The Reading Naturalist

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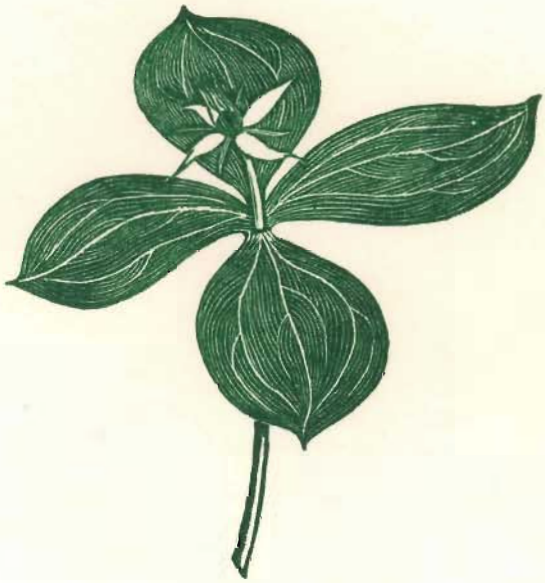

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The Journal of

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Society

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We regret that records of weather and atmospheric pollution are not available to us this year and hope that it may become possible to include them again in future numbers of the Reading Naturalist.

Meetings and Excursions 1976-77

The winter session opened on October 14th with the Annual General Meeting (attendance 62), at which two films, 'British Butterflies, the need for Conservation' and 'The Mute Swan' were shown. Dr. H. J. M. Bowen gave his Presidential Address, on 'Changes in the Berkshire Flora', on March 17th 1977. Other lectures during the winter were 'Plants of the Mediterranean Region', by Mr. S. Davey (45); 'Slow-worms and other British Reptiles', by Mr. R. H. Smith (60); 'The Flora of Chalk and Limestone Grasslands', by Mr. T. Wells (64); 'Deer and their Management', by Mr. Horwood (42); 'Colour in Plants', by Professor Whatley (40); 'Volcanoes', by Dr. T. Huntingdon (45); and 'Bird Migration on the Bosphorus', by Mr. N. Hall (40). A joint meeting with BBONT was held on February 17th, at which Mr. T. A. Potts gave a lecture on 'The Ecology of Heathland' and a film, 'Admirals and Emperors', was shown (93). Members' Evenings of Films, Talks and Exhibits, at which coffee and biscuits were served, were held on December 9th (54) and March 31st.

Winter walks were taken in the Mapledurham area, for general interest, on November 13th; by the canal at Burghfield, for general interest, on December 11th (c. 20); to Reading gravel pits, for birds, on January 8th; to Shiplake for lichens and general interest, on February 5th (20); and to the Silchester area, for mosses, on March 5th (c. 25).

The summer field excursions were to Streatley Hill, for spring flowers, on April 16th (36); Moor Copse Nature Reserve, for spring flowers and birds, on April 30th (20); an evening excursion to the Theale area gravel pits, for birds, on May 4th (16); Queen Wood, near Watlington, on May 14th; an evening excursion to Hartslock (BBONT Reserve) on May 25th (c. 30); a coach excursion to the South Downs, Pagham Harbour and Selsey Bill on May 28th (50); a canal-side walk at Greywell, on June 11th (16); an evening excursion to Bramshill Forest, for night-jar and woodcock, and Stratfield Saye, for bats, on June 15th (13); a day and evening excursion to Bix Bottom (Warburg Reserve) for varied flora and fauna and a barbecue, on June 25th (37); an evening excursion to the Ridgeway area, for downland flora and fauna, on July 6th (24); to Noar Hill and Selborne, for chalk grassland and streamside, on July 9th (23); a joint meeting with Henley N.H.S. to Fawley Meadows (Thames-side), for riverside flora, on July 23rd (25); an evening excursion to Ufton Court, for moths, on July 29th (14); to Sandhurst gravel pits, for botanical studies, on August 6th (10); along the disused railway line at Hermitage, for plants, on August 20th (14); to the Frensham area, for heathland plants and insects, on September 3rd (15); to waste ground in the Reading area, for plants, on September 17th (25); a fungus foray in College Wood, Goring Heath, on September 24th; and a fungus foray at Virginia Water on October 15th (22).

