

Observing Climate Change: the earlier arrival of Spring.

Shaun Russell (retired biologist)

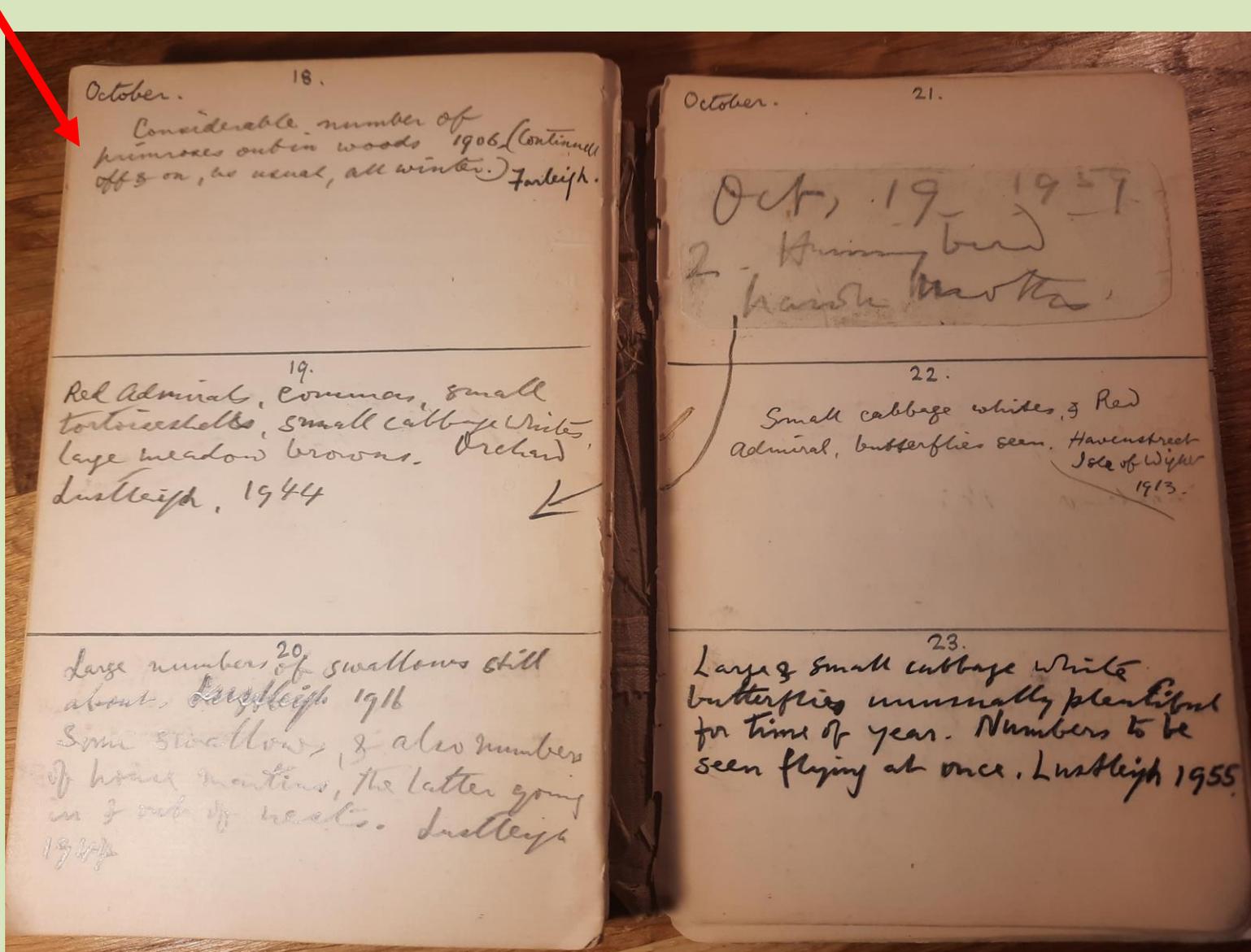


"I used to find the first Primrose in late February or early March, but in the mild winters of modern times I may find them in January, or even during the previous year's December"
(2020)



Matthew Oates, former nature warden with Hampshire County Council and the National Trust.

“October 18th Considerable number of primroses out in woods 1906, (continued off & on, as usual, all winter.) Farleigh”



Nature Diaries



Courtesy
Woodland Trust

SCROPHULARIACEAE
MIMULUS guttatus
(MONKEY FLOWER)



YELLOW WITH
RED SPOTS

1. 8. 71.

Torrin, Skye.

Sunny trackside bank
with other flowers.







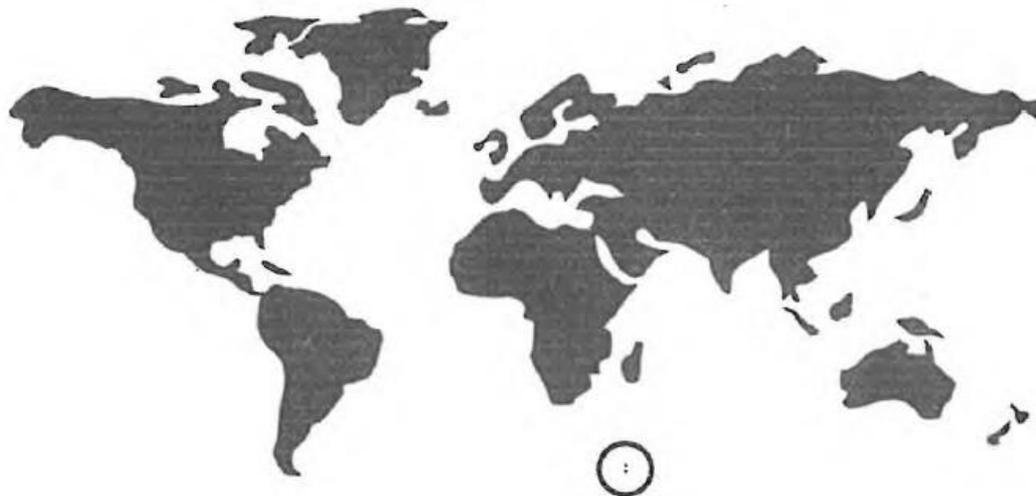
**PRODUCTION ECOLOGY OF
BRYOPHYTE VEGETATION AT
MARION ISLAND (SUB-ANTARCTIC)**

**BY
SHAUN RUSSELL**

**SUBMITTED IN FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF**

DOCTOR OF PHILOSOPHY

**IN THE DEPARTMENT OF PLANT SCIENCES
RHODES UNIVERSITY**



Air

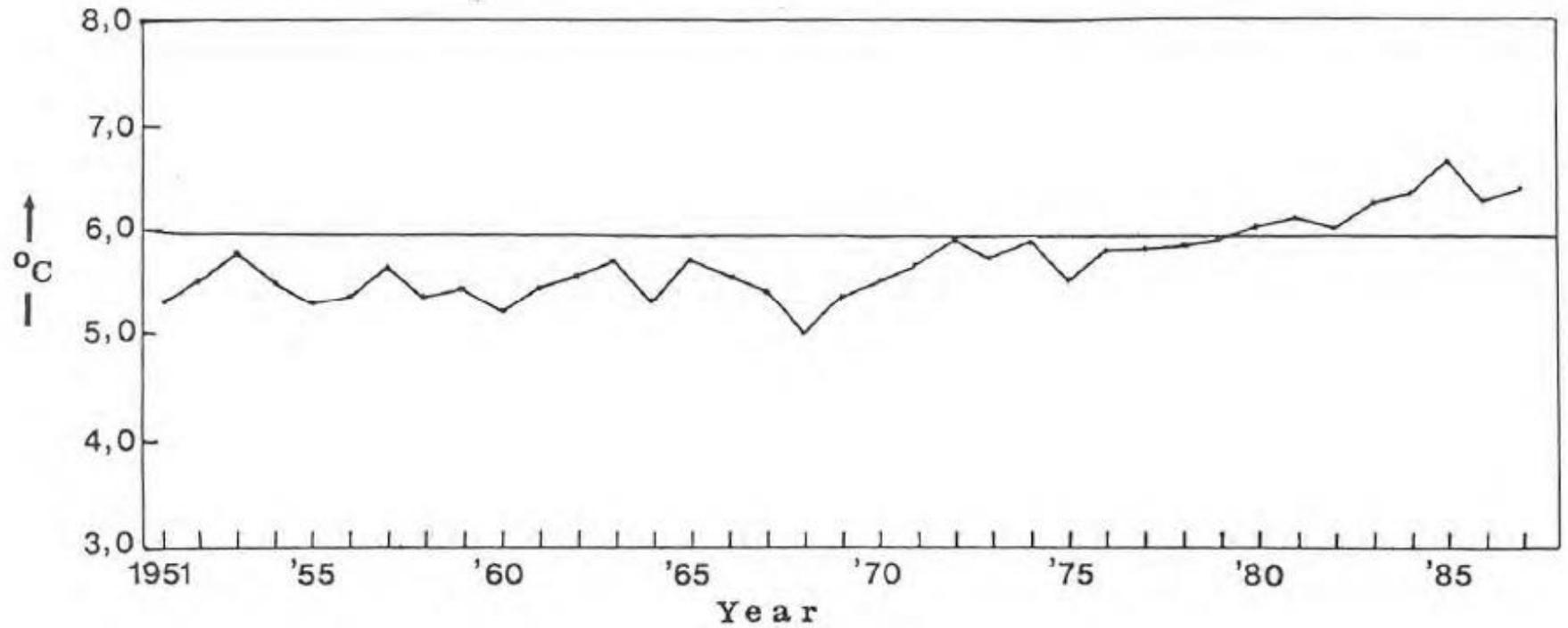
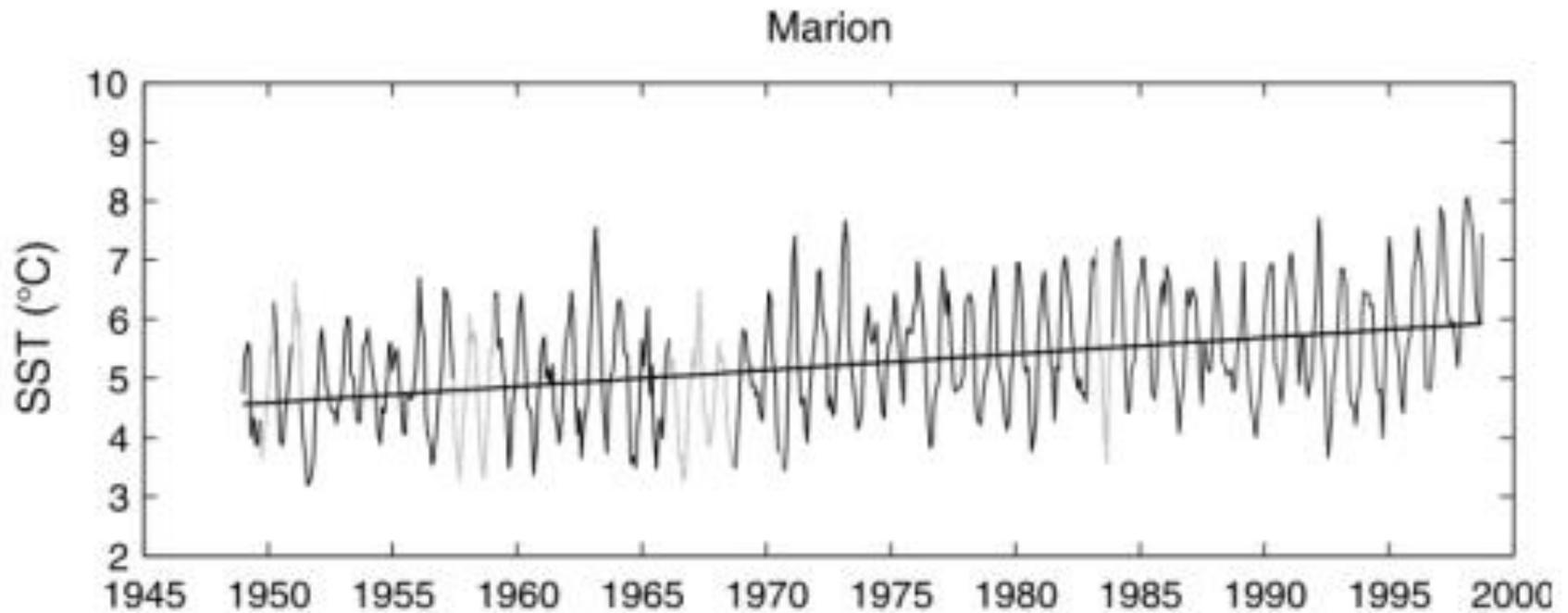


Figure 2.7

Mean annual temperature for Marion Island, from 1951-1987.



SAJSci (2003)

2023 - “Marion Island has warmed by 1.7°C since air temperature recordings started during the mid-20th century.”

1981







Llyn Bochlywd to Llyn Ogwen



Treborth Botanic Garden, Bangor, North Wales

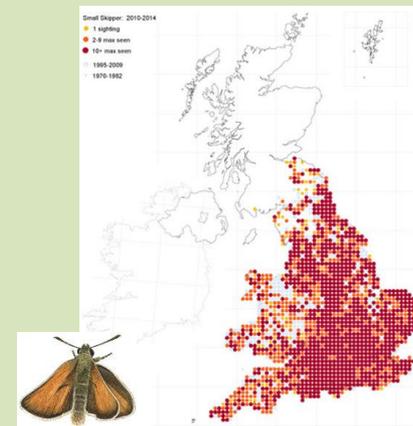
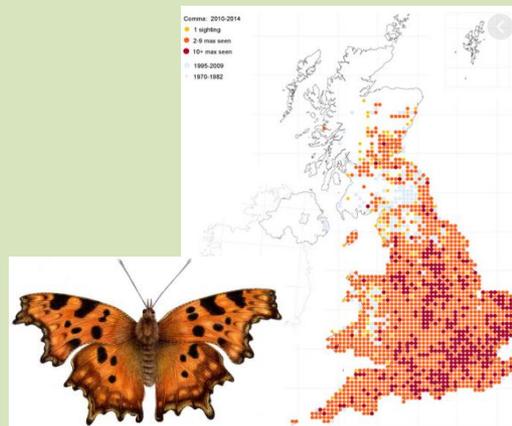
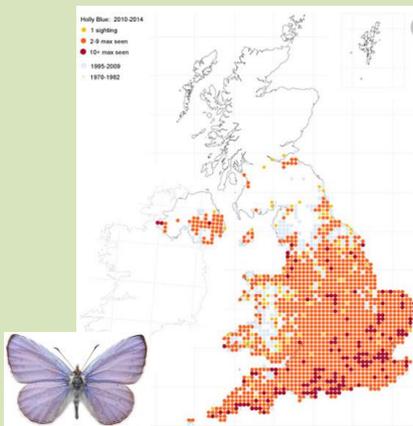


Treborth Botanic Garden - February 2019

Sandpipers, Sand Martins and Painted Lady butterflies all observed



The Holly Blue, Comma, and Small Skipper butterflies have all been recorded for the first time at TBG in the past ten years.



Long time-series of observations enable us to explain the past, better understand the present and forecast the future.

