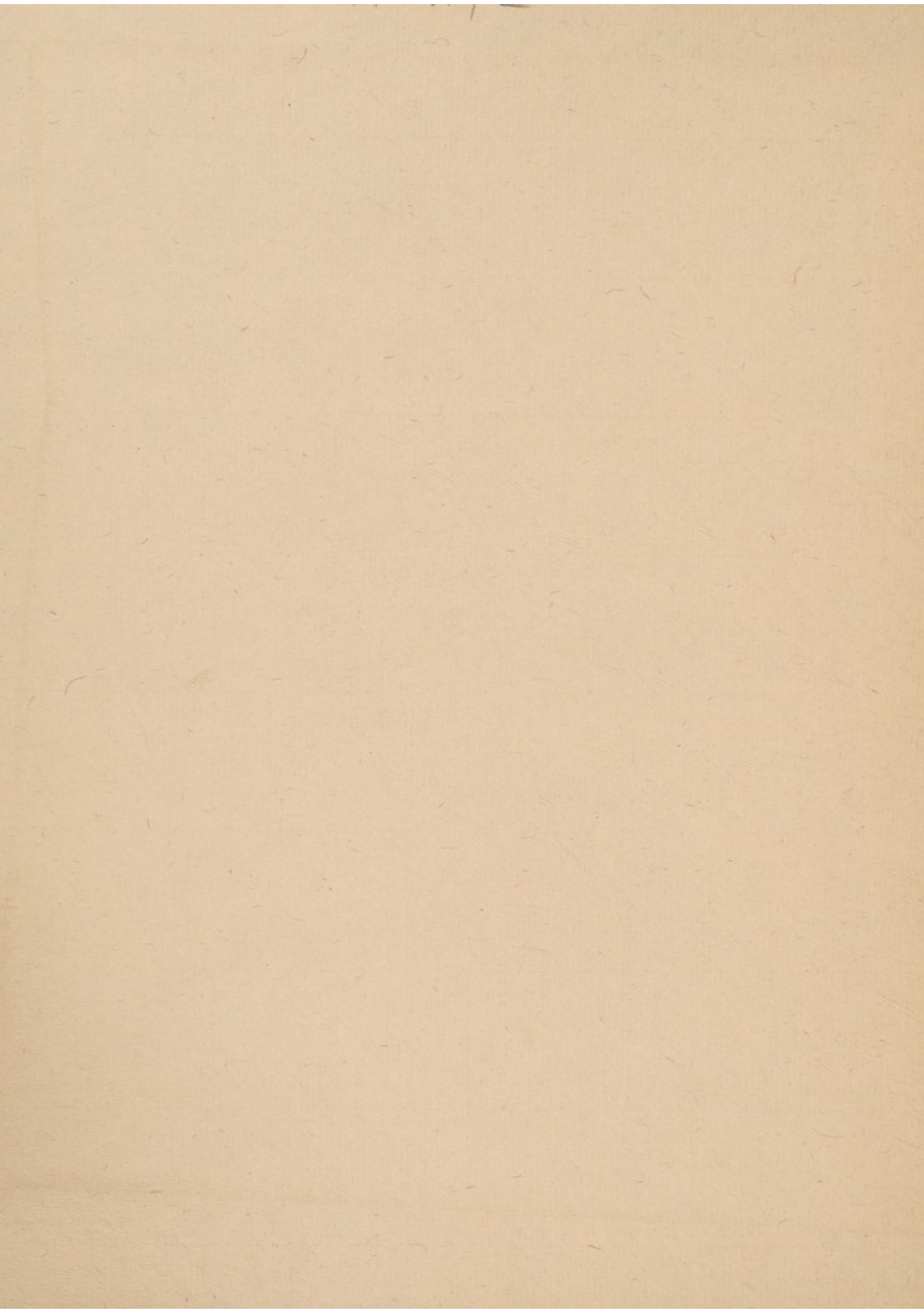
This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.


You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

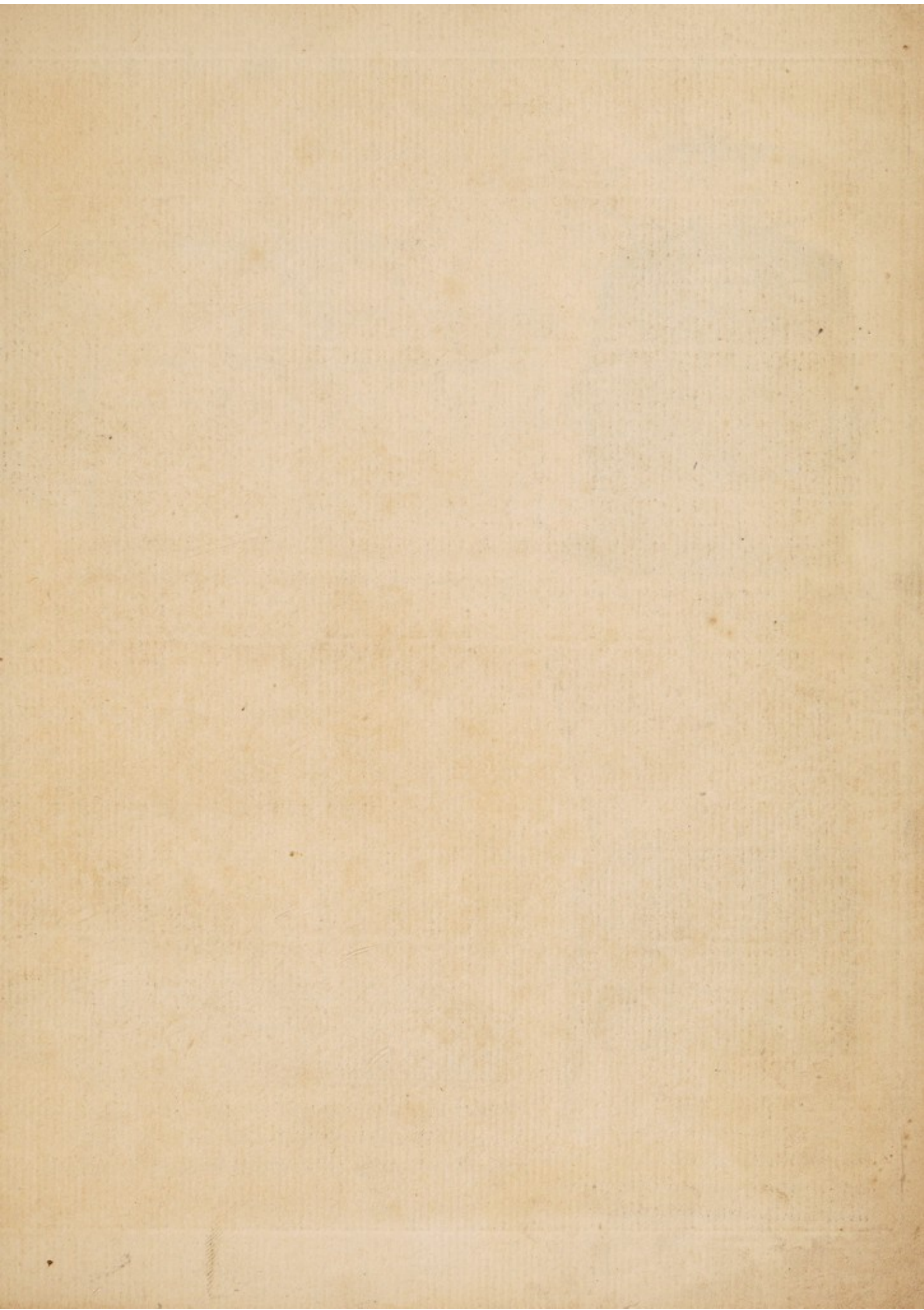






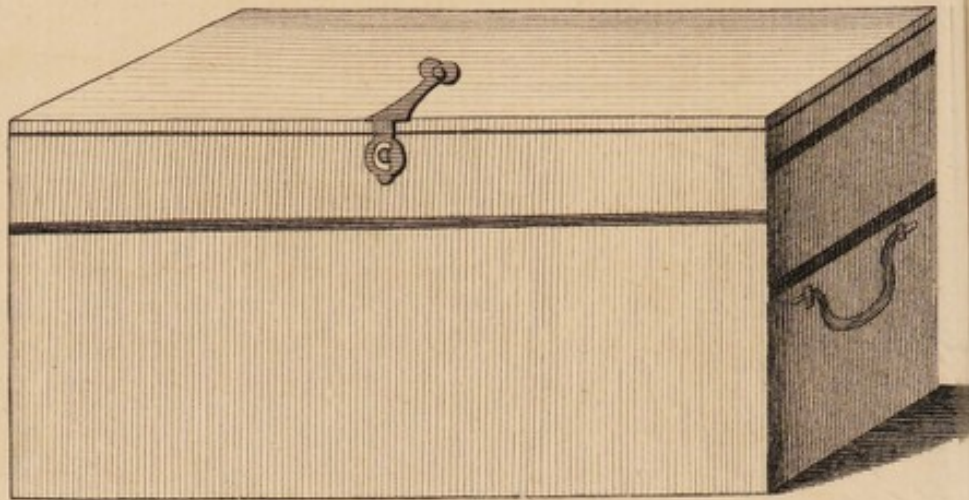
Digitized by the Internet Archive
in 2018 with funding from
Wellcome Library

