BOTANICAL SOCIETY OF THE BRITISH ISLES

WELSH BULLETIN

Editors : R. D. Pryce & G. Hutchinson

No. 71, WINTER 2002 / 2003

Life-size photocopy of specimen of *Pilularia globulifera* (Pillwort) found at garden centre (see p. 12).

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All back issues of the BSBI Welsh Bulletin are still available on request (originals or photocopies). Please send cheque (made payable to BSBI Wales), @ £1 per issue, which includes p & p, to - Dr G. Hutchinson, Department of Biodiversity & Systematic Biology, National Museum & Gallery, Cathays Park, Cardiff CF10 3NP, specifying the issue number, or year (which would have to include the season or month). Large runs - price negotiable.

EDITORIAL

The BSBI Exhibition Meeting was held in the National Museum and Gallery of Wales, Cardiff on 23rd November and despite vast crowds attending the rugby international and congestion on the motorway, was well attended and included a good number of exhibits. One of the most topical was that provided by Geoffrey Kitchener entitled, "Another New British/Australasian *Epilobium* hybrid: *E. parviflorum* (Hoary Willowherb) x *E. briunescenes* (New Zealand Willowherb)" – several in attendance thought this particularly fitting in view of the day's rugby match with New Zealand! The opportunity was taken for Welsh BSBI members to propose a toast of congratulations to David Pearman in person, and Trevor Dines and Chris Preston *in absentia*, on the publication of the *New Atlas of the British and Irish Flora*, a monumental achievement not just for the editors and contributors but for the BSBI as a whole, and a milestone in the Society's history.

Celebrations continued with the presentation of the BSBI Award to Sarah Priest for outstanding achievement in the botanical identification modules of the University Certificate in Biological Recording and Species Identification from the University of Birmingham, run by BSBI jointly with the Field Studies Council, where a student has studied all botanical modules and has achieved over 70% (A or A* grades) in all assignments. Sarah is the first student to ever do this! The BSBI continues to support education initiatives for young ecologists and botanists and this is just one of several schemes at a range of levels which also includes *Spotlight on Plants* for A and AS level students.

As the Exhibition Meeting was held in a public gallery, it was an opportunity for the BSBI to present a flavour of what it does to museum visitors and a number of non-members were seen browsing the exhibits during the afternoon. A short report of the meeting is on the BSBI web site www.bsbi.org.uk

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I felt some gratification when I received an invitation to attend the launch of the Section 74 List of the Countryside and Rights of Way Act as applied to Wales, in my capacity as BSBI President. This list replaces the UK Biodiversity Action Plan list of Priority Habitats and Species in Wales and although members of the BSBI Welsh Committee were not consulted about the proposed changes, we made representations and our views were given consideration. The event took place at Kenfig NNR on 28th November and was held jointly with the launch of the Bridgend Local Biodiversity Action Plan. Sue Essex, Environment Minister of the Welsh Assembly, gave the keynote speech. The new list amends the UK BAP Priority List by adding some habitats and species and deleting others which do not occur in Wales. We are no longer supposed to call them Priority Species (or Habitats) but they now rejoice in the title of Species (or Habitats) of Principal Importance for Conservation of Biological Diversity (under Section 74 of the Countryside and Rights of Way Act 2000 in Wales)! Additions include high profile species such as Curlew, Lapwing, Golden Plover and Yellowhammer but on examination of the vascular plant additions, only three of those dozen or so considered by the Assembly have been included. They are *Campanula patula, Chamaemelum nobile* and *Valerianella rimosa*. I feel slightly disappointed at this, especially as the proposed extra Section 74 habitats were similarly pruned and additions only include Lowland Mixed Deciduous Woodland and Upland Birch Woodland. A copy of the new list can be requested from the Assembly web site at
www.inforegister.wales.gov.uk/recdetails.asp?id=149489

I do feel, however, that by attending this and similar events, the profile of the BSBI can be increased, albeit by a small amount – in fact, on this occasion, several of those present went away in the knowledge that, contrary to their previous belief, there *is* such an organisation as the BSBI and that it *is* very active in Wales.

With the latest BSBI News mailing, you will have received instructions for carrying out the Local Change recording scheme. Pete Selby is co-ordinating the project and is well along the road of setting-up all Vice-county Recorders with the means to complete the surveys successfully over the next two field seasons. If you wish to assist in field-recording or in office tasks such as dealing with record-cards or computer input, particularly if you are new to the Society, please contact your local Vice-county Recorder who is listed in the current Year Book.

Many of this year's field meetings include recording for the Local Change scheme and afford the opportunity for you to make a real contribution to our assessment of the changes to our flora which have taken place over the last fifteen years. Personally, I enjoy looking at places which may not be recognised botanical hot-spots, but which nevertheless, often contain good habitats which often support scarce plants not previously recorded. So good luck with the scheme, and I hope to be able to see you at one or more organised meetings during the season.

Richard Pryce 3/2/03

BSBI WALES ANNUAL GENERAL MEETING 2002
Saturday 6th July 2002 at 5.30 p.m.

The 10th Quadrennial, 40th Annual and 20th Exhibition Meeting of the BSBI in Wales took place at Plas Tan y Bwlch, Snowdonia National Park between 5th - 7th July, 2002

Introduction: The Chairman, Richard Pryce, welcomed everyone, especially visitors from England and Scotland and Pete Selby. Pete has recently been appointed as BSBI Volunteers Officer with part of the grant from the Heritage Lottery Fund.
Congratulations were offered to Peter Macpherson on the award of an MBE and to Peter Jones on the birth of a daughter; also our sympathies to Jean Green on the death of her husband.
The Chairman thanked Trevor Dines and Ian Bonner for organising the weekend.

Apologies for absence: Stephen Evans, Dr George Hutchinson, Dr Quentin Kay, Mike Porter, Joe Phillips, Ray Woods and David Pearman.