Changes in the Berkshire Flora

Presidential address
to the Reading and District Natural History Society
March 17, 1977

by H. J. M. Bowen

When my Flora of Berkshire appeared nine years ago, I suggested reasons why certain plant species were increasing, while others were decreasing in the county. Further information now makes it desirable to review the situation again. Berkshire has a relatively well-documented flora, with records dating from the seventeenth century (Druce, 1897), so that we have quite a lot of information on increasing and decreasing species. It seems that there are three reasons for changes: hybridisation, climatic change and change of habitat.

Hybridisation

Hybrid plant records in Britain have recently been reviewed by Stace (1975). One hundred and twenty five hybrids have been found in Berkshire, but most of these are uncommon or rare, though some are familiar such as the false Oxlip (Primrose x Cowslip) and Red and White Campion. In terms of changes in the flora, hybridisation may be contributing to the slow decline of Heath Violet (x Dog Violet), Chiltern Gentian (x Autumn Gentian), Golden Dock (x Clustered Dock), Least Persicary (x Spotted Persicary or x Water Pepper) and the sedge Carex hostiana (x C. lepidocarpa). On the other hand at least one hybrid, Blue Comfrey (Symphytum asperum x officinale), is an aggressive colonist of roadsides which is spreading rapidly. The effects of hybridisation on the flora of Berkshire are seldom obvious.

Climatic change

I estimate that we have ninety-seven species which are increasing in the county, and one hundred and forty-seven which are decreasing. The latter figure includes thirty species thought to be extinct, though the rediscovery of Elatine hexandra and Sagina nodosa leads one to hope that other lost species may be refound. The species concerned show similar behaviour in the neighbouring counties of Surrey (Lousley, 1976), Oxon. and Bucks. in most cases. They can be classified according to their distribution outside Britain, which gives us some idea of their climatic preferences. Thus we have species of wide European distribution; species of Northern Europe (e.g. the decreasing Bogbean, Grass of Parnassus and Ladies Mantle); species of Southern Europe (e.g. the decreasing Loddon Lily and Ladies Tresses Orchid, or the increasing Ivy-leaved Toadflax, Snowdrop or Turkey Oak); and species of Western Europe (e.g. the decreasing Heath Violet and Wall Pennywort, or the increasing Rhododrendon, Holm Oak and Oxford Ragwort). Established introduced species from East Europe, West Asia, North America or still further afield are all included in the 'increasing' category. The following comparison can then be made.

Distribution outside Britain	Increasing	Decreasing
Wide European	15	68
North European	0	40
South European	21	19
West European	16	20
East Europe and Asia	21	0
North and South America	24	0
Total number of species	97	147

The conclusion is that Northern elements in the Berkshire flora are declining more rapidly than other groups. This may be a response to the slight rise in mean temperature which occurred between 1900 and 1940. Mean temperatures are now falling again, and there also seems to be a decline in the frequency of westerly winds, so the climate of Berkshire may be getting more continental (Lamb, 1970).

Habitat change

Change of habitat, as a result of man's activities, has caused far more change to the vegetation of Berkshire than any other factor, and has also resulted in many changes in the flora. Circumstantial evidence suggests that forest clearance on the Berkshire Downs started around 3000 B.C. and was probably extensive by 1000 B.C. Other forests on heavy clay soils were probably cleared in Roman and Saxon times, as Domesday Book (1086 A.D.) implies that the area and distribution of woodland in the county were not very different from those existing to-day. The population density has risen from about one man per ten acres in 1086 to one man per acre in 1977. We have estimates of percentage land use in 1761 and 1809 (Mavor, 1809), and accurate statistics since 1866. These show a marked decline in arable land from 1890 to 1940, with a corresponding increase in grassland. Much grassland was ploughed in 1940, and the present proportion of arable to grass is about two to one. Permanent grassland has almost disappeared, but one hopes that the new motorway verges will provide refuges for some grassland species; one mile of motorway involves eleven acres of tarmac and fourteen acres of grass verge. Woodlands have slightly increased in area since 1800, and now occupy about 9% of the county. The proportion of oak has probably declined, since the Forestry Commission plant twelve acres of conifers to each acre of hardwood.