<https://archive.org/details/b30414088>

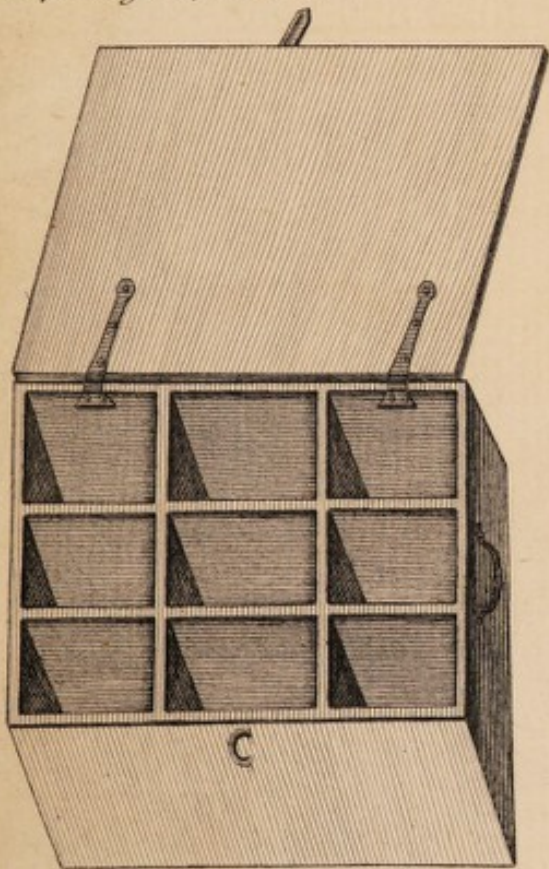




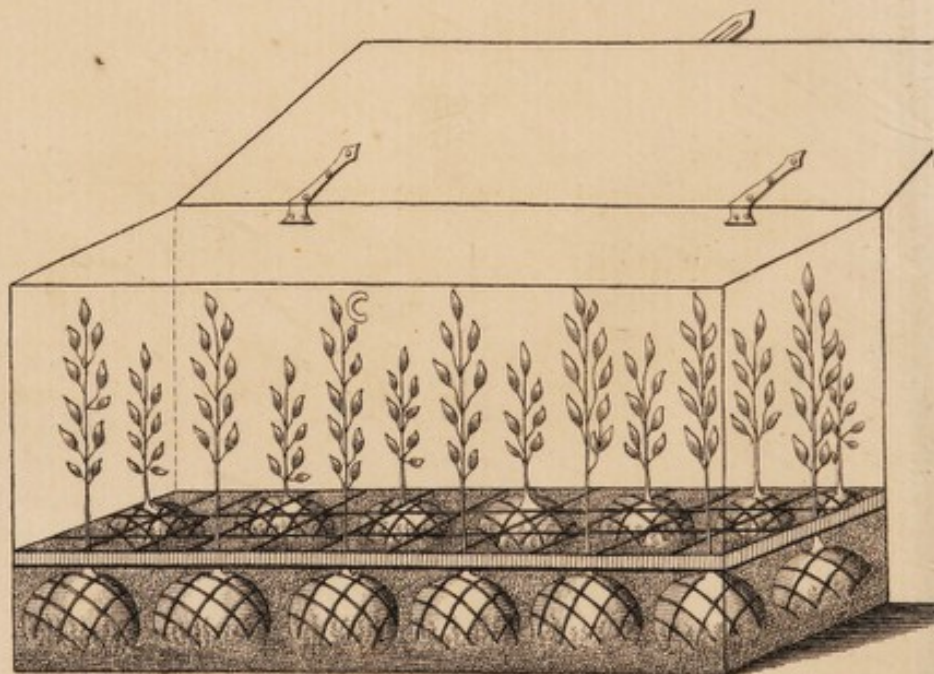
The Cask for sowing East-India seeds with the openings defended by Wire.



The Box with West-India and W. Florida plants shut down with the openings at the ends and front left for fresh Air.



The Box with divisions for sowing different seeds in earth & cut moss from the southern Colonies and the West-Indies.



The Inside of the box shewing the manner of securing the roots of W. Florida and W. India plants surrounded with earth & moss tied with packthread and fastend cross & cross with laths or packthread to keep them steady.

70/51
D I R E C T I O N S

FOR BRINGING OVER

S E E D S A N D P L A N T S,

F R O M

T H E E A S T - I N D I E S

A N D

O T H E R D I S T A N T C O U N T R I E S,

I N

A S T A T E O F V E G E T A T I O N :

T O G E T H E R W I T H

A C A T A L O G U E o f s u c h F O R E I G N P L A N T S a s a r e w o r t h y o f b e i n g e n c o u r a g e d
i n o u r A M E R I C A N C o l o n i e s, f o r t h e P u r p o s e s o f M E D I C I N E, A G R I C U L -
T U R E, a n d C O M M E R C E.

T O W H I C H I S A D D E D,

The Figure and Botanical Description of a new SENSITIVE PLANT, called

D I O N Æ A M U S C I P U L A :

O R,

V E N U S ' s F L Y - T R A P.


B Y

J O H N E L L I S, F. R. S.

L O N D O N,

Printed; and sold by L. DAVIS, Printer to the Royal Society,
opposite Gray's-Inn, Holborn.

M D C C L X X.



DIRECTOR'S

PERMISSIVE OVER

SEEDS AND PLANTS

FROM

THE EAST-INDIES

AND

OTHER DISTANT COUNTRIES

A STATE OF VERIFICATION

TOGETHER WITH

A Catalogue of the Herbarium of the University of London
in the Botanic Garden, for the purpose of the
Trade, and Commerce.

TO WHICH IS ADDED,

The History and Botanical Description of a new Genus of Plants

DIONIA A MUSCIPUBA

OF

VENUS'S ISLAND

BY

JOHN LILLIE, F.R.S.

LONDON

Printed and sold by E. DAVIS, Printer to the Royal Society,
opposite Gray's Inn, London.



Directions for Captains of Ships, Sea Surgeons, and other curious Persons, who collect Seeds and Plants in distant Countries, in what Manner to preserve them fit for Vegetation.

IT might be reasonably supposed, from the great quantity and variety of seeds which we yearly receive from China, that we should soon be in possession of the most valuable plants of that vast empire; yet it is certain, that scarce one in fifty ever comes to any thing, except a few varieties of annual plants, which have been common in our gardens for many years. The intention of those who purchase or collect these seeds is, without doubt, to oblige the curious in these kingdoms, by procuring what they suppose may prove both ornamental and useful: but how contrary to their intentions do their friends find it, who, being under great obligations for this expensive present, have the mortification to be totally disappointed in their expectations! These remarks are therefore intended to prevent, if possible, the like disappointments for the future.

The crafty Chinese traders, perceiving that many of the Europeans who buy these seeds are very little acquainted with the nature

of them, take the advantage of their want of knowledge; and, in order the better to deceive them, put up a great variety of sorts in a very neat manner: when the seeds arrive here, and come to be examined by persons of judgement, they soon find that most of them have been collected many years; consequently are decayed, and of no value. To prevent this fraud for the future, it would be proper to examine the state they are in before they are purchased. And though it is very difficult to judge how long they may have been gathered, yet we may form a tolerable judgement of them by cutting some of the larger ones across, and bruising the smaller ones: By the help then of a magnifying glass of two inches focus, we may discover, whether their internal part, which contains the seminal leaves, appears plump, white, and moist. If so, these are good signs of their being in a vegetating state; but if they are shriveled, inclining to brown or black, and are rancid, they cannot in the least be depended upon.

The resident factors in China are the properest persons to collect the choicest kinds; they will follow any useful hints with cheerfulness. Many valuable trees, unknown in Europe, grow in the northern provinces of China; the seeds of these may be obtained by means of the missionaries at Peking: that climate, though in 40 degrees of North latitude, is liable to more severe cold than ours in winter. So that trees from thence would thrive well with us in the open air, but much better in the same latitude of North-America, on account of the great heat of the American summers. The Secretary of the Royal Society of London corresponds with the Missionaries; and there is no doubt but, upon a proper application, they would with pleasure oblige the Society, as they have done formerly, in sending many curious seeds. But as the distance is great, and the manner of preserving the seeds properly, so as to keep them in a state of vegetation, is an affair of consequence, the following

following hints may be of use in bringing them over to answer the end proposed.

In the first place it ought to be carefully attended to, that the seeds should be perfectly ripe when they are gathered; and they should be gathered, if possible, in dry weather; afterwards they should be spread thin on paper or mats, in a dry airy room, but not in sunshine. The time necessary for this operation will vary according to the heat of the climate, or season of the year, from a fortnight to a month, or perhaps two may be necessary; the hotter the season, the less time will suffice. This is to carry off their superfluous moisture, which if confined would immediately turn to mouldiness, and end in rottenness.

As there are two methods that have succeeded, and put us in possession of several young plants of the true tea-tree of China, I shall mention them both, in order to assist the collector in bringing home the seeds of many valuable plants.

The first is by covering them with bees-wax in the manner explained in the *Phil. Transact.* vol. LVIII. p. 75. and which is hereafter described; where the acorns vegetated freely after they had been kept a whole season inclosed in wax*.

* Here we must observe, that, in the experiment made on the oak acorns inclosed in wax, they were not put into it till the latter-end of February, though they had been ripe and fallen from the tree four months before, which was the latter-end of October preceding; not but that they might have been safely inclosed much sooner.

However, by this time, that property, which all living substances, as well animal as vegetable, of imbibing and perspiring, was very much abated; for the seeds of vegetables, like animals in their torpid state, do imbibe and perspire to a certain degree; yet this degree greatly diminishes in proportion to the time they are kept (under certain circumstances of the manner in which they are kept) till at last they lose their vegetating power. So that we see how necessary it is, that the larger seeds, that are intended to be inclosed in wax, should be in such a state, as not to send forth too great a quantity of aqueous moisture, and yet that there should be sufficient to support them in this confined state. Many of the tea-seeds lately sent over in wax have perished for want of this caution.

Skilful persons, by cutting some of them open and observing the state of the kernels, will be able, after different experiments, to hit on the critical time for this operation.

It principally consists in choosing only such seeds as are perfectly sound and ripe. To prove this, we must cut open some of them to judge what situation the rest may be in, taking care to lay aside any that are outwardly defective, or marked with the wounds of insects. When a proper choice of them is made, they should be wiped extremely clean, to prevent any dirt or moisture being inclosed; each seed then should be rolled up carefully in a coat of soft bees-wax half an inch thick: the deep yellow English bees-wax is the best. When you have covered the number you intend to inclose, pour some of this bees-wax melted into a chip-box of six or seven inches long, four broad, and three deep, till it is above half full; and just before it begins to harden, while it is yet fluid, put in the seeds you have rolled up in rows till the box is near full; then pour over them some more wax while it is just fluid, taking care when it is cold to stop all the cracks or chinks that may have proceeded from the shrinking of the wax, with some very soft wax; then put on the cover of the box, and keep it in as cool and airy a place as you can.