Minutes of the last AGM: Accepted, as published in *Welsh Bulletin* **70**: 4-6, without amendment, proposed by Arthur Chater and seconded by Trevor Evans.

HON. SECRETARY'S REPORT:
Gwynn Ellis congratulated Richard Pryce on becoming President of the Society.
Two issues of the *Welsh Bulletin* had been published since the last AGM and George Hutchinson and Richard Pryce were again congratulated on the continuing high standard of the *Bulletin*. However the editors were short of articles for the next issue and all members, especially vice-county recorders, were encouraged to submit short notes about recent findings or other happenings to George by mid-November. Issue 71 should then be published around Christmas and include Plant Records for 2001 and a report on the papers and exhibits at this AGM.

Wendy McCarthy was thanked for arranging a programme of eight field meetings this season, in addition to the three arranged in conjunction with the AGM. A similar programme was being put together for 2003, which is to include a week long series of site visits and workshop sessions in Carmarthenshire by way of an experiment. Further offers of excursions would be welcome, particularly from new leaders and those who are not vice-county recorders.

In response to a question from Jean Green it was agreed to recommend to Meetings Committee that the Leader's telephone number and/or the grid reference of the meeting point should be included in the meeting programme at the discretion of the Leader.

Gwynn ended his report with thanks to CCW for the use of offices at Bow Street and Llandrindod Wells for Committee meetings, the NMGW and George Hutchinson for the production of the *Welsh Bulletin*, to the exhibitors and speakers at the AGM and to the staff of Plas Tan y Bwlch for making us so welcome.

HON. TREASURER'S REPORT:
Peter Jones presented the annual statement for the calendar year, which showed a satisfactory situation and is printed below. Peter reported that his task was made much easier by the efficient handling of the production and mailing of the *Welsh Bulletin* and the organisation of last year's AGM and he thanked George Hutchinson and Stephen Evans respectively.

The accounts were approved, proposed by Ian Bonner and seconded by Jean Green.

ELECTIONS:
Dr Goronwy Wynne took over as Chairman and Wales Representative on Council.
Julian Woodman was proposed as Vice-chairman by Gwynn Ellis, seconded by Trevor Evans and elected unanimously.

In the absence of any new nominations the retiring members of the Committee were re-elected unanimously and the Honorary Officials all agreed to continue with their respective roles.

AGM AND EXHIBITION MEETING 2003:
It was announced that this would be held from 5 - 7th September 2003 in Abergavenny, with Trevor Evans as organiser. Tim Rich would lead the principal field meeting to Craig y Ciliau to look especially at the whitebeam populations.

ANY OTHER BUSINESS:
Trevor Evans felt it unfortunate that only those sending in their apologies for absence were listed in the record of the AGM. It was agreed the editor should be asked to consider including a list of the names of those present.

The Chairman thanked everyone for attending the AGM.

COMMITTEE FOR WALES 2002-2003

Following the election of honorary officers and members the composition of the Committee for Wales is as follows:

Chairman and Welsh Rep. on Council	Dr Goronwy Wynne
Vice-chairman	Julian Woodman
Secretary	Gwynn Ellis
Treasurer	Dr Peter Jones
Field Meeting Secretary	Mrs Wendy McCarthy
Minutes Secretary	Ian Bonner
Arthur Chater	Paul Day*
Dr Trevor Dines*	Stephen Evans
Trevor Evans*	Dr George Hutchinson
Dr David Humphreys	Dr Quentin Kay
Joe Phillips*	Mike Porter
Richard Pryce*	

Trevor Dines also represents Plantlife, Andy Jones and Ray Woods attend as CCW observers.

*Members due to retire in 2003

Statement of Accounts, 1 January - 31 December 2001

Receipts	£	Payments	£
From BSBI Treasurer	0.00		
2001 AGM	2942.50	2001 AGM	2693.50
Welsh Bulletin Subs.	110.00	*Welsh Bulletin* **68** printing	157.50
		Welsh Bulletin **68** postage	67.65
		Welsh Bulletin **69** printing	56.50
		Envelopes for *Welsh Bulletin*	12.22
Interest on account	0.12		
Totals	3052.62		2987.37
Excess of receipts over payments	65.25		
Carried forward from 2000	£239.92 (current account) £356.72 (deposit account)		
Balance, 31/12/01	£661.89 (consolidated account)		

Peter S. Jones

Hon. Treasurer, BSBI Committee for Wales, 3 July 2002

41st WELSH ANNUAL GENERAL MEETING & 21st EXHIBITION MEETING

FRIDAY 5th — SUNDAY 7th SEPTEMBER 2003

at

TY'R MORWYDD HOUSE (ENVIRONMENTAL STUDY CENTRE) PEN-Y-POUND, ABERGAVENNY, MONMOUTHSHIRE, NP7 5UD (GR SO297.147)

Ty'r Morwydd (House of the Mulberry Trees) is based around a Georgian town house (grade 2 listed), 3 star hostel (Wales Tourist Board).

The 1st floor has 15 twin bedrooms and 4 singles; the 2nd floor 2 twins and 25 singles. All rooms are equipped with H&C wash basins, small wardrobe, small unit of drawers, small table/desk & chair. Grouped toilets/bathroom are on each floor.

There are two sitting rooms with TVs; a basement games room with pool table, two workshops with projection screens & chalkboard, one seats 55, the other 45 and either can be used as an exhibition room. An overhead projector & slide projector are available. There is also a Library and 2 laboratories and vending machine(s) in the Kitchen.

Parking available for 25 cars but with double-parking 45 have been housed. Labour Club car park opposite is also available.

