With William Stearn's
kind regards
(but see pp. 49-51!)

JOHN RAY'S NATURAL HISTORY TRAVELS IN BRITAIN

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Introduction

John Ray, the most distinguished British naturalist of the 17th century, was born in 1628 in a little English village, Black Notley, near Braintree, Essex, and there he died in 1707 (Raven 1942, Baldwin 1986). His publications on botany, zoology and theology brought him international renown; they are so numerous that the description of their editions proved a formidable task even for so experienced and distinguished a bibliographer as Sir Geoffrey Keynes. He wrote "It may be that I should never have attempted to compile a full-scale bibliography of his works; but the versatility of his attainments, the variety of his books, and the real nobility of his character made him irresistible". Keynes' detailed work thus brings forward "evidence in a bibliographical dress of his modesty, his loyalty, and his integrity" (Keynes 1951: ix). Ray was also the most travelled British naturalist of his century, together with his friend Sir Francis Willughby (1635-1672).

Ray's travels extended from Stirling in Scotland to Malta and Sicily, where he climbed Mount Etna up to the snow-line. They provided the background and much of the material for his natural history publications. He and Willughby undertook such journeys out of their wide-ranging curiosity, and fortunately most of them are surprisingly well recorded. My intention in this symposium, on 'The Long Tradition: the Botanical Exploration of the British Isles', is to sketch their travels in Britain, which contributed so much first-hand information on the distribution of British plants to Ray's *Catalogus Plantarum Angliae* (1670) and *Synopsis Methodica Stirpium Britannicarum* (1690, 1696). These two books are the forerunners of later comprehensive British Floras, notably those of J.E. Smith, Babington, and Bentham, down to that of Clapham, Tutin and Warburg. They form an important part of our long tradition of botanical recording. Ray made, as a result of his extensive travels, so many first records of plants from widely dispersed localities that he takes an honoured place as a pioneer observer in many local Floras, for example those of Cornwall, Devon, Essex, Gloucestershire, the Isle of Man, Middlesex, Monmouthshire, Northamptonshire, Suffolk, Yorkshire and Westmorland.

Although the journeys of Ray and Willughby were innovatory as regards the investigation of the plants, birds and fishes of Britain, they were by no means so as regards the antiquities and buildings which also received their attention. During the Middle Ages nobles, diplomats, churchmen, traders, soldiers and people on pilgrimage necessarily travelled about the country, but few endured the discomforts and hazards of journeying merely out of curiosity. Such inquisitive English tourism did not start until after the end of the Wars of the Roses and the beginning of the Tudor reign under Henry VII in 1485. Moir (1964: xiv) has stated that for the English upper and middle classes "the habit of touring their native land began in the sixteenth century; it is a Tudor phenomenon. Better roads and improved cartography were making travel easier and safer, but the motive force was pride in the greatness of Tudor England, and a curiosity both in the historic roots of that greatness and its contemporary manifestations.... It became a popular pastime among gentlemen of leisure to travel for weeks, even months, in the discovery of their own country". Among the first of such travellers was John Leland (1503-1552), librarian to Henry VIII, who spent ten years wandering over England, partly to examine monastic libraries but primarily "to see throughly all those partes of this your opulent and ample reaulme" and to record them all. Unfortunately his *Itineraries* were not published until 1710-1712, too late for use by Ray and Willughby (Hearne 1710-12).

They had, however, available in Latin the *Britannia* (1586) by the antiquary William Camden (1551-1625), of which a much enlarged sixth edition appeared in 1607 and an English translation by Philemon Holland in 1610. This provided a general account. Far more useful, for those planning such long journeys as those of Ray and Willughby, were the maps of England and Wales by the Tudor cartographers. The two maps of 1573 by Humphrey Llwyd, published by Ortelius, which were "the first really good detailed maps of both these kingdoms" (Tooley 1949), had been followed in 1579 by the superb county maps of Christopher Saxton. These show rivers, towns and villages, with green conical figures to represent hills - but no roads. A reduced edition of Saxton's maps on six sheets folded for convenience and thus "portable for everyman's pocket" was published in 1644. These presumably would have been the ones used by Ray and Willughby. However to find the best way from place to place they must have asked local inhabitants.

