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ON
WATER-LILIES

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THE
ROYAL WATER-LILY OF SOUTH AMERICA,
AND THE
WATER-LILIES OF OUR OWN LAND.

THE ROYAL WATERLILY
Victoria Regia

THE
ROYAL WATER-LILY
OF
SOUTH AMERICA,
AND THE
WATER-LILIES OF OUR OWN LAND:
THEIR HISTORY AND CULTIVATION.

BY GEORGE LAWSON, F.B.S., &c.
||

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P R E F A C E.

It is pleasing to observe, in these days of popular science, that the delightful study of Natural History, as a branch of general education, is keeping pace with the rapid progress of other departments of knowledge. Although the lovely science of Botany has not yet assumed an entirely popular form, suitable for all classes, still, much has recently been done to render it attractive, to extend its influences, and to encourage the taste for its study; and the author of these pages feels a gratification in contributing his mite to this department of literature.

The object of the present work is to place before the general reader a popular, yet full and accurate, detail of the history of the most magnificent of all plants, the Royal Water-Lily of South America; together with an account of those less gorgeous, but not less interesting, species that adorn the Lakes and Rivers of our own land.

In the popularisation of Botany, the author is well aware that those efforts are most likely to meet with success which are directed towards the elucidation of our native Flora; and he has accordingly dwelt at some length on this part of the subject.

Although written in a style calculated to engage the attention of the general reader, it is confidently hoped that the work may likewise prove a useful Manual to the cultivator, and be found worthy of perusal by the scientific botanist.

November, 1850.

INTRODUCTORY OBSERVATIONS.

WHILE the dry land is richly clothed with an innumerable array of vegetable forms, each suitable for the region assigned to it by Nature—the gorgeous Orchid luxuriating in the humid shade, and the noble Palm waving in the warm breeze, of the tropics, while a race of more humble productions beautify the meadows and mountains of our northern isle—so, in like manner, the unfathomable ocean, teeming with life, is abundantly furnished with its myriads of peculiar plants, capable of existing in the watery element alone, and often exhibiting a beauty and delicacy of structure totally unknown among the more familiar tribes, which compose the “carpet of flowers and of verdure spread over the naked crust of our planet.” The oceanic vegetation, moreover, frequently displays the brightest and the freshest hues, rivalling the magnificent and lovely productions of the tropical Flora; and the illustrious Humboldt bears witness that, at the depth of 205 feet, the lead brought up sea-weed “green as grass.” The Sargasso Sea, as it is called, presents floating oceanic meadows of the gulf-

weed, "extending over a surface almost seven times greater than that of France," and a single stem of *Macrocystis pyrifera* of the Pacific has been found to attain the length of 1500 feet, while the *Chorda Filum* of the British seas extends to 40 feet. Even "our land-forests do not harbour so many animals as the low, wooded regions of the ocean, where the Sea-weed rooted to the shoals, or long branches of Fuci, detached by the force of waves or currents, and swimming free, upborne by air-cells, unfold their delicate foliage." Well, indeed, may the botanist exclaim, in the language of the poet—

"Oh, what an endlesse worke have I in hand,
To count the Sea's abundant progeny!
Whose fruitfull seede farre passeth those in land,
And also those which wonne in the azure sky.
For much more eath to tell the starres on hy,
Albe they endless seem in estimation,
Then to recount the Sea's posterity;
So fertile be the flouds in generation,
So huge their numbers, and so numberlesse their nation."

But, besides the numerous family of Ocean Flowers, which, in vast congregations, form the meadows and the forests of the deep, and often fringe our rocky shores, and line with their delicate tapestry the dreary caverns at the bottom of the sea, there is a large class of Aquatic plants, whose foliage and flowers float upon the surface of the water in our lakes and rivers, and in whose structural characters

and general appearance we readily trace remarkable similarities with those of the phanerogamous vegetation of the dry land. The curious *Vallisneria* (the female blossoms of which reach the surface of the water by means of a spirally elastic stalk, and are impregnated by the male becoming detached from the bottom, and floating to the surface, likewise, at maturity) is an example of aquatic vegetation well known to every one who has been in the habit of reading botanical books; and the no less curious *Pontederias*, remarkable from the inflated leaf-stalks which float them in the water, are equally well known. In our own country, the various species of *Potamogeton* are perhaps the most prevalent aquatics, several of them being extremely common, often completely covering the surface of the stagnant pond, or the purer waters of the pellucid lake. The *Ranunculus aquatilis* is also common in pools or gentle streams, clothing them with a turf-like verdure, and exhibiting a lovely array of pure white blossoms in early summer time; and the *Butomus*, not unfrequent in the English lakes, though a rare plant, and, at best, an introduced one to Scotland, is peculiarly interesting to the few who still cling to the Linnæan method, from the circumstance of its being the only British representative of the class *Enneandria*. To botanists of the present day, a recent addition to our Aquatic Flora, the *Anacharis*, is highly curious, having only been recognised as a British genus within

the last few years, and subsequently found in the utmost profusion in many of our waters, more especially in England, where, if it be not really indigenous, it has become so abundant, and proved so troublesome, as to require removal by dredging. It is a near ally of the *Vallisneria*.

But by far the most beautiful tribe of Aquatic plants is the Water-Lilies—those lovely Naiads that adorn the lakes and rivers with their ample foliage, in tropical as well as temperate lands, and, raising their gorgeous flowers with the morning sun, recline them

“In graceful attitudes, to rest,”

as the god of day sinks in the western horizon. These plants are arranged by botanists into the Natural Order *Nymphæaceæ*; but the name of Water-Lily is often extended to an allied family, the *Nelumbiaceæ*.

The natural order, *Nymphæaceæ*—which derives its name from its members, nymph-like, inhabiting the waters—although entirely composed of plants holding no higher station than that of “aquatic herbs,” is, nevertheless, at once one of the loveliest and one of the most interesting tribes of the whole Vegetable Kingdom. The expansive and verdant foliage of the *Nymphæas*, floating gracefully upon the surface of the water, render them highly conspicuous as well as pleasing objects in the pure element which they inhabit, while their truly splendid blossoms of pure white, delicate rose, bright yellow,

or, as in the Cape species, of a lively blue, and often deliciously odoriferous, form additional charms. In geographical distribution, the species chiefly abound in the northern hemisphere, being of much rarer occurrence in the southern; sometimes they inhabit the obscure stream or more noble river, and at others enjoy the seclusion and retirement of the still and placid lake—

“Crowning the depths as with the light serene
Of a pure heart.”

The true and natural position of the Nymphæaceæ, or Water-Lilies, in the Natural System of Classification, is by no means very clearly determined, and has given rise to great differences of opinion among scientific observers. Indeed, so ambiguous is the peculiar structure of these plants, and so different are the conclusions arrived at by those vegetable physiologists who have given the subject their close attention, that the Nymphæas have been considered by some to belong to the class of Endogens, while the general opinion of the present day shows a decided tendency to rank them in the other important class of flowering plants, the Exogens. Lindley assigns them a place in the latter class, although it seems only from the paucity of correct information elucidated concerning them, and the unsatisfactory results which have followed the arduous labours of other botanists, that he is “not prepared to disturb existing arrangements.” In a volume like the present, ad-

dressed to a popular audience, it would be out of place to enter upon a discussion of this purely physiological question; and we cannot do better than refer the scientific reader to that important work, the "Vegetable Kingdom," for an extremely concise yet comprehensive view of the various opinions embraced by different botanists regarding the true character and position of the *Nymphæas*.

To these plants, various properties have been attributed which, in the present day, are not by any means generally recognised, and Dr Wight has suggested that they may have originally arisen, as in many similar instances, from the circumstance of the plants inhabiting the "cool and placid waters, combined with the chaste whiteness of their flowers." However, the roots, as well as the seeds, of all the species abound in starch; and, though not now in so very high repute among the natives of the various regions they inhabit, they were, in the earlier ages, more especially in the East, valued as wholesome food. Even in the present day, some of the species are used to a considerable extent. The seeds of *Nymphæa rubra*—a magnificent Indian species, of frequent occurrence, inhabiting the fresh-water pools and gently-flowing rivers—are used by the natives, and considered wholesome—the roots, however, being only resorted to in times of scarcity or famine. Various other species afford food to the aborigines of the tropics, the seeds being manufactured into

bread; and Sloane records, in his "History of Jamaica," that the Egyptians ate the juicy stalks in the heats, and made use of the leaves and flowers "for hot pains, as, likewise, the oils, which are used in want of sleep." But *N. esculenta* seems to be esteemed above all others for food by the natives of the East—the tuberous root, or rhizome, being the portion used. The *Nymphæas* are also applied to other purposes; and the author we have just quoted also tells us, that in Florida, on one occasion, the Indians being surrounded in a lake by the Christians, they, the former, endeavoured their escape in the night with Water-Lily leaves on their heads. The *N. Lotus*—which is used for food in the form of bread, the roots being also eaten—is a famous plant in ancient history, and known under the name of *Lotus*. It is still held sacred in the East; and it is related that a native of Nepaul, upon entering Sir William Jones's study, made prostrations before flowers of this plant, which happened to lie there for examination. The celebrated *Lotus* meets not with the same respect in Hungary, for there the roots are given to hogs. It is stated, that in some districts of that country this Water-Lily may be seen on every stream; and it has been observed to flourish in the hot springs, at a heat equal to 95 deg. of Fahrenheit.

But the *Nymphæa Lotus* is not the only plant to which the name of *Lotus* has been applied; on the contrary, it is now pretty generally believed that

another and more magnificent Water-Lily—the *Nelumbium speciosum* of botanists—is the true Lotus of the ancients—that “Mythic Lotus,” as Lindley says, “which so often occurs on the monuments of Egypt and India.” Indeed, it has been suggested that the name originally belonged to some kind of bean, or other leguminous plant, common in Greece, and was subsequently applied to the *Nelumbium* and other Water-Lilies, on account of the similarity of their seed, just as our English voyagers give the names of Apples, Pears, and Gooseberries, to such tropical fruits as bear an apparent resemblance to the produce of their own country, and as Herodotus had long before, in describing the same plant, called it a rose-coloured Lily. Certain it is, that various Water-Lilies, but chiefly the *Nymphæa Lotus* and *Nelumbium speciosum*, were recognised by the name of Lotus, and held in great esteem by the ancient Egyptians, for we find that the blossoms “crowned their columns, were sculptured on their temples, and associated with their gods.” The Egyptian Bean of Pythagoras is generally referred to the fruit of the *Nelumbium*.

This plant, although once abundant on the Nile (from its association with which it derived its becoming name of “Rose of the Nile”), and described by Theophrastus as occurring spontaneously, as well as where cultivated, is not now an inhabitant of the “father of rivers.” It is supposed to have

been originally introduced to Egypt, and cultivated there. The ancient Egyptians had a highly curious mode of sowing the seeds of this plant, and the gardeners of the present day may perhaps take a lesson from them. The seeds were planted in balls of mud or clay, mixed with chaff, and when thus cast upon the waters, sunk immediately to the bottom into a bed suitable for their germination. Dr Royle mentions that this mode of sowing is to the present day practised by certain tribes in the Indian Peninsula; and it has been instanced as a beautiful illustration of the passage in the sacred writings—Cast thy bread upon the waters, and thou shalt find it after many days.

The *Nelumbium* is that “holy and beautiful plant often met with in the religious ceremonies of the Hindoos, under the Sanscrit name *Padma*.” It has long been considered one of the most splendid Aquatics which inhabit the Eastern waters. Its lovely pea-green leaves, when in a young state, float upon the water; but at a more advanced stage, and when the plant is in flower, they are raised upon the stalks above the surface. The leaves measure nearly two feet in diameter, and afford resting-places for various members of the animal kingdom. “Snakes slumber on the floating leaves of *Nelumbium speciosum*, and aquatic birds, especially the long-toed Chinese Jacana, trip gracefully over them, and sometimes build their nests in the cavities.” In the

East, the *Nelumbium* is especially to be seen on those lakes which resist the drought of the hot season. The large blossoms—nearly ten inches in diameter at full expansion, and produced, in some parts, throughout the entire year—are described by all who have seen them in their native waters to be of the most gorgeous character, although almost destitute of odour. In the words of Roxburgh, the flowers are “large and beautiful beyond description, particularly in the rose-coloured varieties. . . . In China, there is a still more beautiful bright crimson variety, which they call *Hung-lin*,” and which has been stated to be edible. This plant seems to supply the natives of India both with food and dishes from which to eat it. The seeds, and likewise the tender shoots of the roots, are made use of by them as an article of diet, while they use the large leaves instead of plates, from which to take their food. The spiral vessels which Dr Wight has observed to abound in the *Nelumbium*, are carefully collected, and form those wicks, “which, on great and solemn occasions, are burnt in the lamps of the Hindoos, placed before the shrines of their gods.”