One can subdivide the increasing and decreasing species in a variety of ways to try to estimate the effects of recent habitat changes on the flora.

Habitat	Increasing species	Decreasing species
Shade	18	16
Open (Soil visible)	38	78
Closed grassland	44	69
Acid soil	19	41
Calcareous soil	6	30
Dry	74	58
Wet	4	71

These figures suggest that the drainage of wet habitats has been a major factor in the decline of many species in Berkshire. Bogs, Marshes, Fens and old water meadows are now few and far between. Many village ponds and goose greens have also been lost, but this habitat may now be reappearing in abandoned gravel pits used by Canada Geese, which keep the adjacent beaches like lawns. The weed flora of open soils has also suffered great changes as a result of increased use of fertilizers and cleaner seed. Herbicides destroy many of the showy weeds such as poppies and Corn Marigold, whose place is then taken by resistant grasses such as the Wild Oat. The woodland flora of the county is not changing much, though we can expect fewer dramatic displays of spring flowers now that coppicing is largely neglected.

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Mr. A. E. Moon

Mr. A. E. Moon, who has provided us with weather records for the past seventeen years, has now retired and left the district, though not the Society. We offer him our grateful thanks for all his work on our behalf over such a long period and wish him many years of happiness in his new home.

A Different Picture

by M. Trembath

Several times in my walks around the locality of Pangbourne during the spring and summer of 1977, I have been drawn to take a closer look at the banks and verges because I could not account at a distance for the unfamiliar spread of colour in places which I thought I knew well. In four cases it was the pale lilac-blue of Valerianella, called by some Lamb's Lettuce and, by others, Corn Salad. I have usually recorded this as a few plants on the edges of arable but here were masses of these tiny plants on the grass verges. On a spur of the chalk behind Bozedown farmhouse where I have recorded twice a year since 1968 I found large areas of the steep slopes covered with Blue Fleabane (Erigeron acer) in such numbers that they coloured the grassland lilac blue, although each flower is rather insignificant. In previous years I had found only two or three and sometimes none. At the same time, pink and white Centaury (Centaurium erythraea) appeared, not in masses, but overall in ones and twos, numbering hundreds. Down in the valley on Pangbourne Marsh, Sheep's Sorrel (Rumex acetosella) was giving the area an unusual appearance with wide splashes of brilliant reds.

The hot sun and drought of 1976, disastrous for some plants, must have favoured all these. But it was the pigs and their tendency to root out anything edible which could only have accounted for the superb show of wild flowers on the steep chalk slope between the beech trees and the hedge of Hardwick Road, Whitchurch. In 1975, this area had been reduced from grassland to an apparent desert. In 1976, the pigs were taken off, but nothing was done by the farmer to restore the area to grassland. During the summer of 1977, it became a veritable garden of wild flowers. Taking a walk in that direction on August 9th, I gazed incredulously through my binoculars trying to account for the change. When I arrived on the site and had recovered from my surprise, I recorded the plants. Under the tree-line were glorious golden heads of Ragwort (Senecio jacobaea) with Spear Thistle (Cirsium vulgare), Ploughman's Spikenard (Inula conyza) and Wild Parsnip (Pastinaca sativa); coming down the slope were Marjoram (Origanum vulgare), Wild Mignonette (Reseda lutea), Clustered Bellflower (Campanula glomerata), Common Calamint (Calamintha ascendens), Pale Linaria (Linaria repens), and masses of Common St. John's Wort (Hypericum perforatum). Close to the ground grew Hairy Violet (Viola hirta) and, still in flower, Common Rock Rose (Helianthemum chamaecistus) and Centaury, with a few others. Growing right through these along the two hundred or more yards of the whole slope were thousands of plants of Vervain (Verbena officinalis). With their tiny pale mauve petals they gave the effect of a veil over all the others. Yet when I had recorded here regularly in pre-pig days, when the slope was grass grazed by an old horse, I had not found one plant of Verbena, and only a few of the others.