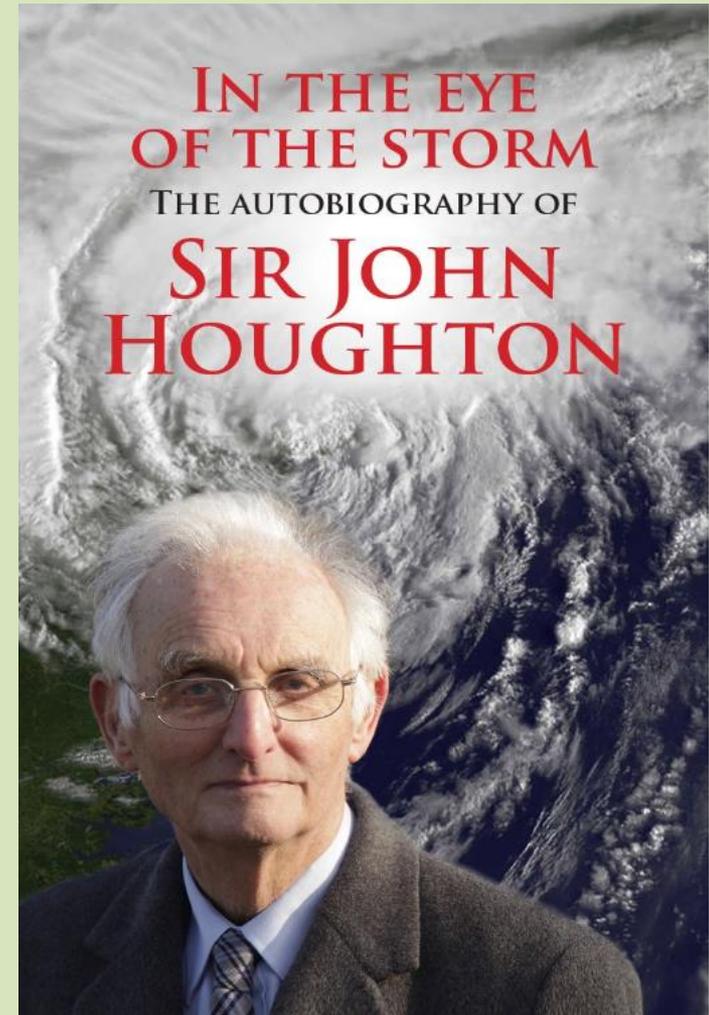
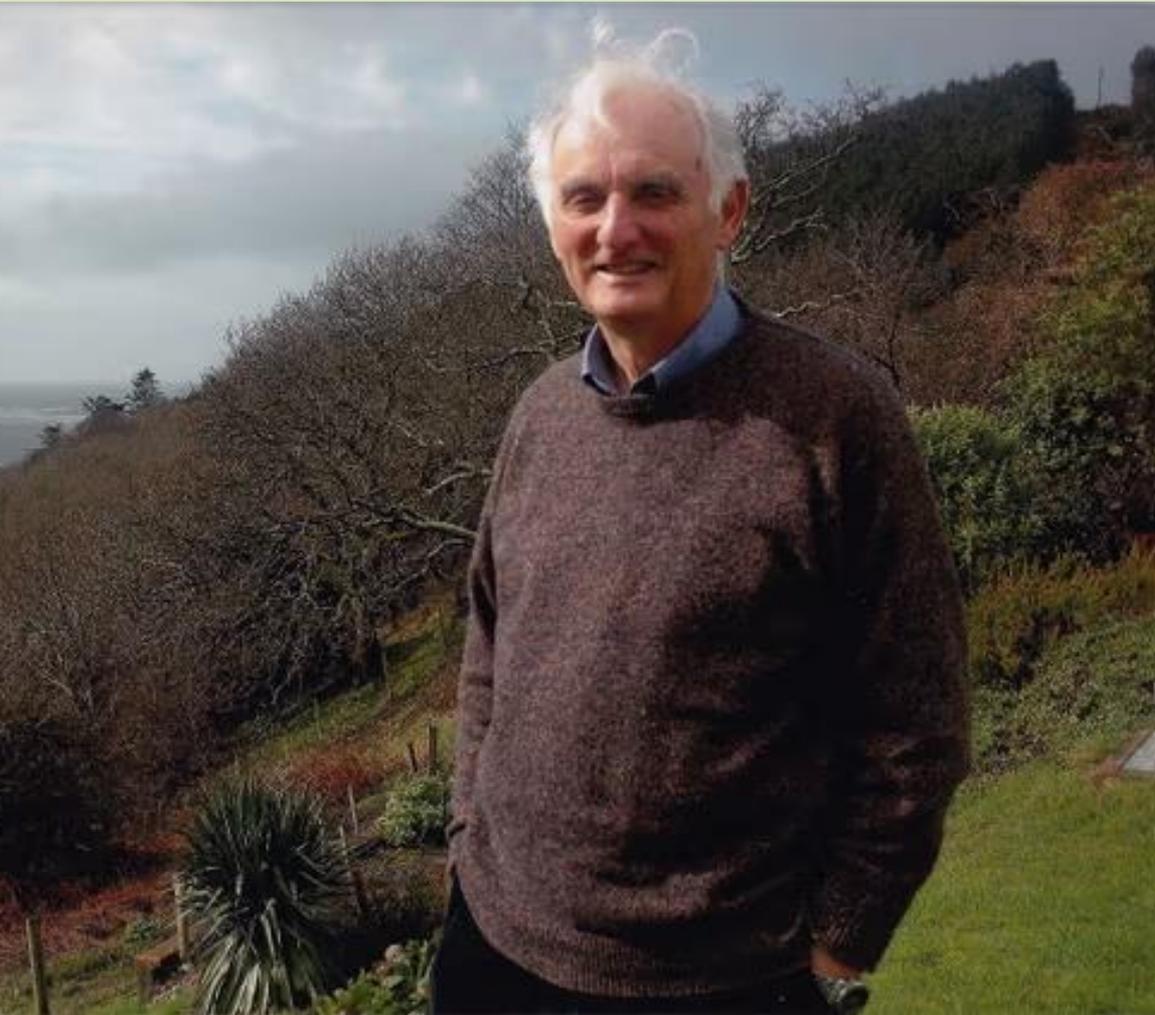


Professor Steven Hawkins

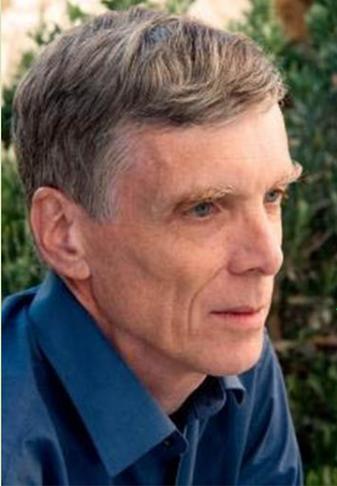


Emeritus Professor, National Oceanography Centre, Southampton. “Responses of marine biodiversity and ecosystems to climate change” (60-year data series on limpet distribution and ecology).

Sir John Houghton CBE (1931-2020)



Sir John Houghton - Head of the British Meteorological Office, co-founder of the UN Intergovernmental Panel on Climate Change and lead editor of first three IPCC reports (with IPCC colleagues shared the 2007 Nobel Peace Prize with former US Vice President Al Gore).



Professor Richard Corlett

Co-author of the “Impacts, Adaptation, and Vulnerability” section of the 2014 IPCC report.

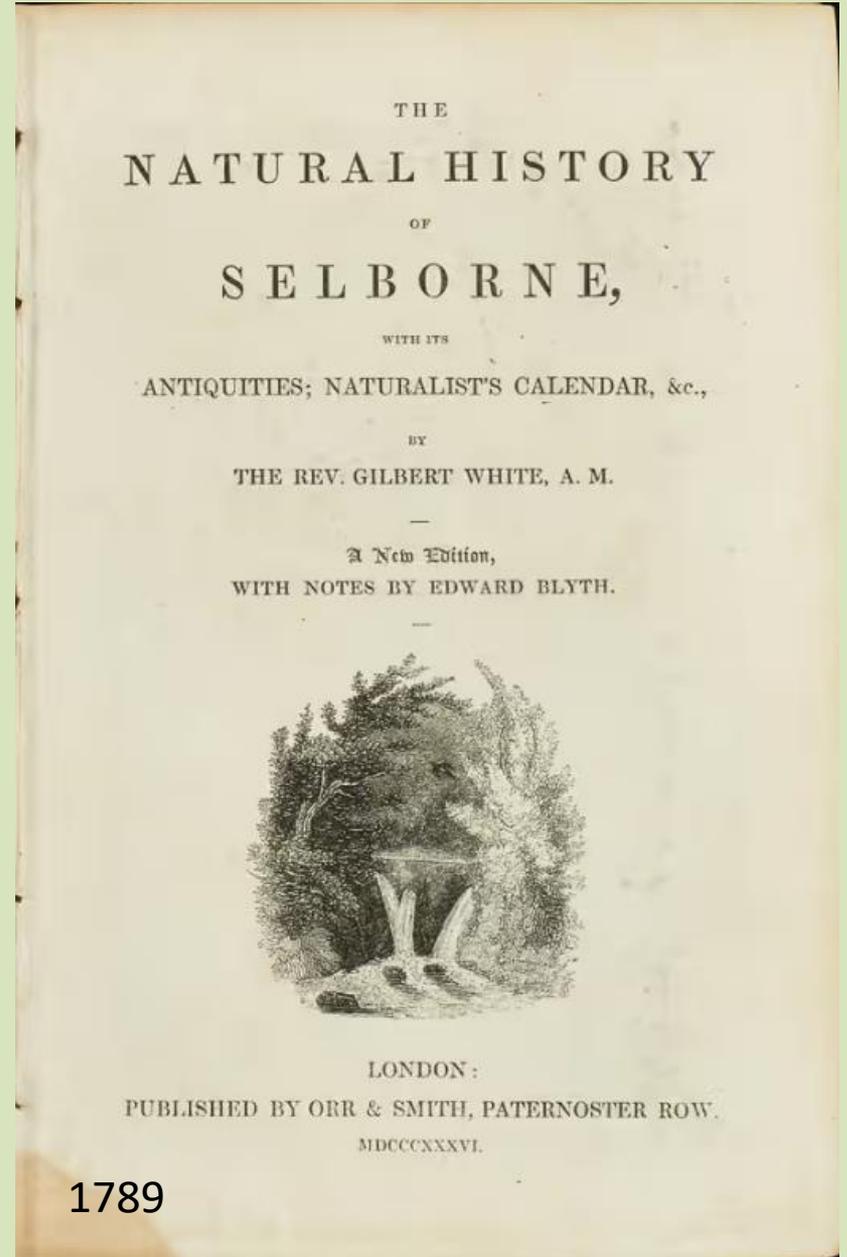


*“On **Mt Kinabalu** in Borneo **moths** have moved 120m uphill in 42 years after 0.7°C warming”*





Gilbert White



THE
7
dir
Blu
SHEPHERD'S CALENDAR;

WITH *A*
VILLAGE STORIES,
AND OTHER POEMS.

BY JOHN CLARE,

AUTHOR OF "POEMS ON RURAL LIFE AND SCENERY."--"THE
VILLAGE MINSTREL," &c.

LONDON:

PUBLISHED FOR JOHN TAYLOR, WATERLOO PLACE,
BY JAMES DUNCAN, PATERNOSTER ROW;
AND SOLD BY J. A. HESSEY, 95, FLEET STREET.

1827.

1827

John Clare





Edith Holden

THE COUNTRY DIARY OF AN EDWARDIAN LADY

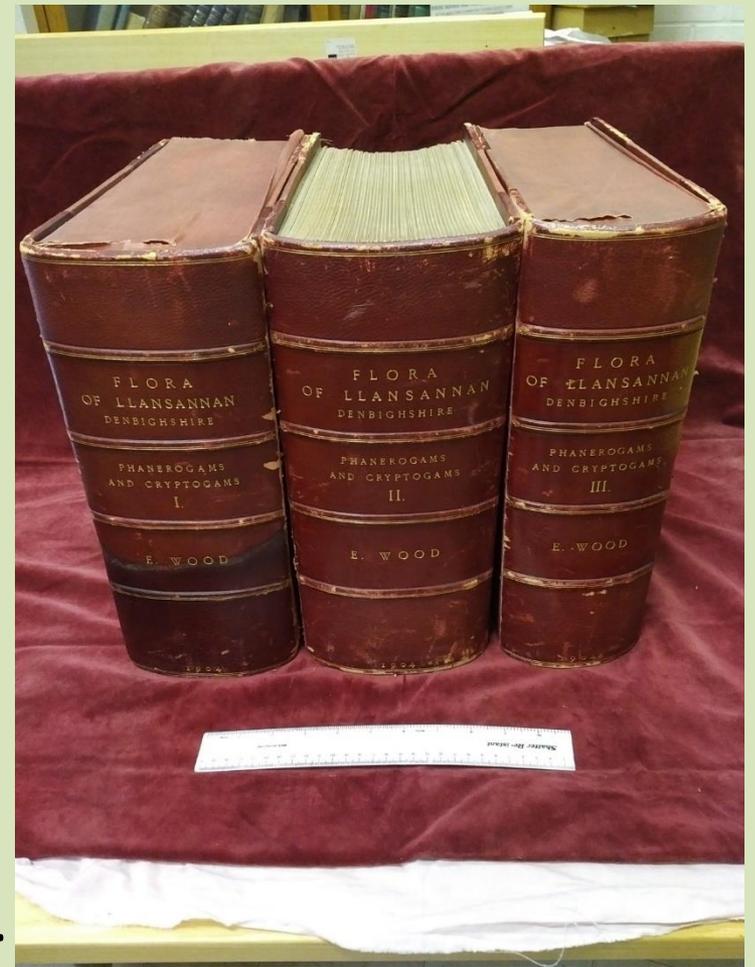


Edith Holden

1906/77

Willow Warbler
feeding young.





Emily Wood, "Flora of Llansannan", 1904.



UK National Ecosystem Assessment 2011



Chapter 20:

Status and Changes in the UK's Ecosystems and their Services to Society: Wales

Coordinating Lead Author: Shaun Russell

Lead Authors: Tim Blackstock, Mike Christie, Keith Davies, Catherine Duigan, Isabelle Durance, Russell Elliot, Hugh Evans, Charlie Falzon, Peter Frost, Sue Ginley, Neal Hockley, Shelagh Hourahane, Barbara Jones, Laurence Jones, Julia Korn, Peter Ogden, Saskia Pagella, Tim Pagella, Brian Pawson, Brian Reynolds, David Robinson, Bill Sanderson, Jan Sherry, James Skates, Emma Small, Barbara Spence and Clive Thomas

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5th Jan 1921. Touch House 3:30 p.m.
First snowdrop brought in very early this year

27 Jan Near Loch Maule 2:50
Saw the red deer again among the trees. Also three coverts of grouse on the moor. Very wild

29 Jan Glen. 12:30 a.m.
Saw two squirrels.

Near Stables. 3:0 p.m.

Shot a Great Tit. Trying to stuff it -
The servants are having a shoot to day. I hear they got two deer this morning. I hope they didn't get the red one. They are the most hopeless shots. If I couldn't shoot better than that I would not shoot at all. I verily believe that when I've had a little more practice I shall be able to shoot better with the air rifle than one of them with a game bird one although mine only fires one pellet and the other 20 or 30. The shot is a cruel way of shooting to let half the beasts go away wounded to suffer and die later on.

The snowdrops are out in masses. In fact unless more come up they will not last much longer

Feb 1st. Glen. 3:30 p.m.

The weather has been very mild so far this year and the birds are beginning to sing. The snowdrops are out in masses here. The mice are running about again already the grass is full of their runs. I hear that a half-fledged starling baby has been found near Edinburgh and that many birds have not migrated from the Bass Rock this year. There are quantities of gulls, Fieldfares and other birds just now, the hedges are full of finches and tits and flocks of birds are always flying about. The geese seem to have left already. All the trees are budding

Feb 2nd Near Stable 11:0 a.m.

Shot squirrel. Out very early.

Feb 24. House (back) 6:0 p.m.

Daffodils nearly out over furnace & boiler house.