The *Nelumbium*, or Rose of the Nile, must not be confounded by the non-botanical reader with a very different plant, often cultivated in our greenhouses under the names of Lily of the Nile and *Æthiopian Lily*. This is the *Calla Æthiopica* of Linnaeus, the *Richardia Africana* of modern botanists,

and has no structural affinity with any of the other plants known as Lilies and Water-Lilies. It belongs to the natural order Araceæ, the Arum Family—being associated with the Cuckoo-pint, or Wake-Robin of our woods (from the root of which plant Portland Sago is prepared), the tongue-swelling Dumb-cane, and the Acorus Calamus, or Sweet Flag. The Richardia is easily cultivated, either in the greenhouse or in the dwelling-house window—a plentiful supply of water being all that is necessary to insure its success. It has been observed, that when the Calla has too much water given it, this will distil away in drops from the tapering points of the leaves, perfectly limpid, and of an acrid taste. It requires to be grown in a pretty large pot, so that its roots may have plenty of room; and, where it can be done, the plant will grow all the better if the pot is plunged into a tub, or cistern of water. The Æthiopian Lily grows very well throughout the summer season in the open air pond, and, where entirely covered with a depth of water sufficient to place its roots beyond the reach of frosts, is said to stand over the winter, and thrive well as a permanent out-of-door Aquatic. Its arrow-shaped, upright leaves, elevated above the water on long stalks, and the large pure white spathe which it produces, render the Richardia an object of great beauty, and point it out as a fitting companion on the lake, but more especially on the artificial pond, for the Great White Water-Lily of our own

land. As a greenhouse plant, it flowers in the winter and early spring months.

It is a well-known fact in botanical geography, that the vegetation of tropical regions far surpasses in splendour the more modest forms of vegetable life that are found in the cold and temperate regions of our globe. This is, however, only a general rule; and, like many general rules in natural science, has its exceptions. In the case of marine Algæ, and other productions inhabiting the ocean, we find that latitude has a very weak influence in varying their form and appearance—the briny element being of much more equable temperature, throughout the different regions, than the atmosphere and the earth's surface. To some extent, this may likewise, in some instances, hold good with respect to lacustrine vegetation, which, in our own country, assumes a comparatively luxuriant aspect; but, on the other hand, we find that those tropical aquatics and semi-aquatics, whose habitats are on the margins of rivers and in shallow waters, often assume a luxuriance and splendour scarcely to be met with in other tribes, and such is especially the case with the magnificent family of Water-Lilies, some of which have, ever since the earliest days of botanical science, been universally acknowledged to be the most splendid of plants.

We accordingly find that the Water-Lilies of our own land are not so brilliantly adorned as the species

of the tropics, where the necessary conditions for the full development of a luxuriant vegetation are always present; yet the Naiads of our own northern waters are, in their own modest way, exquisitely beautiful, and have many and strong claims upon the attention of the botanist and the cultivator. Their peculiarly pleasing aspect, in complete accordance with the character of our lake scenery, recommends them to the especial notice of the landscape gardener, while their easy cultivation ought to induce their introduction into every garden or pleasure-ground where a sufficient supply of pure water is at command. Few aquatics can be so easily managed, in the open air pond; few present a more lovely appearance; and certainly none equal them in interest. Highly as we regard the important discoveries of the naturalists of our day, we do think that a decided tendency is evinced by the horticulturists of the present age to overlook the indigenous productions of our own, in the eager desire for the novelties of other more favoured lands. While we can fully appreciate the value resulting to science from the researches of botanical travellers, we would have it be borne in mind that our native Flora ought not to meet with undeserved neglect; for many more of our British Wild-flowers, besides the Water-Lilies, claim our attention. True, indeed, they are not the gayest nor the brightest flowers in the world. Humble in growth and modest in colouring,

they often seek to shun the vulgar gaze beneath the overhanging woodland bough, the shady rock, or the long green grass of the meadow. But as the gorgeous blossoms of tropical lands give to tropical scenes much of their grandeur and beauty, so many of the gentle flowers of our northern land come forth from their shy retreats to deck the merry plains of old England, and to begem the "land of brown heath" with brighter beauties than the poet dreamt of while depicting her features of stern grandeur. If the southern forest can boast of its tree ferns rising in stately majesty, o'ertopped by the towering Palm, and of the less grand, but not less lovely, productions that luxuriate in the deep shade, or festoon the branches of every tree, can we not point the finger of admiration to the golden glow of our summer fields—the glory of our shady dells, brightly blue as the heavens o'er our head with Harebells and Forget-me-Nots—or, with a prouder feeling still, can we not direct the eye to our lofty mountains covered far and wide with their mantle of bright purple Heather, with here an Oak, and there a Pine-forest waving in the mountain-breeze, and sheltering beneath their rough boughs many a modest gem of loveliness, linked in its associations with the finest feelings of the human heart? Beautiful in their lowliness, the humble wild-flowers claim our warmest sympathies; they are the dear things that adorn our native land, the remembrancers of many a hallowed scene, and of many a

long-cherished love and friendship. In an especial manner are they entwined around our hearts; *they* have a "soul in every leaf," and we call in their aid to give expression to the highest and holiest emotions and feelings of our nature. The poets have lavished on them many a line of praise, and adorned with their fragile forms many a tale of love and innocence, joy and sorrow; and even the botanist often cherishes them as dearer than the bright and beautiful blossoms that unfold beneath the sunny Indian sky.

"Beautiful flowers! to me ye fresher seem
From the Almighty hand that fashioned all,
Than those that flourished by a garden wall."

THE ROYAL WATER-LILY—VICTORIA REGINA.*

“ A fair imperial flower;
She seem'd design'd for Flora's hand,
The sceptre of her power.”—COWPER.

MAGNIFICENT as the entire family of Water-Lilies are, and sacred as many of them have long been held by the natives of those tropical countries wherein they abound, the plant whose history we are about to detail far outstrips all previously-discovered species, in its gigantic size and nobility of aspect. Without doubt, it is the most extraordinary and most gorgeous member of the Vegetable Kingdom, surpassing even the far-famed *Rafflesia* of Sumatra, whose flower has been calculated to weigh fifteen pounds, and is of dimensions sufficient to enable it to hold twelve pints of water!

In general habit and mode of growth, the Royal Water-Lily resembles the rest of the *Nymphæaceæ*; but surpasses all other species in its gigantic proportions and the splendour of its blossoms. Al-

* See plate facing title-page.

though suspected by some, when first brought to this country, to be an annual, the plant has satisfactorily proved itself to be of a perennial character; the thick brown rhizome, buried in the mud, preserves vitality for a long period, the process of decay going slowly on at its base, while its upper and younger part continues development, and year after year produces an abundant supply of fresh foliage and flowers—a constant growth of adventitious roots going on at the same time to supply the place of the old ones lost from time to time by the gradual decay of the tuber. The plant generally grows where there is a depth of about six feet of water at the flowering season—the water rising considerably higher in the wet season during inundations, and thus adding greatly to the luxuriance of the plant and the size of its leaves. The leaves always float on the surface of the water, being produced from long prickly petioles or stalks, springing from the root, and which are inserted in the centre of the leaf, the latter being thus *peltate* or shield-like. It will be observed, from the drawing of the plant, that the leaves are of a roundish oval shape, their margins being turned up all round, exhibiting the purplish hue and prickly ribs, with which their undersides are so abundantly furnished. These turned-up margins give to the leaves a very peculiar appearance, and botanists describing them have been led to liken them to various objects; but perhaps

Mr Spruce's comparison of them to tea-trays is as apt as any with which we have met. They are gigantic tea-trays, however, often-attaining the size of six or seven feet in diameter, and our astonishment at their dimensions is not lessened when we recollect that they are the leaves of a Water-Lily. Mr Henfrey, in the "Gardener's Magazine of Botany," describes the leaves as clothed with short spongy pubescence, with very prominent flattened ribs radiating from the centre to the circumference, and progressively diminishing in depth; "these are united by cross ribs, also vertical plates, and the latter again by less elevated ones crossing them, so that the under surface is completely divided into quadrangular chambers, of which the ribs form the sides, and the general surface of the lamina the top; and as these detain air within them, they act as floats. All the ribs are more or less beset with spines, varying in length, sharp and horny, enlarged at the base." The magnificent blossoms of the plant are not less wonderful than the leaves, and measure about sixteen inches in diameter. The flower expands its array of pure white petals in the afternoon, exhaling a delicious odour; closes them on the forenoon of the following day, on which day they are again fully expanded, when they present a most gorgeous appearance. The flower eventually closes about ten o'clock the same evening, and withdraws beneath the surface of the water to ripen the

fruit, in the spongy substance of which the seeds are imbedded.

The Royal Water-Lily forms a highly conspicuous object on the lagoons and still shallow bays which so frequently occur on many of those immense rivers tributary to the Amazon. It has been observed to occur in equal profusion in similar localities on the comparatively still waters of the La Plata and Essequibo; and, from the scanty knowledge which botanists have obtained of the productions of the interior of South America, it is exceedingly likely that future research may be instrumental in showing this Queen of all the Lilies to be very generally distributed over considerable tracts of the eastern portion of the Continent. No traces of it have hitherto been observed towards the western parts of South America, and its discovery there is not anticipated by botanists—the accuracy of Hooker's suggestion being very generally acknowledged, that the rapidity of the rivers which flow into the Pacific may be the means of preventing its occurrence there, its massive and tender foliage and flowers requiring peaceful waters for their development. In speaking of this Royal Water-Lily, Professor Lindley says—“An undoubted addition to a tribe of plants, at once so beautiful and so circumscribed as that of the Nymphs, or Water-Lilies, would be an event of interest, even if it only related to a distinctly-marked species of some well-known genus. But when the

subject of the discovery is not only a new genus, but a plant of the most extraordinary beauty—fragrant, and of dimensions previously unheard of in the whole Vegetable Kingdom, except in the colossal family of Palms—an interest must then attach to it which can rarely be possessed by a novelty in natural history. Such a plant is the subject of the following notice—a Water-Lily, exhibiting a new type of structure, of the most noble aspect, of the richest colours, and so gigantic, that its leaves measure above eighteen feet, and its flower nearly four feet in circumference.” *

The honour of first making known this magnificent production to the world, in accurate scientific description, having fallen to our own country, it was thought that a better name could not be chosen for the fair and noble plant than that of *Victoria Regina*—a name given in honour of our illustrious Queen, “who at once sways the sceptre of her happily-united kingdom, and pre-eminently so that of the element which this plant inhabits.” Certainly, no other plant has better claims to a royal name, for this is verily the *Queen of Flowers*. Agreed as British botanists universally are of the propriety of dedicating this plant to our Sovereign, a good deal of discussion has taken place in regard to the correct and first-published name. From a careful and apparently correct inquiry into the nomenclature of the Lily, by Mr

* Botanical Register, Miscellaneous Notices—1838—p. 9.

Gray (Annals of Natural History, vol. vi., second series, 146), it seems pretty evident that the original and first published name of the plant is *Victoria Regina*, and that the name of *Victoria Regia*, which has of late been so very generally adopted, is not only of more recent origin, but apparently the result of a typographical error. After detailing the various circumstances that have given rise to the different names which have been applied to the plant by English botanists, Mr Gray goes on to say—"I think that this account proves that the name of *Victoria Regina*, which received the sanction of her Majesty, was the one first used and published, and has the undoubted right of priority; and, I must add, as a personal disclaimer, that I have always considered that both the generic and the specific name properly belonged to Mr (now Sir Robert) Schomburgh, for it was he who proposed that the plant should be dedicated to the Queen [originally under the name of *Nymphæa Victoria*], and the slight alteration made in his paper, before it was read at the Botanical Society, was caused by our having the means of comparison in London which he had not at Berbice, and was regarded by me as a simple act of friendship, such as was due to a person in his situation."

The Lily is known by the natives of the districts where it is found under different names, such as *Mururá*, *Irupé*, *Yrupé*, *Moringua*, and *Dachocho*.

This noble production of the South American waters, from its extraordinary and conspicuous appearance, could not fail to attract the early attention of the native Indians, who inhabit the districts of country where it is produced. No doubt, its large floating leaves, which entirely cover the lakes and streams (and to which the name of Irupé is given, from their resemblance to the dishes used for holding water), must have often proved a source of annoyance in the navigation of the rivers where the plant abounds; and, indeed, the aborigines of some districts, at least, are under the belief that the large prickles with which almost the whole plant is so abundantly provided, are of a venomous nature, and thus they refrain from coming into contact with them—a precaution which no European observer of this magnificent production seems ever to have thought of observing, while no evil consequences seem to have followed the scratchings to which botanical collectors have submitted themselves, in their eagerness to possess specimens. Cautious, however, as the Indians are in their intercourse with this magnificent spinous Aquatic, they often manage to possess themselves of its large fruit, half the size of a man's head, for the sake of the numerous dark-coloured seeds—not so large as those of tares or lentils—which it contains. Although hard and shining on the outside, these seeds are quite soft and mealy within, and the Indians use them as an article

of food, for which they are in great esteem. The difficulty of obtaining the rhizome, or root, no doubt prevents its being applied to similar purposes, for which it is probably as suitable as those of the edible *Nymphæas*, or Water-Lilies, to which we have already referred.

But long as the *Irupé* has been familiar to the native Indians dwelling on the banks of those rivers wherein it has its home, and well known as it has been to them as an economical plant, yet, so far as the civilised family of mankind and science were concerned, it was long doomed to

“Blush unseen,

And waste its sweetness on the desert air.”