The first cartographer to insert roads on British maps was a versatile Scotsman, John Ogilby (1605-1676), who published *Britannia....the Principal Roads thereof* in 1675 with 100

copper-plates. The roads themselves were mostly in a literally dreadful state, despite an Act of Parliament of 1555 which made the upkeep of roads a parish responsibility. They were dusty in summer, and their deep ruts and holes became in winter "ponds of liquid dirt", dangerous to foot-travellers and horsemen alike. For us, able to get to most places in Britain by cars, motor coaches, trains, or even planes and helicopters, equipped with guide-books and Ordnance Survey and other maps, protected by warm and waterproof clothing, it is difficult to realise how heroic, slow, and uncomfortable, by our standards, were the journeys of Ray and Willughby and the earlier botanical journey, in 1629, of Thomas Johnson (Brightman 1986). It was Johnson's intention in 1636 "to travell over the most parts of this Kingdome" (Gerard 1636) in search of plants, and he visited twenty-five English and Welsh counties (Kew and Powell 1932: 137). The death at the age of 40 of Johnson, this able, enthusiastic and intrepid apothecary and brave Royalist officer, in 1644 during the siege of Basing House near Basingstoke by Parliamentary forces, was a sad blow to the continued progress of British floristic botany. William How (1620-1656) and Christopher Merrett (1614-1695) did their best to keep it alive, as did a number of apothecaries, physicians and clergymen who were interested in plants but published nothing. Johnson's effective successor was Ray who, at Johnson's death, had just become a student at Cambridge. Ray was then a boy of seventeen with no particular interest in botany; but undoubtedly he had been made acquainted with some medicinally reputed plants by his herbwoman mother.

A Cambridgeshire Flora

According to Ray's own statement, the beauty and diversity of the wild flowers around Cambridge, much more numerous and species-rich then than now, enticed him to their study after recovering from illness in 1650. This resulted, ten years later, in his anonymous *Catalogus Plantarum circa Cantabrigiam nascentium* (1660), of which an English translation with modern scientific names has recently been published (Ewen and Prime 1975).

This was a carefully produced, methodical little book, with the stated aim of illustrating the glory of God by a knowledge of the works of Nature, of enhancing the repute of the University of Cambridge, and of enriching life by such study, indeed of reviving the almost extinct and moribund study of plants. Extensive fieldwork and close study of the literature, notably the works of Jean (Johann) and Gaspard (Caspar) Bauhin, of Gerard, and of Parkinson, underlay it, foreshadowing his later achievements. By then Ray had begun to

plan a more ambitious undertaking, an account of all the plants of Britain. He started with the intention of writing to "all my friends and acquaintance who are skilful in Herbary to request them this next summer to search diligently his country for plants, and to send me a catalogue of such as they find, together with the places where they grow" (letter to Willughby, 1659, quoted in Raven 1942: 111).

This statement and the acknowledgements of sources of information in Ray's works provide evidence of that widespread amateur interest in plants which has made Britain one of the most thoroughly explored countries in the world botanically.

Ray and Willughby

Ray became a tutor at Trinity College, Cambridge in 1653. Among his students was Francis Willughby. They had very different backgrounds; Ray was the son of a village blacksmith, Willughby the heir to a baronetcy and wide estates in the Midlands, but a similar thirst for learning and skill in mathematics, a similar conscientious diligence in enquiry, especially regarding natural history, united them in friendship. Their interests were complementary but overlapped. To quote from William Derham's life of Ray - the *Select Remains* (published 1760; reprinted in Lankester 1846) "These two gentlemen, finding the 'History of Nature' very imperfect, had agreed between themselves, before their travels beyond sea, to reduce the several tribes of things to a method; and to give accurate descriptions of the several species, from a strict view of them. And forasmuch as Mr. Willughby's genius lay chiefly to animals, therefore he undertook the birds, beasts, fishes, and insects, as Mr. Ray did the vegetables.... Mr. Ray lived to bring his part to great perfection.... Mr. Willughby carried his as far as the utmost application and diligence of a short life could enable him" (Lankester 1846: 33).