What a bounty of dormant seeds the action of the pigs had brought to life and fulfilment. Would a pig in a corner be a good substiute for a 'flymo' in one or two BBONT reserves?! Needless to say, I was not the only animal enjoying the feast. The

butterflies added their beauty, Peacock, Small Tortoiseshell, Marbled White, Small White, Gatekeeper, Meadow Brown, Small Heath, Brimstone, as well as bumble-bees - quite bewildering. The farm was sold last month. I hope nothing worse than pigs is put on to this slope.

Moth (and Butterfly) Flight related to Weather, including Aspects of Migration

by P. A. Davey

Until recently, little was known about the nocturnal life of moths, and the associated weather conditions that controlled their movements; indeed, there is still a great deal to be discovered about weather-related butterfly and moth migration.

With the advent of mercury-vapour and ultra-violet lighting, the full distribution and hence habits of most British species became more well-known. Before these technical advances, the ways by which the entomologist could discover the life-style of moths was to go out into the field and attempt to observe them at night. The ways open to the entomologist at that time included surveying a 'favourite' ivy or sallow bush in flower at certain times of the year or other attractive plants. Another more interesting method was to try to simulate the nectar to which the moths were attracted. This he did by forming a concoction ('sugar'), which enabled him to look at all sorts of species in an area where perhaps there were no particular attractive flowers in bloom. This solution, consisting traditionally of Old Jamaica rum, Barbados sugar, Fowler's black treacle or molasses and brown ale or stout, would be painted on suitable tree trunks or fence posts, and after a few hours a variable number of moths would have assembled. The naturalist in those days was not at all unlucky with this practice. At that time there were no insecticides in widespread use as there are now, and of course there was far more in the way of untouched countryside. Consequently the overall environment was far less harsh for wildlife. So the entomologist of days gone by stood just as good a chance of seeing as many moths with his own methods as an entomologist of today would using expensive portable electrical apparatus.

In all cases where nocturnal insects are active, they occur in greater or lesser numbers according to many parameters, i.e. moonlight, wind speed, population and radiation. This latter factor is possibly the most important for a 'moth-forecast', as it dictates whether there will be high or low activity over-night. Radiation can be thought of in terms of heat loss from the earth at dusk. This parameter is a difficult one to measure as far as the entomologist is concerned, and there is a more easily found one which can be calculated from a wet-and-dry thermometer. This

is the dew-point temperature, a function of wet-and-dry bulb levels. Provided the airmass in the evening does not change much, a fairly accurate 'moth-forecast' can be worked out a few hours before the excursion, with population, wind speed and moonlight being taken into consideration. If the dew-point is relatively high, the air is of tropical origin and, conversely, if it is low, the air is of polar origin, representing, respectively, a night of high and one of low activity.

On some occasions, various species of moths and butterflies migrate. Quite often this migration takes place both day and night and may be anything up to one week in duration. Most of these species will migrate only a few miles at a time to find new territory in which to breed. A few others, however, migrate many hundreds of miles to find new ground in which to continue further generations. There are various reasons and methods for these latter long-distance migrations, and there are three main categories into which this topic has been split.

Firstly, there is displacement by unusual meteorological conditions. Sometimes, especially with the less powerful, smaller-winged species, sudden updraughts of air, often associated with thundery weather, carry the insects from where they are flying up to great heights. At some time, perhaps up to an hour of their being hurled upwards, the updraught will subside, and from there the medium or high level winds will take over and transport them possibly to places where they are rarely observed, several hundred miles away. This is accidental displacement and occurs very occasionally.