It does not appear very evident to whom we are to accord the honour of the first discovery of this magnificent Aquatic, for various candidates are in the field. It would seem, however, that Hænke, the famous but unfortunate botanical traveller, was the first European botanist to meet with this vegetable wonder; he found it in the marshes by the side of the Rio Mamoré, one of the great tributaries of the Amazon, and his observations are detailed in M. D'Orbigny's remarks, afterwards quoted. The date of the discovery, although not precisely stated, must have been about the year 1801. But it was even long after that before any detail of the plant's history was given to the world, and, indeed, before European botanists knew of its existence—the first

full account drawn up being that by Professor Lindley, in 1837, of which a few copies only were privately printed. Even the earliest mention of the plant in print, according to Hooker, was in 1832, in "Froriep's Notizen," wherein it is described as a new species of *Euryale*, under the name of *E. Amazonica*. So little did European botanists recently know of this vegetable prodigy, that even Lindley, in the "Natural System of Botany," published in 1836, then spoke of the Nymphæaceæ as generally rare in the southern hemisphere, and *entirely unknown on the continent of South America*. Since Hænke's time, the observers of the Victoria Lily in her native waters have not been few; and scarcely have they been less enthusiastic in their admiration of the wonderful plant than was that botanist, who, we are told, fell upon his knees, in a transport of admiration, on seeing it, and fervently expressed aloud his deep sense of the power and magnificence of the Creator in his works! In fact, every succeeding observer sees in this plant some new beauty to admire which former travellers had not perceived; and we shall therefore detail the observations of the various discoverers of the Lily in her native habitats, as nearly as possible in their own words; for it is impossible to convey any adequate idea of the magnificence of the plant without adducing the concurrent testimony of those who have seen it in its native grandeur.

In the year 1827, M. A. D'Orbigny discovered this vegetable wonder on the river Paraná, at a part of this "majestic stream" nearly a league in breadth, although distant 900 miles from its junction with the Rio Plata. He communicated specimens, along with his other collections, to the Museum of Natural History at Paris, in the same year. He gives a very interesting account of the Victoria Water-Lily, and also of another allied plant, which he supposes to be a distinct species, although we feel more inclined to follow the general opinion of botanists in considering it a variety only, more especially since Mr Spruce has recently observed different flowers from the same root, varying in their appearance, and uniting the characters of *Victoria Regia* and M. D'Orbigny's second species, for which he proposes the name of *Victoria Cruziana*. To the "Botanical Magazine" are we indebted for M. D'Orbigny's remarks in English dress, and these are withal so interesting, besides containing almost all the information that is known concerning the supposed *second* species, that we must introduce them here at full length. He says: "If there exist in the animal kingdom creatures whose size, compared with our own, commands admiration by their enormous stature; if we also gaze with wonder on the giants of the vegetable kingdom, we may well take especial pleasure in surveying any peculiarly wonderful species of those genera of plants which are already known to us only in more moderate dimen-

sions. I shall endeavour to express not only my own feelings, but those of MM. Bonpland and Hænke, for we were all alike struck with profound emotion on beholding the two species of *Victoria* which form the subject of this note. For eight months I had been investigating, in all directions, the province of Corrientes, when, early in 1827, descending the river Paraná, in a frail pirogue, I arrived at a part of this majestic stream, where, though more than 900 miles distant from its junction with the Rio Plata, its breadth yet nearly attained a league. The surrounding scenery was in keeping with this splendid river; all was on a grand and imposing scale, and being myself, only accompanied by two Guaraní Indians, I silently contemplated the wild and lovely view around me; and I must confess that, amid all this watery waste, I longed for some vegetation on which my eye might rest, and longed in vain! Ere long, reaching a place called the Arroyo de San José, I observed that the marshes on either side the river were bordered with a green and floating surface; and the Guaranís told me that they called the plant in question "Yrupé," literally water-platter, from *y*, water, and *rupé*, a dish. Its general aspect reminded me of our *Nénuphar*, belonging to the family *Nymphaeaceæ*. Nearly a mile of water was overspread with huge round-margined leaves, among which shone, sprinkled here and there, the magnificent flowers, white and pink, scenting the air with their

delicious fragrance. I hastened to load my pirogue with leaves, flowers, and fruits. Each leaf, itself as heavy as a man could carry, floats on the water by means of the air-cells contained in its thick projecting innumerable nerves, and is beset, like the flower-stalks and fruit, with long spines. The ripe fruit is full of roundish black seeds, white and mealy within. When I reached Corrientes, I hastened to make a drawing of this lovely Water-Lily, and to show my prize to the inhabitants; and they informed me that the seed is a valuable article of food, which, being eaten roasted like maize, has caused the plant to be called Water-maize (*Maïs del Agua*). I afterwards heard from an intimate friend of M. Bonpland, the companion and fellow-labourer of the famous Humboldt, that having visited accidentally, eight years previously to my visit, a place near the little river called Riochuêlo, he had seen from a distance this superb plant, and had well-nigh precipitated himself off the raft into the river, in his desire to secure specimens, and that M. Bonpland had been able to speak of little else for a whole month. I was so fortunate as to get dried leaves, flowers, and fruits, and also to put other specimens in spirits; and about the end of 1827, I had the delight of sending them, with my other botanical and zoological collections, to the Museum of Natural History at Paris. Five years afterwards, when travelling in Central America, in the country of the wild Guarayos, a tribe of Gua-

ranis, or Caribs, I made acquaintance with Father La Cueva, a Spanish missionary, a good and well-informed man, beloved for his patriarchal virtues, and one who earnestly devoted himself to the conversion of the natives. The traveller, after spending a year among Indians, may easily appreciate the pleasure of meeting with a human being who can understand and exchange sentiments with him ; and I eagerly embraced the opportunity of conversing with this venerable old man, who had passed thirty years of his life among the savages. In one of our interviews, he happened to mention the famous botanist Hænke, who had been sent by the Spanish government to investigate the vegetable productions of Peru, and the fruit of whose labours has been unfortunately lost to science. Father La Cueva and Hænke were together in a pirogue upon the Rio Mamoré, one of the great tributaries of the Amazon river, when they discovered in the marshes, by the side of the stream, a plant which was so surpassingly beautiful and extraordinary, that Hænke, in a transport of admiration, fell on his knees, and expressed aloud his sense of the power and magnificence of the Creator in his works. They halted, and even encamped, purposely near the spot, and quitted it with much reluctance."

Well, indeed, might Hænke feel a deep sense of the power and majesty of the Almighty God of nature, while beholding the bright blossoms of this extraordinary flower ! Well might he be called to his

knees to acknowledge and to worship the Great Creator ! Too few, alas ! go to see the wonders of the deep with that devout and fervent feeling of reverence towards their Supreme Author, which so well becomes the scientific naturalist, and in the absence of which he can see but the dim shadows of those glories in the great temple of nature that are meant as the heavenly monitors of man. Not a flower of the field, not a leaf of the forest, not a twinkling star in the innumerable host of heaven, but proclaims, in language that "he who runs may read," a thousand messages of heavenly wisdom ; and he who cannot see the traces of the Almighty's hand in the humble blade of grass, and the dewdrop that glitters in the morning beam, need not go to foreign lands to discover Him in the more majestic forms of His handiwork. Hænke could not be filled with a deeper sense of the Divine presence when on his knees before the magnificent Water-Lily, than was the weary traveller in the African desert, when his eye met the hope-inspiring little moss, which gave him hope in God. Linnæus, also, the great father of Natural History, when he first beheld the bright glow of the English furze, instinctively fell upon his knees in profound admiration of the lovely plant, and breathed in spirit, if not in words, a devout and holy prayer of thankfulness to God, under a deep feeling of gratitude for the bountiful manner in which His creating hand had adorned the earth with beautiful productions, mani-

festing the divine power and wisdom of their Creator. Such examples as these exhibit practical and unequivocal evidences of the fallacy of the opinions of those followers of science (of whom we might expect better things), who, in their researches into the works of nature, seek not to trace the "footprints" of an all-creating and all-sustaining God. If cold, scientific research is of itself sufficient to gratify the genuine student of nature, or if that nobler kind of knowledge which profiteth to everlasting life is incompatible with the pursuit of purely scientific discovery, why do we find the immortal Swede, the greatest, the truest, and the most scientific of all naturalists, falling upon his knees in the midst of his observations, arrested in his progress by the manifestations of Divine power exhibited in the objects of his study? We cannot well conceive a more heartless and unhappy man than he who plods his weary way along the gloomy paths of godless science, deaf to the holy whisperings of nature. "There are two books," says Sir Thomas Brown, "from whence I collect my divinity : besides that written by God, another of his servant Nature, that universal and public manuscript that lies exposed unto the eyes of all. Those that never saw him in the one have discovered him in the other. This was the Scripture and theology of the heathens ; and surely they knew better how to join and read these mystical letters than we Christians, who cast a more careless eye on those common

hieroglyphics, and disdain to suck divinity from the flowers of nature."

To resume M. D'Orbigny's remarks:—"It was some months after this interview with Father La Cueva, that I was investigating the province of Moxos, the only means of travelling from one part of which to another is by water; and while I was going up the Rio de Madeiras, towards the source of the Mamoré, and often thinking over in my mind the anecdote which the good old man had related to me, I beheld in an immense lake of stagnant water, which had a communication with the river, a plant of such extraordinary aspect, that I instantly concluded it must be the same as Hænke had seen. I also perceived that it was allied to the Water-maize, already mentioned as found at Corrientes. Great was my delight to find that this gigantic vegetable, though of the same genus, still differed specifically from that which I had seen before. The under side of the foliage and the crimson sepals were quite peculiar. Like Haenke, I made a perfect harvest of leaves and flowers; but subsequent illness, caused by alternate exposure to the blazing sun and drenching rains of these flooded plains, brought on such languor and exhaustion, that I lost my specimens of this second species, and was thus deprived of the satisfaction of carrying the plant to Europe. The honour of naming the original and first found plant has been forestalled by Dr Lindley, who calls it *Vic-*

toria Regia; but to the one subsequently detected at Corrientes, I propose giving the name of *Victoria Cruziana*, in testimony of my obligations to General Cruz, whose kindness mainly contributed to the successful issue of my journey to Bolivia."

The following are M. D'Orbigny's previously published observations, which are quoted in the "Botanical Magazine," from "*Voyage dans l'Amerique Meridionale* :—"I resumed my descent of the Paraná on the 3d of March, and, arriving at the junction of a small river, called the San José, which spreads into a wide marsh before falling into the Paraná, I found one of the most beautiful flowers that America can produce. The plant seems to belong to the family *Nymphæaceæ*, and is certainly much allied to the *Nuphar*, but its dimensions are gigantic. The people of Guiana call it Irupé, deriving this name from the shape of its leaves, which resemble the broad dishes used in the country, or the lids of their large round baskets. A space, more than a mile broad, and nearly a mile long, is covered with the large floating leaves, each of which has a raised edge two inches high. The foliage is smooth above and furrowed below, with numberless regular compartments, formed by the projecting, thick, hollow nerves, the air in which keeps the leaf upon the surface of the water. Leaf stalks, flower stalks, and ribs of the leaves, are alike cellular, and covered with long prickles. Amid this expanse of foliage rise the

broad flowers, upwards of a foot across, and either white, pink, or purple—always double, and diffusing a delicious odour. The fruit which succeeds these flowers is spherical, and half the size, when ripe, of the human head, full of roundish farinaceous seeds, which give to the plant the name of Water-Maize (Maïs del Agua), for the Spaniards collect the seeds, roast, and eat them. I was never weary of admiring this colossus of the Vegetable Kingdom, and reluctantly pursued my way the same evening to Corrientes, after collecting specimens of the flowers, fruits, and seeds.”

Sir Robert Schomburgh, well known for his scientific researches in distant lands, is a more recent observer of the royal plant. In the year 1837, Sir Robert, when investigating the natural productions of British Guiana (on behalf of the Royal Geographical Society of London, aided by the English Government), discovered the Victoria Lily there, and he gives a glowing detail of the discovery, in a letter communicated to the Geographical Society and the Botanical Society of London, which was then reported in various journals. His description and drawing were the means of first directing the attention of British botanists to this extraordinary production, and furnished sufficient information for Dr Lindley to prepare his illustrated history of the plant, before referred to—of which, however, “only twenty-five copies were printed for private

distribution." The following is Sir Robert's letter :—
"It was on the 1st of January, 1837, while contending with the difficulties that nature interposed, in different forms, to stem our progress up the river Berbice (lat. 4 deg. 30 min. N., long. 52 deg. W.), that we arrived at a part where the river expanded, and formed a currentless basin; some object on the southern extremity of the basin attracted my attention, and I was unable to form an idea what it could be; but, animating the crew to increase the rate of their paddling, we soon came opposite the object which had raised my curiosity, and, behold, a vegetable wonder! All calamities were forgotten; I was a botanist, and felt myself rewarded! There were gigantic leaves, five to six feet across, flat, with a broad rim, lighter green above and vivid crimson below, floating upon the water; while, in character with the wonderful foliage, I saw luxuriant flowers, each consisting of numerous petals, passing in alternate tints, from pure white to rose and pink. The smooth water was covered by the blossoms, and, as I rowed from one to the other, I always found something new to admire. The flower-stalk is an inch thick near the calyx, and studded with elastic prickles about three-quarters of an inch long. When expanded, the four-leaved calyx measures a foot in diameter, but is concealed by the expansion of the hundred-petalled corolla. This beautiful flower, when it first unfolds, is white, with a pink centre; the

colour spreads as the bloom increases in age ; and, at a day old, the whole is rose-coloured. As if to add to the charm of this noble Water-Lily, it diffuses a sweet scent. As in the case of others in the same tribe, the petals and stamens pass gradually into each other, and many petaloid leaves may be observed bearing vestiges of an anther. The seeds are numerous, and imbedded in a spongy substance. Ascending the river, we found this plant frequently, and the higher we advanced, the more gigantic did the specimens become ; one leaf we measured was six feet five inches in diameter, the rim five inches and a half high, and the flowers a foot and a quarter across. A beetle (*Trichius* sp.?) infests the flowers to their great injury, often completely destroying the inner part of the disk ; we counted sometimes from twenty to thirty of these insects in one flower."