PROGRAMME

FRIDAY 5th

5.00 p.m.	Registration
6.00	3-course evening meal
7.00	Local Walk

SATURDAY 6th

8.00 a.m.	Breakfast Collect PRE-BOOKED packed lunch
9.45	Leave Ty'r Morwydd for CWM CLYDACH (GR SO221.125) **Minimum number of vehicles, please!**
1.30	Return to Ty'r Morwydd from Cwm Clydach
2.00 – 4.00	WORKSHOP on *SORBUS* — Dr T.C.G. Rich
4.00	Refreshments & Exhibition
4.15 –4.45	WELSH COMMITTEE MEETING (Committee members only)
5.00 – 6.00	WELSH AGM (all members and guests welcome to attend)
6.00	3-course evening meal
7.00 – 8.00	ILLUSTRATED TALK(S)
8.00	EXHIBITION

SUNDAY 7th	
8.00	Breakfast Collect PRE-BOOKED packed lunch
10.00	Depart from Ty'r Morwydd for CRAIG–Y–CILAU (GR SO1818.1700)
4.00	Depart for HOME

Further details and a booking form will be included in the April mailing of BSBI News, but the approximate costs for full board accommodation from Friday evening to Sunday morning will be approximately £75.

Enquiries in the meantime to: Mr T.G. Evans, La Cuesta, Mounton Road, Chepstow, Mon. NP16 5BS. Tel: 01291 620802

FIELD MEETINGS PROGRAMME 2003

Full details and procedure for booking are available in the BSBI Year Book for 2003.

SAT 3rd MAY - CASTELL DINAS BRAN, LLANGOLLEN, DENBIGHSHIRE (v.c. **50**)

SAT 17th MAY - ROUNDTON HILL NNR , MONTGOMERYSHIRE (v.c. **47**)

SAT 7th JUN - LLYN HELYG and Y GRAIG, TREMEIRCHION, FLINTSHIRE (v.c. **51**)

SAT 5th JUL - USKMOUTH WETLANDS RESERVE, MONMOUTHSHIRE (v.c. **35**)

SAT 19th JUL - BANGOR, CAERNARFONSHIRE, (v.c. **49**) [*Rubus*]

SUN 20th JUL - LLANGEFNI, ANGLESEY (v.c. **52**)

SAT 26th JUL – SAT 2nd AUG - GLYNHIR MANSION, LLANDYBIE, CARMS.(v.c. **44**)

SAT 9th AUG - MoD ABERPORTH RANGE, CARDIGANSHIRE (v.c. **46**)

SUN 31st AUG - ST DAVID'S, PEMBROKESHIRE (v.c. **45**)

FRI 5th - SUN 7th SEP - WELSH AGM and EXHIBITION MEETING,
TY'R MORWYDD, ABERGAVENNY (v.c. **35**) [see also preceding page]

A WORD FROM THE CHAIR

My first pleasant task is to thank my predecessor, Richard Pryce who has been chairman of the BSBI Committee for Wales for the past four years. Richard filled the post with enthusiasm and good humour, he kept us in order in the committees and lead with example – his work on the flora of Carmarthen is a tribute to his energy and enthusiasm. I know that all of you in Wales join with me in congratulating Richard on being elected President of the BSBI.

May I also thank all the members of the Welsh Committee. There are 16 of us at the latest count, we meet three times a year, once in Aberystwyth, once in Llandrindod and once during the AGM, which is a "moveable feast". Attendance at these meetings is excellent – it is not unusual for us to have an almost 100% roll-call. Thank you!

Another source of satisfaction is the way in which nearly all the County Recorders in Wales submit plant records for publication in the Welsh Bulletin and in Watsonia. At the last count, each vice-county sent in an average of 37 plant records in a season – which makes the other counties in the UK drool with envy! Well done!

The most important event in the botanical calendar during 2002 was undoubtedly the publication of the long-awaited 'New Atlas of the British and Irish Flora'. We congratulate the three authors (that sounds better than 'editors' and is closer to the truth), and especially Trevor Dines who is now one of us in Wales. Trevor may not be a native but he is far more than a casual; perhaps a well-established introduction? – certainly not an alien!

After many years of organising the Field Meetings in Wales, Dr David Humphreys has handed on the responsibility to Wendy McCarthy. We thank them both for their work in one of the core activities of our Society. Some members enjoy several field meetings every year, some attend one or two, many never join in. Why do we arrange such meetings? What is their purpose? Who are they intended for? Are there too many?....too few?

Should there be more help for beginners and young people? Should we invite schools and other non-BSBI members to join? Would this create insurance and health-and-safety problems? How many individuals would we cater for?....are there minimum, optimum and maximum numbers? If so haw should these be regulated?....or should all meetings be a complete free-for-all on the basis of "the more the merrier"? These are some of the questions that we in the Committee for Wales are thinking carefully about. Please tell us what you think.

Finally, an appeal. During recent years a great number of County Floras have appeared on the market, representing many years of work by their authors. These have included several from Wales, but the coverage is far from complete. I know that many vice-county recorders and others have been collecting data for a long time and that several Floras are in gestation. May I encourage you to hasten the date of birth. Set yourself a realistic deadline – and stick to it. Don't follow the national motto of a certain country (that must be nameless)...."Don't put off until tomorrow what can be put off until the following day". Good luck!

Finally, may I encourage the use of the Welsh language in our activities. There is almost universal goodwill towards Welsh, but many do not translate that goodwill into action. Your contributions will be welcome.

Ychydig o Gymry Cymraeg sy'n aelodau o'r BSBI ond y mae llawer o Gymru brwd sy'n llysieuwyr da. Dowch atom – mae eich angen arnom ac fe gewch groeso. Beth am anfon pwt o erthygl i'r cylchgrawn yma?

GORONWY WYNNE
Chairman / Cadeirydd
Gwylfa, Lixwm, Holywell
Flintshire CH8 8NQ

OENANTHE CROCATA : Hemlock Water Dropwort - 'BEWARE!

Abstract of exhibit shown at the BSBI Welsh AGM Plas Tan-y-Bwlch, Maentwrog July 2002

Illustrations and descriptions were shown of this Umbellifer to highlight its carrot/parsnip-like edible-looking tubers and celery-like leaves, with warnings of the dire consequences of eating this dangerous plant- which moreover is said to taste delicious! Even handling and breaking open raw tubers could be fatal.