Feb 25

Feb 25. House (inside) 12 noon

I have got some tadpoles or rather tadpole spawn in a jar. Some of the spawn has hatched. At present they only move their tails a little. The spawn came from a hollow



1st 2nd 3rd 4 5 6 7 8
(out) (out) (out)

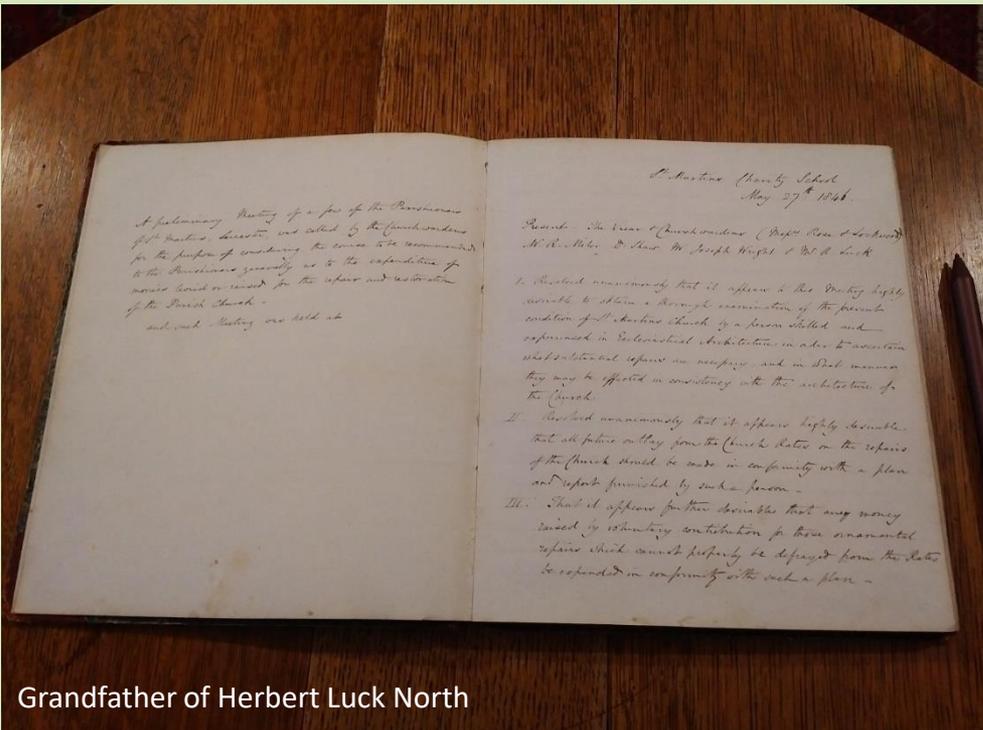
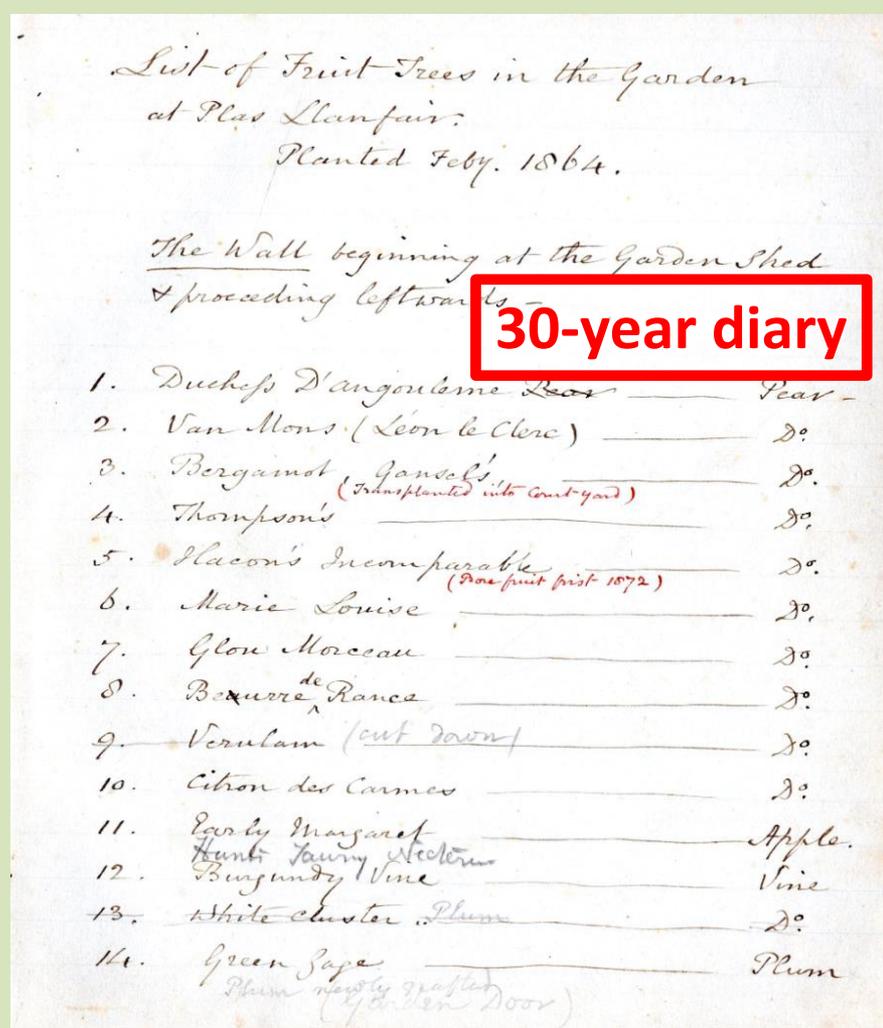
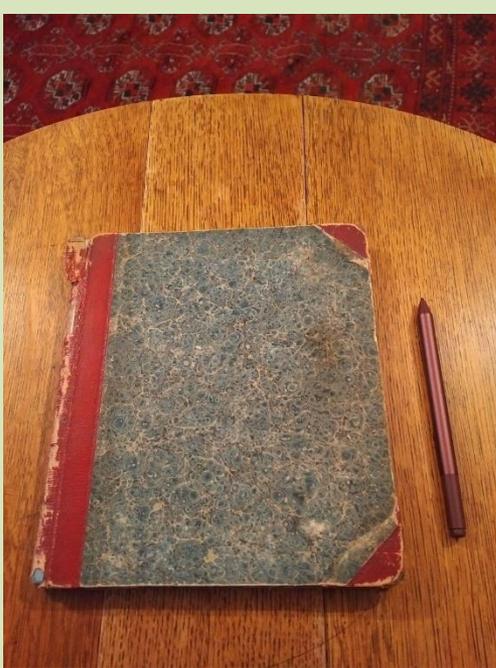
9-year diary



Viola Stirling (Gargunnock, Scotland)
nature notebook 1919 -1928 (aged 12 – 21)



Richard Luck (1812-1898)

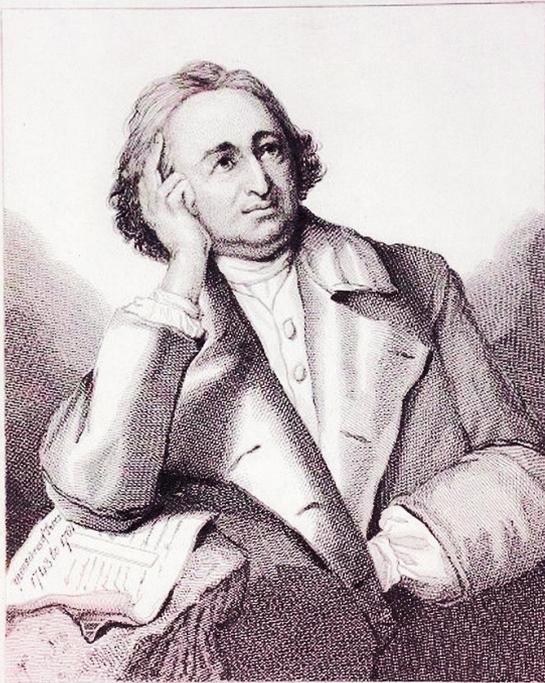


Grandfather of Herbert Luck North

Fruit	Varieties	Fruit	Varieties
Apples	50	Apricots	2
Pears	18	Cherry	2
Plums	13	Vines	1
Nectarines	2	Gooseberries	1
Peaches	3	Strawberries	1

Robert Marsham (1708-1797) recorded 27 “Indications of Spring”, at Statton Strawless Hall in Norfolk between 1736 and 1797.

61-year diary



ROBERT MARSHAM ESQ. P.R.S.
OF STATTON STRAWLESS, NORFOLK, 1797

Marshams' indicators:

- Unfurling of leaves of 13 common species of trees
- flowering times of snowdrop, wood anemone, hawthorn and turnip
- arrival of migratory birds: swallows, cuckoos, nightingales and 'churn owl' (nightjar)
- onset of croaking of frogs and toads

The father of : **“Phenology”**

“PHENOLOGY”

(from the Greek *'phainein'* meaning 'appearance' or 'to show')

The study of seasonal changes

- Bud break
- Leafing
- Flowering
- Fruiting
- Arrival of migratory birds,
- butterflies etc...



News

31st December 2008

Ashtead naturalist Jean Combes given New Year's Honours OBE for climate change work

By Hannah Furness

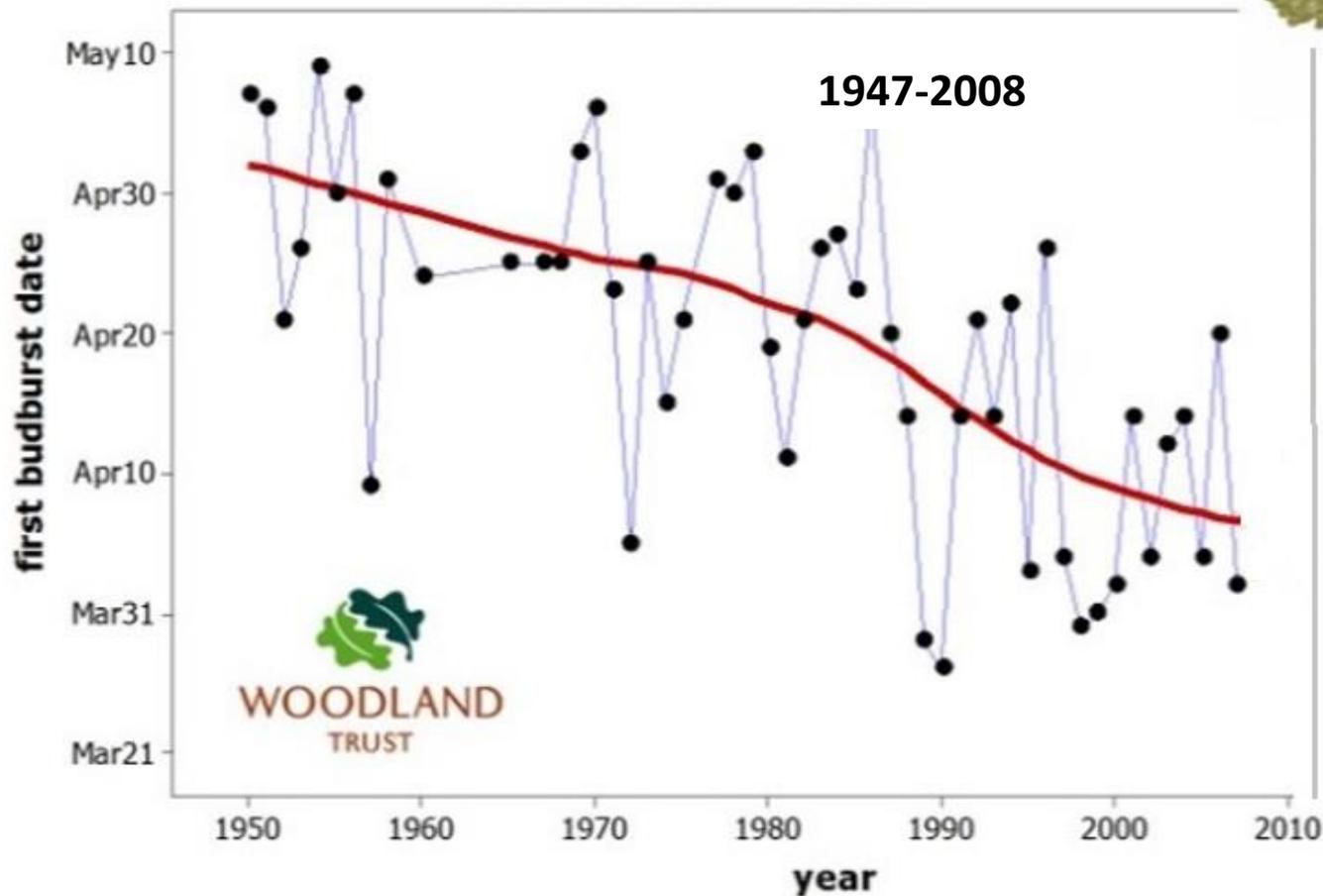


Jean Combes shows David Shukman the records she has kept voluntarily



61-year diary

Oak budburst 1950-2007



WOODLAND TRUST

Jean's note-books show that a particular oak, near her home in Ashted in Surrey, is now bursting its buds about three weeks earlier than it did in the 1960s.





Totnes Community Bookshop
Castle Street
Totnes
Devon



Notes.

F. Beine 12

68-year diary

January.

N

All the observations dated before November, 1907, refer, unless otherwise stated, to Farleigh, near Warlingham, Surrey, Lat. Long. on the Surrey Hills, altitude of land for some way round, about 550 feet above sea.

From November 1907, to May 1912, they refer, except when stated otherwise, to Kingwear, S. Devon, at the mouth of the river Dart. Lat. 50° 20', W. Long. 3° 35'.

From May 1912, to January 1915, they refer to Paignton, in Torbay, S. Devon, & its near neighbourhood, unless otherwise stated.

From Jan. 1915 to [1965] they refer to Lustleigh, Devon, unless otherwise stated.

1.

Willow & Elder leaves opening, & mercury coming up. — 1897.
Yellow jessamine out. — 1897.

Narcissus yellow & white in blossom. Paignton 1913.

2.

Grass lawns covered all over with daisies in blossom as in summer Kingwear, S. Devon, 1909. (Lawn had to be mowed — grass two or three inches high, — last mowed about a month ago.)

Lustleigh, Devon – 1960s



Lionel Bennett of Lustleigh in Devon (1887-1965)



Feb.

22.

All rose trees in some sheltered gardens covered with flowers & buds, Kingwear

Painted Lady butterfly, in perfect condition, looking as if just hatched from pupa. flying vigorously Trapshill Garden Lustleigh. It was getting honey from winter heath, which had attracted numbers of bees. Very warm cloudless day, 63° in shade. 1958.

23.

(See Feb 29th)

All quick & slow hedges beginning to get green. Buds on young shoots of Elm trees beginning to open. A few Hazel nut leaves opening. Kingwear. 1908.

24.

Snowdrops at their best. 1897.

(Very late for so warm a winter.)

Female flowers of hazel out. 1898.

Some Gooseberry bushes in blossom.

Kingwear, 1912.

25.

Hedges becoming green. 1898.

Crocuses in blossom. 1900.

Germander Speedwell in blossom in places. 1909. - Kingwear.

Brimstone butterfly (Colias Phammi) seen at Kingwear. S Devon. 1912.

26.

Ribes (Flowering currant) fully out in Dartmouth Castle gardens etc. 1908.

All currant, apple, pear & lilac leaf buds opening. Kingwear 1908.

Large Cabbage White butterflies. 1961.

27.

Large numbers of primroses out. 1897.

A pair of Robins seen examining a hole in the cliff behind "Dart Bank" Kingwear with a view to building, which they commenced next day. See March, 6th.

1911.

Large Cabbage White & also small Cabbage White on ivy between Lustleigh & Bovey. 1953.

(Next earliest March 24 & 26. *)

68-year diary

[Lionel made observations from age 9 to 78]

1887 89 91 93 95 97 99 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 1965 Year

Victoria

Edward VII

George V

Edward VIII

George VI

Elizabeth II

Boer War

WWI

WWII

Erasmus Darwin PEDIGREE B. (Vide p. 8.)
Erasmus Darwin=Elizabeth Collier.

Edward Darwin of Muckworth. In the 3rd Dragoon. Born 31 Jan. 1782. Died 30 July 1829. Bur. at Breadsall, near Derby; unmarried.

Sir Francis Sacheverel Darwin, Knight, of Breadsall Priory, co. Derby, and sometime of Emmanuel College, Cambridge. In the Commission of the Peace, and Deputy Lieutenant. Born 17 June 1786. Died 6 Nov. 1859. Bur. at Breadsall, near Derby.

Jane Harriett, youngest dau. of John Boyle of Park House, Macclesfield (descended from the Boyles or Boyles of Boyle, co. Lancaster). Born 11 Dec. 1794. Mar. 16 Dec. 1815 at St. George, Hanover Square. Died . . . April 1869. Bur. at Breadsall, near Derby.

Rev. John Darwin, Rector of Elton aforesaid. Born 2 Sept. 1787. Died 13 Nov. 1818. Bur. at Elton; unmarried.

Henry Darwin. Born 10 April 1789. Died 25 April 1790. Buried at Radbourne, co. Derby.

Erasmus Darwin

Signature of Francis S. Darwin to a letter, dated "Muckworth, 30th July 1829," addressed to "Dr. Darwin, Shrewsbury."

Charles Darwin

Reginald Darwin of Fern, near Buxton, co. Derby. In the Commission of the Peace. Born 4 April 1818.

Mary Anne, dau. of Charles Rogers Sanders of Exeter, co. Devon, Banker. Mar. 10 May 1843.

Edward=Harriet, dau. of Francis Levet of Buxton, Derby, Mar. 11 April 1808.

John Robert, Born 29 March 1817. Mar. 29 March 1817. Died in 1872.

Mary Jane, Born 14 Jan. 1840. Died in 1835.

Charles Carill Worsley of Platt Hill, co. Lane, and Winster, co. Derby, Esq. Bapt. at Platt Chapel 12 May 1806. Died at Platt 14 Aug. 1864.

Reginald Darwin

Signature of Reginald Darwin, Esq.

Sacheverel Charles Darwin, Captain R.N. Born 5 March 1844.

Mary Clementia. A son. Born 3 Nov. 1845. Died 2 June 1848.

Elisabeth. Born 13 Feb. 1847. Mar. 24 May 1876.

Nicolas, eldest son of Acton Tindal of the Manor House, Aylesbury, who assumed names and arms of Carill Worsley by Royal Licence in 1878.

Charles Nicolas Carill Worsley. Born 20 Aug. 1876.