A paragraph which recently went the rounds of the newspaper press, forms a not inapt commentary on the circumstance last noted, and we here reproduce it :—" Insects generally must lead a truly jovial life. Think what it must be to lodge in a Lily. Imagine a palace of ivory or pearls, with pillars of silver and capitals of gold, all exhaling such a perfume as never rose from human censer. Fancy, again, the fun of tucking yourself up in the folds of a rose, rocked to sleep in the gentle sighs of summer air, nothing to do when you awake but to wash yourself in a dewdrop, and fall to and eat your bedclothes."

The discovery of the Royal Lily by Sir Robert Schomburgh, and the interest which was thereafter excited by the details of his researches, laid before various scientific bodies, and quoted extensively in scientific as well as literary journals, had the effect of directing the attention of scientific travellers to this extraordinary production; and several interesting accounts of the Lily have been subsequently forwarded to this country by various travellers, whose searches for the plant have been successful.

In the summer of 1845, Mr Bridges observed the Victoria in the vicinage of Santa Anna, in the province of Moxos, republic of Bolivia. Whilst riding along the woody banks of the river Yacuma, one of the tributaries of the Mamoré, he "had the good fortune to come suddenly on a beautiful pond, or rather small lake, embosomed in the forest," where, to his delight and astonishment, he discovered, for the first time, the "Queen of Aquatics"—the *Victoria Regina*. "There were, at least, fifty flowers in view, and Belzoni could not have felt more rapture at his Egyptian discoveries than I did in beholding the beautiful and novel sight before me, such as it has fallen to the lot of few Englishmen to witness. Fain would I have plunged into the lake to procure specimens of the magnificent flowers and leaves; but, knowing that these waters abounded in alligators, I was deterred from doing so by the advice of my guide, and my own experience of similar places."

He found it necessary to procure a canoe. "In this tottering little bark, we rowed amongst magnificent leaves and flowers, crushing unavoidably some, and selecting only such as pleased me. The leaves being so enormous, I could find room in the canoe for but two—one before me, and the other behind; owing to their being very fragile, even in the green state, care was necessary to transport them; and thus we had to make several trips in the canoe before I obtained the number required. Having loaded myself with leaves, flowers, and ripe seed-vessels, I next mused how they were to be conveyed in safety, and determined at length upon suspending them on long poles with small cord, tied to the stalks of the leaves and flowers. Two Indians, each taking on his shoulder an end of the pole, carried them into the town—the poor creatures wondering all the while what could induce me to be at so much trouble to get at flowers, and for what purpose I destined them, now they were in my possession. . . . From each plant, there are seldom more than four or five leaves on the surface; but even these, in parts of the lake where the plants were numerous, almost covered the surface of the water, one leaf touching the other. I observed a beautiful aquatic bird, (*Parra* sp.) walk with much ease from leaf to leaf, and many of the *Muscicapidæ* find food and a resting-place on them. . . . The vegetation surrounding the locality of the *Victoria* was not of that splendid character that

I could have wished. It wanted those noble palms, the *Mutacu* and *Palma real*, which so beautifully adorn the banks of the Mamoré, to have made a perfect and enchanting picture with the *Victoria* in the waters. The trees belonged to genera new to me, and peculiar to this level part of the country. Amongst the shrubs, I observed two species of *Bauhinia*, and a fine purple-flowered *Bignonia*, climbing even to the summit of the trees."

Dr Campbell of Demerara—well known as the original secretary of the Botanical Society of Edinburgh—gives an account of his visit to the *Victoria* on the Essequibo, in a letter to Professor Balfour, accompanying some seeds of the plant. This interesting letter was read to the Botanical Society at their meeting on 11th July, 1850. Dr C. says—"I enclose in this a dozen seeds of *Victoria Regia*, brought from the Essequibo a few days ago by an itinerant collector, who seems to know their value, as he charges a dollar (4s. 2d.) a dozen for them. I am afraid they will not germinate after their voyage across the Atlantic; but this, at least, you must bear in mind, if you intend to try the experiment, that the plant will not live in an atmosphere within the influence of the sea breeze, nor grow in soil or water where there is the slightest saline principle existing. Such, at least, is the result of experiments tried here. I visited the locality of the plant in the Essequibo, above a hundred miles from the sea, in 1846, and it

appeared to me a small lagoon, rather than a lake, over which the river flows in the rainy season. It is surrounded on all sides with a dense "bush" (natural forest), through which we had great difficulty in dragging a small corial (wood-skin boat), in which we embarked on the lagoon, which is a most gloomy spot, the favourite resort of caymans, where the sun can scarcely penetrate even at noon, and with an atmosphere oppressively damp and hot. So far as I could judge by sounding and examining the stems of the plant, it appears to grow at a depth of twelve or fourteen feet, in an oozy, slimy, muddy sort of compound, with which, I presume, sand must be mixed, for higher up the river there are immense tracts of loose sand in the bed of the river, which must be swept along with the torrent every rainy season."

Mr Spruce, who is at present on a botanical mission in the South American wilds, and whose excellent parcels, already received in this country, afford ample proof of his activity and the success of his exertions, is also another recent observer of the Victoria Lily, and the following interesting observations from his pen have been published in "Hooker's Journal of Botany":—"We reached the igarapé, and were at once gratified by seeing the Victoria growing by the opposite shore of the igarapé itself. We were warned by the people not to go amongst the plants, as their prickles were venomous; but I got both

hands and feet considerably pricked without experiencing any ill effects. We were fortunate in finding the plant in good flower; but, according to the testimony of all at Santarem who have seen it, the leaves attain their greatest dimensions in the winter. Captain Hislop assures me he has seen many leaves twelve feet in diameter, whereas the largest we saw measured a very little above four feet across, and they were packed as close as they could lie. But I can easily conceive how in the wet season their dimensions should be considerably augmented; for where, as at present, the plant is growing in less than two feet of water, in winter the igarapé will be filled to its topmost banks, or at least fifteen feet deeper than at present, while its breadth will also be greatly increased, so that the petioles of the Victoria, lengthening, doubtless, with the rise of the waters, will bring the leaves to a much greater surface, on which they will have room to dilate to about twice their present size. The aspect of the Victoria, in its native waters, is so new and extraordinary, that I am at a loss to what to compare it. The image is not a very poetical one, but assuredly the impression the plant gave me, when viewed from the banks above, was that of a number of tea-trays floating, with here and there a bouquet protruding between them; but, when more closely viewed, the leaves excited the greatest admiration from their immensity and perfect symmetry. A leaf turned up suggests some strange

fabric of cast-iron just taken out of the furnace; its colour, and the enormous ribs with which it is strengthened, increasing the similarity. I could find no prostrate trunk, as in the other *Nymphæacæ*. The root is central, the thickness of a man's leg, penetrating deep into the mud (we could not dig to the bottom of it with our *trésados*), and sending out fascicles of whitish radicles, about twenty-five from below the base of each petiole, the thickness of a finger, and two feet or more in length. The radicles are imperforate, and give out here and there a very few slender fibres. From the same root, I have seen flowers uniting the characters of *Victoria Regia* and *Cruziana* (of the latter I have only the brief description in Walpers), so that I can hardly doubt their being the same species as had been already more than suspected. The *igarapé*, where we gathered the *Victoria*, is called *Tapiruari*. I had two flowers brought to me, a few days afterwards, from the adjacent lake, which seems to have no name but that of the *sitios* on its banks. Mr Jeffreys has also brought me flowers from the *Rio Arrapixuna*, which runs into the *Tapajoz* above *Santarem*, and unites the *Tapajoz* and *Amazon*. I have further information of its growing abundantly in a lake beyond the *Rio Mayaca*, which flows into the *Amazon* some miles below *Santarem*. Mr Wallace, who recently visited *Monte Alegre*, had a leaf and flower brought to him there; I have seen a portion of the leaf

which he dried. Lastly, I have correct intelligence of its occurring in the Rio Trombetas, near Obidos, and in lakes between the rivers Tapajoz and Madeira, so that there can be no doubt of its being plentifully distributed throughout the whole of this region, both north and south of the Amazon."

We have thus endeavoured, by descriptive remarks and careful selections from the observations of botanical travellers, to convey to the reader's mind as correct an image as it is possible to place before him of the magnificent aspect which this Regal flower,

"Aspiring to the rank of Queen,"

presents in her native waters. We shall now proceed to detail the Victoria's history as a garden flower. Beautiful as was the western nymph, when she dwelt alone, unknown, and uncared for on the bosom of her native bays, it was only after science had taken her by the hand, and declared her loveliness to the world, that her merits were fully and frankly acknowledged.

Immediately that the Royal Lily became known in this country, an eager desire was evinced in botanical and horticultural circles to obtain its introduction, in a living state, to our British gardens. This desire was greatly increased in consequence of the necessarily very imperfect dried specimens which had been transmitted to this country, and which, although "botanically examinable," as the results of Lindley's examination show them to have been, were

fitted to convey but a very imperfect notion of the magnificent character of the living plant. Accordingly, we find that repeated attempts were made to transplant the *Victoria* from the South American waters to the gardens of Britain, but long without success. No doubt, a minute account of all the circumstances connected with the long series of futile attempts to introduce the Royal Water-Lily might form an interesting chapter in the history of botanical and horticultural science, and an instructive one for the scientific travellers, botanists, and horticulturists of future times; but it is more in our way to notice in detail those efforts which have been more or less successful.

The first perfect seeds which reached England in a condition fit for germination were those collected in Bolivia by Mr Thomas Bridges (to whose observations we have already referred, p. 44), and which were received at the Royal Gardens, Kew, in August, 1846. They were safely brought to this country in a bottle containing moist earth, with which they were mixed. These seeds produced only two plants, the progress of which was at one time so satisfactory, that they were confidently expected to flower. However, their melancholy history is thus briefly told:—"By the month of October, they were in a thriving condition, but soon after that time they began to show symptoms of decay, and by the 12th of December they were both dead." A short and a sad tale

this, and one that well nigh blighted the hopes of the most ardent admirers of the Royal Lily.

The difficulties attending the introduction of this extraordinary plant seemed to increase. Even after being thus successfully conveyed to the Royal Botanic Garden at Kew—an establishment affording every facility for encouraging its growth—the *Victoria* perished in a few months, before arriving at that condition of development necessary for the production of flowers and fruit, and was consequently lost to our gardens. It was not alone the difficulty of obtaining living plants or perfect seeds, and getting them safely transferred to English soil, that stood in the way of the Lily's introduction to Britain. Its habits were new to our horticulturists, who were in a great measure ignorant of the natural conditions under which the plant was developed in the South American waters, and consequently were ill prepared to judge of the conditions requisite for its successful cultivation under artificial circumstances. Its gigantic size, and other peculiarities, rendered its treatment peculiarly difficult; no plant, requiring the same care, and attention, and favourable circumstances for its healthy development, had ever before come through the hands of the gardener.

The tuberous roots of various species of *Nymphæa* are capable of retaining vitality for a long period after removal from their native waters, having, in some instances, been revived by the application of

moisture, and successfully grown, after being kept in dry sand for a number of years. This fact seemed to point out even a more successful method for transplanting the *Victoria*, than by means of seeds, because, as was thought, if strong roots were once obtained, they would have a better chance of success in cultivation, and not require that amount of fostering care necessary to insure the favourable growth of tender seedlings. Accordingly, through the exertions of E. G. Boughton, Esq., M.D., of Leguan Island, roots were obtained from the Upper Essequibo, native Indians having been specially employed by him for the purpose. These roots were received at Kew, in October, 1848, being packed in a glazed case, but, on arrival, were found to be quite dead. The same gentleman, anxious to insure the safe introduction of the *Victoria* to Britain, did not cease his exertions with this effort, but obtained some ripe capsules containing seeds, which he forwarded by the following month's mail. He also sent more seeds in a bottle of muddy water, thinking that this imitation of the plant's seed-bed, as prepared by nature, might be successful; but neither these seeds nor the seeds contained in the dry capsules germinated, when sown at Kew.

Again, however, an attempt was made with seeds, and was followed with success; from it we have to date the introduction of the *Victoria* to the gardens of England. This time, the seeds were put into

phials of *pure* water, and forwarded per mail to the Kew Gardens by two gentlemen, whose names will long remain on record in connection with the Victoria's history—Hugh Rodie, Esq., M.D., and ——— Luckie, Esq., George Town, Demerara. The first arrival of seeds from these gentlemen was in February, 1849. These seeds proved quite perfect and fresh; and three other importations, sent at different times, shortly afterwards, all arrived safely at Kew in the like good condition. By the end of March, six healthy plants had been raised from the seeds first received from Messrs Rodie and Luckie, and those which afterwards came to hand continued to germinate from time to time. More than fifty plants were in all produced, and were in good condition by the latter end of summer.