Common in ditches throughout Wales and with a predominantly Western British distribution it is characteristically absent from the more calcareous/lime-rich areas. Absent from continental Europe north of Belgium it is restricted to W. Europe and the W. Mediterranean. Matthews (1955) lists it under his Oceanic West European element: and roughly comparable with the range of *Erica cinerea** (Hulten & Fries 1986 map 1446) but without its more northerly outposts. [* but not with *Erica tetralix* as wrongly stated on the exhibit]. Preston & Hill (1997) class it as 'Suboceanic Southern-temperate' i.e. *c.f.* Southern-temperate but with less western restriction; although, in the British Isles, its occurrence agrees more closely with their map illustrating an 'Oceanic Eastern limit' type.

The fatal consequences to man and livestock of eating and even inhaling the fumes of broken tubers were exemplified with horror stories - ranging from the fatal 'lunch' partaken by the seven Irish lads recounted by a local Irish doctor writing to JOHN RAY in the 17th century [all but one of whom either dropped dead, went stark mad or lost hair and nails] to the Dutchman who boiled and ate the tops thinking they were like dutch 'celery'. The modern-day hippies living off the land up the Pennant Valley, Snowdonia, survived. [See also Farrell, *BSBI News* **88**: 37 (2001)]. Medical aspects and the toxins involved, i.e. oenanthetoxin and other polyacetylenes, were quoted, and the dire outcome of inhaling the fumes from fresh tubers was dramatically demonstrated by the Bangor Botany Dept. practical Exam - an anatomical investigation - which required section-cutting of freshly dug tubers! Result: Exam abandoned - students in need of resuscitation!!

References:

Hultén, E. & Fries, M. 1986. *Atlas of North European Vascular Plants* II. Königstein, Fed. Rep. Germany: Koeltz.

Matthews, J.R. 1955. *Origin and distribution of the British Flora*. London: Hutchinson & Co.

Preston C.D. & Hill, M.O. 1997. The geographical relationships of British and Irish vascular plants. *Botanical Journal of the Linnean Society* **124(1)**: 1-120.

ANN CONOLLY
25 Brocks Hill Drive
Oadby, Leicester LE2 5RE

NB seen recently on sale at a Garden Centre near Derby, without any warning, several pots of the only somewhat-less-toxic *Oenanthe fluviatile* 'Flamingo' with pink on white variegation.

AILSA BURNS, July 2002
3 Rosliston Road, Stapenhill
Burton-on-Trent,
Staffordshire DE15 9RJ

PEPPERGRASS

Abstract of exhibit shown at the BSBI Welsh AGM Plas Tan-y-Bwlch, Maentwrog July 2002

This week I came across this container of *Pilularia globulifera* in a Garden Centre / Nursery near Leominster on a bench of plants labelled Oxygenating Aquatic Plants. The name Peppergrass was new to me, and was explained on the label as indicating the sporocarps like peppercorns at the base of the grassy leaves. There does seem to be an unusual abundance of sporocarps in this specimen. This nursery has, I think, only recently added aquatics to its display, and I was told that the aquatic supplier was Essex. I wonder where the original plants came from?

However, also for sale on the bench were *Myriophyllum aquaticum* (I think) but labelled *M. proserpinoides* Parrot's Feather, a Hydrocotyle labelled *H. novae-zealandiae* (is this aquatic?) and *Crassula helmsii* (but labelled *Tillaea aquatica*, an extinct Yorkshire native).

These all had a warning on their plant labels saying "could be invasive". Are they legally allowed to be sold as garden plants?

DAVID HUMPHREYS
Knill Court
Knill, nr Presteigne
Powys LD8 2PR

10th October 2002
Nursery revisited. The bench with pots of "oxygenating plants" was there as before, but the Crassula helmsii had now spread across the other pots on the bench and was flowering profusely.

RARE PLANT MAPS AND REGISTERS

Abstract of talk given to BSBI Welsh AGM Plas Tan-y-Bwlch, Maentwrog July 2002

Geographical Information Systems (GIS) are a very useful way of displaying the information in County Rare Plant Registers. Electronic maps of rare plant localities can help conservation bodies respond to planning applications, keep landowners informed, survey and monitor, etc. They are also very convenient from a recorder's perspective for storing, manipulating and sharing all kinds of additional information. The BSBI and CCW are both interested in making electronic maps available to recorders but the OS data presently cost too much. There is a very strong possibility, however, that recorders will soon get reasonably-priced access to this data[1] and it might be useful in readiness to consider the format and appearance of rare plant maps.

One very interesting possibility would be to include population data for rare plants in maps. This would add to the scope of most existing registers but could have several wider benefits. For the statutory conservation agencies, in particular, population data can help in selecting Sites of Special Scientific Significance. The Guidelines for Biological Site Selection (Ratcliffe, 1989), for instance, seek to conserve "the largest populations of all the scarcer species within an Area of Search" [*p.27*] and "any particularly large population of a species with restricted distribution at the edge of its range" [*p.218*]. It would be especially useful from a conservation standpoint to identify these populations in County Rare Plant Registers and, more generally, maps of population size could help illuminate aspects of species ecology.

ANDY JONES
Countryside Council for Wales
Plas Gogerddan, Aberystwyth
Ceredigion, SY23 1BP

[1] From December 2002 the NBN Trust are offering 1:50,000 scale OS map tiles for the whole GB in 5 CDs for £15.00 with every copy of 'Recorder 2000', further details: maps@nbn.org.uk.

THE PROSTRATE JUNIPERS OF PEMBROKESHIRE

A) RECENT HISTORY

The earliest known mention of juniper in Pembrokeshire is from Ordnance Survey maps. The first edition of the 6 inch OS map for Ramsey Island published in the late nineteenth century, map number 52020NW, has an "Ogof Juniper" on the east side of Ramsey at SM 704242. Later maps show Ogof Juniper about 100 metres to the north.