The method of inclosing tea-seeds singly in wax, and bringing them over in that state, has been practised for some time; but few have succeeded, owing to the thinness of the coat of wax, or putting paper first round them, or inclosing them too moist.

The stones of mangoes have been covered in the same manner, but most of them have been pierced by insects through the wax, and of many of them that were not pierced, their kernels were black and hard; a plain proof they had been too dry before they were inclosed, and that these large stones require as strong a covering of wax as the oak acorns, to prevent the air or insects coming to them.

It appears from experiments made by curious persons in the East-Indies, that mangoes will vegetate sooner by sowing only
the

the kernels: if then some of the ripest kernels were taken out of the stones cautiously, without bruising them, and preserved in the same manner as the oak acorns, it would be an experiment worth trying, in order to obtain this most valuable tree, especially if some of these kernels so preserved were taken out of the wax at St. Helena, and sown in boxes of fresh earth. The same might be practised with success on the tea-seeds, as some of my friends, who have taken this hint, have experienced very lately.

The second method that has been tried with success is, by procuring the tea-seeds in their pods or capsules, when they are brought down fresh from the tea-country at the latter-end of the year, to Canton, at the time that our East-India ships are preparing to depart for Europe. The seeds then in their pods are to be put into pound or half-pound canisters made of tin and tutenague*, with a double rim to the top: the inside of the canister should be first lined with silk paper, or the paper commonly used in China, and the seeds pressed down close, but not so as to be bruised. When the canister is near full to the neck, some more of the same paper must be stuffed in very close, till it is full to the top, and then the double-rimmed cover should be put on very tight. Care must be taken that the seeds are not too moist when they are put into the canister, and that they are found and in good order. The canister then is to be kept in an airy cool place. If the ship arrives early in England, I mean in June or the beginning of July, they may be sown with success; the sooner it is done; the better chance we shall have of

* Whether there is any particular antiseptic quality or power of resisting putrefaction in the metallic parts of these kind of canisters, I will not pretend to determine; but it is most certain, that there are sulphureous mineral steams, very perceivable to persons of a nice sense of smelling, that are continually flowing from almost all metallic substances, especially in hot weather; which steams being confined, may probably resist putrefaction, and destroy insects in vegetable bodies; and perhaps these may rather promote than impair their vegetative powers, as I shall shew hereafter in an instance of the use of common sulphur applied for this purpose; for most of the tea-seeds had pushed forth roots in the canister.

their

their growing. Those seeds which I have seen brought home in this manner, had shot out roots, owing to the heat of the climates they had passed through, and the confined moisture; and though not above twenty out of two hundred in the canister succeeded, yet these are thought a great acquisition. Perhaps there would be less danger of so many of them putrefying, if each capsule with its seeds was wrapped up tight in a separate piece of paper, and afterwards closely packed in the canister as before-mentioned. We see how long oranges, lemons, and other fruit wrapped up singly in papers, and put into close packages, will continue sound by the papers absorbing the moisture that must exude from them, and which prevents their heating and putrefying.

Tea-seeds, put up in this manner, require less trouble than those that are rolled up singly, and afterwards immersed in melted wax. Experience will determine which is the best method. When the ship arrives at St. Helena, they may be easily examined to see in what state they are, by cutting some of them open; and if they are found, some of them should be sown immediately in cases or tubs of fresh earth, well secured from rats, and the vacancy made in the canister immediately filled up, and stuffed very close with the same sort of paper, to prevent the air getting to the rest, which would soon spoil them. These that are thus put into earth should have but little water given to them till they pass the tropic of Cancer; otherwise they will spire up very weak, from the great heat, and want of a free circulation of good air.

It might be proper, after the ship has passed the tropic of Cancer, near the latitude of 30 degrees North, to sow some more seeds in the same boxes, by which experiment we may judge the better of the properest place to sow the seeds at sea. It has been practised by many, to sow the seeds immediately on leaving China; but this is rarely attended with success, particularly on account of the bad weather too often met with in coming round the Cape of
Good

Good Hope; beside, the young plants are apt to grow too freely and slender in their confinement, and therefore less able to bear the cold air when they arrive in this latitude.

If by chance the tops of such plants as come up should be broken off by any accident, the earth and seeds should not be thrown away, for the remaining part of the stem next to the seed will shoot up afresh, as I have experienced in the pot of oak acorns (that grew after they had been preserved a season in wax); some of the tender young plants were by accident broke off short close to the earth; but before the summer was over they grew up again, full as vigorously as those that were not hurt.

The following is a description of a proper-sized box to sow the seeds in, in the East-Indies or on the voyage. It should be three feet long, fifteen inches wide, and eighteen or twenty inches deep, or more, as it may be found convenient, with a proper cover of wire to secure the seeds or young plants from vermin, and a lid with hinges to shut down over the wire, as there may be occasion, and a handle at each end, to move the box easier to and fro. The ends of the box near the top must be bored full of holes, to let the crude vapours pass off that arise while the cover is obliged to be let down; or a small valve or wooden shutter at each end to open outwards, of six inches long and three broad; the openings to be defended with wire, to prevent the rats getting into the box. This hint is sufficient to shew that air is absolutely necessary, and an ingenious carpenter will easily contrive small doors or openings all round for the health of the young plants.

Or a cask, perhaps, may be made equally as convenient for this purpose, as the cooper on board a ship has always spare casks more ready than boxes. The following is the proportion it should be of: two feet three inches high, two feet bung diameter, and one foot nine inches head diameter; there should be a large opening at the top wired over, the wired part of which might be lifted up at pleasure, and a lid with hinges to cover it; this may

be either circular or square, as will be most convenient, the larger the better; and on the upper part of the sides there may be four or five little openings wired, with doors to each, for the sake of giving air all round upon some occasions. Care must be taken not to expose the young plants to strong sunshine: sometimes, when the lid and doors are open, it may be necessary to throw a matt or thin cloth over them, but this must depend on the judgement of the person who has the care of them; there should be handles fixed to the sides, to move it with more safety.

There should be a layer of wet moss, of two or three inches deep, at the bottom of the box or cask; or, if that cannot be got, some very rotten wood or decayed leaves, and then fresh loamy earth, about twelve inches deep, both of which will sink to a foot deep: the wet moss is intended to retain moisture, and to keep the earth from drying too soon.

The surface of the earth should be covered with moss cut small, which now and then on the voyage should be washed in fresh water, and laid on the earth again to keep the surface moist, and to wash off mouldiness or saline vapours which may have settled on it. When the plants come up, it will be proper to save what rain-water can be got, which will encourage their growth, and be of more service than the water drawn out of casks that have been long on board the ship.

These kind of boxes or casks will be very proper to sow many sorts of such seeds in as are so difficult to be brought from China, and other parts of the East-Indies, to Europe in a vegetating state; such as the lechee, mangoes, mangoosteens, pepper, marking nuts, various sorts of peaches, roses, oranges, citrons, lemons, &c.

And nothing can be more convenient than these casks, for sending olive plants, capers, young vines, &c. &c. to our distant American plantations. The size may be varied as the plants to be sent may require.

To

To this I must add a method that promises success for bringing over plants from the West-Indies, and the southern parts of North-America, particularly West-Florida, the voyage from hence being longer than from the West-Indies, and more attention is required to keep the plants in health, than from any other parts of our North-American settlements: but as there is a good deal of difference in the climates of these places, it will be necessary to observe, that plants from the West-Indies should be put on board in the latter-end of Spring, so as to arrive here in warm weather, otherwise they will be destroyed by the cold of this latitude; and the ever-greens, which are the most curious from West-Florida, must be sent in the winter months, while their juices are inactive, so as to arrive here before the heats come on. If the plants sent from these countries were planted in pots or boxes, and kept there a year, they might be brought over with very little hazard; or even if they were first transplanted from the woods into a garden, till they had formed roots, they might be sent with much more safety.

The size of the boxes that will be most convenient for stowing them on board merchant-ships, where there is very little room to spare, should be three feet long, fifteen inches broad, and from eighteen inches to two feet deep, according to the size of the young trees; but the smallest will be most likely to succeed, provided they are well rooted. There must be a narrow ledge nailed all round the inside of the box, within six inches of the bottom, to fasten laths or packthread to form a kind of lattice-work, by which the plants may be the better secured in their places. If the plants are packed up just before the ship sails, it will be so much the better.

When they are dug up, care must be taken to preserve as much earth as can be about their roots; and if it should fall off, it must

be supplied with more earth, so as to form a ball about the roots of each plant, which must be surrounded with wet moss, and carefully tied about with packthread, to keep the earth about the roots moist: perhaps it may be necessary to inclose the moss with some paper or broad leaves (as the palmetto) that the packthread may bind the moss the closer. Loamy earth will continue moist the longest. There must be three inches deep of wet moss put into the bottom of the box, and the young trees placed in rows upright close to each other, stuffing wet moss in the vacancies between them, and on the surface; over this palmetto leaves, if to be had, should be put to keep in the moisture, and over them the laths are to be fastened cross and cross to the ledges or packthread to be laced to and fro, to keep the whole steady and tight. The lid of the box should be either nailed down close, or may have hinges and a padlock to secure it from being opened, as may be found necessary, with proper directions marked on it to keep the lid uppermost. There must be two handles fixed, one at each end, by which means there will be less danger of disturbing the plants. Near the upper part of the ends of the box, there must be several holes bored to give air: or in making the box there may be a narrow vacancy left between the boards of one-third of an inch wide, near the top, to let out the foul air; and perhaps it may be necessary to nail along the upper edge of these openings list, or slips of sail-cloth, to hang over them, to secure the plants from any spray of the sea; and at the same time it will not prevent the air from passing through. Boxes with plants packed in this manner, must be placed where there is free air, that is, out of the way of the foul air of the ship's hold.

If the plants should be taller than the depth of the box mentioned here, they may be placed length-ways in the same sized boxes: but then care must be taken to secure their roots in the
moss.

moses at one end of the box, so as not to be shook out of their places, and laths should be nailed across the inside to support their branches, and keep them from pressing upon one another. The best moss that can be used on these occasions is the *Sphagnum palustre*, or swamp moss, which is very soft, whitish, and spongy; it will retain water a long time, and not be liable to putrefy.