So soon as the seedlings were in a fit state for safe removal, they were liberally distributed to distinguished private cultivators and public gardens in various parts of the country. It was only in some of the establishments, however, to which it was sent, where accommodation sufficient for the colossal Water-Lily could be provided, and in such only did the plants survive. In a few instances, under the most favourable circumstances, have the plants been successfully cultivated, and produced flowers and fruit.

Among other gardens to which the seedlings of the Victoria were sent, one was received on 3d August,

1849, at Chatsworth, the seat of the Duke of Devonshire, long celebrated as one of the first horticultural establishments of Europe, and of peculiar interest to the botanist and the scientific gardener, from the magnificent display of rare exotic plants which it at all times contains. Mr Paxton, chief gardener to his Grace, being anxious to afford the Victoria every accommodation, and, if possible, to bring it into a flowering condition, immediately prepared a tank, expressly for its reception, measuring twelve feet square, wherein it was planted on the 10th of August. Although the plant was of very limited dimensions when received from Kew, having only four leaves, the largest of which measured only four inches in diameter, yet it soon increased greatly in size, and, by the latter end of September, nineteen leaves were formed, the largest measuring three feet six inches across, or about eleven feet in circumference. The tank became so crowded of leaves, that it was soon necessary to enlarge it to double its original size, to allow of the full development of the plant; and it was not long before even that was found insufficient for the extent of its gigantic foliage. Although there were only thirteen leaves, yet the dimensions of each measured from four to four feet six inches across, or from sixteen to eighteen feet round. It was observed, that although the plant was thriving vigorously, yet the leaves, which had always been described by observers of the Lily in her native waters

as curiously turned up in the edges, remained quite flat—an occurrence for which various causes have been assigned. Even in this form, however, the foliage was very buoyant, although certainly not so much so as when fully developed under the suitable natural conditions. It is related of the Chatsworth plant, that a young lady enjoyed a sail on one of the gigantic leaves, a board being placed upon it to prevent her feet going through the fragile vegetable texture. Thus, as has been remarked, Homer's fabulous story of Venus floating on the Water-Lily leaf might be repeated as a practical feat, instead of remaining a merely poetical fiction. When the plant increased in age, the leaves presented a different appearance, and the peculiar turned up margins, not observable at first, became evident, so much so, that some of the leaves are described as having "presented a perfect rim, like that of a common garden sieve," although in no instance has this been so remarkable as in the wild plant when grown in the American waters.

On the 1st of November, 1849, a flower-bud appeared upon the Victoria at Chatsworth, indicating a condition of advancement beyond what had been attained by any of the other plants, at Kew, or elsewhere in England. By this time, thirty-one additional leaves had been produced, the largest of which measured four feet ten inches in diameter. Some of the more vigorous leaves, at particular stages of

their growth, are recorded to have increased in diameter at the remarkable rate of sixteen or eighteen inches in one day. On the evening of Thursday, the 8th of the same month, between five and eight o'clock, the petals of this flower partially opened; but they again closed during sunlight on Friday the 9th, and fully expanded the same evening—thus rewarding the care, skill, and industry, which Mr Paxton had expended in its culture, by according to him the honour of flowering, for the first time in Europe, the most extraordinary and the most beautiful vegetable production of the tropics, the successful cultivation of which had baffled the skill of the celebrated horticulturists who had previously attempted it. On the morning of Saturday, the flower began to wither, evincing that rapidity of development and decay which scientific travellers had observed of the Lily in its native lakes, and which has been subsequently observed in all the other instances of the production of its flowers in England. The splendid blossom is thus described by Professor Lindley, whose truthful pen is not easily decoyed into the paths of eulogy, even in the description of the most extraordinary productions of tropical climes:—"The flower itself, when it first opens, resembles the white Water-Lily, of a dazzling white, with its fine leathery petals, forming a goblet of the most elegant proportions; but, as the day advances, it gradually expands, till it becomes nearly

flat; towards evening a faint blush becomes visible in the centre, the petals fall back more and more, and, at last, about six o'clock, a sudden change occurs; in a few minutes, the petals arrange themselves in the form of a snow-white hemisphere, whose edge reposes on the water, and the centre rises majestically at the summit, producing a diadem of rosy points. It then . . . constitutes one of the most elegant objects in nature. Shortly after, the expansion of the central parts proceeding, these points fall back; the stamens unfold in an interior coronet, the stigmas are laid bare, a grateful perfume arises in the air, and the great object of the flower—the fertilisation of the seeds—is accomplished. Then fold inwards the petals, the flower closes, the fairest of vegetable textures becomes wrinkled, decay begins, and the flower-stalk withdraws itself beneath the water, as if to veil the progress of corruption. But out of this decay arises a new living body; the fruit, curved downwards, swells rapidly, and in a short time a prickly seed-vessel is observed concealed beneath the floating leaves." The Chatsworth plant continued to bloom profusely, and likewise produced abundance of fruit and perfect seeds, which ripened in December, and from which were raised a new progeny to replenish the gardens of England. The ripe seed-vessel of the *Victoria* has been described, from specimens produced in this country, as exactly resembling a Meerschaum tobacco-pipe.

It is worthy of notice, that about the middle of February following, two self-sown seedlings came up in the immediate neighbourhood of the parent plant. The largest flower produced at Chatsworth in 1849 measured ten inches and a half in diameter. The old plant survived the winter, though resting in the water, in perfect health; and Mr Paxton, writing to the "Gardeners' Chronicle," under date 10th April, 1850, spoke of it as then "in the most vigorous health—the leaves rapidly increasing in size, having arrived at nearly the same dimensions as the largest which was produced during the last season. A flower opened on Monday the 8th instant (April), and measured thirteen inches in diameter; this is more than two inches wider than any which had previously expanded, the largest never having before exceeded ten inches and three quarters. . . . Of the plant's duration, it may be well to state, that the flowering specimen has formed large fleshy root-stocks, and that its perennial character may now be considered almost certain." We should mention that Mr Paxton had the honour of presenting one of the earliest flowers produced at Chatsworth to her Majesty the Queen.

The following is the mode of cultivation so very successfully pursued by Mr Paxton at Chatsworth, as detailed in the "Gardeners' Chronicle":—"In a hot-house of sufficient dimensions, a tank was constructed, three feet deep, and twelve feet square. To this

was added a ledge all round, nine inches deep, three and a half wide, and heated by a triple row of small lead pipes, through which hot water circulated. By these means, the tank was rendered nineteen feet square, with a deep centre and shallow sides. In order to keep the water in motion, a small wheel was added at one corner ; over that wheel water was caused to drop continually with force enough to keep the wheel constantly revolving; the water thus continually flowing into the tank is carried off by a small pipe in one of its corners near the bottom. In this way were secured the important advantages of the water being so often changed that it could not become stagnant, together with ceaseless gentle agitation. Nothing could be more like the natural state of a tranquil river. By the heating apparatus, its temperature could also be regulated with facility. The thermometer has generally indicated 85 degrees. In the centre of the tank was introduced a hillock of earth, consisting of *burnt loam* and peat. To the burning of the loam Mr Paxton attaches great importance; and this agrees with the daily experience of those who employ burnt or charred materials in gardening. The physical condition of the soil is much improved by the process, and the weeds and insects are destroyed. Mr Paxton is also of opinion that the removal by fire of all matters ready to enter into fermentation or rapid decomposition when in contact with water heated to 85 degrees, was in

itself no inconsiderable cause of the success of his experiment; in addition to which, it preserved the water perfectly 'translucent.'

Although the Victoria produced its first blossoms at Chatsworth, that princely establishment was not doomed to be long the only garden that could boast of this splendid flower. The success which had attended the Chatsworth plant, under judicious cultivation, gave a renewed impulse to the interest which the Victoria had previously excited, and especially increased the anxiety of cultivators into whose hands seedlings of the Lily had fallen, while Mr Paxton's experience furnished them with a clue to its successful culture. In April, 1850, blossoms appeared on a thriving plant of the Royal Lily in the noble gardens of his Grace the Duke of Northumberland, at Syon House, rewarding the zealous exertions of Mr Ivison, head-gardener of the establishment; and it continues in vigorous health, producing abundance of flowers. Mr Ivison gives an excellent account of the progress of the Victoria, and of the manner in which it was managed, from the time it was first received at Syon, in that elegant work, the "Gardeners' Magazine of Botany" (vol. i., p. 229), in which is also published a concise and illustrated detail of the Lily's general history. Mr Ivison says:—"The plant at Syon was received from Kew in the second week of September, 1849, being one of the number which was distributed about that time. It had

then four leaves, the largest being about four inches in diameter. It was placed at once under similar treatment to that which was so successfully pursued with the *Nelumbiums* in these gardens some years back, the basis of which was a constant circulation of the water in which they were grown. This was effected by placing three tubs at different elevations. The upper one rested immediately over a hot-water pipe. This warmed the water, which was then conveyed by a syphon into the one below, in which the *Victoria* in a pot was placed, and which was plunged in a bark bed. From this, the water was conveyed by a pipe into the third and lowest tub, from which it was returned into the upper one, again to follow the same course of circulation. Under this treatment, the plant soon became too large for its original pot, and in about two weeks it was shifted into one of a much larger size ; and, continuing rapidly to increase its dimensions, it was removed into a wicker-basket about two and a half feet in diameter by two feet deep. About the same time, the size of the tub was enlarged by fixing sheet lead to the upper part of it, and dressing it out into a superficies of six feet square, and about three inches deep at the sides—thus allowing room for the increased length of the leaf-stalks. In this situation it remained, producing a succession of healthy leaves, until January 5, 1850. It was then removed into a low-roofed lean-to house, in which Mr Beck had been ordered to prepare a

slake tank for its reception, twenty-two feet long by twelve feet wide, and arranged in the following manner:—the central portion was made two feet six inches deep, for the reception of the soil; the remaining part, over which the leaves were to expand, was only one foot deep, which has been found amply sufficient. At one end, and elevated above it, is placed a cistern through which pass two-inch hot water pipes, connected with a single one of the same size descending from it and continued all round the shallow part of the large tank below, whilst the centre and deeper part is heated by a four-inch pipe passing entirely round it. These pipes are all connected with a boiler, which heated the building before it was applied to its present purpose. That this may be clearly understood, I will enter a little more into detail:—A large reservoir receives all the rain water which falls on the glass erections in this part of the gardens. From thence, it is pumped up into a cistern which supplies the smallest one placed above the tank in which the plant is growing; thence, passing through a cock, it falls upon a small wheel which, revolving gently, agitates the water, and this, flowing towards a waste pipe, again finds its way into the reservoir, from which it originally came—thus keeping up a continued and healthy circulation. The water is kept at an equable temperature of about 85 degrees Fah. by the hot water pipes arranged as before described. The soil in which the

Victoria was planted consisted of three cart-loads of good old turfy loam, which had lain in heap for two or three years. Previously to placing it in the tank, six inches of broken brickbats were laid on the bottom, and covered with turves of peat. On these the soil was laid in a conical form, rising to within six inches of the surface of the water, and in the centre of this the Victoria was planted. For three weeks after its removal into its new home there was scarcely a sunny day; indeed, it was generally very foggy weather; and during this time it only existed, making no apparent progress. The weather then changed, and it immediately showed evident symptoms of growth. On February 1, I discovered on the surface of the soil several white roots, unmistakeable evidences of health under water; on the third, it produced its first healthy leaf since its removal; by the tenth, this was ten inches in diameter; at the end of the month, seven leaves were formed, the largest of which was sixteen inches in diameter; during March, it added nine other leaves, the diameter of the largest being nearly four feet. On April 1, I discovered the first flower-bud, and on the 10th, the flower began to open. It first opened about five o'clock P.M., continued open all night, and closed about ten A.M. on the following day. On that day (April 11), it began to open about two o'clock P.M., having gone through its various stages, reached its full expansion about six, when it was at its

greatest beauty. It continued thus for about four hours, when it began finally to close preparatory to seeding. On the third morning, the remains of the flower were partly under water, and gradually sank lower, but the flower-stalk continued to lengthen for some time afterwards. I may here observe that, on the morning of the day on which the flower first expanded, the bud was seen to move itself as far as possible in one direction, then back again in a semi-circle, and finally raised itself out of the water to rest and expand upon the young leaf, with which it was produced. Just before opening, and during the whole of the first night, the flower is very fragrant—the perfume being that of the pine-apple; this odour is distinctly perceptible outside the house. At the present time (May 6), the tenth flower is expanded; it is twelve inches in diameter. I find that each succeeding flower increases in size. There are now four more flower-buds visible; in fact, with every young leaf, comes its attendant flower-bud. Since the 10th of April, the Victoria has been in flower for two successive days, missing the following one, with very little variation. The largest leaf is now five feet in diameter, with an inch and a half of its edge turned neatly up, and forming a beautiful rim; the under surface being of a purplish red colour, and contrasting well with the deep green of the upper portion. The formation of the under side of the leaves is very beautiful. The large veins near the

centre are about two inches deep, gradually shallower towards the edge, and connected with each other by means of smaller ones, altogether forming a strong network, the whole being armed with powerful spines. The growth of the plant has latterly been so vigorous, that it has become necessary to enlarge the tank to nearly double its original size. This alteration is now being made; when completed, the deeper portion of the addition will be planted with the different species of *Nelumbium* now advancing towards a flowering state; and at the corner will be placed *Nymphæa rubra*, *N. cœrulea*, *N. dentata*, and *N. odorata*, most of which are already in flower, and are found to grow at a surprising rate in the temperature kept up for the *Victoria*. Altogether, I hope to form a very beautiful, fragrant, and interesting group of tropical and other aquatics."