The first botanist to record juniper in Pembrokeshire was Mrs. M. Barnes of St.Davids. No details of her discovery are available to the author other than that it was growing on a cliff on Ramsey Island in 1961 (Nature in Wales Vol.7, page 171.) Between 1962 and 1966 Mrs. I. M. Vaughan and T. A. W. Davis (TAWD) botanised on Ramsey and compiled a joint species list. They noted two juniper bushes on the sheltered east side of the island. One was described as a 'fine bush' and the other was in an adjacent cove. One of the two bushes they observed was in fruit and the more southerly of the two was 'much damaged'. The uncertain status of juniper in Pembrokeshire at that time was revealed by TAWD's comment 'perhaps native' in his 1970 'Plants of Pembrokeshire'.

In August 1973 the author visited Ramsey during a Nature Conservancy Council sea-cliff vegetation survey and completed rare species forms for three separate prostrate juniper bushes at SM705242, 705243 and 706237. Unfortunately the largest juniper recorded in 1973, the one nearest to Ogof Juniper, had disappeared by October 1976. It had been growing on a steep unstable cliff with its upper branches covered in shale and its lower roots or dead branches were exposed . It must have fallen into the sea between 1973 and 1976. Good photographs were taken of this bush in August 1973. In 1982 further forms were compiled for two more prostrate bushes near the southern tip of the island at Aber Myharan at SM705230 and 704230. Juniper had been reported from this part of the island several years earlier by Robin Pratt.

The debate about the status of juniper in Pembrokeshire was renewed by the discovery of a

author near the top of an unstable 150 metre cliff at Cemaes Head at SN128492. In the following year the author managed, with extreme difficulty, to collect twigs from two of the Ramsey junipers. The specimens were sent to the county recorder, TAWD, and in the accompanying letter the author wrote 'It would seem that the population is most likely a relict and the production of fruit shows that it is not yet finished!! Do you think it is subsp. *nana* or *communis*? It seems to be somewhat intermediate but nearer *nana*. I do not know what typical specimens are like but perhaps you do. If not it may be worth sending it off to Cardiff.' On the advice of David McClintock, TAWD sent the specimens to Dr. D. E. Coombe of Christs' College, Cambridge.

Dr. Coombe was undertaking research on juniper throughout the British Isles and was 'immensely excited' to receive the Ramsey cuttings. On 26th October 1976 he wrote to TAWD and said that 'As far as I can judge, the two plants represented by the cuttings are closely similar to the 'original female' (Clone A) plant in the variable population of some eight plants at the Lizard. That is to say, they are the form which Perring in the Critical Supplement to the Atlas (1968) regards as intermediate between subsp. *communis* and subsp. *nana*.' In a letter to the author on 2nd November 1976 he said that 'As I told T.A.W.Davis, the Ramsey bits seem so far as I can judge, to be very like one at least of the seven surviving bushes at Gew Graze, the Lizard, W. Cornwall and therefore unlike all other British material (I have grown about 150 clones from Cornwall to Shetland, and the Burren to E. Anglia).' This information supported the emerging hypothesis that the Pembrokeshire junipers were a long isolated relict population perhaps dating back several thousand years to the early post-glacial era. It was especially pleasing that two or three of the Ramsey cuttings collected in 1976 rooted in mist propagating apparatus and were grown on in the Botanic Garden at Cambridge. By 1985 Dr. Coombe reported that they were 'quite prostrate but fairly fast growing' They have their own 'island' bed west of the Lizard ones but not as far west as the Burren material he collected in 1959. The entry number for the Ramsey junipers in the Botanic Garden collection is 244/79.

In correspondence with Dr. Coombe the possibility that juniper bushes may have survived elsewhere on the coast of Pembrokeshire was mooted but it was a further 10 years before another Pembrokeshire location for juniper was discovered. In March 1985 Jack Donovan found juniper growing in the south of the county at Skrinkle Haven, near Manorbier. He spotted a sprawling prostrate bush at SS081974 on the margin between cliff scrub and a narrow band of maritime grassland about 15 metres up on a 20 metre high stable limestone promontory. The author asked a climber, Elfyn Jones, to collect material in January 1986 for Dr. Coombe who himself visited the site in May of that year. Dr. Coombe estimated the age of the juniper to be over 100 years. He also remarked that the Skrinkle Haven material was 'somewhat different' from the Ramsey bushes but 'nothing like the Gower plants which are typical and very spiny subspecies *communis*.'

A fourth location was discovered by the author whilst canoeing near Morfa Head, Newport, in October 1986. A single prostrate juniper was growing at SN048414 about 8 metres below the crest of a 45 metre cliff and twigs were subsequently collected and sent to Dr. Coombe but unfortunately he appears not to have commented on their affinities.

The most recent find was, surprisingly, a further bush on Ramsey at SM698244. In June 1989 Jack Donovan found the first juniper to have been recorded on the west side of Ramsey. A population form was completed in November of that year and the ca. 7 x 4 metre prostrate bush had much dead, salt/drought scorched foliage in its lower sections. It was growing at the top of the vertical part of the cliff just below an unstable grazed slope of gorse (*Ulex europaeus*). By May 1991 this juniper was dead with completely brown foliage. Sue Ward, the island manager, suggested that it had probably died as a result of severe salt-laden

During May 1991 the author, assisted by Andrea McConnell, collected some twigs from the most accessible juniper, the female in the cove at Capel. This is one of the two bushes originally sampled in 1976 and which was successfully grown on at Cambridge. This later sampling also rooted and by January 2003 it had developed into a robust prostrate bush with a diameter of 1 metre and a central stem of 4cms. It has produced abundant immature berries for several years. Although it has been grown in a pot in a relatively sheltered garden its maximum height is only 25cms. and its main branches either grow horizontally or bend down over the side of the pot towards the ground.