The following method of preserving seeds from turning rancid from their long confinement, and the great heat of the climates which they must necessarily pass through from China, was communicated to me some years ago by the celebrated Professor Linnæus, of Upsal, in Sweden. He advises, that each sort of seed should be put up in separate papers, with fine sand among them, to absorb any moisture (dried, loamy, or soapy earth may be tried): these papers, he says, should be packed close in cylindrical glass, or earthen vessels, and the mouths covered over with a bladder, or leather tied fast round the rims: he then directs that these vessels, with the seeds in them, should be put into other vessels, which should be so large, that the inner vessel may be covered on all sides, for the space of two inches, with the following mixture of salts. Half common culinary salt; the other half to consist of two parts of salt-petre, and one part of sal-ammoniac, both reduced to a powder, and all thoroughly mixed together, to be placed about the inner vessel, rather moist than dry. This he calls a refrigeratory; and says it will keep the seeds cool, and hinder putrefaction. Perhaps if small tight boxes, or casks or bottles of seeds were inclosed in casks full of salts, it might be of the same use, provided the salts do not get at the seeds; and as sal-ammoniac may not be easily met with, half common salt, and the other half salt-petre, or common salt alone, might answer the same end. But it would be very necessary to try both methods, to know whether the latter would answer the purpose of the former, as it would be attended with much less trouble, and might prove a useful method

method to our feedsmen, in sending seeds from hence to those warm climates.

The smallest seeds being very liable to lose their vegetative power by long voyages through warm climates, it may be worth while to try the following experiment upon such kinds as we know for certain are found. Dip some square pieces of cotton cloth in melted wax, and while it is soft and almost cold, strew the surface of each piece over with each sort of small seed, then roll them up tight, and inclose each roll in some soft bees-wax, wrapping up each of them in a piece of paper, with the name of the seed on it; these may be either surrounded as before with salts, or packed without the salts in a box, as is most convenient.

There are many seeds, which we receive both from the West-Indies and the southern parts of our North-American colonies, as South-Carolina, Georgia, &c. which the gardeners find very difficult to raise here, unless the following method is pursued. Divide a box, according to your quantity and sorts of seeds, into several square partitions; then mix the seeds with loamy earth and cut moss, and put each sort into its separate cell, filling it up to the top: the earth and moss must be rather inclining to dry than wet; then nail the lid down very close on your box, keeping it in an airy situation. If the voyage does not exceed two months, they will arrive in good order in the spring; and, though many of them may begin to germinate, yet, if they are sown directly, they will succeed much better than those that are brought over in papers, as is well known to our most curious gardeners. Seeds of the nutmeg-tree from Tobago, the cinnamon-tree, the cacao or chocolate-nut, and Avocado pear, must be brought in this manner. Seeds of all the sorts of magnolias, stewartias, chionanthus, and many others from South-Carolina, will succeed better this way, than any other method we yet know.

There

There are many valuable seeds may be brought from the South of France, Italy and Turkey, particularly the rarer kinds of oaks, the Alkermes oak, the Velani oak, the gall-bearing oak, which ought to be preserved in bees-wax, as the voyage is often very long, and the Turkey ships frequently detained on account of the quarantine.

The seeds of many of the small succulent fruits may be brought to England from very distant parts, by pressing them together, squeezing out their watery juices, and drying them in small cakes gradually, that they may become hard; they may be then wrapt up in white writing paper, not spongy, as this is apt to attract and retain moisture: but I believe it will be found, that a covering of wax will be better than one of paper.

The Alpine strawberry was first sent to England in a letter from Turin to Henry Baker, Esq; F. R. S. by pressing the pulp with the seeds thin upon paper, and letting it dry before they were inclosed. The paper mulberry from China was brought hither about the year 1754, much in the same manner. Formerly, varieties of the *Arbutus*, from the southern parts of France, were brought over in thin dried cakes; and a few years ago the *Arbutus Adrachne* seeds were sent in the same manner from Aleppo by the late Dr. Al. Russel. Our mulberries, strawberries, and other succulent fruits, may be conveyed to distant parts by the same method. The pulp, when dried, hardens like a varnish, and keeps the seeds from the air (provided they are kept dry), as the larger kinds are by bees-wax.

These hints may prompt us to try the larger succulent fruits; for instance, the mangoes, lechees, and others of this kind: if their fleshy part, when they are very ripe, was brought to the consistence of raisins or dried figs, it would keep their kernels plump, and in this state they might be better preserved in wax, than by any other method yet known. The nutmegs in the same manner must not be divested of their pericarpium before they are inclosed in wax. The marking nut, or *anacardium orientale*, should be brought over
with

with its apple or receptacle dried, adhering to it before it is inclosed in wax. Of this valuable plant we are yet ignorant, even of its leaves and blossoms, though very East-India ship brings some of the nuts, but none of them have yet been raised in England. This is the tree so much commended by Kæmpfer, in his *Amœnitates Exoticæ*, p. 793. for yielding the Siam varnish of so much consequence in China and Japan, for the first layer of their varnish, in all their curious lacquered ware. There is another fruit which I shall recommend to be brought in wax from China; this is called by the Chinese Unchee, or Um-Ky; it is described by Doctor Solander, in the *Philosophical Transactions*, vol. LII. p. 654. Feb. 20. where there is a very exact figure of it, taken from specimens in the British Museum, as they are preserved in several *Hortus Siccus's*; the volumes in which they are to be found are particularly enumerated by the Doctor, with an account of their great use in dying scarlet: this shrub may be cultivated in our American islands. The pulpy part among the seeds gives, when put into warm water, a very lively yellow colour, which is much wanted among the dyers. This plant is now cultivated in our curious botanical gardens from cuttings, and is known by the name of the single Gardenia, or the single Cape Jasmine of Miller: it was raised from seeds about ten years ago, brought from China by Thomas Fitzhugh, Esq; and is often found among the boxes of seeds sent from China, but not in a vegetating state. Mr. Fitzhugh followed the Linnæan manner of bringing over seeds surrounded with salt, which he thinks a very good method.

Our seedsmen are much distressed for a proper method to keep their seeds sound, and in a state of vegetation, through long voyages. Complaints are made, that, when their seeds arrive in the East-Indies, and often in the West-Indies, few of them grow; but that most of them are full of insects, or, what they term weevilly. This seems to proceed from the damp and putrid heat

of the hold, or too long confinement in close warm air, which brings these animals to life, which soon begin to prey on the inside of the seeds, and those seeds that are oily turn rancid. This putrid penetrating steam, that strikes every one upon opening the hatches of a full loaded ship's hold after a long voyage, it is this that does the mischief to seeds. This vapour, as the excellent Doctor Hales observes, without frequent ventilating, will become fatal to vegetable substances, as well as animals.

When the cavalry of our army in Germany was under the necessity of being supplied with hay from England, the difference was too manifest between the hay that had been but a month on board, and fresh hay, that had never been confined in the hold of a ship.

Experiments have been made on the best hemp from Russia, and hemp of English growth, by persons belonging to the navy, of great credit and honour, and the difference in the strength was amazing; the length of the voyage from Russia, with the very close package that is necessary to stow that article on board of a ship, raises such a heat, as to shew evident signs of putrefaction begun, which must weaken the strongest vegetable fibres*.

To illustrate this farther in an instance of the different manner of packing and stowing seeds for a long voyage, which has lately come to my knowledge and may be of use, as it not only points out the error, but in some manner how to avoid it.

A gentleman, going to Bencoulen in the island of Sumatra, had a mind to furnish himself with an assortment of seeds for a kitchen

* This hint may be worthy of the consideration of the linen as well as the hempen manufacturers, both in Great-Britain and Ireland, as it will shew them the necessity of raising both hemp and flax, the first principles of these most useful and necessary manufactures, at home; by convincing them, from experiment, of the great difference they will find between the comparative strength of what we raise at home, and what we bring from beyond sea.

garden; these were accordingly packed up in boxes and casks, and stowed with other goods in the hold of the ship.

When he arrived at Bencoulen, he sowed his seeds; but soon found, to his great mortification, that they were all spoiled, for none of them came up.

Convinced, that it must be owing to the heat of the ship's hold, and their long confinement in putrid air, and having soon occasion to return to England; he determined in his next voyage thither, to pack them up in such a manner, and place them so, as to give them as much air as he could, without the danger of exposing them to the salt-water; and therefore put the smaller kinds into separate papers, and placed them among some clean straw in a small close net, and hung it up in his cabin; and the larger ones he put into boxes, stowing them where the free air could come at them, and blow through them: the effect was, that as soon as he arrived at Bencoulen he sowed them, and in a little time found, to his great satisfaction, that they all grew extremely well. It is well known to our seedsmen, that, even here at home, seeds kept in close warehouses, and laid up in heaps, frequently spoil, unless they are often sifted, and exposed to the air.

Seeds sowed in moist cold summers, as their juices are too watery, and the substance of their kernels not sufficiently hardened to a due ripeness, are by no means fit for exportation to warmer climates.

Our acorns, unless ripened by a warm summer; will not keep long in England: those acorns that are brought from America, and arrive early in the year, generally come in good order, owing to their juices being better concocted by the heat of their summers, and are not so apt to shrivel when exposed to the air as ours are.

These

These hints are given to shew how necessary it is to take care, that the seeds we send abroad should be perfectly ripe and dry.

One of the methods now practising in sending garden-seeds to the East and West-Indies, is to put a small piece of camphire into each parcel: as to this experiment, we are not yet certain of its success; the hint is taken from the common method of preserving butterflies, moths, beetles, and other insects, from being destroyed by very minute animalcules, which are apt to infest them.

Flowers of sulphur in water, in a certain proportion, will destroy insects that infest plants, and will rather encourage than hurt their vegetation, as appears from a method practised here with success for many years, in the culture of the ananas, or pine-apple plant, by one of the most eminent fruit and kitchen gardeners in England*. The inside of boxes and casks should be washed with

* In order to introduce the method of destroying insects that infest the ananas, or pine-apple plant, it may not be disagreeable to the reader, to know some general rules (though foreign to our present subject), that are necessary to be observed in the culture of that curious and delicate fruit.