Derham recorded this account of the division of labour "as I had it from Mr. Ray himself, when I waited upon him at Black Notley, May the 15th, 1704". In furtherance of this plan, they needed to see their objects of study at first-hand, whenever possible in natural habitats, which necessitated extensive travel.

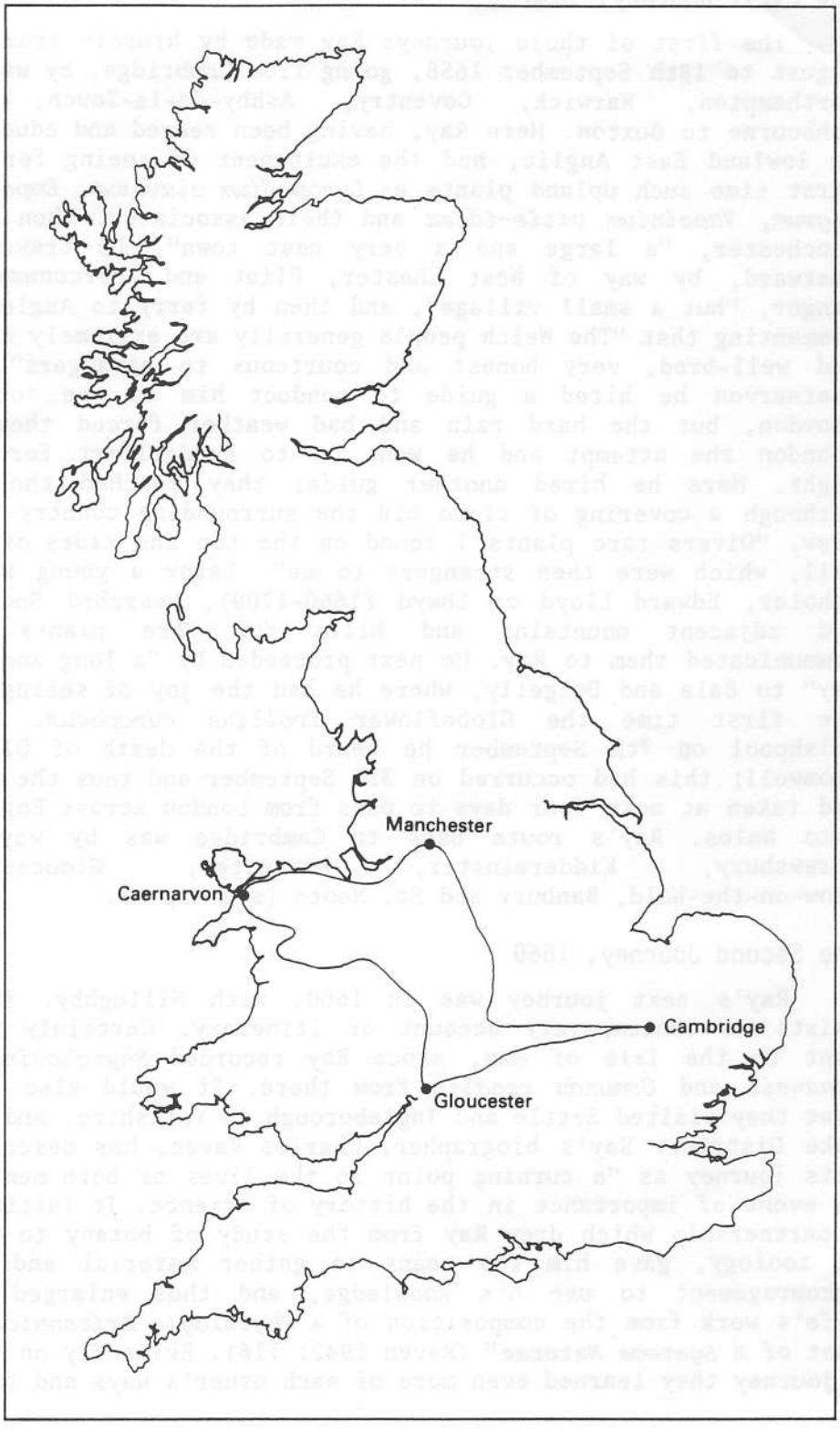
Of their journeys, the itineraries of which were abstracted from Ray's original journals and published by George Scott in 1760 (reprinted in Lankester 1846), limitations of space permit no more than an outline here. In this summary, the spellings of place-names have been modernised where unambiguous.