At the London Horticultural Society's exhibition, in Chiswick Gardens, on 20th July, 1850, Mr Ivison exhibited two leaves of the *Victoria Water-Lily*, each measuring about six feet in diameter, and one of the magnificent flowers. This production, as noble as it was novel at such an exhibition, no doubt attracted considerable attention from visitors; and it occurs to us, that Horticultural Societies would do well to reward the successful cultivators of the Royal Lily, and otherwise encourage the cultivation of the entire family of Water-Lilies. Although the improvement of already well-known ornamental plants, and the in-

crease of their varieties, is a department of horticulture which is by no means on the decline, yet, if we read aright the general aspect of horticulture in the present day, the introduction to our gardens of totally new productions from other climes, and the successful cultivation of such as have baffled the exertions of the cultivators of former times, are characteristic and unmistakeable features which daily increase in importance. Aquatic plants generally are beginning to receive more attention than they ever before received from cultivators; and our opinion is not the result of an over-sanguine enthusiasm, but of a considerate observation of the present tendency of horticultural taste, when we say that ere long the exotic Aquarium and the open-air pond, for the culture of aquatics, will be considered indispensable adjuncts to every garden of any extent.

The *Victoria Regina* has also flowered in the Royal Gardens at Kew, where the first young plants were raised, and whence they were derived by the other cultivators. The previous failure in the cultivation of the Lily at Kew has been attributed to various circumstances. The bad quality of the water with which the Aquarium was for a long time supplied is, however, one of the most likely causes to which the want of success has been assigned. Under great care and judicious improvements in their management, the plants at Kew have exhibited considerable health and vigour, and produced blossoms

profusely. The garden being freely open to the public, one of the great *sights* of London during the past season has been the Royal Lily, and many have availed themselves of the opportunity thus afforded of seeing a vegetable production, the like of which has never before been equalled by any one of the numerous trophies which botanical travellers have cast at the feet of science. Admirable wax models of the flower have also been exhibited in London, and attracted considerable attention.

A botanical friend of ours, writing from London, thus expresses himself, after seeing the plant at Syon House and the Royal Gardens at Kew:—"My pen fails me when I attempt to convey an idea of the magnificence of the Victoria. Beautiful as is *Nymphæa alba*, unfolding her snowy petals on the bosom of our Scottish lakes, she sinks into mediocrity when compared with this monarch of the waters. Nothing can equal the beauty of this extraordinary plant, as seen at Syon House and Kew, surrounded by its lovely associates, *Nymphæa dentata*, *cœrulea* and *rubra*, *Limnocharis Humboldtii*, and the majestic *Nelumbium speciosum*—all of which yield the palm of supremacy to their Royal sister. You may think I express my admiration strongly, in speaking of this vegetable wonder; but these expressions do not even do it justice. The plant at Syon House, which I have just left, with its noble flower and fifteen gigantic leaves, some of them measuring

sixteen and a half feet in circumference, fills every beholder with admiration. To me, it is the wonder of wonders; and truly a befitting object to fill the mind with reverence and awe towards the Almighty."

Besides the establishments which we have noticed, wherein the *Victoria* has flowered, it is also now growing in many other gardens in England, partly from plants distributed from Chatsworth, through the kindness of his Grace the Duke of Devonshire, and partly from those sent from Kew. Only one Scottish garden can as yet boast of it—that at Dalkeith Palace, the seat of his Grace the Duke of Buccleuch, where the enterprise of Mr Mackintosh has secured ample accommodation for the Royal plant. We hope that he may soon be rewarded for his unwearied exertions by the distinguished honour of being the first gardener in Scotland to flower the magnificent *Victoria*.

From a paragraph by Mr Paxton, in the "Gardeners' Chronicle" of 28th September, 1850, we learn (as these pages are going through the press) that the original plant of the *Victoria* received at Chatsworth from the Royal Gardens at Kew has produced its 140th leaf and 112th flower-bud—a few of the flower-buds produced during its partial torpidity having been removed at an early stage of their growth, lest so constant a succession of flowers should debilitate and prove otherwise detrimental

to the health and vigour which it is desirable the plant should sustain. It is stated to have seven fresh leaves, and to have produced fine plump seeds, from which a large number of strong and healthy seedlings have been raised. These facts concerning the original plant—the one which first produced blossoms in Europe—are of interest, and worthy of record in connection with the Lily's history. It is gratifying to see that this individual plant is still sustaining a condition of health and vigour, for an interest is attached to it such as none of the other numerous plants of the *Victoria* can possess.

Mr Paxton has, more than any other horticulturist, shown himself a zealous cultivator of the *Victoria*, and has erected a splendid new structure, specially for its accommodation, measuring sixty-one and a half feet in length, and forty-six feet nine inches wide, over the walls; the tank is circular, and measures thirty-three feet in diameter, while the centre part, containing the soil for the plant, is sixteen feet in diameter. This elegant structure is figured, and its mode of construction fully detailed, in the "Gardeners' Chronicle" (1850—p. 549), and intending cultivators of the Lily will do well to consult the details therein given. Mr Paxton's *Victoria*-house, planned by himself, afforded him the type of that enormous structure now building for the Great Exhibition of 1851, of the design for which he has the entire honour. In his account of the new *Victoria*-

house, to which we have referred, Mr Paxton remarks :—" The accompanying design, described in the foregoing paragraphs, is the type of my design for the building for the Great Industrial Exhibition of 1851. When the large Conservatory at Chatsworth was built, a great point was gained by being able to have the glass manufactured in sheets of four feet in length; but since that period the improvements in different branches of manufactures have enabled me to make the present Lily-house (though comparatively small) of a much more light and elegant appearance. It occurred to me, that it only required a number of such structures as the Lily-house, repeated in length, width, and height, to form, with some modifications, a suitable building for the Exhibition of 1851. Hence arose the design for that structure, and the subsequent honour conferred on me by its unqualified adoption by her Majesty's Commissioners." The Victoria, which has been planted in the new structure, is in a very healthy condition, producing a profusion of flowers. The new house seems admirably adapted for its purpose, and forms an excellent model for such structures.

It is not alone the gardens of Britain, however, that have benefited by the discovery of the Victoria Water-Lily. The plant has been successfully introduced to the lakes of Jamaica and Trinidad, and now flourishes vigorously there, having been origi-

nally reared from seeds obtained at one of its localities on the Essequibo. The genial climate of these islands is found to be highly favourable for the development of this plant, and enables it to be grown abundantly in the open-air ponds and streams, wherever proper situations can be selected. When grown in the open air, however, the *Victoria* is very sensible to the influences of the sea-breeze; this may prevent its very extensive cultivation in such sea-girt islands, as it will be necessary to confine it to the interior, beyond the reach of the maritime breeze.

The editor of the "Kew Garden Miscellany" (Sir William Hooker) mentions that his most recent letters from Dr Falconer, of the Honourable East India Company's Botanic Garden, dated 2d May, 1850, announced the arrival of the head-gardener, Mr Scott, at that establishment, bringing with him seeds of the *Victoria*, which, says Sir William's valued correspondent, "will constitute a splendid feature in our out-of-door tanks, surrounded with *Nelumbium speciosum*—which we grow almost by the acre—*Euryale ferox*, and *Nymphæa rubra*, &c.; but we have yet to ascertain whether the seed will germinate." The Royal Lily will indeed prove a grand addition to the magnificent aquatic vegetation of India, already so rich and luxuriant as to strike every European observer with profound admiration and astonishment. Once successfully introduced to India, and

its growth encouraged, there is little doubt but it may soon become a naturalised plant in the Eastern waters, disputing the right to occupy the lakes and tanks, with *Nelumbium*, the Indian *Nymphæas*, and other indigenous productions.

Scientific foreigners visiting England have shown an eager desire to behold the Royal Water-Lily, and have evinced a deep interest in its history; the result will no doubt be the extensive cultivation of this plant in other lands. But the Lily will likewise be reared by English hands in many parts of the world. The banner of England encircles the entire globe, and in every region where that banner is seen to float on the tropical breeze, there, in the silvery lake beneath it, will be also seen the Royal Victoria Water-Lily, the namesake of our illustrious British Queen—the attendant satellite of her sovereign's power.

The extraordinary interest attached to the Victoria Regina—its truly magnificent and noble aspect—and the remarkable success in its culture which has rewarded the exertions of a few of our most zealous and most celebrated horticulturists, will no doubt have the effect of speedily extending its cultivation in Britain, and of introducing it even into many private gardens of comparatively small extent. It is not such a plant, however, as anybody may cultivate. The accommodation it requires is somewhat extensive, and the conditions requisite

for its successful culture are not attainable without trouble and expense. Although the other tropical Water-Lilies may be conveniently and successfully grown in large tubs of water kept in an ordinary plant stove, yet the *Victoria* cannot be grown, except in its very youngest condition, without a structure prepared expressly for its reception. Recent improvements in materials, and decrease in their cost, have, however, rendered the erection of such structures comparatively easy, and brought the means of growing this plant within the reach of many who, some years ago, would not have contemplated such a profitless project for the mere gratification of their floral tastes.

It is the opinion of Mr Paxton, that no tank of less dimensions than fifteen feet in diameter will be of sufficient size for the *Victoria*; and the new tank at Chatsworth, which has been erected with the view of allowing the Lily full scope (and to which we have already referred, p. 70), measures thirty-three feet across, inside measure—provision being made for its enlargement to a considerable extent, if found requisite. The heat necessary to be maintained is that of a tropical stove; but there are other essential requisites in the cultivation of this plant which must be carefully attended to. In its native habitats, the *Victoria* has been observed to grow only in open parts of the rivers, where it is free from the shade of the surrounding arboreous vegetation on

the shores; and it has likewise been observed, that under cultivation in this country, it is of paramount importance to afford the plant as much air, light, and sunshine as possible, although at Chatsworth, "during the brightest weather in summer, it was found advisable to afford some degree of shade to the *flowers*, in order to prevent their becoming too fugitive, perishing in much less time than two days." However effective such a shading may be in lengthening the life of the individual blossoms, it is highly probable that it may by no means contribute to the general health of the plant, and is therefore, as a general rule, to be avoided, more especially by inexperienced cultivators. In the erection of a Victoria-house, every precaution ought to be adopted to secure as much light as possible, by dispensing altogether with walls of masonry, and using glazed sashes instead; by having the sashes and whole framework, whether of wood or iron, made of the slightest construction compatible with due strength; by glazing with large-sized panes; and by choosing an open situation freely exposed to the sun. A continual supply of fresh water is also essential, which, in entering, should be made to fall upon a small water-wheel fixed at the surface of the tank—an ingenious method successfully adopted by cultivators to give a motion to the water, in imitation of the gentle ripple of the Victoria's native rivers. It has been suggested that this motion might be given by the

aid of ornamental fowl. No doubt, some tropical aquatic species, associated with the Lily in her native waters, or belonging to the same regions, may be well adapted for the purpose; they would add life and additional interest to the Victoria pond. It has been ascertained that the proper average temperature at which the water should be kept is about eighty-five degrees. It is also of importance to give fresh air at all times, when it can be safely done without unduly lowering the temperature of the house. So important does a due allowance of fresh air appear, that Mr Ivison attributes the finely-developed leaves of the plant at Syon House, with their turned-up margins (a feature not at first observable), to the freedom with which air was admitted on all proper occasions.

It is a curious fact connected with the Victoria, and one which has important bearings on its cultivation, that, although an aquatic plant, it will not grow within the influence of the sea-breeze, nor in water having the least admixture of saline particles. Dr Campbell mentions that the native station which he visited on the Essequibo is more than a hundred miles from the sea; and Sir Robert Schomburgh records, that in his progress up the Berbice, the farther up the river he proceeded, the more gigantic and fully developed did the specimens become. Attention ought, therefore, to be given to the purity of the water used; and although

the influences of the sea-breeze cannot prove so detrimental to the plant under glass, as if it were exposed to the external atmosphere, yet it will be well to have the structure removed from the immediate vicinage of the sea, when this can be accomplished, and to use no sand or other materials impregnated with salt.

Attention has recently been called to the application of the principles of landscape gardening to the cultivation of exotic plants—a feature quite novel in British horticulture, and one which will undoubtedly gain ground with the advancement of the science. The cultivation of exotic plants on the shelves of a greenhouse, however well the specimens are grown, conveys little or no idea of the aspect the species present, and the manner in which they are associated in their native lands; and yet it is avowedly one of the great objects of exotic gardening to present to the eye vivid pictures of nature, as she is exhibited in the gorgeous vegetation of tropical lands.