John Acton Carill Worsley. Born 20 July 1877. Died 21 July 1877.

Acton Carill Worsley. Born 9 Sept. 1878.

Ralph Carill Worsley. Born 27 Dec. 1881.

Clementia. Born 27 Dec. 1884.

Samuel Tertius Galton of Doddington House, co. Warwick. Born 23 March 1788 in Birmingham. Bapt. at Radbourne, co. Derby, J.P. and D.L. for co. Warwick. Died 23 Oct. 1844 at St. Leonard's, Bur. 30 Oct. following in Claverdon Churchyard, co. Warwick. M.I.

Frances Anne Violetta. Born at Radbourne, co. Derby, 23 April 1783. Bapt. at Radbourne, Mar. 30 March 1807 at Breadsall. Died 12 Feb. 1874 at Bertie Terrace, Leamington. Buried 18 Feb. following at Claverdon, co. Warwick. M.I.

Emma Georgiana Elizabeth. Born 24 Aug. 1784. Died 6 March 1818. Bur. at Breadsall, near Derby; unmarried.

Harriet. Born 5 July 1790. Dec. 1811 to Admiral Thomas James Mailing (who died . . . Jan. 1849). Died 6 Aug. 1829 at Valparaiso in South America. Buried at Breadsall, near Derby.

S. Galton

Signature of Mrs. F. A. V. Galton.

Emma Darwin

Signature of Emma Darwin to a letter, dated "The Priory, Dec. 23d 1804," addressed to Dr. Darwin, Shrewsbury.

H. Mailing

Signature of Harriet Mailing to a letter, dated "The Priory, April 18th," addressed to "Doctor Darwin, Shrewsbury."

1st, Mary, dau. of John Phillips of Edstone, co. Warwick. Born 18 March 1822. Mar. 22 Sept. 1840 at Wootton Wawen, co. Warwick. Died 26 Nov. 1869 at Claverdon, co. Warwick. Bur. at Wootton Wawen.

Darwin Galton of Claverdon=2ndly, Frances Jane, dau. of Peter Willemsley, Esq., of Derby. Born 31 May 1815 at Ladywood, co. Warwick. Bapt. 27 April following at St. Martin's, Birmingham, co. Derby.

Erasmus Galton of Loxton Manor, co. Somerset, J.P. and D.L. Born 31 May 1815 at Ladywood, co. Warwick. Bapt. 30 June following at St. Martin's, Birmingham.

Francis Galton, F.R.S.=Louisa Jane, dau. of Rev. George Butler, D.D., Dean of Peterborough, and sister of the Hon. Montagu Butler, Head Master of Harrow School, and afterwards Master of Trinity College, Cambridge. Mar. 1 Aug. 1853 at Peterborough Cathedral.

John Samuel Phillips Galton. Born 23 Nov. 1841 at Leamington. Died 20 Aug. 1842 at Edstone, co. Warwick. Bur. at Wootton Wawen, co. Warwick.

Francis Galton

© The Complete Work of Charles Darwin Online

Lionel Bennett's great, great, great grandfather was Erasmus Darwin, the grandfather of Charles Darwin. So Lionel is a cousin, three times removed, of Charles Darwin.

John Samuel Phillips Galton. Born 23 Nov. 1841 at Leamington. Died 20 Aug. 1842 at Edstone, co. Warwick. Bur. at Wootton Wawen, co. Warwick.

Francis Galton

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Elizabeth Ann. Born 19 Feb. 1808 at Ladywood, co. Warwick. Bapt. 25 Sept. 1809 at St. Martin's, Birmingham. Mar. 31 Dec. 1845 at Claverdon, co. Warwick.

Edward Wheeler of Leamington Hastings, co. Warwick (son of Charles John Wheeler by Isabel, dau. of John Close, Esq., of Eastby, co. York). Born 26 Sept. 1798 at London. Bapt. at St. George's, Bloomsbury. Died 16 Nov. 1879 at Leamington. Bur. 20 Nov. following at Claverdon, co. Warwick.

Lucy Harriet. Born 8 May 1809 at Ladywood, co. Warwick. Bapt. 25 Sept. following at St. Martin's, Birmingham. Mar. 29 March 1832 at Aston, Birmingham. Died 6 Nov. 1848 at Brighton. Buried at Abberley, co. Worcester.

James Mollitt, Esq., of Cheney Court, co. Hereford, J.P. for co. Warwick (son of John Lewis Mollitt, Esq., of Abberley Hall, co. Worcester, by Amelia, dau. of Captain James Keir, F.R.S., of Hill Top, West Bromwich). Born 1806. Died 1 July 1878 in London; buried at Abberley, co. Worcester.

Millicent Adèle. Born 21 July 1810 at Ladywood, co. Warwick. Bapt. 29 May 1812 at St. Martin's, Birmingham. Mar. 13 May 1846; bur. 3 June following at Swansea.

Rev. Robert Shirely Bunbury, Rector of Swansea. Born 17 Oct. 1811 at Ladywood, co. Warwick. Bapt. 29 May 1812 at St. Martin's, Birmingham. June following at Swansea.

Emma Sophia. Born 17 Oct. 1811 at Ladywood, co. Warwick. Bapt. 29 May 1812 at St. Martin's, Birmingham. June following at Swansea.

Edward Galton Wheeler. Born 12 June 1850 at Snitterfield, co. Warwick. Bapt. 28 July following at Snitterfield.

Lucy Elizabeth. Born 21 April 1847 at Snitterfield, co. Warwick. Bapt. 29 June following at Snitterfield.

Millicent Galton Bunbury. Born 13 March 1846 at Swansea, co. Warwick. Mar. 23 May 1866 at Yardley, co. Warwick.

John Christopher Baron Lethbridge of Tregear, co. Cornwall, son of John King Lethbridge of Tregear. Born 1845. Died 9 Jan. 1885 at Tregear. Bur. at Egloskerry, near Launceston.

Edward Galton Baron Lethbridge. Born 12 Aug. 1867 at Tregear, co. Cornwall. Bapt. 6 Oct. 1867 at Launceston.

John Charles Henry Lethbridge. Born 6 Dec. 1868 at Launceston. Died in infancy.

John Guy Baron Lethbridge. Born 15 Nov. 1873 at Tregear. Bapt. 11 Jan. 1874 at Launceston. Died in infancy.

Robert Christopher Baron Lethbridge. Born 15 Sept. 1875 at Tregear. Bapt. 27 Sept. 1875 at Launceston.

Francis Charles Baron Lethbridge. Born 8 May 1877 at Launceston.

Frederick Shirley Baron Lethbridge. Born 4 June 1879 at Tregear. Bapt. 11 Feb. 1881 at Launceston.

Hugh Copland Baron Lethbridge. Born 14 Dec. 1880 at Launceston. Bapt. 11 Feb. 1881 at Launceston.

Emma Millicent Adèle. Bap. 13 Nov. 1870 at Launceston. Died in infancy.

Lucy Amy. Born 1 Feb. 1872 at Tregear. Bapt. 15 Feb. 1872 at Launceston.

Francis James. Born 9 April 1834 at Smithgrove. Mar. 21 Nov. 1854.

Orange Cameron Galton of Shelsley Grove, co. Worcester, son of Howard Galton, Esq. of Hadzor. Born 17 Nov. 1830 at Geneva. Died 22 March 1866, and buried at Hadzor.

Emma Sophia. Born 29 Dec. 1844 at Selly Hall, near Birmingham. Bapt. 6 Feb. 1845. Married 2 May 1866 at Abberley, co. Worcester.

William Theodore Bent, eldest son of Rowland Bent, Esq., of Liverpool (who died at Coldbrook Park, co. Monmouth, 27 April 1881), and was bur. at Allensmore, near Hereford), by Eliza, da. of Major James Bent, 27th Regiment. Born 16 March 1836; bapt. at St. Thomas Church, Pendleton.

Even Cameron Galton. Born 22 Oct. 1856 at Hadzor House, co. Worcester. Bapt. at Hadzor Church. B.A. Clare Coll., Camb., and of the Inner Temple, Barrister-at-Law.

Lucy Ethel. Born 6 Oct. 1855 at The Elms, Abberley, bapt. at Hadzor Church. Mar. 22 June 1882 in London.

Amy Caroline. Born 23 April 1858 at Hadzor House; bapt. at Hadzor Church. Mar. 22 June 1882 in London.

Rev. Herbert Johnson, eldest son of the late Dean of Wells. Of Exeter Coll., Oxford, M.A. Vicar of Crookham, Edenbridge, Kent.

Adèle Vera Harcourt. Born 11 Aug. 1859 at Kitchberg, Lake Zurich; bapt. at Hadzor Church. Married 5 May 1886 at Shelsley, co. Worcester.

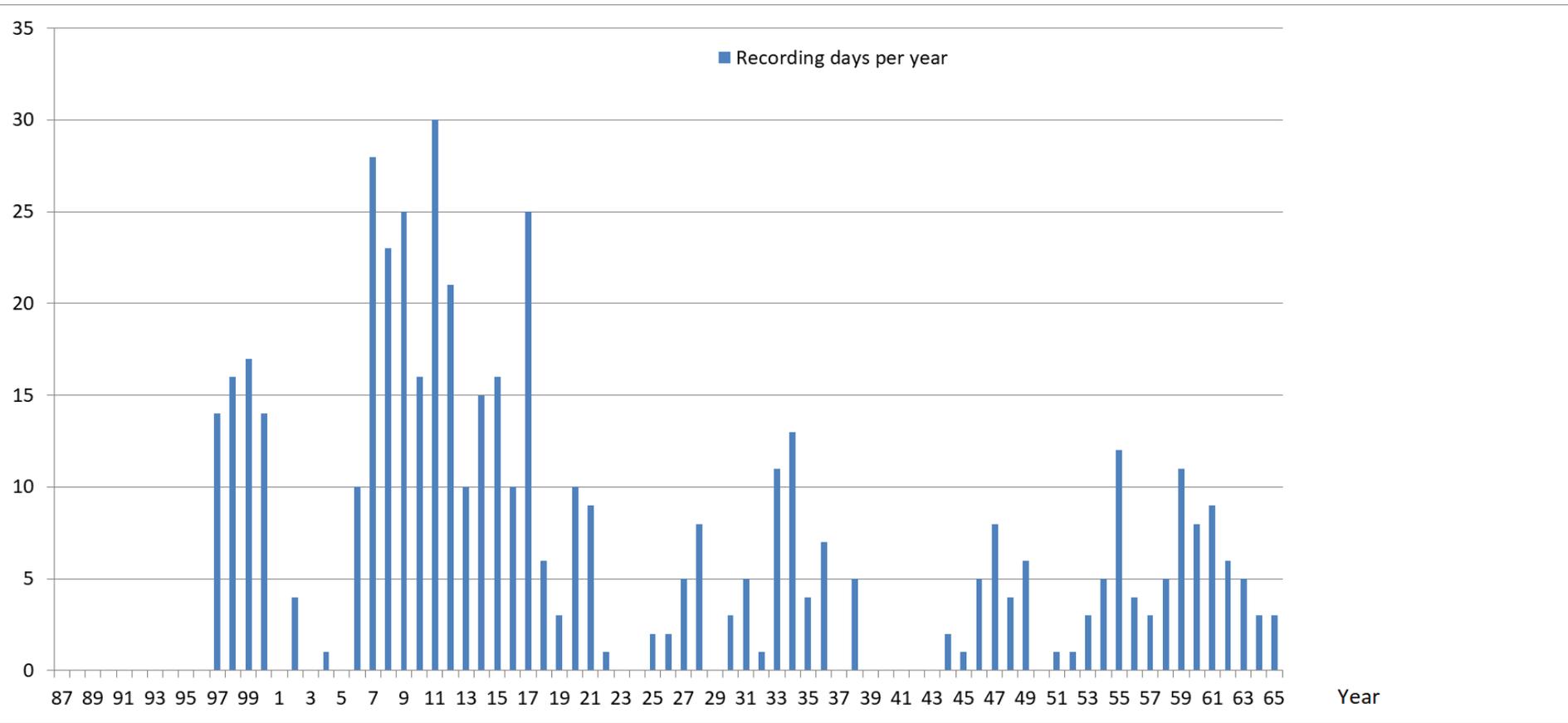
Rev. Frederick Bennett, eldest son of Rev. F. H. Bennett, Vicar of Freeland, Oxon, by Anne, da. of Rev. G. D. Renaud, M.A. Merton Coll., Oxford. Rector of Farleigh, Surrey. Born and bapt. at St. John's Vicarage, Worcester, Mar. 1844.

Violet Darwin. Born 12 Aug. 1862 at Hadzor; bapt. at Hadzor Church.

William Lionel Galton Bennett. Born 4 March 1887 at Worthing.

Lionel Bennett

Natural History Diary - 503 entries for 493 days over a 68-year period



Age: **1-10** **teens** **20s** **30s** **40s** **50s** **60s** **70s**

1897-1907 Farleigh, Surrey	1907-1912 Kingswear, Devon	1912-1915 Paignton, Devon	1915-1965 Lustleigh, Devon	
			'Kemerton'	'Trapstile'
				

Sarah Wollaston

197 different kinds of plants and animals recorded in the diary

A – Animals (8)

G - Garden plants (77)

B – Birds (16)

T – Wild trees and shrubs (15)

C – Butterflies (41)

W – Wildflowers (23)

O - Other insects (17)

No.	Group	Common name	Latin name	Notes
1	A	Adder	<i>Viper berus</i>	
2	G	Almond	<i>Prunus dulcis</i>	
3	G	Antirrhinum	<i>Antirrhinum majus</i>	Snapdragon
4	G	Apple	<i>Malus domestica</i>	
5	G	Arabis (blue)	<i>Arabis alpina</i>	Aubrieta?
6	G	Arabis (white)	<i>Arabis alpina</i>	var. <i>Caucasica</i> ?
7	T	Ash	<i>Fraxinus excelsior</i>	
8	G	Asparagus	<i>Asparagus officinalis</i>	
9	C	Bath White	<i>Pontia Daplidice</i>	
10	A	Bats	<i>spp.</i>	
11	T	Beech	<i>Fagus sylvatica</i>	
12	O	Bees	<i>Bombus etc</i>	Bees
13	O	Beetles	<i>spp.</i>	Beetles
14	G	Begonias	<i>Begonia spp.</i>	
15	G	Blackberries	<i>Rubus fruticosus</i>	
16	B	Blackbird	<i>Turdus merula</i>	
17	T	Blackthorn	<i>Prunus</i>	Sloe
18	W	Bladder campion	<i>Silene vulgaris</i>	
19	C	Brimstone	<i>Colias Rhamni</i>	
20	G	Broad beans	<i>Vicia faba</i>	
21	C	Brown Hairstreak	<i>Zephyrus betulae</i>	
22	G	Budleia	<i>Budleia globosa</i>	



1947 Oct 1. *“This is a great year for Clouded Yellow butterflies. Saw first at Lustleigh on June 25th & they have been common all over England since middle of July, but the number is greater now than earlier in the year The invasion of 1947 has been perhaps even more extensive than in 1928 and 1899.”*

Clouded Yellow “invasion years” - 1877, 1899, 1928, 1947, 1983, 1992, 1994, 1996 and 2000

Distribution Trend Since 1970’s = +84%.



Lionel has many records of the pearl bordered fritillary in the early 20th century

17 May 1900

20 May 1909

7 May 1910

24 May 1912 (aged 25).

“Large pearl bordered fritillary butterflies on the wing on a hillside covered with burnt gorse, between Birchanger Cross and Pinchaford near Bovey Tracey.

11 May 1917

“First Large Pearl bordered fritillaries seen (plentiful). Heaven’s Gate, Lustleigh.”