The First Journey, 1658

The first of these journeys Ray made by himself from 9th August to 18th September 1658, going from Cambridge, by way of Northampton, Warwick, Coventry, Ashby-de-la-Zouch, and Ashbourne to Buxton. Here Ray, having been reared and educated in lowland East Anglia, had the excitement of seeing for the first time such upland plants as *Lycopodium clavatum*, *Empetrum nigrum*, *Vaccinium vitis-idaea* and their associates. Then from Manchester, "a large and a very neat town", he travelled westward, by way of West Chester, Flint and Aberconway to Bangor, "but a small village", and then by ferry to Anglesey, commenting that "The Welch people generally are extremely civil and well-bred, very honest and courteous to strangers". At Caernarvon he hired a guide to conduct him to the top of Snowdon, but the hard rain and bad weather forced them to abandon the attempt and he went on to Beddgellert for the night. Here he hired another guide; they reached the top although a covering of cloud hid the surrounding country from view. "Divers rare plants I found on the top and sides of the hill, which were then strangers to me". Later a young Welsh scholar, Edward Lloyd or Lhwyd (1660-1709), searched Snowdon and adjacent mountains and hills for rare plants and communicated them to Ray. He next proceeded by "a long and bad way" to Bala and Dolgelly, where he had the joy of seeing for the first time the Globeflower *Trollius europaeus*. Near Welshpool on 7th September he heard of the death of Oliver Cromwell; this had occurred on 3rd September and thus the news had taken at most four days to pass from London across England into Wales. Ray's route back to Cambridge was by way of Shrewsbury, Kidderminster, Worcester, Gloucester, Stow-on-the-Wold, Banbury and St. Neots (see Map 1).

The Second Journey, 1660

Ray's next journey was in 1660, with Willughby. There exists no contemporary account or itinerary. Certainly they went to the Isle of Man, since Ray recorded *Rhynchosinapis monensis* and *Osmunda regalis* from there. It would also seem that they visited Settle and Ingleborough in Yorkshire, and the Lake District. Ray's biographer, Charles Raven, has described this journey as "a turning point in the lives of both men and an event of importance in the history of science. It initiated a partnership which drew Ray from the study of botany to that of zoology, gave him the means to gather material and the encouragement to use his knowledge, and thus enlarged his life's work from the composition of a *Phytologia Britannica* to that of a *Systema Naturae*" (Raven 1942: 116). Evidently on such a journey they learned even more of each other's ways and found