There are no juniper records from the coast of Carmarthenshire or Cardiganshire although there used to be a juniper bush in the Upper Tywi at ca. SN773458. It was last seen by Mrs I. M.Vaughan in June 1972 and she noted that it was in poor condition. Dafydd Davies has informed Richard Pryce that it had been growing in a precarious position on a very steep slope. This bush had been recorded as early as 1937 and there is voucher material in the herbarium at the National Museum of Wales. The Gower junipers are the nearest extant population to the 7 relict bushes of Pembrokeshire lying about 40kms east of Skrinkle Haven.

B) PAST HISTORY

Studies of the pollen and plant remains stored like a museum in the peat bogs of Pembrokeshire have revealed evidence of abundant juniper between about 12,000 and 11,000 years ago. Locations where it has been identified in the peat include Esgyrn Bottom and Hendre-fach near Fishguard, Cilgwyn near Newport and at Dinas Island. The valley between Dinas Island and the mainland has the deepest peat deposits known in Pembrokeshire and juniper pollen was present at a depth of between 10 and 11 metres. Juniper pollen has also been found in the cave deposits and lower scree of Little Hoyle Cave, near Tenby. Other woody species that were abundant at the time juniper was widespread in the county included Scots Pine (*Pinus sylvestris*), willows and birch.

At this time juniper would have formed a widespread and distinctive low open scrub over the more freely drained parts of Britain prior to the spread of dense tree cover. There is much evidence that juniper has long been native to Britain having been present through several Ice Ages. Its dominance, after the last glaciation, did not last long, however, as progressive climatic amelioration led to the spread of birch and hazel which shaded out most of the juniper from about 9,000 years ago. Unfortunately there is, as yet, no pollen evidence for the survival of relict populations of juniper in Pembrokeshire through from the late-glacial to the present day. This may be partly because there have been too few pollen studies completed in the county, and sadly none from the islands, and partly because the population of juniper was too small or localised to generate sufficient pollen.

Juniper survived in Britain where woodland was more open, perhaps owing to shallow soils and steep slopes, but its major refuge was probably in montane areas above the tree-line where it still exists today. Although the low and rounded Pembrokeshire hills with their tors may have acted as refugia following the spread of dense forests it seems more likely that sea-cliffs would have provided the most suitable retreats.

It is important to appreciate that the dominance of juniper occurred before the rapid eustatic rise in ocean-levels of the mid-Boreal. Many of the current sea-cliffs of Pembrokeshire would have been inland cliffs with extensive scree slopes fronted by coastal plains of varying widths. Nearly every major beach around the coast of Pembrokeshire from Newport in the north to Amroth in the south has a submerged forest exposed at low tide. Today's sea-cliffs are, of course, the product of past marine erosion during inter-glacial seas, as well as

Such relict sea-cliffs would have been present all around the edge of Pembrokeshire at the time these submerged forests were flourishing on the coastal plains. This magnificent inland cliff line would have offered open, often base-rich, and invariably freely drained habitats with all possible aspects. The cliffs would have provided an ideal niche for plants like juniper that could not tolerate the dense shade of the forests. Could it be that the seven juniper bushes left in Pembrokeshire are a living link with this juniper scrub of the late-glacial period?

C) SUMMARY POINTS

- seven prostrate bushes of juniper occur on Pembrokeshire sea-cliffs
- the prostrate growth form persists when grown in sheltered environments
- observations over the last 30 years have shown that leading shoots are vulnerable to salt damage which appears to scorch the foliage and cause significant dieback
- the Pembrokeshire junipers show intermediate characters between typical subspecies *nana* and subspecies *communis*. The Ramsey specimens are now considered to be subspecies *hemisphaerica* along with those from the Lizard, in Cornwall. This subspecies has arisen as a result of isolation over several thousand years in an exposed maritime environment
- both sexes occur on Ramsey but there is no evidence for regeneration from seed in the last 50 years
- Pembrokeshire sea-cliffs are classic refugia for species requiring open conditions. For example the circumpolar arctic montane plant Roseroot (*Sedum rosea*) survives on a cool north-east facing igneous cliff at St. Davids Head
- numerous rare heathland plants occur on the sea-cliffs of Pembrokeshire
- sea-cliffs of Pembrokeshire are frequently burnt and have a long history of occupation since at least Mesolithic times
- juniper is extremely vulnerable to damage by fire and the remaining juniper bushes grow in places which would escape any normal fires on the adjacent cliffs
- the juniper bushes of Pembrokeshire all appear to be of considerable age and most have large stems/exposed roots and the population is largely moribund
- five of the Pembrokeshire junipers are growing in situations where layering appears to have occurred so is it correct to treat them as functionally extinct? The term functionally extinct was used in the UK Action Plan for juniper to describe long-living moribund populations with no regeneration
- as a result of layering the seven individual prostrate bushes should perhaps more accurately be treated as seven clumps or clones because there could be more than one separately rooted bush at each location
- two juniper bushes have been lost from Pembrokeshire since 1973 as a result of cliff-falls and salt-laden storms and one of the four left on Ramsey is extremely unhealthy
- although the author has searched all of the Pembrokeshire coastline from the land and parts from the sea it is possible that one or two more bushes remain to be found
- there are also tiny relict populations of juniper on the Lizard in Cornwall and at South Stack on Anglesey. The South Stack population was first found by R.H.Roberts in 1978 and has both sexes but is only 3 possibly 4 bushes. Both these locations have extensive cliff heathland with several other relict plants and show many similarities with Pembrokeshire
- two of the associates of juniper in Pembrokeshire are Thrift (*Armeria maritima*) and Sea Campion (*Silene uniflora*) and both have coastal and montane distributions but once had continuous distributions prior to the spread of forest cover
- the biggest population of juniper left in Pembrokeshire occurs on Ramsey which was the first of the Pembrokeshire islands to be cut off from the mainland by rising sea levels. Perhaps this island with its prominent rocky hills was never fully colonised by

Lewisian country of north-west Scotland where most of the islands in the numerous lochs have at least some juniper whereas it is absent or scarce in the surrounding burnt moorlands?