“ The stems of the heads and suckers should not be stripped up higher than to the place where they appear white under the leaves you pull off.

“ The composition to plant them in should be three parts of strong fresh loam, and the fourth part rotten dung; they should be mixed together, and often turned, for a year at least together before it is used. The pots should be rather small than large, in proportion to the plants at all times.—The plants should be put into the stove or store-pit, and kept with a brisk heat, shading them from the violence of the sun, and sprinkled every day, or twice a day, if the weather is hot.—In a week they will have roots enough to support themselves, and should be inured by degrees to the full sun, and the oftener they are sprinkled in warm weather, the faster they will grow; but when they are sprinkled, they should be shut up close, and shaded for an hour or more; then give them air, and take away the shade. Those plants that are large, and that you design should bear fruit the next year, should be put into larger pots the latter-end of August, when some new tan should be added, and mixed up with that which they stood in till this time.—In November, the tan-bed should be turned over two-thirds of the way down, and a good quantity of new tan mixed with it, throwing away some of the rottenest, which may be separated by screening it: this will heat sufficiently to carry the plants on till January or February, when they will shew their fruit, if the fire heat is kept up as usual. As soon as the plants begin to grow in the spring,

with water that has been impregnated with sulphur; or, perhaps, the Hepar Sulphuris, or liver of sulphur, which is sulphur combined with an alkaline salt to make it soluble in water, would be more effectual: a little of this solution laid over the inside of a box or cask, with a hog's-bristle brush, would raise such a penetrating stench in warm weather, when confined, as to destroy all kind of insects. Or the casks and boxes might have brimstone burnt in them before the seeds are put in them: but the success must depend on experiment. There is great probability, that the vegetative powers of the seeds will not be hurt by the fumes of the sulphur, if we may reason from the use of it in destroying the insects in the pine-apple, and rather promoting than hurting their vegetation †.

Besides

“ they should be often sprinkled with water made a little warm only, by standing in the
 “ stove. But when the plants are in bloom, care must be taken not to wet the blossom,
 “ which would prevent the fruit swelling near so large as it would if they had been kept dry
 “ at that time.

“ In February or March, before the plants blow, the tan-bed should be turned over, and a
 “ little more new tan added to it, and all the plants that have shewed for fruit should be put
 “ into larger pots; but not to put any plants that you design to have fruit into larger pots,
 “ till they shew for fruit, nor should any of their roots be cut off; but take off all the earth,
 “ from the surface down to the roots, of those you put into larger pots. The sooner you
 “ shift your stove plants in the spring into fresh earth and larger pots the better, as it will be
 “ a means, not only of setting them a-growing early, but keeping them from fruiting. It is
 “ a practice among our nursery-men, to force the young plants in hot-beds of horse dung
 “ with a moist strong heat, which pushes them forwarder than tan-beds during their growing
 “ state, which is from March till the end of September.

“ Lest the tan in the fruiting stove should cool suddenly, either through neglect or want
 “ of judgement, it would not be improper to have a flue run zig-zag under the bottom of the
 “ tan-pit, the top of which should be level with the bottom of the tan-pit, but not to be made
 “ use of on any account, unless when the heat suddenly leaves the tan.

“ If the plants are troubled with insects, take a pound of flower of brimstone and put it into
 “ ten gallons of water, and water the plants well all over with it. This will destroy the in-
 “ sects, and promote vegetation.”—It must be remembered, that the water must be of the
 same degree of warmth with the air in the stove.

† Various kinds of pulse and grain, which I have lately received from different parts of the East-Indies, have been eaten hollow, and most of them destroyed, by a kind of very small beetle, or insect of the weevil kind.

Besides this method of destroying insects, there is another, which, for the benefit of mankind, should be generally known, particularly as most ships that pass through warm climates are infested with those disagreeable ones called cock-roaches.

The following preparation will prevent them from spoiling many valuable articles on the voyage, and perhaps be of use in saving seeds, books, and papers, which they are apt to destroy on board of ships: at the same time we shall find that this preparation is equally destructive to all other insects. Dissolve one ounce of crude sal-ammoniac in a quart of water, then put in two ounces of corrosive sublimate mercury. This solution, when used, should be first heated in the following manner: put the liquor into a phial, and set it in a tin pot of water on the fire, and when the water boils, the solution in the phial will be heated enough. N. B. The phial with the solution must be put into the water when it is cold, and then there will be no danger of breaking the phial: a piece of packthread or wire should be put round the neck of the phial, to lift it in and out of the water: it will corrode every vessel but glass; therefore it is necessary that it should be heated in the foregoing manner. You must use a hog's-bristle brush to wash over any box or furniture.

It is likewise too well known, the great damage done to wheat by this pernicious insect the weevil, which, after feeding on the inside of the grain, eats its way out: how it comes into the grain, is a consideration worthy of the attention of the philosopher.

The same observation may be made on turnip-seeds kept confined in sacks in hot weather, where the moist heat brings the animals to life. This affords us a very useful hint in regard to the black fly, as it is called, that destroys the newly-sown turnips in dry weather, just as their lobe leaves are expanded; and points out to us the probability that this little animal, which afterwards destroys the tender plant, may have existed in the seed itself; so that it is a consideration well worth the farmer's notice, to try either by fumigating his seed well with burning brimstone, or by soaking them in brimstone and water, or by dissolving a small portion of liver of sulphur in water, and steeping his seed in it, to destroy these animals. If these experiments are made with judgement, there is great probability that we shall be able to destroy the animals without affecting the vegetation of the plant.

The heating of the liquor will make it penetrate better into wood, and no insect will come near where it has been once rubbed over. If this liquor is put into the paste used in binding of books, the cockroaches or other insects will never touch them. It will likewise preserve the hair and feathers of dried specimens of birds and beasts, and the bodies of curious butterflies, from being destroyed by minute animalcules; and will be found to be an effectual remedy against bugs, and is one of the great secrets of the bug-killers. Another is a solution of corrosive sublimate mercury, dissolved in spirit of wine, and lowered with water: this leaves no stain on furniture.

As tobacco is universally known by the gardeners to destroy insects by its deleterious quality, and as tobacco-sand is to be had upon very reasonable terms, it is recommended to seedsmen to mix it up with their smaller seeds on exportation, as it may absorb their humidity, prevent their putrefaction, and destroy the insects that are in them. But it must be observed, that it is not meant here, that it will keep them from the penetrating noxious steams that arise from the ship's hold, particularly in warm climates; for I am doubtful, whether even a thin coat of wax would be a sufficient guard in that dangerous situation. And as to the larger seeds, the putting some fine cut-tobacco in small quantities loose among them, seems to carry some probability of being at least an experiment worth trying, to prevent their being destroyed by insects.

In short, the demand for our kitchen-garden-seeds would be very great, both in the East and West-Indies, if we could hit on a proper method of sending them into those warm climates in a vegetating state; so that it is well worth our attention, as an article of commerce, to try every experiment that may lead to so useful a discovery.

I hope, then, these hints may incite curious gentlemen, as well as intelligent seedsmen and gardeners, to begin a course of these
kind

kind of experiments; in the progress of which, I am persuaded, they will receive great pleasure as well as knowledge, and both do honour to themselves, and a real service to their country. But as gardeners and feedsmen, from their constant experience, must know the nature of such bodies better than most gentlemen, especially as it is their daily business; I don't doubt but that excellent and useful Society for the encouragement of arts, manufactures, and commerce, will amply reward their discoveries.

* * It may be necessary to add to the article of preserving seeds in wax, that whereas many of the valuable kinds, such as cloves, pepper, &c. are too small to be rolled up in wax separately; many of them may be inclosed in small balls of warm wax in such a manner, as to be kept from touching each other; and when the balls are cold, they may be put into melted wax, in the same manner as in the experiment to preserve oak acorns, tea-seeds, &c. in wax, before-mentioned.

The

The following Catalogue of such Plants as deserve the particular Attention of our American Colonies, are here exhibited in one View, in order to incite such Persons as have it in their Power to procure the Seeds or Plants of the most valuable of them, for this interesting Purpose.

To avoid Confusion in the Botanical Names, both the generical and specific, or trivial Names of the Plants, are set down, with the Page referred to in the celebrated Linnæus's Second Edition of his Species of Plants.

Other Authors of the best Authority are mentioned, where Linnæus is silent.

Latin Names.	2d Ed. Lin. Sp.	English names.	Observations.
Rubia Peregrina	p. 158	Turkey Madder	The first is supposed to be the same that is now cultivated in Smyrna for a crimson dye.
Rubia Tinctorum	p. 158	Dyers Madder *	
Quercus Suber	p. 1413	Cork-bearing oak	Grows in the southern parts of France, Spain, and Portugal.

* This plant is a native of the warmest parts of Europe, and is better calculated for the climate of the Floridas than either of Holland or England, where it is cultivated; but principally in the former, from whence we are chiefly supplied with this valuable dye. The chemists say, and with reason, that the warmth of the climate exalts the colour. If so, it may be well worth the attention of the publick to encourage the planting of so valuable an article of commerce in a climate and soil that seems so much better adapted to it, where the land is cheap, and where vegetation is so much quicker and more luxuriant; and while we encourage the growth of it in our colonies, we may have the advantage of manufacturing this valuable commodity at home, for which at present we pay *sums scarcely credible*, to the Dutch.