The inordinate taste for stiff geometrical gardens, which—copied from the Dutch—prevailed to such an extent at one time in England, is now a mere matter of history, although its traces are not altogether obliterated. Our plant-houses, or exotic gardens, as they are generally constructed in the present day, are essentially of the same character, although they cannot be looked upon as a remnant of Dutch

gardening. They are, perhaps, more the result of necessity and convenience than of taste. The high price of materials required for plant-houses, and other circumstances, render it expedient, where the mere cultivation of exotics as individual objects, without regard to artistic combination and arrangement, is the object in view, to prefer that structure as the best which offers the greatest capabilities for plant accommodation at the lowest proportional cost. The time was, when this principle was held equally applicable to the open-air garden, and when number of species and varieties was considered the infallible criterion by which to judge of the excellence of a collection. Since then, however, landscape-gardening has given to horticulture a more noble aspect, and placed it in a wider field. Since it is now universally acknowledged that Nature is as necessarily the cultivator's guide in the laying out of his garden and the arrangement of his ornamental plants, as she is his guide in the cultivation of the latter, there is great reason to hope that in like manner the claims of Nature may by and by be recognised in the formation of structures for the culture of exotics.

It has been shown by Professor Lindley, in the "Gardeners' Chronicle," how easily a fair specimen of tropical scenery could be got up beneath glass, without decreasing the plant-accommodation to any great extent. We venture to suggest, that a structure raised for the culture of the *Victoria*, instead

of being merely a tank covered in with glass, and containing the solitary plant, might be rendered much more interesting by an attempt at the imitation of natural scenery, and the introduction of a few other aquatic plants to form a pleasing contrast with the Royal Lily. A small waterfall at one end of the house, verdant with moisture-loving plants, might be made to supply the pond, and give to its surface that gentle agitation so necessary for the healthy development of the *Victoria*. While the gigantic Lily occupied the chief portion of the pond, the shallow margins might be planted with various small aquatics, suitable for such situations; and, if space allowed, a few other tropical Water-Lilies might be introduced into the deeper parts. It might obscure the light too much to run climbers up the rafters, and hang drooping plants from the roof, but, under favourable circumstances, this might be done to some extent, especially in the summer season, when there is an abundance of sunshine. In the formation of Aquariums of all kinds, it has been strongly recommended to steep the materials separately in boiling water before being used, in order to destroy insect life; and the mould into which the plants are to be grown should also be well burned. The admirable manner in which the other exotic Water-Lilies are thriving at various establishments where they join the *Victoria* in the occupancy of structures erected specially for the accommodation of the latter, and

where they are treated in the same manner as that plant, show how well a general collection of aquatics, grown somewhat in the way we have mentioned, would succeed.

Before concluding our account of the Victoria Water-Lily, it may not be out of place to allude to the circumstance, that a drawing of this Royal plant occupies a prominent position in the diploma of the Botanical Society of Edinburgh, which contains a delineation of the principal vegetable productions characteristic of the tropics, as well as of those inhabiting our own northern land. The seal of the Botanical Society of London is also adorned by a representation of the Royal Lily—another instance of the great esteem in which the Victoria is held by botanists.

GREAT WHITE WATERLILY

Nymphaea alba

THE GREAT WHITE WATER-LILY—
NYMPHÆA ALBA.

“ A bed of Water-Lilies:
Broad-leaved are they, and their white canopies
Are upward turn'd, to catch the heaven's dew.
Near to a little island's point they grew;
Where Calidore might have the goodliest view
Of this sweet spot of earth.”—KEATS.

OF the three Water-Lilies indigenous to the fresh-water lakes and rivers of Britain, the Great White Water-Lily (represented in the adjoining plate) is certainly the most conspicuous, and is indeed one of the most magnificent plants belonging to our native Flora. It is this

“ Flower of the watery plain ”
which has especially attracted the attention of our English poets—neither of the other two species being recognised as poetical flowers. The lovely and graceful appearance of this Naiad, the pure element which she inhabits, the often highly beautiful and picturesque scenery with which she is associated, as well

as many interesting circumstances of her history, conspire to claim for her the especial notice of our nature-loving poets; and the fact that her Eastern congeners—still held sacred by the natives of the regions they inhabit—are mentioned in the earliest records of literature, may be deemed sufficient of itself to draw the admiring eye of every lover of nature towards this noble flower. Well is it remarked, in “English Botany,”—“India may boast her Palm-trees and America her Magnolias, but the latter scarcely exceed our *Nymphæa* in magnificence, and the most noble and celebrated of all Indian productions is, in fact, a Water-Lily—*Nymphæa Nelumbo*. That, however, does not more exceed the other vegetables of this country than this every British plant besides. It has altogether the air of a tropical production.” Certain it is that

“The large-leaved Lotus, on the waters flowering,” is not more admired by the botanists of the East, than is the White Water-Lily of Britain by the botanists of her own land.

The *Nymphæa alba* (as science terms it) may be familiar to every reader who has wandered amid the lake scenery of our land. Although the circumstance of its being truly an aquatic plant, requiring deep and still water for its successful development, has the effect of preventing its universal occurrence throughout our country, yet the Great White Water-Lily is by no means rare. It prevails very generally on our

British lakes, reclining upon the bosom of their clear waters in peaceful repose, and adding greatly to their beauty. In the quiet recesses of the Highland lakes, especially, as Hooker has remarked,—

“ The Water Lily to the light
Her chalice rears of silver bright.”

And beautiful, indeed, the scenes which she adorns often are—the islands of verdure formed on the unruffled surface by her expanded foliage, studded with myriads of majestic blossoms of the purest white, which, reflected in the mirroring waters, give quite a fairy aspect to the mountain lake. But much as she loves the peaceful retirement of the Highland waters, far away from the homes and the haunts of men, she does not always seek this mountain seclusion; sometimes her fair form may be seen upon the gentle stream, or more nobly flowing river, where the water is sufficiently deep, the current not too strong for her delicate, yet stately form, and the bottom soft, slimy, and muddy enough to form a congenial soil for her deep rooting radicles :

“ Mark where transparent waters glide,
Soft-flowing o’er their tranquil bed;
There, cradled in the dimpling tide,
Nymphæa rests her lovely head.”

It may appear supererogatory for us to give any description of this lovely lady of our Scottish lakes, seeing that there are few flowers more easily distinguished, and few that can boast of so many personal

admirers. But as our little book is especially intended to convey some knowledge of the floral Naiads, to those readers who have not made the vegetable kingdom the object of their careful study; and, as aquatic plants wofully deficient in dignity of aspect and gracefulness of form, when compared with the true Water-Lily of the poets, are frequently mistaken by general observers for that plant, a few descriptive remarks may not be wasted even on this well-known species. To begin at the root, therefore, where the precepts of botanical philosophy and the examples of nature teach us to begin—that organ is of a tuberous nature, forming a horizontal rhizome, which generally lies near the surface of the soft mud at the bottom of the water. From this rhizome, proceed a numerous series of strong filmy radicles, which descend to a considerable depth in the mud, and are “fibrous at the extremity,” according to the author of the “English Flora,” a circumstance extremely likely, although our own researches have not been carried to sufficient depth to corroborate the fact. The tuberous root or rhizome is said to have “an astringent and bitter taste like the roots of most aquatic plants that run deep into the mud.” Although the Great White Water-Lily generally prefers rather deep water, and always those lakes and rivers which the summer heat never dries up, yet the alternate floods and drought which affect those natural reservoirs to so great an extent, have the effect of

changing its depth of water very frequently, and the leaf and flower-stalks appear to be gifted with the power of relaxing and contracting according to the circumstances of the plant. In one instance, recorded by Leighton in the "Shropshire Flora," the foot-stalks were observed of the extraordinary length of fourteen feet; but it is probable that they do not generally attain to half that length. The leaves, which it is the purpose of the foot-stalk to support, float upon the smooth surface, being sometimes so numerous as to completely cover large portions of the pure element, and thus impart to it their own verdant hue. They are oval, or heart-shaped, with parallel lobes at the base, so that the leaf appears as if partly slit up in the middle, but otherwise quite entire. The leaves are of a stout leathery texture, so "smooth and shiny, that the water runs over them as if their surfaces were oiled," and about nine inches, sometimes more, in diameter. The blossoms are of the purest white, the calyx leaves being occasionally very slightly tinged with red. When fully expanded, the flower is not unlike a double rose, there being several rows of regular petals, gradually decreasing in size towards the centre of the blossom, where they insensibly merge into the yellow stamens; thus, it is in every respect a natural *double* flower, differing in no manner of way from those double flowers grown by the florist, except that in the Lily there are al-

ways left a sufficient number of unconverted stamens for the purposes of fertilisation, whereas, by high cultivation, the florist sometimes totally extinguishes these essential organs.

Alluding to the gorgeous double blossoms of the White Water-Lily, Withering remarks:—"Botanists often affect to despise the labours of the florist, who wishes, by multiplying the petals, to produce double flowers, stigmatising them by the name of monsters. They may be monsters, but they are often beautiful monsters. Who does not admire the flower of the double-blossomed Cherry? And when, as in the White Water-Lily, the petals are naturally multiplied to a great degree, the botanist who turns away with disdain from this splendid object of creation must be fastidious indeed. The petals gradually lessen as they approach the centre of the flower, where the outer filaments expanding in breadth gradually assume the form of petals, as is generally the case in the double flowers of our gardens." The appearance of the splendid blossom has suggested the name, which it sometimes receives, of White Rose of the Waters. It has often occurred to us that it resembles more closely, especially in the purity of its flowers, some white varieties of the Camellia than any other flower: but it often measures four or five inches in width. Some botanical authors have attributed to the flowers of this Lily a slight degree of fragrance, while others, with perhaps more

candour, have declared it scentless. On this point, Mr Luxford remarks:—"In the 'English Flora,' the flowers are said to be without scent; I have found them, on the contrary, to give out a powerful and exceedingly disagreeable odour." Like the other Water-Lilies, this one has its peculiar times of opening and closing. Long ago, it was observed that

"When evening tinged the lake's ethereal blue,"

the White Water-Lily closed its pearly petals, the blossom-bud floating on the surface of the water or sinking beneath it. But

"The morn is up again, the dewy morn,
With breath all incense, and with cheek all bloom—
Laughing the clouds away with playful scorn,
And living as if earth contained no tomb."

And with the rising of the bright morning sun, the beauteous Lily arises from her watery lair, decked in new loveliness, fresh from the bosom of the crystal waters—

"Those virgin Lilies all the night
Bathing their beauties in the lake,
That they may rise more fresh and bright
When their beloved sun's awake."

According to the observations of Linnæus, the flowers are not fully opened till about seven in the morning, and close about four in the afternoon.

This highly interesting phenomenon is beautifully described by the poet :—

“ But, conscious of the earliest beam,
She rises from her humid nest,
And sees, reflected from the stream,
The virgin whiteness of her breast.

Till the bright day-star to the west
Declines, in ocean's surge to lave;
Then, folded in her modest vest,
She slumbers on the rocking wave.”

Like many other curious facts in Natural History, this very poetical peculiarity of the Water-Lily was long supposed, by men of science, to owe its existence entirely to poetic fancy; but Sir James E. Smith (than whom no one is greater in authority on English botany) says: “The sinking of the flowers under water at night having been denied, or at least doubted, I have been careful to verify it in this species. The same circumstance is recorded of the Egyptian N. Lotus, from the most remote antiquity. The stimulus of light, which, indeed, acts evidently on many other blossoms and leaves, expands and raises with peculiar force those splendid white flowers, that the pollen may reach the stigma uninjured; and when that stimulus ceases to act, they close again, drooping by their own weight to a certain depth. The still more ponderous fruit sinks to the bottom.” Coleridge, perhaps more beautifully than truthfully, remarks: “The Water-Lily, in the midst

of the waters, opens its leaves and expands its petals at the first pattering of the shower, and rejoices in the rain-drops with a quicker sympathy than the parched shrub in the sandy desert."

The fruit, or berry, of the *Nymphæa*, after sinking to the bottom, as Sir James Smith mentions, gradually decays, and the seeds thus freed from the pulpy mass are dispersed by the action of the waters, some of them probably sinking in the mud, to give birth to a progeny of young plants around the parent, while others are carried away in the stream to diffuse the species in waters which had not previously been adorned with the Lily's flower.

This splendid aquatic is not entirely without its economical uses. Gray mentions that, in his day, its roots were sometimes made into bread; but we much fear our countrywomen have now lost the art. Various writers mention that, in the Highlands of Scotland, as well as in Ireland, the roots are used to dye a dark chestnut, or brown colour; and Dr Mackay states that, in Connemara, they are used for dying wool black. Withering records the fact, that swine eat this plant—the root, we presume; but it does not appear to be a favourite article of food with farm-stock generally; for he also mentions, that while goats are "not fond of it," cows and horses refuse to eat it.

Like all the other species of Water-Lily, this one has been applied to medicinal purposes; but its alleged

properties do not seem to be recognised by the profession in the present day. The Rev. G. E. Smith remarks: "The modern Greeks make a cordial of its flowers; the eye, at least, is refreshed by their spotless delicacy. I would willingly seek medicines elsewhere; even the famished lion felt the power of beauty, gazed, and turned aside!"