- juniper is one of the rarest and most interesting Pembrokeshire plants and now that it is treated as a separate subspecies *hemisphaerica* in the 'New Flora of the British Isles' it is also an exceptionally rare British plant
- progeny from one of the Ramsey junipers, a female, are growing in the Botanic Garden at Cambridge and in the author's garden but more 'captive' plants from the other three junipers should be propagated and possibly reintroduced to bolster the Ramsey population. The Countryside Council for Wales management statement for Ramsey/Ynys Dewi Site of Special Scientific Interest says ' Vegetative material of all surviving plants should be held in cultivation and their seed sown into suitable habitat.'
- samples should be collected from the three mainland bushes for propagation and further study.

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Table 1 Some details of the location of juniper bushes in Pembrokeshire

	Height above Sea level	Height of Cliff	Nature of Cliff	Solid Geology	Aspect
A) Surviving juniper bushes					
Capel, Ramsey	ca.15m.	ca.24m.	stable	odovician sediments Road uchaf formation	south
Farmbuildings, Ramsey	ca.24m.	ca.30m.	unstable	ordovician sediments Road uchaf formation	east
Aber Myharan North Ramsey	ca.24m.	ca.40m.	stable	ordovician rhyolite	south
Aber Myharan, Ramsey	ca.10m.	ca.40m.	unstable	ordovician rhyolite	south
Newport Cliffs	ca.35m.	ca.35m.	unstable	silurian sediments	west
Cemaes Head	ca.120m.	ca.135m.	unstable	silurian sediments	west
Skrinkle Haven	ca.14m.	ca.30m.	stable	limestone	west
B) Bushes recently lost					
Aber Mawr, Ramsey	ca.60m	ca.60m.	unstable	ordovician igneous microtonalite	south
Ogof Juniper, Ramsey	ca.8m.	ca.24m	unstable	ordovician sediments Road uchaf formation	east

Table 2 Plants associated with juniper in Pembrokeshire

Higher plants found within one metre of one or more juniper bushes

A) Plants found growing with more than one bush

Festuca rubra	with	6	bushes	Sedum anglicum		3	
Dactylis glomerata		5		Hedera helix		2	
Armeria maritima		4		Lonicera pericylamen		2	
Ulex europaeus		4		Rubus fruticosus		2	
Prunus spinosa		3		Silene uniflora	with	2	bushes

B) Plants found growing with a single bush only

Aira carophyllea
Brachypodium sylvaticum
Calluna vulgaris
Centaurea scabiosa
Cochlearia officinalis
Crithmum maritimum
Erica cinerea
Euphorbia portlandica
Inula crithmoides
Jasione montana
Leucanthemum vulgare
Orchis mascula
Plantago lanceolata
Primula veris
Sanguisorba minor
Spergularia rupicola
Viola riviniana

NB. With one exception all these associated species were recorded with binoculars or a telescope so others, especially less conspicuous plants, could have been missed.

Table 3 Estimated size and condition of the juniper bushes of Pembrokeshire

A) Surviving bushes

Capel, Ramsey Female	ca. 2.5 x 1.5m. in 2002 Less healthy in 2002 than 1973 when it was described as very healthy. It expanded in the intervening years. Its seaward and lower branches have now died back leaving it wider but narrower than 1973.
Farmbuildings, Ramsey Male	ca. 5 x 1.5m. in 1973 It was described as not very healthy in 1973 with some of that years growth having died back. In October 1976 it was recorded as healthier. By 2002 this bush was in very poor condition with extensive dieback leaving a few isolated living shoots.
Aber Myharan North, Ramsey Sex unknown	ca. 2.5 x 2.5m. in 1982 In 1982 there were only a few dead tips to the lowest branches. It was described as dark green and healthy in 1989. Still present 2001.

Aber Myharan, Ramsey Sex unknown	ca. 1 x 3m. in 1982 In 1982 a few brown shoots were observed. In 1989 it appeared to be lighter in colour than the Aber Myharan north bush. Still present 2001.
Newport Cliffs Sex unknown	ca. 5 x 2m. in 1986 In October 1986 the bush showed scorched foliage below which was attributed to salt damage from hurricane 'Charlie' of 25.08.1986. Very healthy 2002 but with a tiny fringe of brown foliage and some dead twig ends on lower exposed edge.
Cemaes Head Sex unknown	described as not very large in 1975. Dead foliage noted in August 1991. Reduced in size by 1995 but still with some green growth at south-east side at the top and bottom of ends of branches and near the stem.
Skrinkle Haven Male	ca. 4 x 6m. but patchy in 1985 In 1985 an estimated 10% was suffering from dieback. Dr. Coombe gave a size of 4.5m. diameter in 1986 with a separate little bush below on the landward side. By 2000 the clump appeared to have expanded but also to have become more fragmented.

B) Bushes recently lost

Aber Mawr, Ramsey Sex unknown	ca. 7 x 4m. in 1989 Much dead or scorched foliage observed in lower sections of the clump in 1989. By May 1991 all the foliage was brown.
Ogof Juniper, Ramsey Sex unknown	ca. 3 x 5m. in 1973 Upper branches covered in shale in 1973. No subsequent record of this bush which was perhaps present 100 years or so earlier when the OS prepared the first 6" map.

NB. Because of access difficulties none of these prostrate junipers have been directly measured. All the figures in table 3 are rough visual estimates. Indeed the Cemaes Head bush is so distant that it is unwise to attempt to estimate its dimensions.

THE BOTANICAL PAINTINGS OF DR HAROLD DRINKWATER

Introduction

The National Museums & Galleries of Wales holds a superb collection of 385 watercolour paintings of Welsh wild plants by Dr Harold Drinkwater. This paper is intended as a celebration of this collection and outlines the circumstances of its creation and presentation to the Museum.