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
<i>Quercus Ægilops</i>	p. 1414	Avellanea or Valenida oak	The cups of the acorns, which are very large, used here in dying, grow in Greece and Natolia, particularly in the Island of Zia in the Archipelago, where Tournefort says they gather in one year 500 hundred weight.
<i>Quercus Gallifera</i>	Parkinson 1386	Gall-bearing oak	Galls from Aleppo and Smyrna. This oak is not yet known in England: The Acorns may be brought over in Wax, and sent to the Floridas, Georgia, and S. Carolina.
<i>Carthamus Tinctorius</i>	Lin. Sp. 1162	Safflower	Much used in dying, grows in Egypt.
<i>Rhamnus catharticus minor</i>			
<i>Rhamnus Saxatilis</i>	Lin. Sp. 1671	Buckthorns that produce yellow berries of Avignon.	Used by painters and dyers; both these plants produce berries fit for this purpose.
<i>Olea Europea</i>	p. 11	Olives of several varieties	For oil; these grow in France, Spain, and Italy. Young Plants and ripe Fruit of the French and Spanish sorts, may be brought from thence.
<i>Sesamum Orientale</i>	p. 883	Oily grain	Propagated in the Levant for oil, which does not soon grow rancid by keeping.
<i>Gossypium herbaceum</i> <i>Gossypium hirsutum</i>	p. 975	Two sorts of annual cotton	Both these kinds of annual cotton are yearly sown in Turkey, and would grow well in the warm climates of N. America, as the Floridas, Georgia, Carolina, and Virginia.

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Salsola Soda Salsola Sativa and Chenopodium maritimum	p. 323 p. 321	These kinds of glasswort for Ba- rilla	These are sown yearly in fields near the sea in Spain, for making Barilla, for soap, glass, &c.
Ceratonia Siliqua	p. 1513	Locust-tree or St. John's Bread	The pods are excellent food for hard-working cattle, and used for this purpose on the sea-coast of Spain, where they are easily propagated from seeds or cuttings.
Pistachia Vera	p. 1454	Pistachia-tree	They are propagated about Aleppo, where the female or fruit-bearing ones are ingrafted on the stocks raised from the nuts.
Pistachia Terebin- thus	p. 1455	Chio turpentine- tree	This kind of turpentine is used in medicine.
Pistachia Lentiscus	p. 1455	Mastick-tree	Gum Mastick from the isle of Scio; as this tree, common- ly called the Lentiscus, is doubted to be the genuine Mastick-tree, seeds of the true kind may be procured from the isle of Scio.
* Styrax Officinale	p. 635	Gum Storax-tree	This tree grows in Italy, Syria, and India; but the warmer climates yield the best gum.
Convolvulus Scam- monia	p. 218	Gum Scammony	Seeds of the Plant, from whence this excellent drug

* There is a resinous juice, which, by age, hardens into a solid brittle resin, of a pungent, warm, balsamic taste, and very fragrant smell, not unlike the Storax calamita, heightened with a little ambergrise, which is produced from the *Styrax aceris folio* of Ray, or *Liquidambar Styraciflua* of Linnæus, *Spec. plant.* 1418, which grows in perfection in the Floridas. This, Dr. Lewis, in his *Materia Medica*, p. 353, says, might be applied to valuable medicinal purposes.

The French, in Du Pratz' *History of Louisiana*, speak with rapture of its healing qualities, and the high esteem it is in among the Indians of Florida, on account of its infinite virtues: it is known to the English by the name of the Sweet Gum-tree, and to the French by the name of Copalm.—This is well worth the attention of the College of Physicians, as we can have it genuine, whereas the Storax from the East is often adulterated.

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Papaver Somniferum	p. 726	True opium poppy	is procured, were sent into England about 20 Years ago, from Aleppo, by the late Dr. Alex. Ruffel: it bears this climate very well, and produces seed in hot summers; but requires the warmer climates of Carolina, Georgia, and the Floridas, to make the gum-resin that flows from it a beneficial article of commerce. It is so frequently adulterated in Turkey, that, in order to have it genuine, it is well worth propagating in our colonies.
Cassia Senna	p. 539	Alexandrian purging Senna	This grows in Upper Egypt, and is brought from thence to Alexandria; it would not be difficult to procure the seeds of this useful drug.
Croton Sebiferum	p. 1425	Tallow-tree of China	This plant grows in moist places in China, and is of great use in that country.
Rheum Palmatum	p. 521	True Rhubarb	The seed of this plant was brought to England about five years ago, by Dr. Mounsey, F. R. S. from Moscow, and appears by experiment to be the genuine true Rhubarb of the shops, and is a

* The seed of this species of poppy is recommended by a physician of great eminence as proper for the same purposes in medicine as sweet almonds are used. It is observed not to have the least degree of a narcotic quality in it.

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Calamus Rotang Pterocarpus Draco Dracæna Draco	p. 463 p. 1662 Lin. Syft. Ed. 12. p. 246	Three sorts of Gum Dragon, or Dra- gon's blood	most valuable acquisition to this country, as it will grow well in a deep rich soil, in- clining to a sandy or gra- velly loam, but not in too wet a situation, and may be cultivated both here and in North-America. Mr. Ing- lish has raised this plant with so much success at his country-house at Hamp- stead, as to be able not only to produce some excellent good Rhubarb, but a suffi- cient quantity of ripe seed to make a large plantation; and at the same time has most generously bestowed a great deal of seed to be sent to our American colonies, where, no doubt, but it will prove in a few years a most beneficial article of commerce.
Dolichos Soja	Lin. Sp. 1023	A kind of kidney- bean called Daid- su	1. From a kind of cane in the East-Indies. 2. From Java and Surinam. 3. From the Canary and Madeira islands. Used for making Soye † or In- dia Ketchup. See Kæmp. Amœnitat. 837.

Laurus

† The method of preparing East-India Soye, or India Ketchup.

Take a certain measure, for instance a gallon, of that sort of kidney-beans, called Daidfu by the Japonese, and Caravances by the Europeans; let them be boiled till they are soft; also a gallon of bruised wheat or barley, (but wheat makes the blackest Soye) and a gallon of common salt. Let the boiled caravances be mixed with the bruised wheat, and be kept covered close a day and a night in a warm place, that it may ferment. Then put the mixture of the caravances and wheat, together with the gallon of salt, into an earthen vessel, with two gallons and a half of common water, and cover it up very close. The next day stir it about well with a battering machine or mill (Rutabulum) for several days, twice or thrice a day, in order to blend it more thoroughly together. This work must be continued for two or three months, then strain off and press out the liquor, and keep it for use in wooden vessels; the older it is the clearer it will be, and of so much more value. After it is pressed out, you may pour on the remaining mass more water, then stir it about violently, and in some days after you may press out more Soye.

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Laurus Cassia	p. 528	Cassia Lignea-tree	Grows in Sumatra.
Laur. Cinamomum	p. 528	Cinnamon-tree	In Ceylon, Guadaloupe, and in most of our newly ceded islands.
Laurus Camphora	p. 528	Camphire-tree*	In Japan, and in Sumatra, now in England in the green-houses about London. It will grow freely where oranges and lemons do.
Cycas Circinalis	p. 1658	Sago Palm-tree	In Java, and the warmest parts of the East-Indies.
Amyris Gileadensis	Lin. Mant. 165.	True balm of Gilead-tree †	Lately discovered in Arabia by Dr. Forskall, and described by Dr. Linnæus in a late dissertation.
Arundo Bambo	p. 120	The true Bamboo cane	Of great use in China, and might be also in our American islands ‡.
Anacardus Orientalis	Kæmp. Amœn. p. 793	Siam varnish-tree, called Ton-rak by the Japonese	The fruit of this is the Malacca bean, or marking nut, and the Oriental Anacardium of the shops. This is the common varnish of the East-Indies, as described by Kæmpfer. This tree is unknown to the botanists.

* The camphire from Sumatra is greatly preferable to that of Japan; we are not certain whether it is from a different species of tree, but it seems well worth inquiring into, as the effects of proportionable quantities in medicine are surprizingly different, perhaps it may be owing to the great difference of heat in the climates.

† We have in the island of Jamaica, a species of tree of this genus, called by Linnæus *Amyris balsamifera*. See *Species Plantarum*, p. 496. Sir Hans Sloane, in his *Hist. of Jam.* vol. II. p. 24. calls this tree *Lignum Rhodium*, from the odoriferous smell of its wood when burnt, which it diffuses a great way; for which reason he believes it to be the tree that afforded the agreeable scent which Columbus perceived on the south shore of Cuba, upon the discovery of that island, as it is mentioned by several historians.—Dr. Pat. Browne, in his *history of Jamaica*, p. 208. calls this tree white candlewood, or rosewood, and commends it much; he says it is very resinous, burns freely, and affords a most agreeable smell; and that all the parts of this tree are full of warm and aromatic particles.—*Quere*, Whether it is not worth while to extract the balsam, as it agrees so near in character and genus with that most valuable drug the balsam of Mecca?

‡ The French had brought this most useful plant from the East-Indies to their West-India islands: a few roots have been got from thence to Grenada, and will perhaps in time become familiar

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Thea	Lin. Sp. p. 734.	Tea	From Japan and China. See Kæmpfer's Amœnitates, p. 60. *
Gardenia Florida	p. 305.	Umky of the Chinese	Used in dying scarlet in China. The pulp that surrounds the seeds, gives in warm water a most excellent yellow colour, inclining to orange. See Phil. Transf. Vol. 52. p. 654. where there is an exact figure of it.

familiar in our islands. But too much pains cannot be taken in the propagation of this plant, as its uses are manifold and extensive, both in building, and all kinds of domestic instruments.

* It is asserted by some people, that the green tea and the bohea tea are two different species; but without foundation: they are one and the same species. It is the nature of the soil, the culture, and manner of gathering and drying the leaves, that makes the difference; for take a green tea-tree and plant it in the bohea country, and it will produce bohea tea, and so the contrary. This is a fact attested by gentlemen now in London, that have resided many years in China, and who have had great experience in this article.

The method of bringing over this valuable plant being already described, I shall only mention an observation of the celebrated Linnæus, who is now in possession of the true tea-tree, two of which he received from Captain Ekenberg, the commander of a Swedish East-Indiaman, in the year 1763, who raised them from seed on the voyage. This celebrated professor had tried for many years to get this curious tree into the physic-garden at Upsal; but, by a variety of accidents, they were all destroyed on the passage. At length, about the year 1755, Mr. Lagerstrom, a director of the Swedish East-India Company, brought him two plants alive to the garden at Upsal, which he had bought in China: they grew very vigorously for two years; but when they came to shew their blossom, they proved to be of that genus of plants, called by Kæmpfer Tsubakki, and by himself Camellia, Sp. Plant. p. 982. The crafty Chinese, when they sold the plants to Mr. Lagerstrom for the true tea plants, had artfully pulled off the blossoms.