Butterfly Conservation: *“The pearl-bordered fritillary has undergone a severe decline in England”*

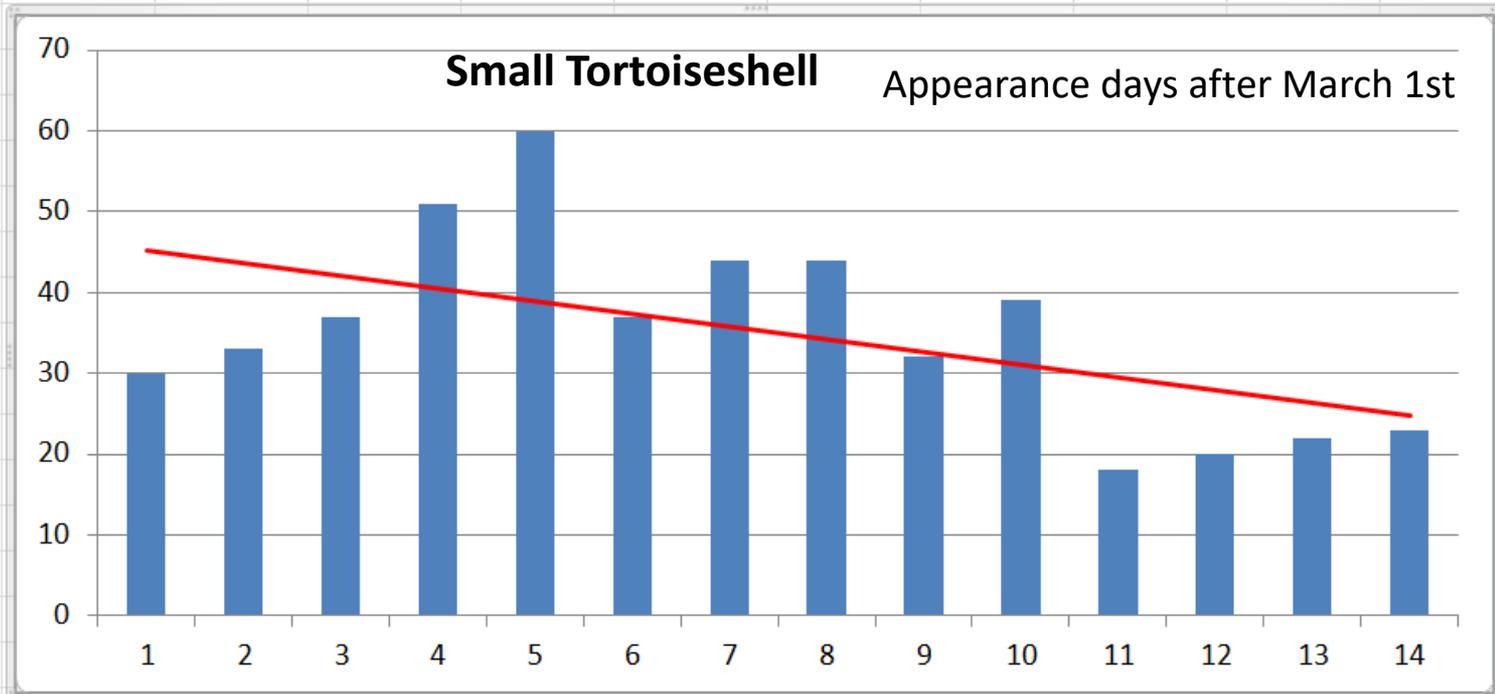
-95% since the 1970s due to a decline in coppicing and woodland clearing habitat

This species can still be seen in the New Forest at Denny Wood and Holmsley.



Small tortoiseshell

1897	Mar 30
1898	Apr 2
1899	Apr 6
1900	Apr 20
1907	Mar 29
1912	Apr 6
1914	Apr 13
1915	Apr 13
1916	Apr 1
1917	Apr 8
1918	Mar 18
1935	Mar 20
1959	Mar 22
1961	Feb?
1965	Mar 23

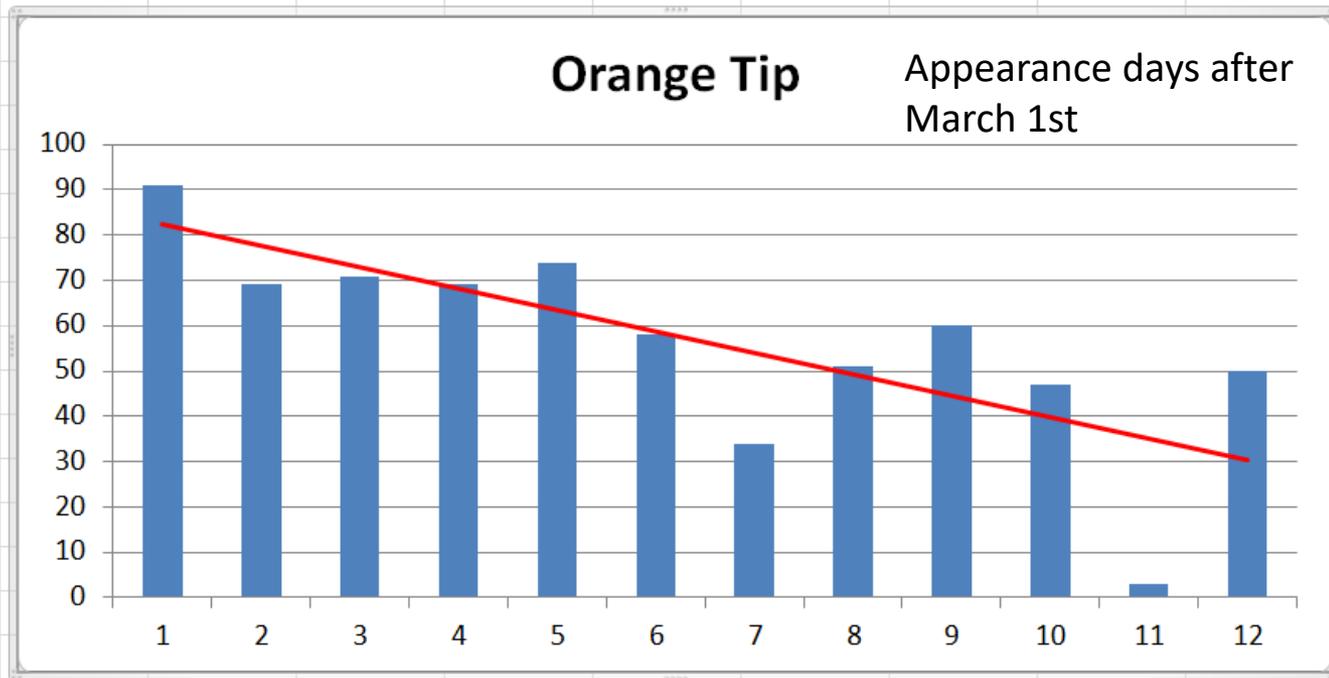


Increasing parasitic fly, *Sturmia bella*, due to global warming?



Orange tip

1899	May 30
1900	May 8
1907	Apr 17 (captive pupa)
1909	May 9
1910	May 7
1911	May 13 (v. late)
1915	Apr 27
1921	Apr 3
1956	Apr 20
1959	Apr 29
1960	Apr 16
1961	Mar 3
1965	Apr 19



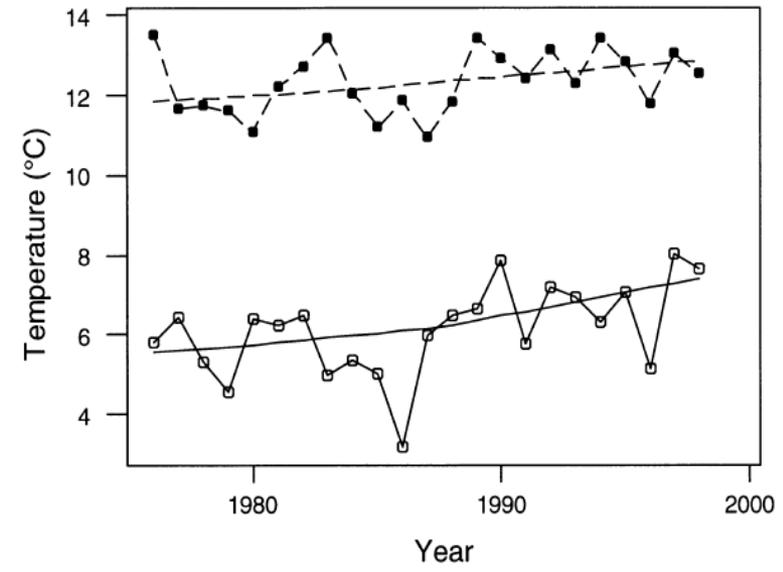
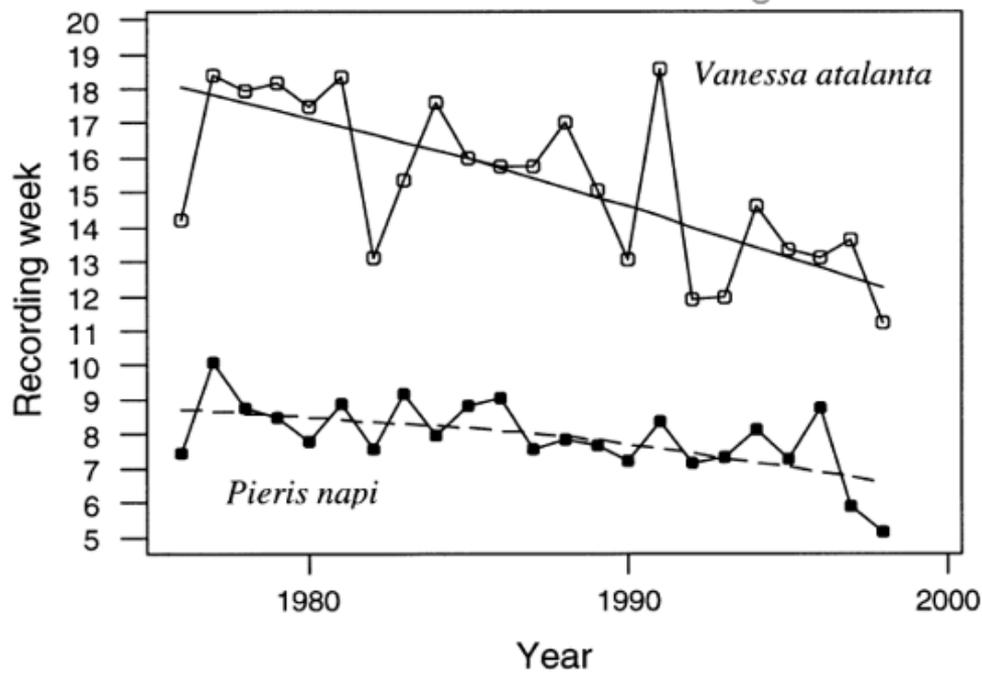


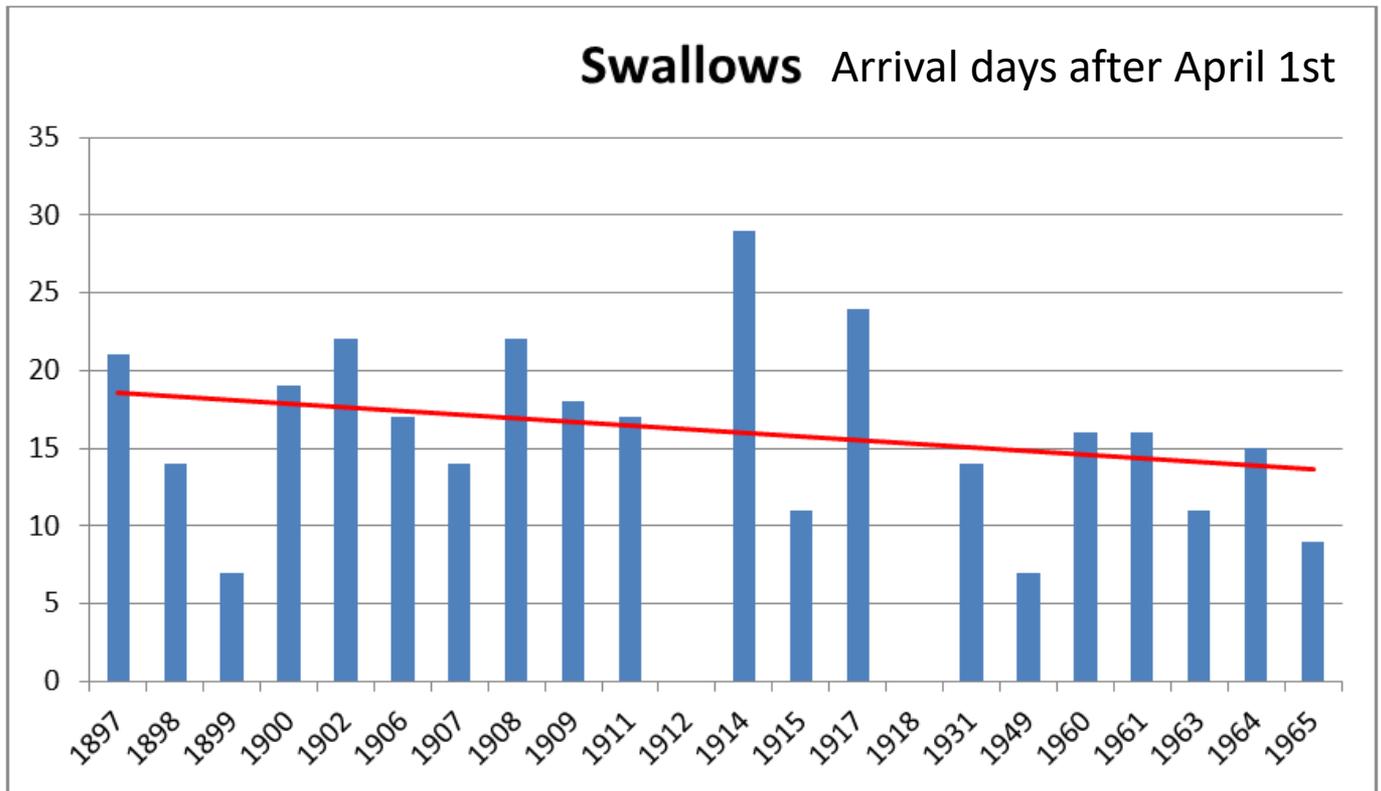
Fig.1. Time trends in spring and summer Central England Temperature (CET) 1976-98. Open circles are spring temperatures (mean February-April CET) and solid circles are summer temperatures (mean May-July CET).

BBMS - weekly observations at 100 sites on fixed transect routes in defined weather conditions since 1976



First Swallows

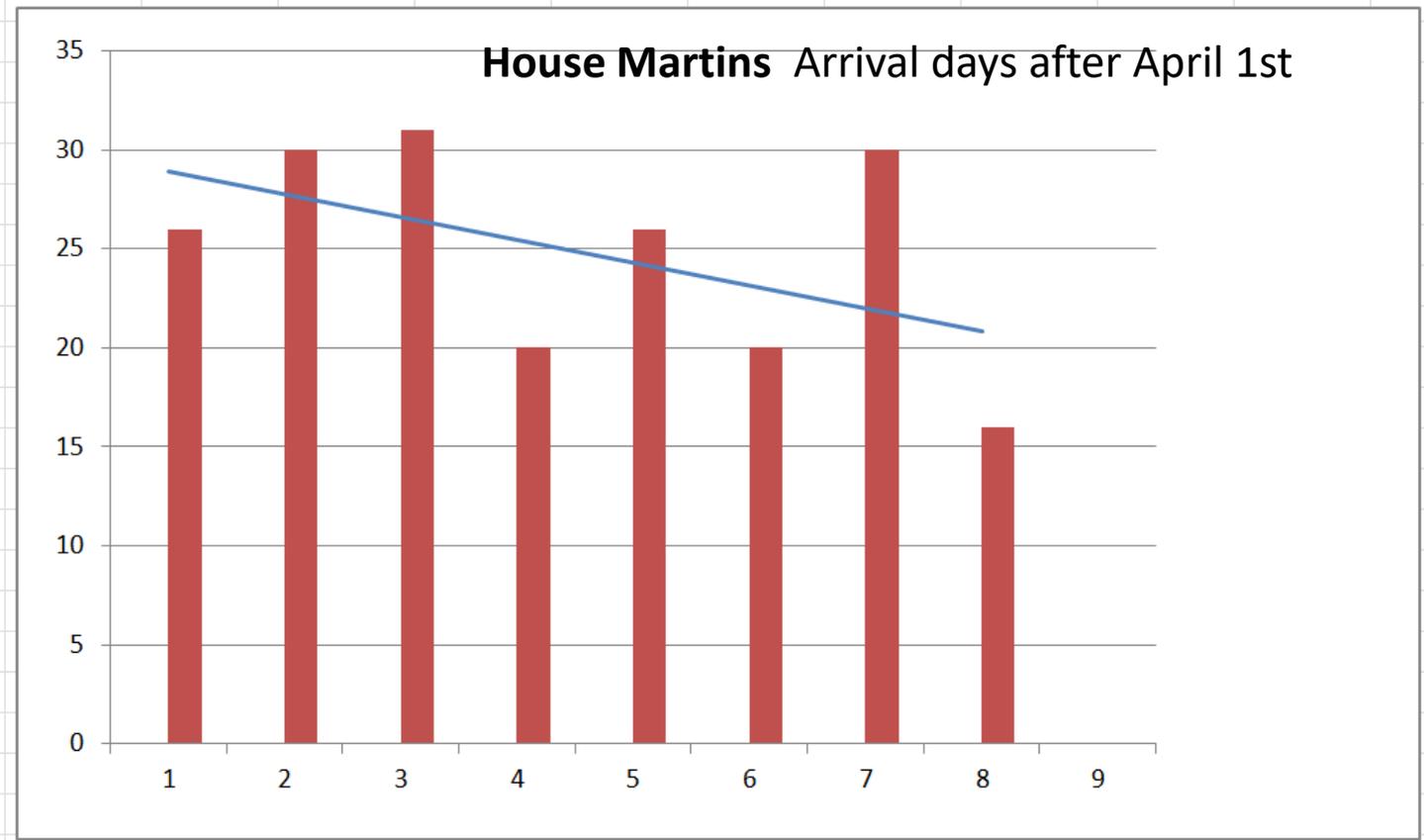
Year	Days after Apr. 1	
1897	21	
1898	14	
1899	7	
1900	19	
1902	22	
1906	17	
1907	14	
1908	22	
1909	18	
1910	Mar 28	France
1911	17	
1912	38	
1914	29	
1915	11	
1917	24	
1918	31	
1931	14	
1949	7	
1960	16	
1961	16	
1963	11	
1964	15	
1965	9	