Dr Drinkwater – physician and artist

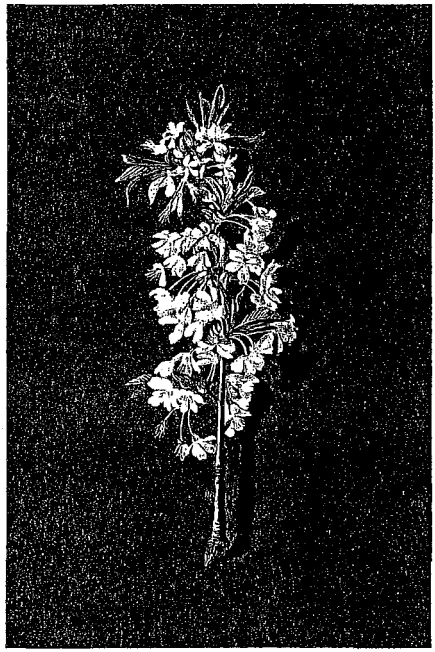
Dr Harry Drinkwater was born in Northwich, Cheshire in 1855. He was an eminent physician who carried out detailed research into hereditary diseases. His research demonstrated that Mendalian Laws applied to Man as well as to animals and plants. He studied medicine at Durham and Edinburgh. During his medical training he was obliged to study botany and this aroused his interest in the British flora. He practised medicine for many years in Sunderland and moved to Wrexham in 1890.

After Drinkwater lost his first wife he began collecting and recording plants around Wrexham. He would collect plants in rural areas when he visited patients. It was said that he often left his second wife, a fully qualified practitioner, to look after the practice while he went botanizing. The drawings were all done from fresh living specimens very soon after they were collected. The work was constantly subject to interruption: some drawings show the effect of the artist's being called away to attend patients, making it impossible to complete the work.

Drinkwater's two main hobbies were field botany and painting. His exquisite plant portraits, painted in gouache (watercolour mixed with Chinese white) provide ample evidence of his proficiency in both. Unusually he worked on green paper "in order to show the plants against their usual environment." He included shadows on the paintings, producing a strong three-dimensional effect. The plants from which the drawings were made were almost all collected in North Wales, many of them from localities around Wrexham. Most of the plants depicted are found wild in Wales, mainly in hedgerows and woodlands.

Many of Drinkwater's drawings were exhibited at the National Eisteddfod held in Wrexham in 1912. He had already donated 95 paintings to the Grosvenor Museum, Chester where they can still be found.

Dr Harold Drinkwater
1855 - 1925



Prunus cerasus (Dwarf Cherry)

Presentation of the collection

The Museum holds in its archives a lengthy correspondence between Dr Drinkwater and the Director of the National Museum of Wales, Dr Hoyle. At times the tone is quite querulous. Following the Eisteddfod the Director wrote to Dr Drinkwater to ask whether the Museum could borrow the drawings for an exhibition. Drinkwater replied that he could not agree to this request since he had already loaned the collection to several institutions and some of the works had been damaged and, as an old man, he did not have time to produce duplicates. Dr Hoyle then enquired about Drinkwater's long-term plans for the collection. Dr Drinkwater replied that he intended to donate the majority of his collection of watercolours to the British Museum. However, he was persuaded that since the subjects were mainly wild plants from the Wrexham area that they really belonged at the National Museum of Wales in Cardiff.

At first Drinkwater wished to sell the collection to the Museum for £1500 but insufficient funds were available for the purchase. Later he decided to donate them to the Museum rather than to distribute them amongst his relatives. It seems that he was influenced by J.T. Davies, Private Secretary to the Prime Minister, Lloyd George. Drinkwater mentioned in one letter that he wanted the collection to be kept together so that they would be of real use to botanists.

In 1920 Drinkwater visited Cardiff for the first time and formally presented the collection of 385 drawings to the Museum Council in person. Following his trip to Cardiff, he wrote that the visit had stimulated him to draw, desirable because "I cannot paint unless I feel in the humour for it and I fear the war nearly killed my energy in this direction." However, it seems that this renewed enthusiasm was short-lived because he writes in 1921 that he has not been able to draw any of the plants that Dr Thomas, the Keeper of Botany, had suggested.

Drinkwater felt that he deserved some form of recognition for the work in lieu of pecuniary acknowledgement since it had occupied practically all of his spare time over some twenty years. He petitioned Lloyd George and Sir John Lynn-Thomas to this effect. He declared that several professional artists had admired his paintings and that "there was great lamentation amongst the people of Wrexham when they learnt of the drawings going away."

Furthermore, Drinkwater was unhappy that his paintings were not prominently displayed. He recommended that the paintings should be displayed with the light coming from the left since this was how they had been painted and therefore the shadow on the painting would appear to be in the correct position. In a subsequent letter, the Keeper of Botany assured the doctor that now that the Museum had moved into a new building a selection of his paintings would be put on display and that they would be changed regularly so that over time the public could see the entire collection. In 1924 Drinkwater's wish was fulfilled and the University of Wales awarded him an honorary Master of Science degree. Dr Drinkwater died suddenly in 1925. His widow kindly sent a photograph of him to be hung in the Museum's herbarium.

Displaying the Drinkwater Collection

The Drinkwater collection was celebrated in an exhibition at the National Museum of Wales in Cardiff in 1947. A catalogue of the exhibition was prepared by the Museum's senior botanists, Dr Hyde and Mr Wade.

For many years the paintings formed part of the botany exhibitions at the National Museum of Wales. They have also been shown at the Turner House Gallery, Penarth and the Snowdonia Museum, Llanberis. Only one has been published – in *The Paradise Garden* by Lazarus *et al.*

Interest in this collection has been revived recently due to the preparation of an exhibition of Drinkwater's paintings in his home town of Wrexham, at the County Borough Museum. It is particularly satisfying that for the first time in many years the paintings will be on show in the Wrexham area where they were painted. The exhibition runs for three months from mid-July 2003. A comprehensive list of the Drinkwater collection, together with some biographical details, can be found in a new catalogue of botanical illustrations held by the National Museums & Galleries of Wales, to be published shortly.

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