Map 1

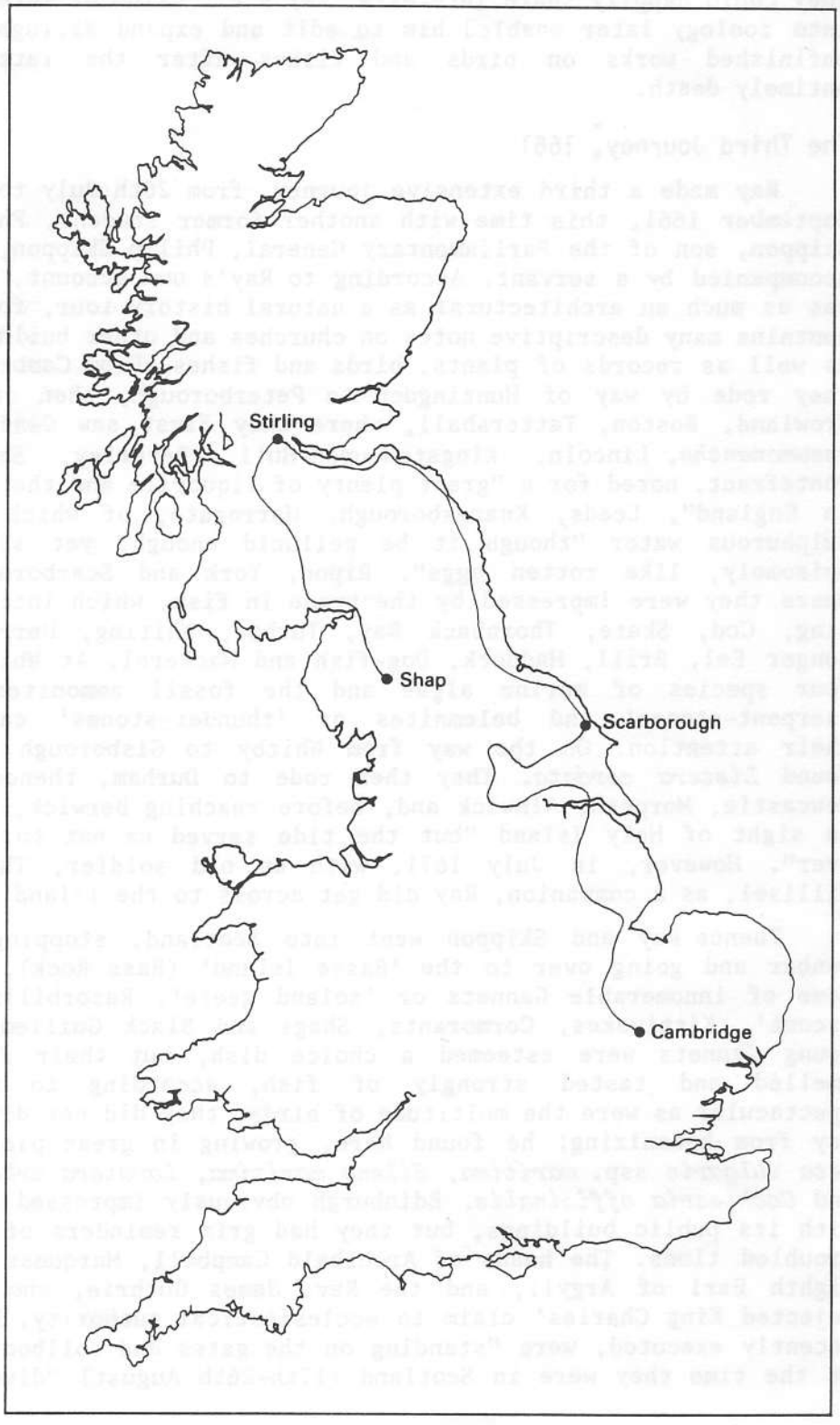
Journey of John Ray in 1658

they could happily share interests. Ray's extension of interest into zoology later enabled him to edit and expand Willughby's unfinished works on birds and fishes after the latter's untimely death.

The Third Journey, 1661

Ray made a third extensive journey, from 26th July to 7th September 1661, this time with another former student, Philip Skippon, son of the Parliamentary General, Philip Skippon, and accompanied by a servant. According to Ray's own account, this was as much an architectural as a natural history tour, for it contains many descriptive notes on churches and other buildings as well as records of plants, birds and fishes. From Cambridge they rode by way of Huntingdon to Peterborough, then on to Crowland, Boston, Tattershall, where they first saw *Gentiana pneumonanthe*, Lincoln, Kingston-upon-Hull, Beverley, Selby, Pontefract, noted for a "great plenty of liquorice and the best in England", Leeds, Knaresborough, Harrogate, of which the sulphurous water "though it be pellucid enough, yet stinks noisomely, like rotten eggs", Ripon, York and Scarborough, where they were impressed by the trade in fish, which included Ling, Cod, Skate, Thornback Ray, Turbot, Whiting, Herring, Conger Eel, Brill, Haddock, Dog-fish and Mackerel. At Whitby, four species of marine algae and the fossil ammonites or 'serpent-stones' and belemnites or 'thunder-stones' caught their attention. On the way from Whitby to Gisborough they found *Listera cordata*. They then rode to Durham, thence to Newcastle, Morpeth, Alnwick and, before reaching Berwick, came in sight of Holy Island "but the tide served us not to pass over". However, in July 1671, with an old soldier, Thomas Willisel, as a companion, Ray did get across to the island.