Kæmpfer observes, that there is one species of Tsubakki, (see his Amœnit. Exoticae, p. 853. the leaves of which they prepare, and mix with their tea, to give it a fine flavour; and Linnæus says, that the leaves of his Camellia are so like the true tea, that they would deceive the most skilful botanist: the only difference is, that they are a little broader. In a letter, dated Upsal, November 8, 1769, he says, that he has just received from a very great person in France, a small branch of a plant, which was brought from China for the true tea; but it proves to be the Camellia. This caution is intended for captains of East-India ships, not to purchase the plants, but the fresh seeds of the tea in their capsules; which they may soon sow after they pass the Cape of Good Hope, or on other parts of the voyage as directed.

A new kind of tea-tree being this last summer brought from China, it is suspected may be a Camellia; but as that is a most elegant flowering shrub, it may be as valuable an acquisition to the gardeners as a tea-plant, considering the many tea-seeds that have succeeded lately, which have been brought home in wax, and otherways.

The late Lord Petre, of Thorndon-hall in Essex, was formerly in possession of one of these beautiful Tsubakki's, or Camellia's, which was greatly admired for the elegant brightness of its flowers. See the figure in Edwards's History of Birds, vol. ii. t. 67.

This

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Mangifera Indica	p. 290	East-India Mango-tree	This excellent fruit is much esteemed in the East-Indies, and 'tis said there is a tree of it now growing in the island of Madeira. By the description which Dr. Solander gives of this fruit, at Rio Janeiro in Brasil, it is not so good as the East-India sort.
Morus papyrifera	p. 1399	Paper Mulberry-tree	Used for making paper in China and Japan. See Kæmp. Amœnit. p. 467. This has been some time in the English gardens.
Cinchona Officinalis	p. 244	Jesuits-bark tree	This grows at Loxa in the province of Peru; and could it be obtained so as to be cultivated in our American islands, would be of infinite advantage to us.
Dorstenia Contrayerva	p. 176	Contrayerva-root	This grows in New Spain, Mexico, and Peru.
Smilax Sarfaparilla	p. 1459	Sarfaparilla-root	It is brought from the Bay of Campeachy, and the Gulph of Honduras, where it grows in plenty, and might easily be propagated in Florida.
Copaifera Officinalis	p. 557	Balsam Copaiva tree	In Brazil, and Martinico.
Toluifera Balsamum	p. 549	Balsam Tolu tree	This tree grows near Carthage, in South-America.
Hymenea Courbaril	p. 537	The Locust or Gum Copal tree, for the finest transparent varnish.	This tree is known to yield the true Gum Copal, and that the difference between this and Gum Anime, may be

Latin Names.	2d Ed. Lin. Sp.	English names.	Observations.
Jalapium Officinatum	Dale 183	True Jalap	be owing to soil and heat of climate; it grows wild in our American islands, the Moskito shore, and in Terra Firma.
Bixa Orellana	Lin. Sp. 730	Arnotto, for dying	This grows in all the warm climates of America. The French cultivate it, but what the Spaniards send is much richer in colour and more valuable.
Mimosa Senegal	p. 1506	Gum Senegal tree	This grows in Ægypt, and in Senegal.
Mimosa Nilotica	p. 1506	Gum Arabick	In Ægypt, from whence the feeds may be procured.
Ficus Sycomorus	p. 1513	True Sycamore of Zaccheus	This is reckoned the most durable timber we know. The repositories of the Mummies found in Ægypt are made of this timber.
Ficus Carica	p. 1513	Turkey Figs	Figs grow in the greatest perfection in Carolina, and would become a valuable trade if they had the method of curing them as in Turkey.

The

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Vitis Apyrena	p. 293	Currants or Corinthian grapes	The cuttings of this vine might be procured from Zant.
Fraxinus Ornus	p. 1510	Calabrian Mannã Ash *	This is worth trying in our southern colonies, where the heats are violent in the summer. It is common in our nursery gardens.
Amygdalus Com- munis	p. 677	Sweet Almonds	These would grow to great perfection in our southern colonies.
Capparis Spinosa	p. 720	Caper tree	This shrub requires a rocky soil to grow in, as it is about Marseilles and Toulon.
Punica Granatum †	p. 676	Balaustians, or the blossoms of the double flowering pomegranate	This tree would thrive extremely well in our southern provinces, and yield a profitable article in their blossoms. Plants of this kind are to be bought from most of our nursery-men.
Lichen Roccella	p. 1622	Argal, Canary-weed, or Orchell	'Tis possible this valuable plant may be found in our American islands, as well as in the Canaries and Cape-Verd islands.
Cistus Ladanifera	p. 737	Gum Labdanum	In Spain and the Archipelago.
Bubon Galbanum	p. 364	Gum Galbanum	In Ethiopia.

* There is no drug so liable to adulteration as this: and therefore, as it is a medicine so frequently in use among persons of tender constitutions, especially young children, great care should be taken to have it genuine.

† The single flowering or fruit-bearing Pomegranate, will afford the most grateful addition to the fruits of our colonies, and a valuable medicine. The ripe fruit full of seeds is to be met with at our fruit-shops in the winter season: from the seeds of such fruit this tree may be easily propagated.

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Pastinaca Opoponax	p. 376	Gum Opoponax	In Sicily.
Amomum Cardamomum	p. 2	Cardamums	In the East-Indies.
Curcuma Longa	p. 3	Tumerick	In the East-Indies.
Astragalus Tragacantha	p. 1073	Gum Tragacanth or Gum Dragon	In the south of France and in Sicily.
Cucumis Colycinthis	p. 1435	Coloquintida, or Bitter apple	In Africa
Gentiana lutea	p. 329	Gentian	In the Alps, Apennines, and Pyrenees. To be had of the nursery-men.
Similax China	p. 1459	China root	In China and in New Spain.
Pimpinella Anisum	p. 379	Anise seeds	In Egypt.
Gambogia Gutta	p. 728	Gamboge	In the East-Indies.
Quercus Coccifera	p. 1413	Alkermes oak	About Marseilles and Toulon.
Myrrha Offic.	Dale. 325	Gum Myrrh	In Abyssinia. The characters of this plant and the five following are not yet known to the botanists.
Benzionum Offic.	Dale. 303.	Gum Benjamin	In Sumatra and Java.
Ammoniacum Offic.	Dale. 119	Gum Ammoniacum	In Africa
Balsamum Peruanum	Dale. 337	Natural Balsam of Peru	In Peru.
Olibanum Thus Masculum	Dale. 348	Frankincense	In the Upper Egypt and interior parts of Africa.
Nux-Moschata Offic.	Dale. 302	Nutmegs with Mace *	In Amboyna. In

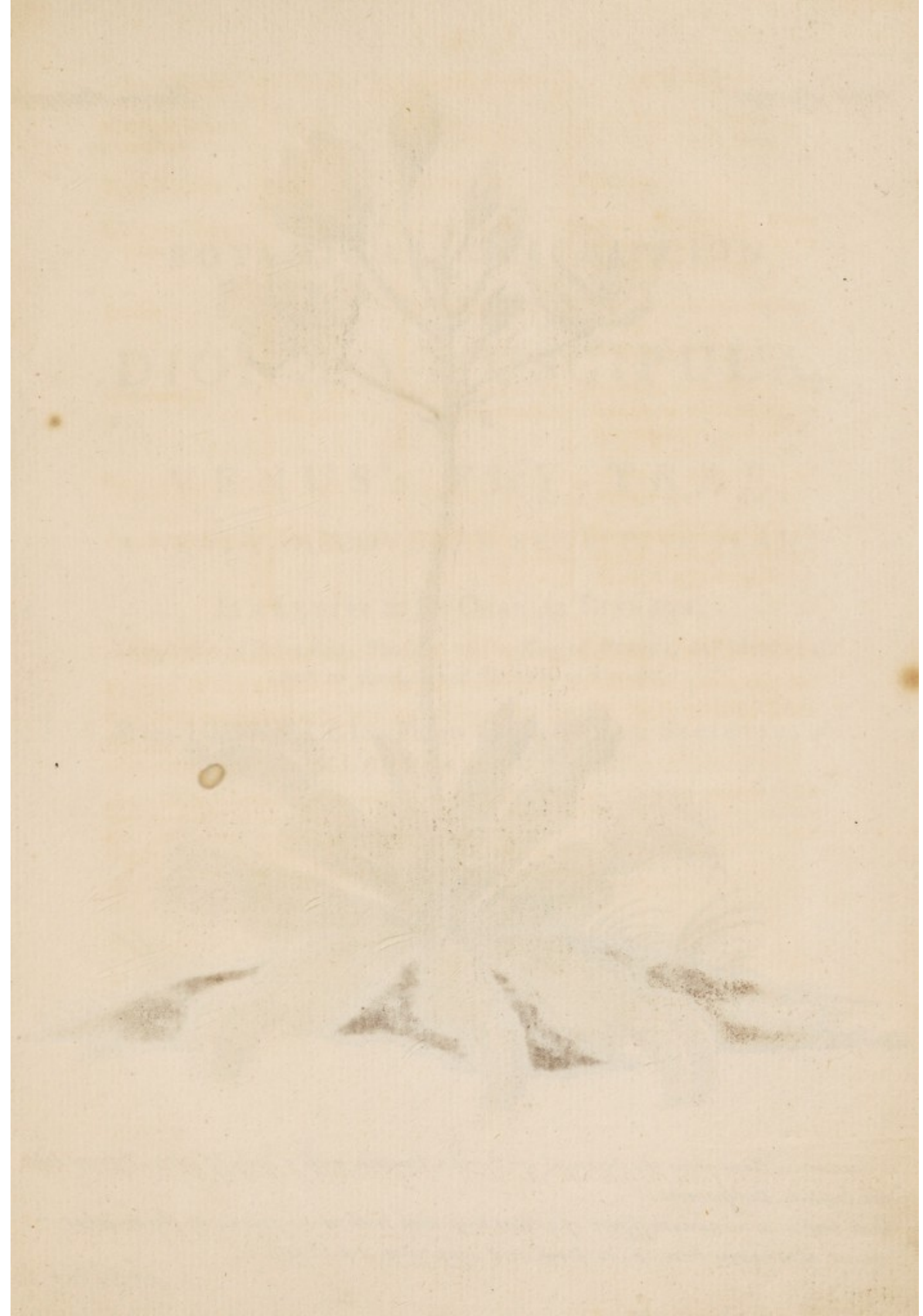
* Specimens of the Nutmeg-tree in fruit from the island of Tobago have been lately received by the Earl of Hillsborough, which his Lordship has sent, with specimens of many other curious plants,