Secondly, conditions in a particular area might be exceptionally favourable for one or more individual species. This would be due possibly to a combination of many factors, for example: lack of predators, favourable climatic conditions, absence of fungal infections, etc. On taking to the wing, the insect would be faced with a rather claustrophobic situation, in the sense that the surrounding area would be full of emerging and flying insects, and this factor might well be responsible for initiating migratory tendencies within the swarm. Visual observations have in the past added strength to this particular method of dispersal with some reports of many hundreds of butterflies far out at sea all flying in an apparently purposeful direction.

Thirdly, more commonly, certain species exhibit a migratorial tendency every year and these species possess an inherent migratory gene. The wind direction and speed then takes care of the dispersal of the insect. In most years, certain moths and butterflies come from countries far away. The Large White and Red Admiral are two frequently seen migratory butterflies, as also are the Dark Sword Grass and Silver Y moths. Sometimes, especially on the south coast of England, these species make a fine spectacle coming in from the sea and heading inland hour after hour.

There have been several outstanding instances of migration of unusual moths and butterflies to this country over the past ten years, and below is a list of the species involved and the dates on which they were recorded. Following this there is a general

description of the types of weather that were associated with these records.

A.

i).

Vestal Moth
Ni Moth
Small Marbled Moth
Bordered Straw Moth
Scarce Bordered Straw Moth — 1/7/68

ii)

Vestal Moth
Small Marbled Moth
Purple Marbled Moth
Bordered Straw Moth
Humming-bird Hawk Moth
Painted Lady Butterfly — 2/3/77

B.

i).

Spurge Hawk Moth — 27/5/73

ii).

Oleander Hawk Moth — 17/8/75

C.

i).

Bedstraw Hawk Moth — 14/7 - 1/8 1972

ii).

Camberwell Beauty Butterfly — 27/6 - 31/10 1976

Taking section A, on both these occasions the air mass over England at that time had originated from the Sahara, having passed north-westwards into the Atlantic, northwards over and to the west of Portugal, through the Biscay area and on north-north-eastwards to England. The weather at the time of capture was fine with abnormally high temperatures and light to moderate southerly winds. Red rain fell over parts of western Britain on both occasions.

In section B, the airmass was of Mediterranean origin and had a direct course across southern Germany and France on both occasions.

In section C, two remarkable mass invasions were recorded, both of these taking place in similar weather types. The airmass on both occasions originated from southern Scandinavia and the Baltic Sea area. The former occurred in a summer of very cool westerly weather in Britain up to that time, but further east it was exceptionally warm with hot southerly winds. The first recorded migrant to arrive, at Walberswick, Suffolk, was back-tracked with respect to the surface wind speed and direction. The resulting trajectory showed a possible path back to the Baltic Sea area. Winds from this time were north-easterly and continued from a north-easterly point for a fortnight, and during this period

some twenty individuals were recorded. The second migration took place over a more protracted period and involved ten times as many insects. Nearly half of these were taken in mid-August, and during this time (a fortnight) the wind was continuously between east and north-east and quite strong. A typical back-tracked trajectory passed over Denmark and the southern Baltic Sea area and this followed the trajectory of the first example to be taken in June.

From this small account of certain recorded migrations a basic pattern emerges, with respect to both insect and weather type. If one were to backtrack many more past migrant records, given accurate documentation, one would not only obtain a clear picture as to how migration occurs, but also one might in some part answer the puzzling question as to why.

Observations on the Grayling (Thymallus thymallus Linnaeus 1758) in the River Lambourn

by G. C. Bellamy

The grayling is recorded by Maitland (1972) as being "Indigenous, fairly widespread and common" in Britain. It belongs to the Salmonid group of fishes which contains the salmon and trout, but is separated at the family level into a group of its own, the Thymallidae. The grayling is characteristically found in clean, fast-flowing, stony rivers in which it forms shoals in the deeper parts.