Thence Ray and Skippon went into Scotland, stopping at Dunbar and going over to the 'Basse Island' (Bass Rock), the home of innumerable Gannets or 'soland geese', Razorbills or 'scout', Kittiwakes, Cormorants, Shags and Black Guillemots. Young Gannets were esteemed a choice dish, but their flesh smelled and tasted strongly of fish, according to Ray. Spectacular as were the multitude of birds, they did not divert Ray from botanizing; he found here, growing in great plenty, *Beta vulgaris* ssp. *maritima*, *Silene maritima*, *Lavatera arborea* and *Cochlearia officinalis*. Edinburgh obviously impressed them with its public buildings, but they had grim reminders of the troubled times. The heads of Archibald Campbell, Marquess and eighth Earl of Argyll, and the Rev. James Guthrie, who had rejected King Charles' claim to ecclesiastical authority, both recently executed, were "standing on the gates and tollbooth". At the time they were in Scotland (17th-26th August) "diverse



Map 2

Journey of John Ray and Philip Skippon in 1661
(Route from Shap back to Cambridge not recorded)

women were burnt for witches", they reported, "to the number of about 120".

From Edinburgh the party rode by way of Stirling to Glasgow, "the second city in Scotland, fair, large, and well built, cross-wise, somewhat like unto Oxford, the streets very broad and pleasant". From Glasgow they rode on to Douglas and Dumfries, then on 26th August bade farewell to Scotland and reached Carlisle, fording three rivers on the way. Homeward bound for Cambridge they found many uncommon upland plants about Shap in Westmorland, including *Trollius europaeus*, *Primula farinosa*, *Saxifraga aizoides*, *Saussurea alpina* and *Huperzia selago*.

Ray, one regrets to record, did not get a very favourable impression of the Scots. "The women, generally, to us seemed none of the handsomest. They are not very cleanly in their houses, and but sluttish in dressing their meat. Their way of washing linen is to tuck up their coats, and tread them with their feet in a tub.... The Scots cannot endure to hear their country or countrymen spoken against. They have neither good bread, cheese, or drink. They cannot make them, nor will they learn. Their butter is very indifferent, and one would wonder how they could contrive to make it so bad. They use much pottage made of coal-wort, which they call keal, sometimes broth of decorticated barley. The ordinary country houses are pitiful cots, built of stone, and covered with turves, having in them but one room, many of them no chimneys.... The people seem to be very lazy, at least the men, and may be frequently observed to plough in their cloaks. It is the fashion of them to wear cloaks when they go abroad, but especially on Sundays. They lay out most they are worth in cloaths, and a fellow that hath scarce ten groats besides to help himself with, you shall see come out of his smoaky cottage clad like a gentleman.... The people here frequent their churches much better than in England, and have their ministers in more esteem and veneration". For those who have in these recent days enjoyed the good food of Edinburgh, most of Ray's comments make strange reading indeed. The Scottish Enlightenment and industrial prosperity had yet to come. On this journey Ray and Skippon had travelled some 700 miles (see Map 2).

The Fourth Journey, 1662

Ray's fourth major journey, from 8th May to about 20th July 1662, was made in company with Willughby. Whereas in the account of the third journey relatively few plants and birds received mention, the account of this journey abounds with notes on them, which Raven attributed to the energy and

enthusiasm of Willughby. Ray and Willughby set out from Cambridge on 8th May 1662 and rode by way of St. Neots to Northampton, then by way of Rugby, Coventry and Coleshill, to Middleton, Willughby's residence and later for some years also Ray's home. Here Skippon presumably joined them. Their route took them to Stafford, Nantwich, Chester and Wrexham, and so into north Wales. On a bushy hill near Denbigh, Ray found, in addition to many other plants, *Lithospermum purpurocaeruleum* and *Hypericum montanum*, seemingly for the first time. They then made their way to Bettws, Conway, Bangor, Beaumaris and Penmaenmawr, from here crossing to the island of Prestholm (Puffin Island), on which grew *Smyrnium olusatrum*, *Cochlearia officinalis*, *Crithmum maritimum*, *Beta vulgaris* ssp. *maritima* and *Erodium maritimum*: a characteristic seaside assemblage. Sea-birds also abounded.