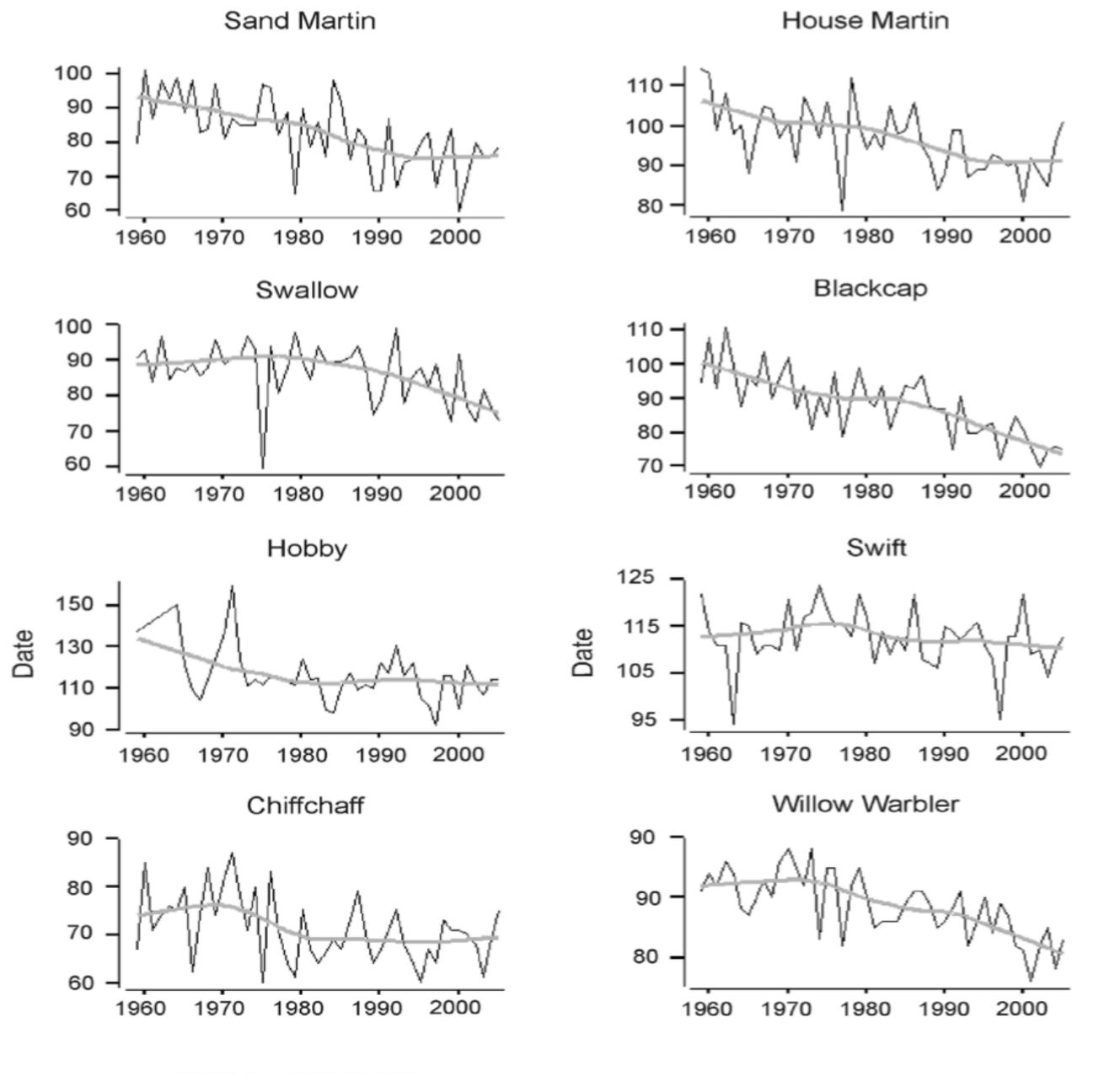




First House Martins days after April 1st

1900	26
1902	30
1909	31
1959	20
1960	26
1961	20
1962	30
1964	16

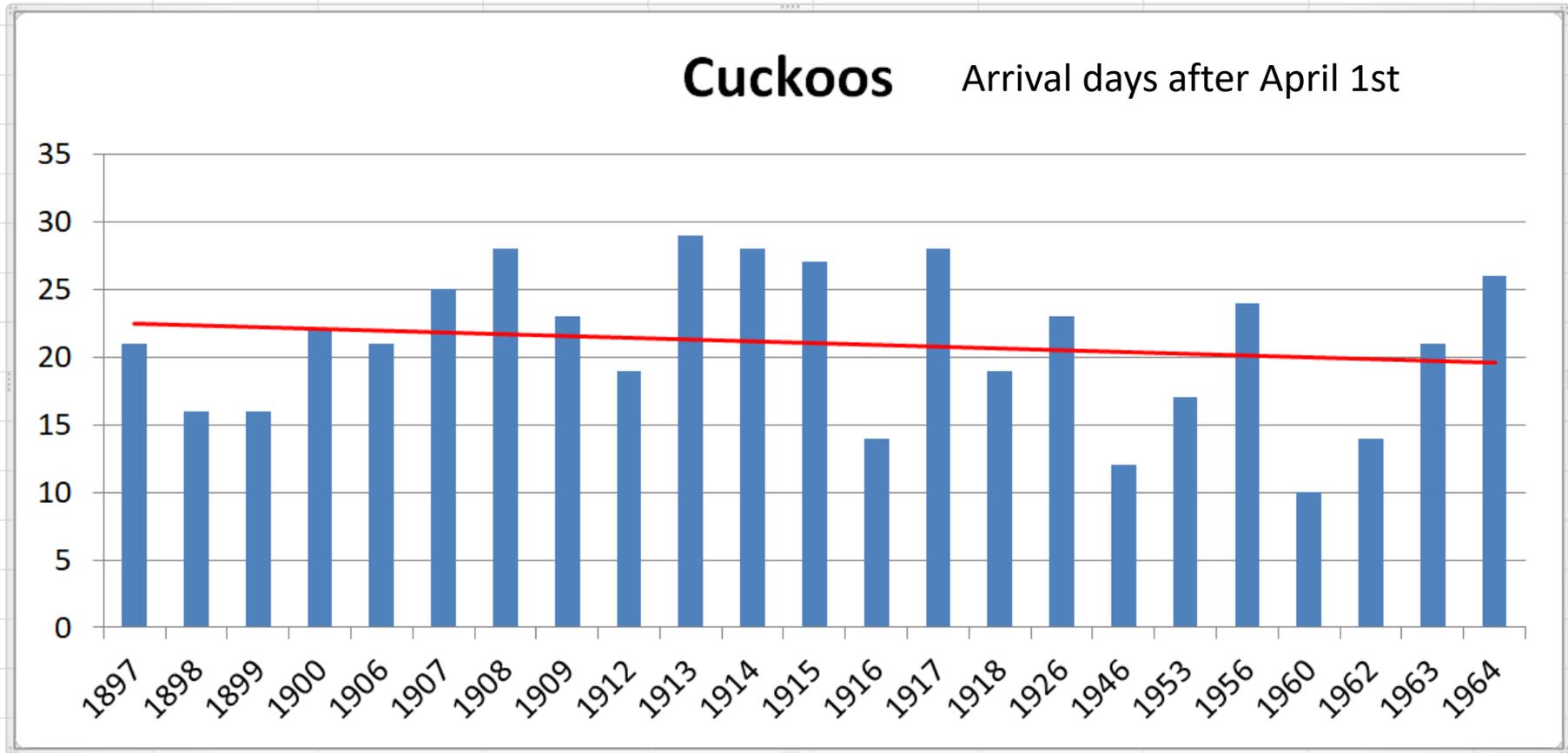




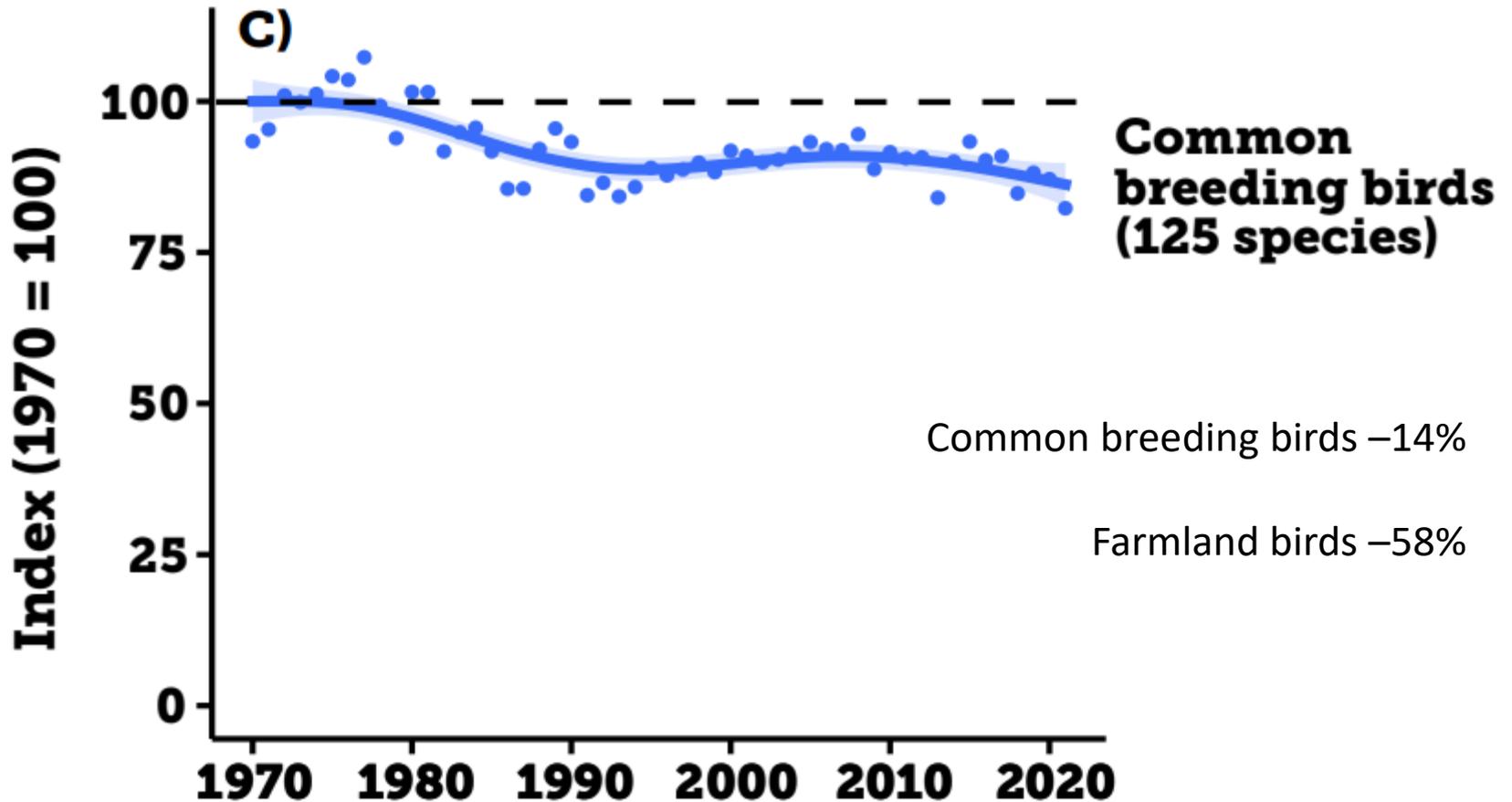


Cuckoos

Arrival days after April 1st



Average species abundance (birds)



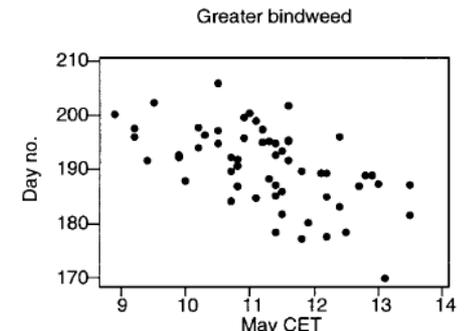
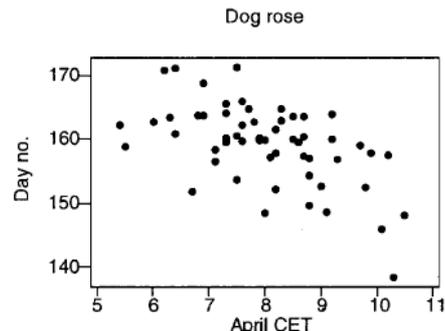
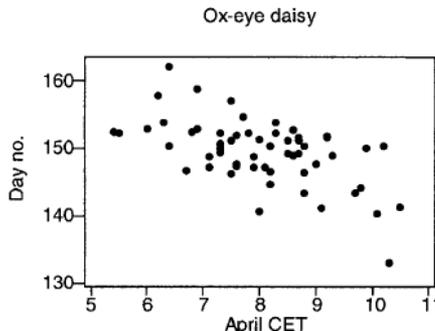
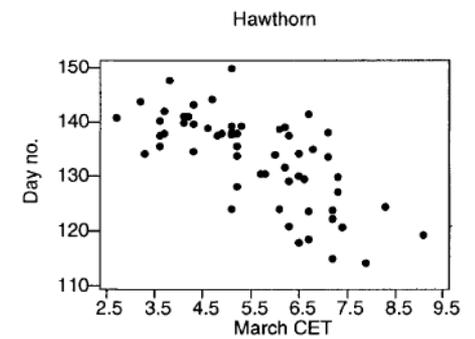
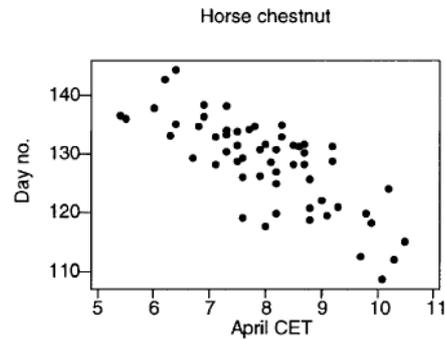
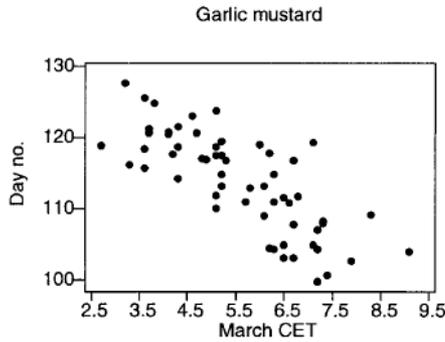
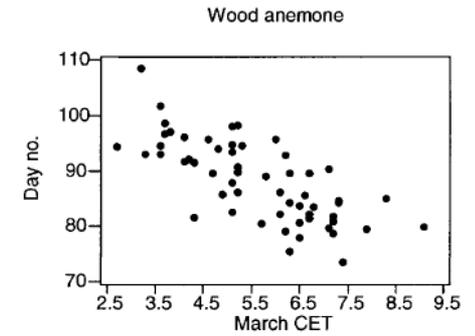
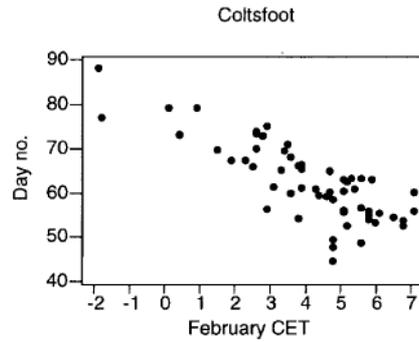
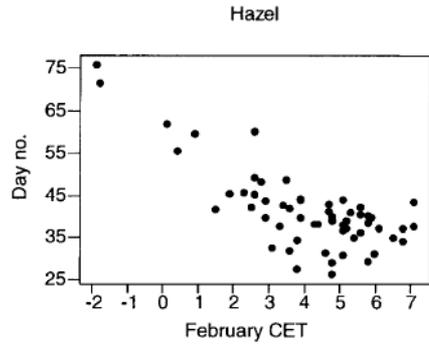
UK Breeding Birds Survey

Yellowhammer	Stock dove
Grey partridge	Fieldfare
Eurasian skylark	Brambling
Northern lapwing	Common reed bunting
Corn bunting	Common linnet
Meadow pipit	Cirl bunting
Eurasian tree sparrow	Red-legged partridge

T.H. Sparks · E.P. Jeffree · C.E. Jeffree

An examination of the relationship between flowering times and temperature at the national scale using long-term phenological records from the UK

58 years (1891-1948)



Media reports:

BBC

NEWS

Wednesday, 7 April 2010

Flowers bloom earlier as UK warms

By Richard Black
Environment correspondent, BBC News



Flowers are now emerging about five days earlier than 30-40 years ago

The Telegraph

Spring now arrives across Britain 11 days earlier

Spring now moves faster up the country, speeding through Britain at 1.9mph compared with 1.2mph in the 19th century



By Sarah Knapton, Science Editor

9:30PM BST 11 Jun 2015

Follow 8,977 followers

Spring really is arriving faster across Britain, with the season fully 'sprung' a full 11 days earlier than in the 19th century, a new study has shown.