The cultivation of hardy aquatics has not been much attended to in this country; but it is probable that the impulse given to this neglected department of horticulture, by the recent flowering of the Victoria Lily, will have the effect of calling attention very generally to the subject, and of inducing many who have the means at command to attempt the culture of the highly interesting tribe of water-plants, more especially of the Water-Lily family. It seems to have been too generally supposed by those who have introduced these plants to waters in the pleasure-ground, or to the more circumscribed pond of the flower-garden, that all that is necessary is to find a sufficient depth of water; and the roots or seeds being thrown into the pond or stream, they are generally left to their fate. If the effort fails in the production of the plant, more roots or seeds are thrown into the water, the cause of the failure seldom being sought to be discovered in the unsuitableness of the pond or lake for such purposes, or the absence of the necessary conditions for successful cultivation, but complacently attributed

solely to the stubborn nature of Water-Lilies, and the difficulty of transplanting them from their native waters.

To insure the success of the Great White Water-Lily, its large size requires that it should occupy a pond of, at least, three or four feet in depth, and have, likewise, plenty of surface room for the expansion of its wide-spreading foliage, which loses much of its beauty when cramped into small space. The piece of water should be freely exposed—morning, mid-day, and afternoon—to the full influence of the sun, the arboreous shade, apparently, proving prejudicial to the entire race of Water-Lilies, and preventing the maturation of their blossoms. It has been observed that the present species, in its natural habitats, occurs most frequently in those lakes from which a stream issues, and whose waters, thus kept in slight motion, and constantly though gradually renewed, are clear and free from the filth of stagnation. This condition should be carefully imitated in the formation of an out-of-door aquarium, as in its absence successful cultivation cannot be expected. We have already mentioned that Mr Paxton, very sensible of the importance of imitating the natural conditions of the Victoria, kept a continual flow of warm water into the pond, the water, in entering, being made to fall upon a small wheel fixed at the edge of the pond and touching the water, and the wheel being thus moved communi-

cated a motion to the surface not unlike the ruffling caused by a gentle breeze. A Water-Lily-pond should always be furnished with a plentiful supply of clear water, and, while the supply is constantly kept up, it is equally essential that provision be made to run off the superfluous water regularly, at short intervals, in order to preserve the purity of the pond, which, besides being greatly advantageous to the Lilies, adds considerably to the beauty of the pond itself, and, on that account alone, repays the trouble and expense. In these times of sanitary reform, a piece of stagnant water should not be accounted the ornament of a pleasure ground, yet, strange to say, such ornaments are not unfrequently found where their existence might be least suspected.

In the cultivation of aquatic plants, it is a great error to suppose that, in every case, so large a proportion of their nourishment is derived from the surrounding water, that it is a matter of little moment what kind of soil their roots are made to rest upon. The soil is of great importance in the culture of Water-Lilies, and with none of the native species, perhaps, so much as the present. The roots descend to a great depth, and it is, of course, at their lower extremities where their nourishment is chiefly obtained. The bottom of the pond should, therefore, be formed of soft mud, heavy enough not to be readily washed away; but by no means of a clayey nature, although a clay lining may be made

beneath it, as is sometimes done, to prevent the escape of the water.

The White Water-Lily being a perennial, the tuberous roots may be obtained from any of the lakes or rivers where it grows naturally; the winter season has been recommended as that best fitted for its removal. If the pond is properly prepared, and the hints we have given are attended to, it is only necessary to throw in a few of the tubers at the different places where plants are wanted to grow, a stone or other heavy substance being tied to them to prevent their shifting, and the tubers will soon strike root into the mud, and send up leaves and eventually flowers to the surface of the water. Once established, there is little fear of the continued success of this Water-Lily; it will increase and multiply, so as to render an occasional thinning necessary to preserve it within due bounds. The roots of the different species may be kept for a long period out of the water without losing their vitality. M. Delile brought roots with him from Egypt, and although they were kept out of the ground upwards of two years, yet, upon being planted in water, they immediately vegetated, and produced flowers.

The White Water-Lily may also be grown from seeds obtained in the autumn, and sown at that season. The entire fruit may be committed to the waters, and allowed to decay at the bottom, scattering the seeds amongst the mud; or the Indian plan

may be adopted of imbedding the seeds in balls of earthy matter, the weight of which settles them at the bottom.

It is a remarkable circumstance, which every one who has seen this Lily in her native waters must have remarked, that, however plentiful the plant may be upon a sheet of water or a stream, it never extends its foliage or its flowers, even under the most favourable circumstances, within a certain distance of the dry land, ceasing to grow where the water lessens in depth. Nature thus places the blossom out of the reach of many an admirer, and even sometimes temptingly tries the ardour of the more adventurous botanist. This circumstance reminds us of a pleasing story—"no fable"—which Cowper tells of his adventures one day with a Water-Lily, on the river Ouse; and we dare say the reader will be glad to have the anecdote in the poet's own words:—

“The noon was shady, and soft airs
Swept Ouse's silent tide,
When, 'scaped from literary cares,
I wander'd on his side.
My spaniel, prettiest of his race,
And high in pedigree
(Two nymphs adorn'd with ev'ry grace,
That spaniel found for me),
Now wanton'd lost in flags and reeds,
Now starting into sight,
Pursued the swallow o'er the meads,
With scarce a slower flight.

It was the time when Ouse display'd
His Lilies newly blown;
Their beauties I intent survey'd,
And one I wish'd my own.
With cane extended far I sought
To steer it close to land;
But still the prize, though nearly caught,
Escaped my eager hand.

Beau marked my unsuccessful pains
With fix'd considerate face,
And puzzling set his puppy brains
To comprehend the case.

But with a cherup clear and strong,
Dispersing all his dream,
I thence withdrew, and follow'd long
The windings of the stream.

My ramble ended, I returned;
Beau, trotting far before,
The floating wreath again discern'd,
And, plunging, left the shore.

I saw him, with that Lily cropp'd,
Impatient swim to meet
My quick approach, and soon he dropp'd
The treasure at my feet.

Charm'd with the sight, the world, I cried,
Shall hear of this thy deed;
My dog shall mortify the pride
Of man's superior breed:

But chief myself I will enjoin,
Awake at duty's call,
To show a love as prompt as thine
To Him who gives me all."

Nymphaea odorata—a deliciously odorous species, native of North America, being found “from Canada to Carolina”—is very nearly allied to our British *N. alba*, and, indeed, some botanists have applied that name to the American plant.

THE COMMON YELLOW WATER-LILY— NUPHAR LUTEA.

ONE of the many pleasing features of *Nymphæa alba*, which conspire to render it so interesting in the eye of the poet, is the snowy whiteness of its flowers, which contrast so finely with its deep green leaves, and are so effectively reflected in the crystal waters. The Yellow Water-Lily, on the other hand—of a hue which in flowers is thought to be essentially “vulgar” by those who understand the sentimental whisperings of the floral world—wants all that semblance of purity the possession of which brings her fair sister so much good-will alike from poets and proserers. The *Nuphar lutea* is accordingly by no means so generally esteemed and admired as the *Nymphæa*; nor is it indeed so universally known as an inhabitant of our waters.

The Yellow Water-Lily is, however, no despicable or inconspicuous flower; when congregated in numbers on the surface of the lake, this species, with its broad leaves and large golden yellow blossoms,

is scarcely less showy in appearance than the white flowered plant. It is, however, somewhat smaller in all its parts. By the general observer, the *Nuphar* will be readily distinguished by the golden hue of its cup-shaped flowers; but the botanist finds more important structural distinctions betwixt this plant and the *Nymphæa*, in the number of the calyx segments, insertion of the petals, &c., which are considered sufficient to warrant their separation into distinct genera. Smith was indeed quite decided in his opinion of the genus *Nuphar* "being essentially different" in structure from *Nymphæa*; and succeeding botanists have corroborated his views. In general appearance, the foliage of the Yellow Water-Lily does not differ materially from that of the *Nymphæa*; but it has been observed, that, besides the leaves which are presented to view floating on the surface of the water, the plant bears a distinct set of leaves which never appear above the surface, and which have been described as tenderer, more undulated, and shorter, their lobes being very much divaricated or extended, and hence approaching to kidney-shaped.* The flowers, which measure two inches or more in width, have an odour resembling that of brandy, a fact which, we think, was first observed by Ray. In some places—Norfolk especially, we are told—the

* Botanical Magazine.

epithet of "Brandy-bottles" has been applied to this plant. The name has no doubt arisen from the odour of the flowers taken in connection with the peculiar "flagon-shaped" seed-vessels by which they are succeeded. The berry or seed-vessel of this plant, unlike that of the White Water-Lily, bursts when ripe for the emission of the seeds, not dissolving into a soft pulp, as we have already noticed to be the case with the *Nymphæa*.

We have already referred to the fact of various species of Water-Lily being edible, and used for food both by man and the lower animals; and even in the case of the sacred Lotus, "Achilles was so profane as to feed his horses with it." The roots of the Yellow Water-Lily, while they are eaten by some animals, prove poisonous to others. Withering states, on the authority of Linnæus, that the root rubbed with milk destroys crickets and cockroaches; and that, as already mentioned regarding the *Nymphæa alba*, although swine eat it, goats are not fond of it, and cows, sheep, and horses refuse it. The same botanist mentions that it has proved poisonous to moles. Smith thinks that the flowers are perhaps used to communicate a flavour, by infusion, to the cooling liquors or sherbets used in the Levant.

While the Great White Water-Lily chiefly inhabits the clear and still waters of the lake or the quiet river, the Yellow Water-Lily, on the other hand, dwells oftener in the running streams and ditches,

and especially in those deep pools formed near the margins of extensive lakes, or in immediate connection with them. So situated, the Nuphar is often more conveniently within the easy reach of the botanical collector than the Nymphæa ever ventures. The preference which this plant shows for pools and shallows seems to recommend it as peculiarly suitable for cultivation where the accommodation of a large pond, so necessary for the Nymphæa, cannot be had. It must not, however, be supposed, when we mention the plant as growing in pools, that, under cultivation, it will thrive in any sort of a muddy puddle. All the family of Water-Lilies love pure waters, clear as crystal, and attention to this fact is the main element in their culture.

THE LEAST YELLOW WATER-LILY— NUPHAR PUMILA.

THE various Water-Lilies which have occupied our attention in the preceding pages are all distinguished from the common races of plants by their gigantic size, the gorgeous colouring of their blossoms, and their general nobility of aspect, and may well be ranked among the most imposing objects of the vegetable creation. We now come to detail the history of a species which wants all the superior elegance and beauty that so pre-eminently distinguish its more noble kindred.

However different it may be with the ordinary observer, the scientific botanist does not recognise elegance of form and richness of colouring as the only criteria by which to judge of the beauty and interest of a plant; many peculiarities of structure and habit he investigates, which could not enter into the calculations of the non-botanical admirer; and, accordingly, we find that the Least Water-Lily, humble though it be, and faint the colouring of its

tiny flowers, is to the botanist one of the most interesting plants that adorn the waters of our native land. In the Victoria Regina is presented the most lovely of all Water-Lilies, even the most gorgeous member of the vegetable kingdom; but, in the little *Nuphar pumila*, we see a plant essentially of the same family, similar in its habits, and not far removed in its structural characters, but proportionally minute in all its parts as the other is gigantic. If, on the one hand, the colossal size and gorgeous colouring of the Great American Water-Lily excite a reverential wonder and admiration in every beholder, it gives not the genuine botanist less cause to wonder and admire, when his contemplation of the tiny *Nuphar* discovers to him the same infinite skill displayed in its minute structure, which equally bears the same unmistakeable stamp of divinity, and is equally a perfect and beautiful work—indeed, “very good.” And thus it is with all the other humble things of creation. Even—

“A blade of silver-hair-grass nodding slowly
In the soft wind—the thistle’s purple crown,
The ferns, the rushes tall, and mosses lowly—
A thorn, a weed, an insect, or a stone—
Can thrill me with sensations exquisite,
For all are exquisite; and every part
Points to the Mighty Hand that fashion’d it.”

The *Nuphar pumila* is not only the least of all our native Water-Lilies; it is also the rarest, being, as a

British plant, almost exclusively confined to a few of our Scottish lakes. In general appearance, it resembles some of the other species; but is very small in all its parts—the leaves measuring about three inches in length, and the flowers about an inch and a half in width. Like the *Nuphar lutea*, its blossoms are yellow, but of a paler yellow than the flowers of that plant, and slightly tinged with green. The *Nuphar pumila* is supposed by some botanists of high authority to be identical with the *N. Kalmiana* of the American botanists—a species which inhabits Canada, and which has been described as “almost a counterpart in miniature of the European Common Yellow Water-Lily.” Indeed, it has been hinted that the present is only a small variety of the preceding *N. lutea*; but Sir James Smith considered this a “most distinct species.” It is generally recognised as a species by the botanists of the present day, but they do not seem to have entirely made up their minds on the subject of its specific distinction.

The humble and unassuming aspect of this Water-Lily does not give it a very strong claim upon the attention of the cultivator; it is by no means a very ornamental plant, although valued highly by the British botanist, and does not by any means form a conspicuous object on the open-air pond. However, what it wants in show is made up for by its botanical interest, which should find for it a place in every collection of aquatics. From its small size, it does not

require extensive accommodation, and may readily be grown in a small tub, or in a tank among other water plants. Like the two preceding species of Water-Lily, the *Nuphar pumila* flowers in the month of July. The great attention which botanists have recently been paying to aquatic plants (and which has already been rewarded by several interesting discoveries), give us reason to hope that this plant may ere long be discovered in lakes to which it has been hitherto considered a stranger.

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