I made observations on the spawning behaviour and shoal structure in the River Lambourn at Bagnor (Grid Reference 45 69) during 1975 and 1976. The fish were marked by clipping a coloured plastic ring around the anterior edge of the dorsal fin. These marked fish could be identified and watched from behind cover on the river bank.

Spawning Behaviour

Unlike salmon and trout, which spawn over winter and bury their eggs deeply (c. 25cm.) in the river bed, grayling spawn during April and May and deposit their eggs just beneath the surface of the river bed. Observations made on the Lambourn confirmed those made in Sweden by Fabricius and Gustafson (1954). Mature male grayling are larger than females of the same age and can be distinguished by possessing a larger dorsal fin. In April the males leave the deeper shoaling areas, and move to areas of silt-free gravel, which are the spawning beds. These areas are often associated with fairly fast flow over shallows. The males change colour dramatically from dull silver-grey to black, the tip of the snout becoming white. The colours of the dorsal

and pelvic fins become greatly enhanced. The dorsal fin becomes dark and ocellated with iridescent blue spots, its leading edge being a bright crimson; the pelvic fins also become dark and streaked with blue. The males now select and defend from other males a territory on the gravel bed. This was one to three or more metres square depending on the size of the fish and the nature of the river bed. If the river bed is very hummocky it screens one male from another, and more fish will be able to hold a territory than would be the case if the bed was flat. Within the spawning area some territories appeared to be more desirable than others; these tended to be occupied by larger, more aggressive males. If the resident male left this preferred territory, then his place was quickly taken by a neighbouring territory-holder. Some males were unable to maintain a territory of their own and continually attempted to force out territory-holding fish. The territories were used for courting and for spawning with females, and the relative spawning success of territory-holding males and males without territories is shown below.

Territory	Fish	Number of spawning attempts	Percentage of total spawning attempts by each fish
A	Mid	15	29
	Nose	20	38
B	Yellow/Green	11	21
C	Blue	1	2
	Pink	3	6
D	Blind	0	0
No territory	Nm	1	2
No territory	M	1	2
Total		52	100

Table: Showing the number and percentage of spawning attempts made by individual male grayling in the spawning bed, and in which territory they occurred.

Territory A was the one that was most preferred, and the two fish that held this territory in succession during the observation period were responsible for 67% of all the observed spawning attempts. The males "Nm" and "M", who were unable to hold a territory, were only observed to attempt spawning once each. The

territory-holding male "Blind" was blind in one eye and failed to spawn at all, apparently due to his inability to detect females nearby or on other territories. The term "spawning attempt" is used as it was not known whether eggs had been laid in every case.

Spawning occurs when a female swims into the male's territory. She is immediately approached by the male who would then count her by erecting his brightly coloured fins and swimming close alongside her. The male then vibrates his body rapidly against the female, flank to flank; if the female vibrates her body in a similar manner the male presses more closely and vibrates more vigorously. The male finally tilts towards the female and clasps his large dorsal fin over her back; this presses the female to the gravel bed, the vibrations of their bodies being sufficient to bury their tails up to the adipose fin. It is now that eggs and milt are released. The female is thought to signal egg release to the male by gaping her mouth open; the male will then snap his mouth open as milt is released on to the eggs. Unlike trout, grayling do not actively cover up the eggs after spawning, but it is thought that gravel falls in to cover the eggs as the fish leave the small depression made by their tails. The spawning act lasts only a few seconds, although courting may be prolonged due to interference from neighbouring males who try to court the female. After spawning the pair separate and the female will swim off the spawning bed. Both may spawn several times with different partners.

Most spawning occurred in the afternoons after the water temperature had reached 10°C. Individual males may remain on their territories for a week. After spawning is complete, the males resume their normal coloration and return to the shoaling areas, leaving the eggs to hatch on their own in two or three weeks.