Their southward, coastal, route was to 'Llandwyn', Caernarvon, Llanberis and Beddgelert, with *Meconopsis cambrica* and *Pseudorchis albida* seen on the way. They climbed Snowdon and then from Aberdaron on 29th May went by boat to the island of Bardsey, which yielded *Scilla verna*, *Erodium maritimum* and *Asplenium marinum*. Continuing southward they visited Harlech, Aberdovey, Talybont, Cardigan, and St. Davids, then Haverfordwest and Tenby. The last was notable for the extraordinary diversity of fish caught nearby, at least twenty-eight species being for sale, including shellfish, crabs, etc. An excursion to Caldy Isle, where the nests of gulls and terns so closely covered the ground that "a man can scarce walk but he must needs set his foot upon them", produced the same maritime plants seen elsewhere but also *Lavatera arborea* and *Inula crithmoides*. Continuation of their journey across southern Wales, by way of Kidwelly, Llandaff, 'Newton', Caerwent, 'Creek', Chepstow and Tintern Abbey, brought them back into England and to Gloucester.

Here Willughby left, presumably to return to Middleton, and Ray and Skippon went on to Sodbury, Alderley and Bristol, including St. Vincent's Rock. They left Bristol on 20th June and travelled to Bath, Wookey Hole, Wells, Glastonbury, Taunton, Wellington, Tiverton, Barnstaple, Bideford and Kilkhampton. Here in Cornwall they found such characteristic western plants of moorland as *Wahlenbergia hederacea*, *Scutellaria minor*, *Narthecium ossifragum*, *Pinguicula lusitanica* and *Hydrocotyle vulgaris*. Going southward they passed through Holsworthy and Launceston, then westward to Tintagel and Padstow, near which they saw great flocks of Choughs, now so rare, and on to St. Columb, Truro and St. Ives. Ray noted that "nothing [is] more common than *Osmunda regalis* about springs and rivulets in this country". This was, of course, long before

Map 3

Journey of John Ray, Francis Willughby and Philip Skippon in 1662
(Route from Windsor back to Cambridge not recorded)

the ruthless large-scale uprooting of this conspicuous species for sale during the Victorian fern craze (Allen 1969) exterminated it in so many localities.

On the way from Land's End to Penzance, near St. Ives, they discovered a little plant previously unknown, *Sibthorpia europaea;* later, on the beach at Penzance, *Otanthus maritimus* and *Euphorbia peplis* were among the rare plants which caught their attention. The route eastward took them to Penryn, Falmouth, Saltash, near which *Melittis melissophyllum* grew in great plenty, and then to Plymouth, near which grew *Eryngium campestre*, previously unknown to Ray, and *Rubia peregrina;* then onwards through Modbury and Dartmouth, Exeter and Salisbury to Amesbury, where they visited Stonehenge, for Ray a second visit. They then rode on to Stockbridge, Winchester, Alton, Farnham, Windsor and back to Cambridge (see Map 3).

Other Travels

The above were Ray's major recorded journeys, but it is evident that he had travelled much before then, as his reference to a previous visit to Stonehenge, for example, makes evident, and he also travelled extensively afterwards, in Suffolk, Essex and Kent, and then in 1667 again to Land's End. He became acquainted with Thomas Willisel, who had been a soldier in the Parliamentary army under John Lambert, victorious at Dunbar and Worcester, and thus was used to rough living. Willisel was employed as a collector by Morison and Merret, and later by the Royal Society and Ray; being sharp-eyed, he brought many plants to their notice. Ray wrote of him, after his death in 1675, that "he was indefatigable and could endure hardship and live as well upon oatcake and whig [buttermilk] as another man upon flesh and wine, and ramble over hills and mountains and woods and plains" (quoted in Raven 1942: 151). In 1671, Ray and Willisel made a journey together in the north of England, visiting Holy Island, Malham Cove, Settle, etc. Their finds, as listed by Raven (1942: 153) were remarkable indeed. These included *Tofieldia pusilla*, "about two miles from Berwick, in a boggy ground" from which it disappeared long ago, *Mertensia maritima*, *Epipactis atrorubens*, *Polygonum viviparum*, *Arenaria* [*Minuartia*] *verna*, *Polygonatum anceps* [*P. odoratum*], *Sedum villosum*, *Alchemilla alpina*, *Lobelia dortmanna*, *Cornus suecica* and *Potentilla fruticosa*.