Latin Names.	2d Ed. Lin. Sp.	English Names.	Observations.
Caryophyllus aromaticus	Lin. Sp. 735	Cloves	In the Molucca islands.
Piper Nigrum	p. 40	Pepper	Sumatra.
Garcinia Mongastona	p. 635	Mangosteens	A most delicious fruit, grows in Java, and in several parts of the East-Indies.
Lechee		Lechee of China	This fruit is highly commended by all persons who have been in China*.
Ipecacuanha	Dale. 170 Margrave 17	Ipecacuanha of the shops, or Brasilian root.	Very useful in medicine, and worthy of our attention to propagate it in our West-India islands: at present its genus is unknown to the botanists.
Ferula Assa Fœtida	Lin. Sp. 356	Assa Fœtida, or Devil's dung, called Hing in the Malay language	The gum of this plant is much used in medicine. Kæmpf. 535 and 536.

To this catalogue may be added liquorice, saffron, and aloes focotorina: of the two first we do not raise near a sufficiency at home for our own consumption, but are obliged to import those articles from Spain.

plants, for the information of the publick, to the British Museum. They are certainly of the same genus with the true nutmeg, and possibly may be improved by cultivation; the mace evidently covers them, and they have all the characters and the same leaves with the wild Nutmeg-tree described by Rumphius, in his Herbarium Amboinense, published by Burman.

* The characters of this fruit are not yet known to the botanists.



Venus's Fly-trap.

Dionaea Muscipula?



A sensitive Plant from the Swamps of North America with a spike of white blossoms like the English Lady-smock?

Each leaf is a miniature figure of a Rat trap with teeth; closing on every fly or other insect, that creeps between its lobes, and squeezing it to Death?

James Roberts sculp.

A
BOTANICAL DESCRIPTION
OF THE
DIONÆA MUSCIPULA,
OR
VENUS'S FLY-TRAP.

A NEWLY-DISCOVERED SENSITIVE PLANT:

In a LETTER to Sir CHARLES LINNÆUS,

Knight of the Polar Star, Physician to the King of Sweden, and Member of
most of the Learned Societies of Europe,

From JOHN ELLIS, Fellow of the ROYAL SOCIETIES of
LONDON and UPSAL.

A
BOTANICAL DESCRIPTION
OF THE
DIONÆA MUSCIPULA,
OR
VENUS'S FLY-TRAP,
A NEWLY-DISCOVERED SENSITIVE PLANT.

In a Letter to Sir CHARLES LINNÆUS,
Knight of the Polar Star; Physician to the King of Sweden, and Member
of the Learned Societies of Europe;
From JOHN ELLIS, Fellow of the Royal Society,
London and Paris.

London, Sept. 23, 1769.

MY DEAR FRIEND,

I KNOW that every discovery in nature is a treat to you; but in this you will have a feast.

You have seen the Mimosa, or Sensitive Plants, close their leaves, and bend their joints, upon the least touch: and this has astonished you; but no end or design of nature has yet appeared to you from these surprizing motions: they soon recover themselves again, and their leaves are expanded as before.

But the plant, of which I now inclose you an exact figure, with a specimen of its leaves and blossoms, shews, that nature may have some view towards its *nourishment*, in forming the upper joint of its leaf like a *machine* to catch food: upon the middle of this lies the bait for the unhappy insect that becomes its prey. Many minute red glands, that cover its inner surface, and which perhaps discharge sweet liquor, tempt the poor animal to taste them: and the instant these tender parts are irritated by its feet, the two lobes rise up, grasp it fast, lock the rows of spines together, and squeeze it to death. And, further, lest the strong efforts for life, in the creature thus taken, should serve to disengage it; three small erect spines are fixed near the middle of each lobe, among the glands, that effectually put an end to all its struggles. Nor do the lobes ever open again, while the dead animal continues there. But it is nevertheless certain, that the plant cannot distinguish an animal, from a vegetable or mineral, substance; for if we introduce a straw or a pin between the lobes, it will grasp it full as fast as if it was an insect.

In

In the year 1765, our late worthy friend, Mr. Peter Collinson, sent me a dried specimen of this curious plant, which he had received from Mr. John Bartram, of Philadelphia, botanist to the King. The flower of this specimen Doctor Solander dissected with me, and we found it to be a new genus; but not suspecting then the extraordinary sensitive power of its leaves, as they were withered and contracted, we concluded they approached near to the *Drosera* or *Rosa Solis*, to which they have been supposed by many persons since to have a great affinity; as the leaves of the most common English species of *Rosa Solis* are round, concave, beset with small hairs, and full of red viscid glands.

But we are indebted to Mr. William Young, a native of Philadelphia (to whom likewise the Royal favour has been extended, for his encouragement in his botanical researches in America), for the introduction of this curious plant alive, and in considerable quantities. He informs me, that they grow in shady wet places, and flower in July and August; that the largest leaves, which he has seen, were about three inches long, and an inch and half across the lobes; and observes, that the glands of those that were exposed to the sun were of a beautiful bright red colour, but those in the shade were pale, and inclining to green.

It is now likely to become an inhabitant of the curious gardens in this country, and merits the attention of the ingenious.

The Botanical Characters of the Genus *Dionæa*, according to the Linnæan Sexual System, where it come under the Class of Decandria Monogynia.

The *Calyx*, or Flower-cup, consists of five small, equal, erect leaves, of a concave oval form, pointed at the top.

The

- The *Corolla*, or Flower, has five concave petals, of an oblong, inverted-oval form, blunt at the top, which curls in at each side, and is streaked from the bottom upwards with seven transparent lines.
- The *Stamina*, or Chives, have ten equal filaments, shorter than the petals; and their tops, which contain the male dust, are roundish. This dust, or farina fœcundans, when highly magnified, appears like a tricoccus fruit.
- The *Pistil*, or Female Organ, has a roundish germen or embryo seed-vessel, placed above the receptacle of the flower: this is a little depressed, and ribbed like a melon. The style is of a thread-like form, something shorter than the filaments. The stigma, or top of the style, is open, and fringed round the margin.
- The *Pericarpium*, or Seed-vessel, is a gibbous capsule, with one cell or apartment.
- The *Seeds* are many, very small, of an oval shape, fitting on the bottom of the capsule.

I shall now give you a general description of the species of *Dionœa* before us, called *Muscipula*, or *Venus's Fly-trap*.

This plant is herbaceous, and grows in the swamps of North-Carolina, near the confines of South-Carolina, about the latitude of 35 degrees North, where the winters are short, and the summers very hot.

The roots are squamous, sending forth but few fibres, like those of some bulbs; and are perennial.

The leaves are many, inclining to bend downwards, and are placed in a circular order; they are jointed and succulent: the lower joint, which is a kind of stalk, is flat, longish, two-edged, and inclining to heart-shaped. In some varieties they are ferrated on the edges near the top. The upper joint consists of two lobes; each lobe is of a semi-oval form, with their margins furnished with stiff hairs like eyebrows, which embrace or lock into each other, when they close: this they do when they are inwardly irritated.

The upper surface of these lobes are covered with small red glands, each of which appears, when highly magnified, like a compressed arbutus berry.

Among the glands about the middle of each lobe, are three very small erect spines. When the lobes inclose any substance, they never open again while it continues there. If it can be shoved out, so as not to strain the lobes, they expand again; but if force is used to open them, so strong has nature formed the spring of their fibres, that one of the lobes generally snaps off, rather than yield.

The stalk is about six inches high, round, smooth, and without leaves, ending in a spike of flowers.

The flowers are milk-white, and stand on foot stalks, at the bottom of each of which is a little pointed bractea, or flower-leaf.

As to the culture of it: the soil it grows in (as appears from what comes about the roots of the plants, when they are brought over) is a black light mould, intermixed with white sand, such as is usually found on our moorish heaths.

Being a swamp plant, a north-east aspect will be the properest situation at first to plant it in, to keep it from the direct rays of the meridian sun; and in winter, till we are acquainted with what cold weather it can endure, it will be necessary to shelter it with a
bell-glass,

bell-glass, such as is used for melons; which should be covered with straw or a matt in hard frosts: by this method several plants were preserved last winter in a very vigorous state. Its sensitive quality will be found in proportion to the heat of the weather, as well as the vigour of the plant.

Our summers are not warm enough to ripen the seed: or possibly we are not yet sufficiently acquainted with the culture of this plant.

In order to try further experiments, to shew the sensitive powers of this plant, some of them may be planted in pots of light moorish earth, and placed in pans of water, in an airy stove in summer; where the heat of such a situation, being like that of its native country, will make it surprizingly active.

But your knowledge of universal nature makes it very unnecessary for me to say any thing further, than that I am, with the utmost regard and esteem,

Dear Sir,

Your assured friend,

and very humble servant,

JOHN ELLIS.

bell-glass, such as is a bell-glass, which should be covered with
flax or a mat in front of the glass, by this method several plants were
preserved till winter in a very good manner. In the winter season
it will be found that the plants will be preserved, as well as
the vigour of the plants.

Our journals are now being revised, to finish the history of the
we are not yet ready to publish with the contents of this class.
In order to be more complete, to show the progress of
at this time some of the plants are placed in pots of light
two or three inches in diameter, in water, in an air bath, as
found; when the plants are such a number, being that of its
nature course, will make it desirable to give.

For your knowledge in several matters make a very un-
certain for me to say, but I am sure that I am, with the
most of the plants.

Dear Sir,

Your obliged servant,

and very humble servant,

JOHN ELLIS