Shoaling Behaviour

Using the same method of observing individually ringed fish, the behaviour of grayling in the shoal areas was studied. It was found that a shoal would be made up of essentially the same individuals from day to day, and that fish occupied fairly constant positions within a shoal. The constancy of position was maintained by behavioural interactions between the fish which resulted in an order of dominance, or a hierarchy, being formed. The largest and most dominant fish were to be found in the deepest parts, usually at the front of the shoal, the other fish being graded by size behind them, finishing up with the smallest ones at the rear of the shoal. That the front parts of the shoal were the most desirable locations was seen by their immediate occupation by fish lower down the hierarchy when a more dominant fish was absent and feeding upstream. The fish showed a regular spacing within the shoal, and it was seen that if a neighbour were to approach too closely the resident fish would threaten the intruder by erection of the fins, and opening of the mouth to reveal a dark spot on each side of the throat. If the intruder persisted the two fish would lie side by side and move upstream with exaggerated waggling movements of the body as if they were directing thrusts of water at each other; this is called the "lateral

display" (Fabricius & Gustafson 1954). Occasionally, after prolonged threat, body contact would be made by ramming the opponent with the snout and thrusting with the flanks. When contact was observed it was often made in the region of the anal fin. Here the grayling has a thickening of the proximal fin ray to form a spike-like structure which is sharp enough to cause pain while handling the fish. In a majority of cases the resident fish successfully defended its area, and usually erection of the fins and movement towards the intruder were sufficient to drive the fish off. This maintenance of a defended space within a shoal means that a given area of river can only contain a certain number of grayling, and so, by their behaviour, grayling have a mechanism for effectively limiting their population density.

Many people are surprised by the complexity of social organisation that may be shown by fish. These observations on the natural history of the grayling show that their types of social structure and behaviour are not dissimilar to those of birds. Simple observation in the field can still be fruitful and enlightening, and I hope that some readers may be stimulated to look a little more carefully at any fish they see, and try to observe something of the way they live: - a relatively untouched field of research.

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Fallow Deer

by R. H. Smith

Working with wild deer has many attractions, not least of which is the opportunity it gives of spending time out in the forest watching animals in their natural environment. There are also potentially considerable, if less immediate, scientific benefits. A great deal is now known about red deer in Scotland as a result of extensive studies by the Nature Conservancy (now the Institute of Terrestrial Ecology), but the more common and widespread fallow deer has received much less attention from scientists in Britain. This does not mean that there are easy pickings to be made by the zoological entrepreneur; the reason why relatively little is known about wild fallow deer is that they are

particularly difficult animals to study. Most of what is known about fallow deer is based on studies in parks and zoos and there is little hard data on deer in the wild.

Why are fallow deer difficult to work with? Basically it is the same combination of qualities which makes them such attractive animals to watch, that is shyness and a graceful agility and speed which reflects their perfect form. Few animals retain the charm characteristic of their young when they are grown up, but fallow deer are a magnificent exception. Some people maintain that deer appear clumsy compared with gazelles, although it seems difficult to believe. The commonest view that a walker has of the dappled variety of fallow deer in a forest is a white caudal disc framed with black as the animal bounds away, tail held stiffly erect to accentuate this signal to its fellows which at the same time warns of danger and signposts the direction of presumed safety. Thus in order to study the normal behaviour of deer it is necessary to spend long hours waiting quietly at dawn in the hope that deer will pass by without detecting the watcher.

There are few occasions when it is possible to approach deer without them fleeing in response to the slightest sound or scent, but the rutting season in autumn provides an occasion when bucks at least are more concerned with their own species than any other. Does are still very wary and do not lose all their inhibitions in the urge to mate. After all, they will almost certainly find a willing buck eventually and will continue to ovulate periodically until February or March if not mated during the main rut in October. Bucks, on the other hand, find it much harder to propagate their genes and a buck who has achieved dominance at a rutting stand has to keep a constant watch on his harem to ensure that a rival buck does not slip in unnoticed. Bucks do not feed during the rut and look very much the worse for wear by the beginning of November. The characteristic groaning sound made by bucks during the rut is thought to be a call to does and a challenge to other bucks, but it often sounds more like a simple cry from the heart of an over-weary animal pushed to the limits of his endurance!