The itineraries above may make tedious reading, but are important because they show how extensive was the fieldwork on which Ray's accounts of the British flora were based, and how reliable in consequence were his records of distribution. He not only traversed many counties, but he also examined the

plants of many different lowland and upland habitats in England, Wales and the south of Scotland.

Floristic Publications

The first major published result of all this botanical exploration was Ray's *Catalogus Plantarum Angliae et Insularum Adjacentium* (1670), dedicated to Willughby, with a supplement *Fasciculus Stirpium Britannicarum* (1688). Here Ray stated that he had explored the country from Land's End in Cornwall to Berwick and Carlisle in the north, in order to see for himself the plants in their habitats. Almost all the species were listed from first-hand evidence, except for a few included on the authority of L'Obel and Johnson. Among them were species new to science.

Ray followed this with his *Synopsis Methodica Stirpium Britannicarum* (1690; 2nd edition 1696; 3rd edition 1724; Ray Society facsimile, Ed. Stearn, 1973). This was stated (Pulteney 1790: 235) to have been "the pocket companion of every *English* botanist", who must have had capacious pockets indeed to hold a volume which by the third edition (1724) comprised 524 pages with 24 plates! It differed from the earlier *Catalogus* in being arranged not alphabetically by generic name but according to Ray's classification of the vegetable kingdom. Numerous friends sent him records of plants, but on almost every page comes evidence of observations resulting from his travels. The entry relating to *Lavatera arborea* (Ray 1724: 252) will suffice as an example: "Malva arborea marina nostras *Merr. P. Park.* 301. sine Icon. *English Sea-tree Mallow.* I have observed it in many Places by the Sea-side, as at *Hurst-Castle* over-against the Isle of *Wight*; in *Portland* Island; on the Rocks of *Caldey* Island; and on the *Basse* Island near *Edinburgh* in *Scotland*".

Linnaeus

When Linnaeus wrote his *Species Plantarum* (1753), his herbarium contained no British plants. His knowledge of them came entirely from published works, the most important being those of Ray. Using the third edition of Ray's *Synopsis* (1724) he compiled the dissertation *Flora Anglica* (1754; 1759; Ray Society facsimile, Ed. Stearn, 1973) providing Linnaean binomial specific names for species recorded by Ray, e.g. *Lithospermum officinale* for Ray's 'Lithospermum seu Milium Solis'; *Lithospermum purpurocaeruleum* for Ray's 'Lithospermum majus Dodonaei, flore purpureo, semine Anchusae'; *Lithospermum arvense* for Ray's 'Buglossum arvense annuum Lithospermi folio'. According to Dandy (quoted in Stearn 1973: 45) "out of 1094 identifications made by Linnaeus more than sixty per cent of

the names are exactly those still in use (allowing for a few orthographical adjustments); and that a further twenty-five per cent were accurately applied, though now transferred to other genera or reduced to synonymy. Only fifteen per cent are errors by modern standards, and many of these were originally correct according to the different specific limits adopted in Linnaeus's time".

Conclusion

This new Linnaean binomial nomenclature made Ray's polynomial nomenclature obsolete; it destroyed the utility of Ray's *Synopsis* as a guide to the naming of British plants but not the validity of his observations. Ray had travelled over Britain and recorded its flora before the Industrial Revolution, urban expansion and major changes in land use had drastically affected it. In wilder places we can still find the same species as Ray did; in others, for example, as around Cambridge, the plants and their habitats have gone for ever. We can be grateful that, through their journeys and as part of a long tradition of recording, Ray and his contemporaries have left us so much information about a vanished Britain.

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