Gardeners across the country can now expect to see the first oak leaves, swallows or hawthorn flowers a week and a half earlier than was recorded in 1890.

Search The Guardian UK edition

Juliette Jowit

Thu 1 Mar 2018 06.01 GMT

Nature showing early signs of spring despite cold snap

Woodland Trust records show more evidence that spring is arriving earlier in the UK



▲ 1 March is officially the first day of spring in the UK. Photograph: Arno Balzarini/EPA

MailOnline

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Latest Headlines | NASA | Apple | Twitter

Climate change is shifting Spring forward in the UK with butterflies hatching TWO WEEKS earlier and birds laying eggs sooner than they did 50 years ago

- Wildlife could get 'out of sync' with the life cycles of other species they rely on
- Aphids, moths and butterflies are also now flying much earlier, experts say
- The shift towards is also happening in shady forests as well as more open areas

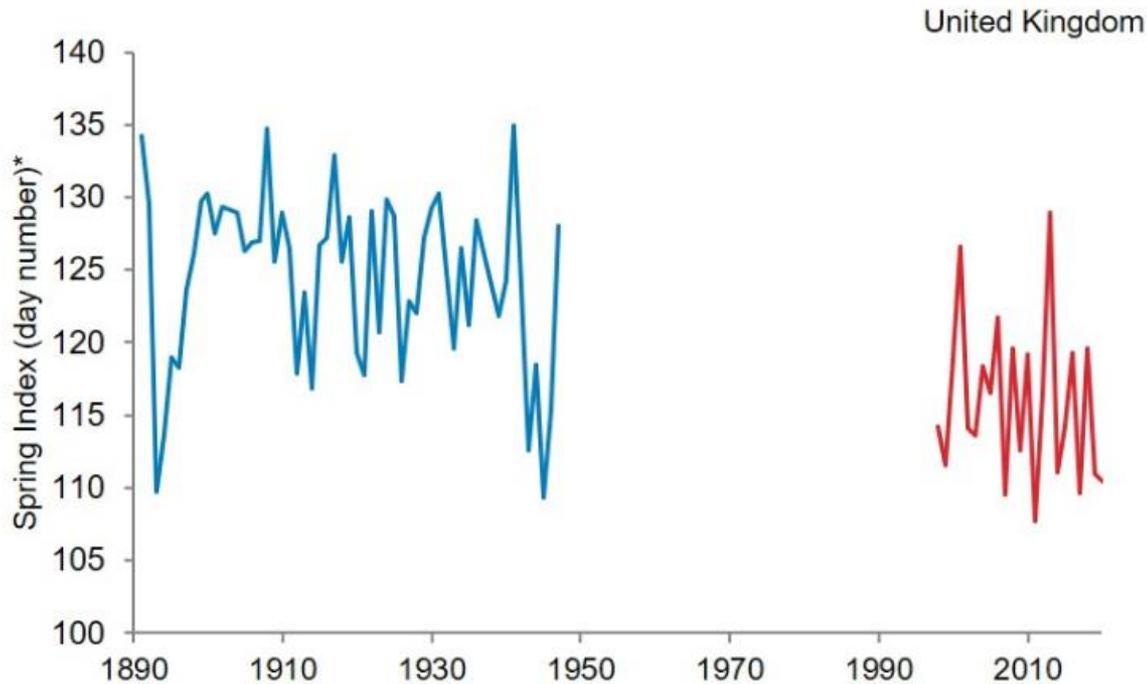
By VICTORIA BELL FOR MAILONLINE

PUBLISHED: 13:03, 1 April 2019 | UPDATED: 09:11, 2 April 2019

“SPRING INDEX”



Figure B4i. Index of the timing of biological spring events (number of days after 31 December) in the UK, 1891 to 1947, and 1998 to 2020.



Since 1998, the annual mean observation dates have been about **nine days in advance** of the average dates in the first part of the 20th century.

Calculated from the annual mean observation dates of the first flowering of hawthorn and horse chestnut, the first recorded flight of an orange-tip butterfly and the first sighting of a swallow.

1891 to 1947 – Royal Meteorological Society; 1998 to 2020 – ‘Nature’s Calendar’ (UK Phenology Network (Woodland Trust))

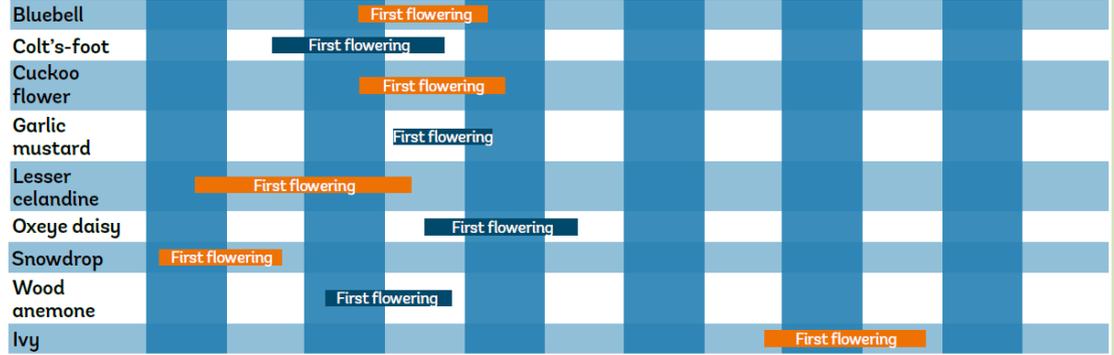
Nature's Calendar

Trees and shrubs
Flowers
Grasses and Fungi

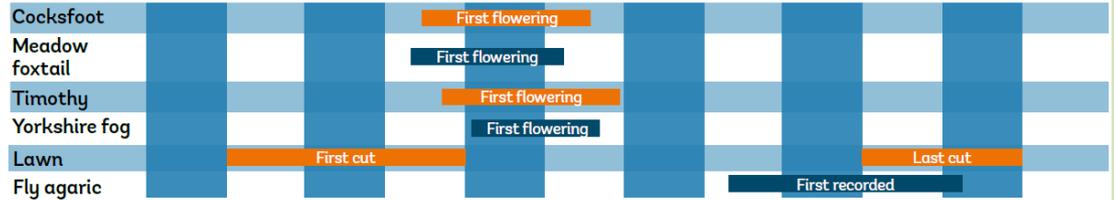
Birds
Insects
Amphibians

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

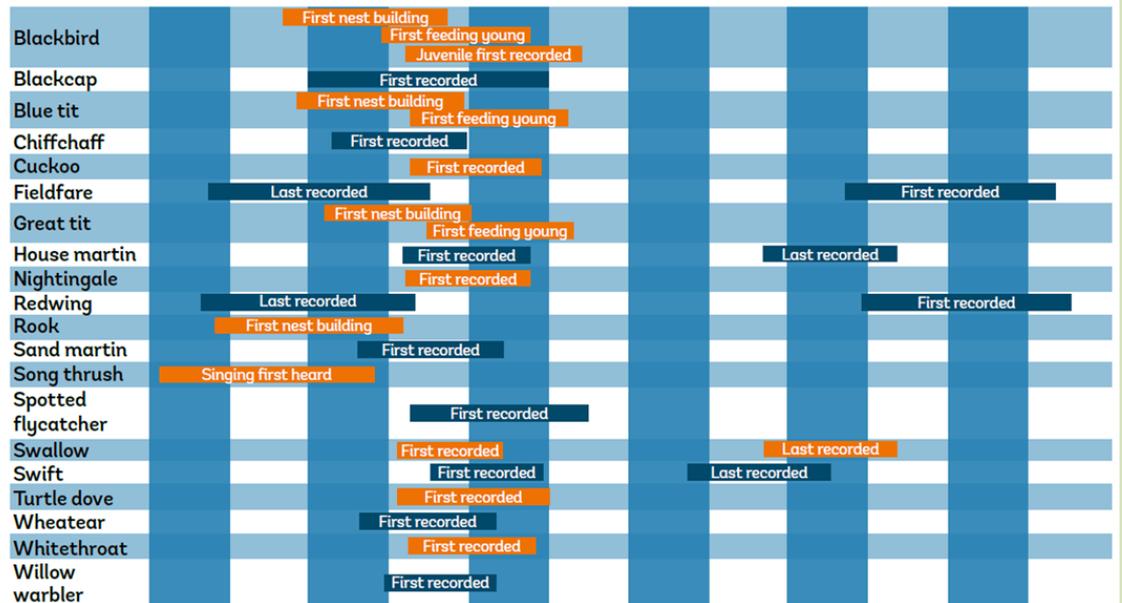
Flowers



Grasses and Fungi



Birds



Nature's Calendar

<https://naturescalendar.woodlandtrust.org.uk/analysis/species-and-events-map/>

Home > Analysis > Species and Events Map

Species and Events Map

Choose which species and event you would like to view on the map. Drag and drop the slider to see the spread across the UK

Map options

Species type

Species

Event

Year(s)

Apply

 Recorded by you  Recorded by other users

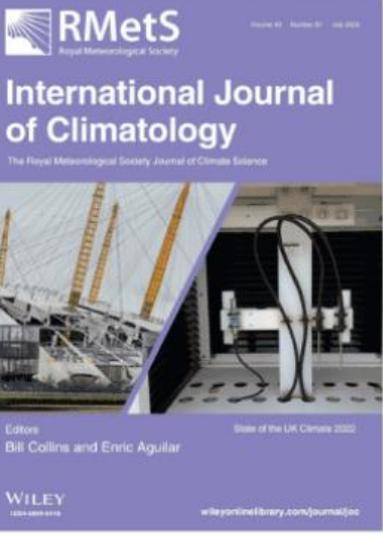


10/02/2022

February 2022



April 2022



State of the UK Climate 2022

Published July 2023

This annual report now includes a Phenology section based on Nature's Calendar observations.

First appearance of **7-spot Ladybird**, **Brimstone butterfly**, **Red-tailed Bumblebee** and **Speckled Wood butterfly**

First song of **Song Thrush**, appearance of **Chiffchaff**, **Swallow** and **Common Frog** spawn

First flowering of **Hazel**, **Lesser Celandine**, **Wood Anemone** and **Bluebell**.

Date of bud burst and length of in-leaf season for **Elder**, **Hawthorn**, **Silver Birch** and **Oak**.

The 2022 trees in-leaf season was 7–16 days longer than the mean for 1999-2021

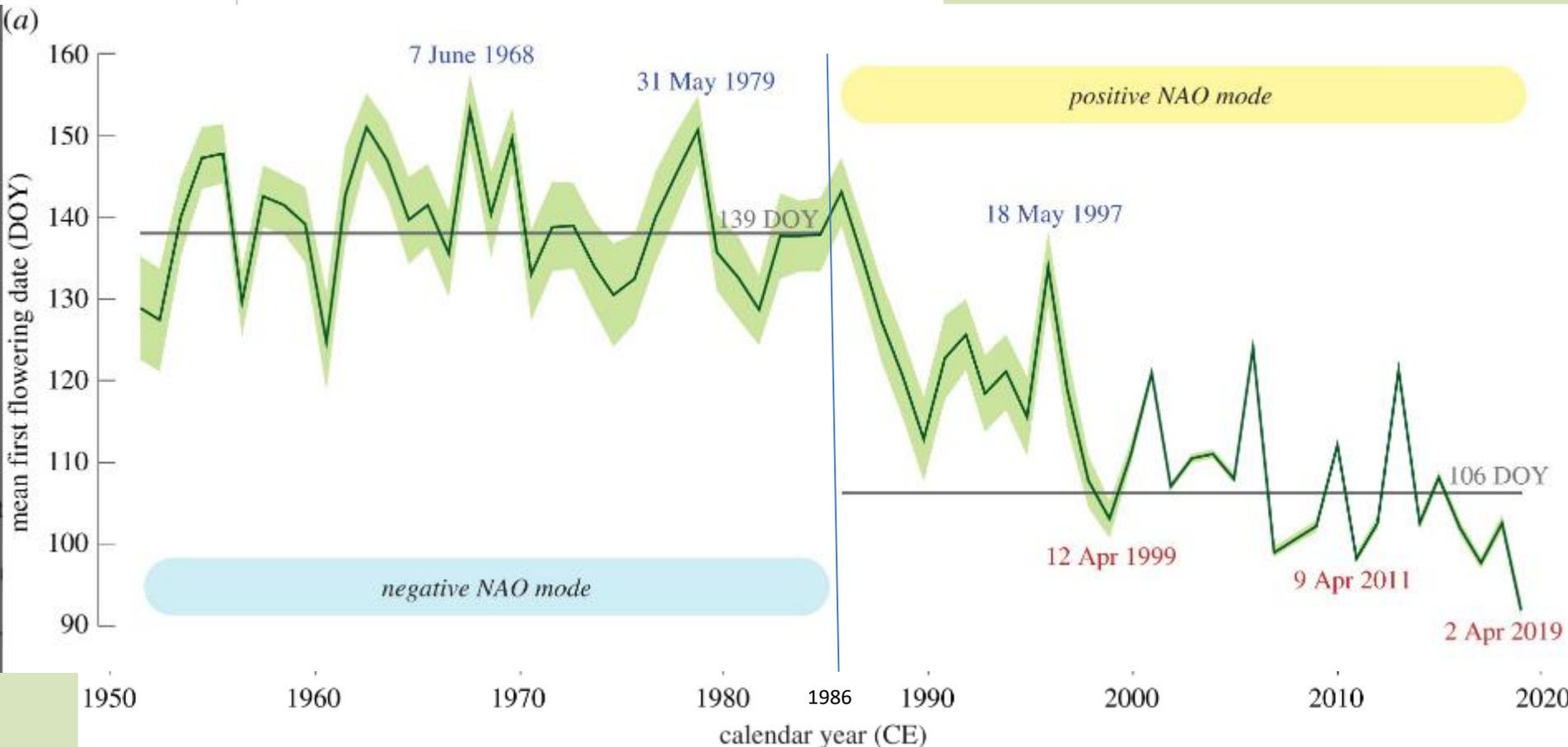
PROCEEDINGS OF THE ROYAL SOCIETY B

BIOLOGICAL SCIENCES

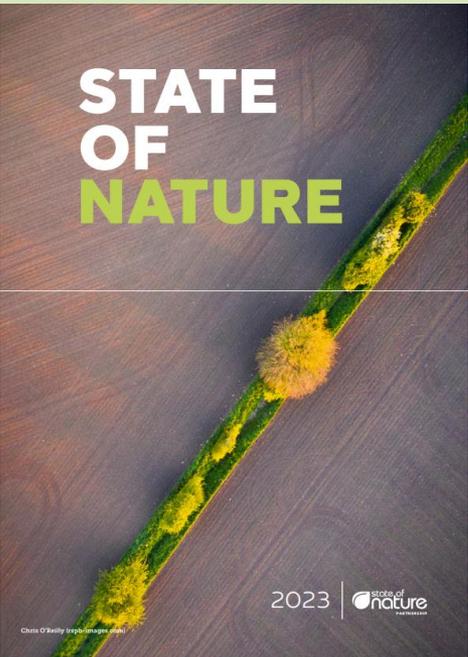
419,354 recordings of the first flowering dates of 406 plant species in the UK between 1753 and 2019

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Research articles
Plants in the UK flower a month earlier under recent warming
Ulf Büntgen, Alma Piermattei, Paul J. Krusic, Jan Esper, Tim Sparks and Alan Crivellaro
Published: 02 February 2022 | <https://doi.org/10.1098/rspb.2021.2456>



temperatures using the original and first difference time series from 1952–2019 (left and right maps). (Online version in License



STATE
OF
NATURE

State of Nature 2023

Since 1970 UK species have declined by about 19% on average, and nearly 1 in 6 species are now threatened with extinction.

Main causes are: intensive farming, overfishing and **climate change**

- Land temperatures are 1.1°C warmer than 1961–90.
- Summers are 17% wetter than 1961–90
- Sea temperatures are 0.7°C warmer than 1961–90.
- Mean sea level is 16.5 cm higher than in 1900 and is rising increasingly quickly.



New Forest National Park

“Climate change is the biggest long-term threat to the New Forest National Park” (warmer, wetter winters, hotter, drier summers, rising sea levels and increasing frequency of extreme weather events)

“These changes will have an increasing impact on our wildlife, local livelihoods, human health and wellbeing.”

Exotic creatures are moving to the UK, and one is in my garden

Night herons, bee-eaters and egrets – unusual wildlife is appearing in the UK, but it's not necessarily a good thing

By Adam Hart
4 July 2023 • 9:00am



Night heron

Purple heron

Little egret

Great egret

European bee-eater

Little bittern

Eurasian spoonbill

Bluefin tuna

Jack fish

Red mullet

Ornate cow tick

Southern emerald damselfly

Small red-eyed damselfly

Jersey tiger moth

Box tree moth

Tube-web spider

Green-jawed tube web spider

Oak borer beetle

Leathery sea squirt

Black bee fly

(*Anthrax anthrax*)



The age of extinction
Trees and forests

UK forests face catastrophic ecosystem collapse within 50 years, study says

'Alarming' new research warns of risk to British woodlands from disease, extreme weather and wildfires, unless 'call to action' is heeded now

The age of extinction is supported by

the
guardian
.org

About this content

Phoebe Weston

🐦 @phoeb0

Wed 8 Nov 2023 06.30 GMT



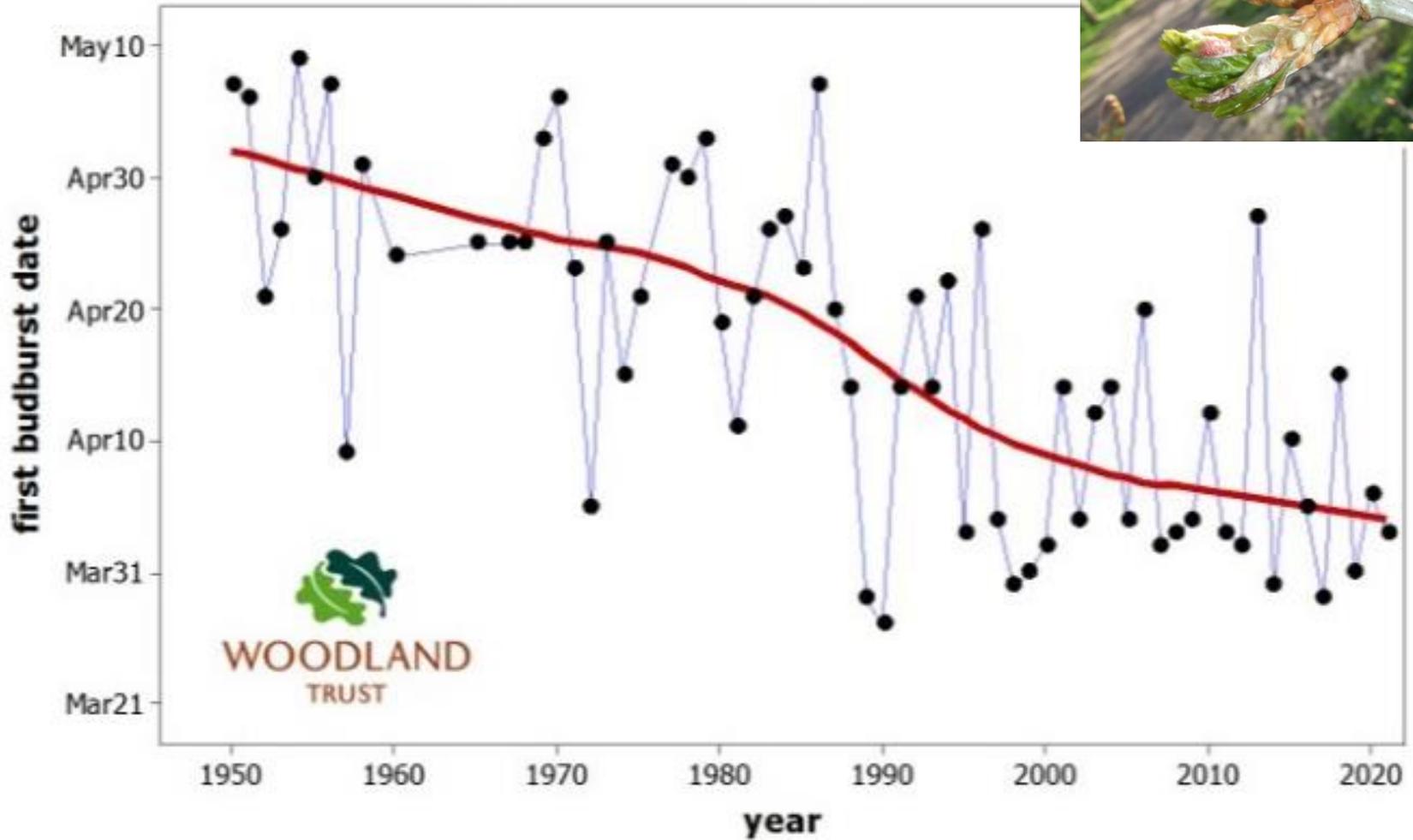
42 researchers, with 1,200 experts consulted

State of Nature “Responses”

- Achieve net zero by 2045/50
- Ambitious targets for tree planting
- Increase renewable energy capacity including a UK target for 50GW from offshore wind power by 2030
- Robust spatial planning is critical to protect and restore nature
- Maximise nature-based solutions in the land sector but with trade-offs for current food production and other land-uses

Jean Combes - Ashstead

Oak budburst 1947-2023



Jean Combes obituary

76-year diary

Gill Combes

Sun 24 Sep 2023 18.36 BST



📷 Jean Combes was responsible for what is believed to be the longest recording of phenological data by a single person anywhere in the world

Every year from the age of 20 my mother, Jean Combes, who has died aged 96, recorded the time of year that four tree species - oak, ash, horse chestnut and lime - came into leaf. What started in 1947 as a personal project, driven by a simple love of nature, turned out to demonstrate with textbook clarity that the long-term trend in Britain has been for spring to start much earlier than it used to. Her 76-year dataset has been used by scientists in climate change modelling, and earned her national recognition in 2009 with appointment as an OBE for services to phenology, the study of periodic

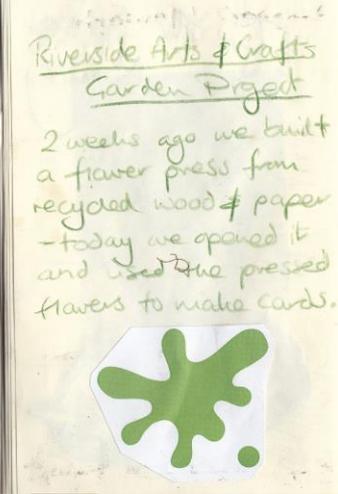
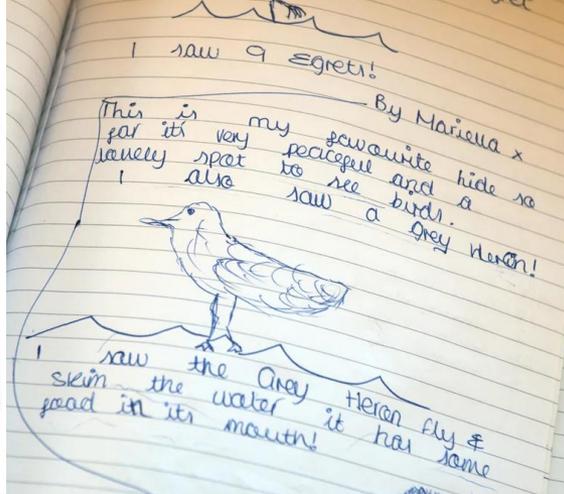
Nature's Calendar

There are now thousands of Natures Calendar volunteers reporting annually

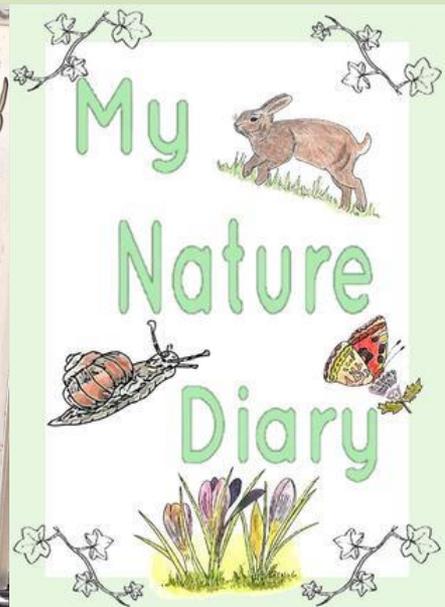
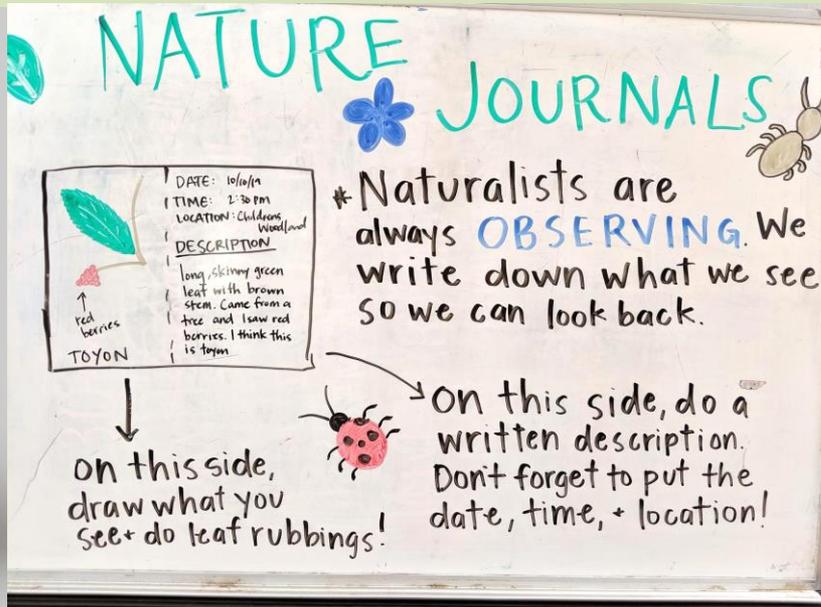
Many of them are children recording as young "citizen scientists"

A new Natural History GCSE is expected to be offered in the UK school curriculum in 2025





Thank you and feel free to ask questions!



THE
EARTHSHOT
PRIZE

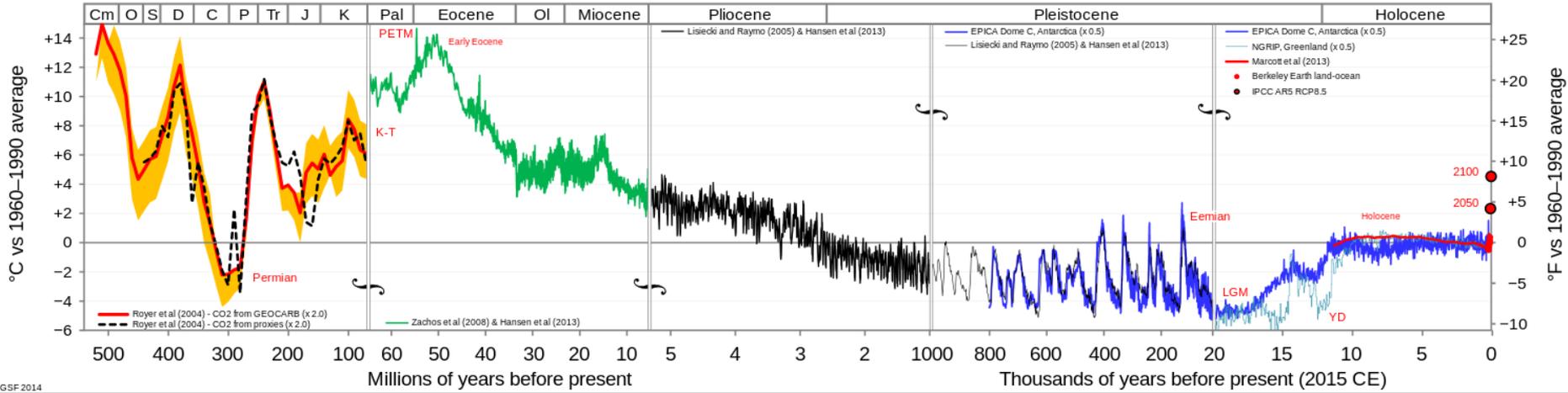
MEET OUR
2023 FINALISTS



EU funded Research 2023

- Findings published in the journal 'Communications Earth & Environment' showed that Gen Zs (born between the late 1990s and early 2010s) and millennials (born from 1981 to 1996) have higher levels of fear, guilt and outrage about the effects of climate change compared with Gen Xers (born from 1965 to 1980), baby boomers (born from 1946 to 1964) and post-war groups.
- Lead author Prof. Wouter Poortinga of Cardiff University said: "In our study, we found an overall pattern of higher levels of climate-related beliefs, risks perceptions and emotions among younger generation groups."
- "However, the gap between generations about climate change is mainly in their emotional responses to climate change, rather than in beliefs about climate change," Prof. Poortinga explained. "For example, there are no generational differences in beliefs in the causes and impacts of climate change, although older age groups are more likely to think that we are already feeling the effects of climate change."

Temperature of planet Earth



2° C warming

Negative impacts on human health, livelihoods, food security, human security, water supply and economic growth

- Deadly heat waves will occur annually
- Increased illness and death in “heat-island” urban environments
- Crop failures and food shortages
- Invasive species and pest increases
- Knock-on effects for GDPs of food exporting nations
- Water stress (drought) will impact twice as many people
- Increased high rainfall events and more extensive flooding
- 18 percent of insects, 16 percent of plants and 8 percent of vertebrates will see their climatically determined geographic range reduced by more than half
- Reduction of rainforest biomass, deforestation and wildfires. Trees at the southern boundaries of boreal forests will die
- Low oxygen, acidification and storm damage = dead zones in the world’s oceans
- Fisheries and aquaculture will be less productive in warmer seas
- 70 percent of Earth’s coastlines will see sea-level rise greater than 0.2 meters, resulting in increased coastal flooding, beach erosion, salinization of water supplies and other impacts on human and ecological systems
- Instabilities in the Antarctic ice sheet and/or the irreversible loss of the Greenland ice sheet could lead to multi-meter (greater than 6 feet) sea level rise over hundreds of years

Some observed impacts of climate change on UK biodiversity

- Drought stress, frost damage, and insufficient winter chill prevents normal bud development in many woody species.
- Warmer wetter conditions encourage pathogenic fungal growth that is threatening several of Britain's tree species.
- Heath/moorland habitats are susceptible to increasing wildfire risk.
- Increased intensity of spring rainfall affects breeding success and over-winter survival of some UK birds, while summer drought reduces food supplies for others.
- Milder winters have driven increases in the abundance of many common and widespread resident species, but reduction in the breeding success of some owls and raptors that predate small rodents.
- Southern species are appearing in the UK (from the continent) while some northern species are retreating towards Arctic and may be lost to the British Isles.
- Populations of many winter migrants are very likely to decline due to shifts in wintering locations.
- Some summer migrants will be sensitive to changes in the frequency of the Sahel drought.
- Populations of summer migrants are vulnerable to trophic mismatches between timing of breeding and peak food availability. This may increase in the future in some long-distance migrant woodland species that rely on highly seasonal synchronous food sources.

*“We see things not as they are,
but as we are”*

“Hence, it is the most difficult thing in the world to broaden a man so that he will realize truth as other men see it”

“Seeing is not believing—believing is seeing”