Rutting stands are at traditional sites, and it is said that both bucks and does return to the same rutting stand year after year. An interesting question arising from this is to what extent does the mating system lead to inbreeding? Since a buck in his prime may be dominant for three or four years and yearling does normally mate at the age of sixteen months, he may mate not only with his daughters but also his grand-daughters. Such a mating system would be expected to result in a high level of inbreeding with consequent fixation of alleles at many loci, and yet small herds in parks and forests thrive whereas conventional wisdom would predict loss of vigour under inbreeding. The explanation may be that fallow deer in Britain are thought to have all originated from small park herds imported since the Roman occupation, so that inbreeding has always been the norm. Inbreeding tends to eliminate deleterious, recessive genes, and inbred herds may have reached a state of genetic balance analogous to cases known in the Lepidoptera where complex, mimetic patterns are maintained under inbreeding but break down when crosses are made between isolated populations. However no information is available as yet

on genetic variability in either wild or park fallow-deer populations, although different coat-colour varieties are present in most herds.

The intrinsic attractiveness of fallow deer creates a conflict for most people involved in either scientific studies or management of fallow deer. However, it must be remembered that there are now effectively no natural predators and that an unmanaged herd is an unhealthy herd likely to be suffering from winter starvation or disease and causing unacceptable levels of damage to trees, crops and gardens. Nowadays most foresters have an enlightened attitude towards deer and accept that there are economic and recreational returns from deer which balance a small level of damage to young trees. Most damage occurs in late summer and autumn when bucks fray trees while cleaning "velvet" from their newly formed antlers, and in winter when food is scarce and both sexes are browsing. Damage is minimised by good management which reduces the population to a density that can be supported by the particular forest and often selectively removes bucks to increase productivity and reduce fraying. Incidentally, the policy of managing a herd consisting of one third or one quarter bucks accentuates inbreeding by reducing effective (genetical) population size. The annual cull should never be haphazard and normally requires estimation of population size, age-structure and sex ratio as a preliminary to formulating a management plan. Culling is selective, and unhealthy, injured or old animals are removed first. The choice of weapon is restricted by law so that death is clean and quick; a major problem nowadays is the suffering caused by poachers using inappropriate weapons in the dark so that deer often escape, peppered with shot, to die a slow, miserable death unless lucky enough to be spotted and finished off humanely with a high velocity rifle. Thus fallow deer provide a good example of the way in which conflicts of interest may be resolved to the benefit of all concerned by measures of active conservation.

Recreation Surveys on the Ridgeway

by C. M. Hibbert

Almost every year, one of the Reading Natural History Society outings includes a section of the Ridgeway Path which gives access to a fine area of downland with interesting chalk flora and fauna. Walking along the Ridgeway, we are following one of the oldest trackways in England; a green road which forms part of an ancient route leading across the country from East Anglia to the Devon coast. From Streatley westwards to Avebury in Wiltshire the track flolows the high downs and there are still many signs of its prehistoric origins in long and round barrows, tumuli, Iron Age forts and the famous Uffington White Horse. Today the Ridgeway is a popular informal recreation area, visited by thousands of people every year. How many visitors come? How do they get there?

Where do they come from? What do they come to see and do? To answer questions like these, an interview survey was undertaken on the Ridgeway in 1975 to find out more about the people who visited the Path and what they thought about it.

The surveys were carried out to assist in management decisions concerning the Path. In 1972, the Countryside Commission had designated it as a Long Distance Path, from Avebury in the west to Ivinghoe Beacon in Buckinghamshire. Such routes are designated primarily for the benefit of long-distance walkers, but on most of the Ridgeway west of Streatley all forms of traffic have an historic legal right of travel. The Path is used by farm vehicles, motor-cyclists and cars, though the bumpiness and narrowness of the route in places tends to deter the average motorist. The Commission and the Oxfordshire and Berkshire County Councils have received a lot of complaints from the general public about the condition of the Path and conflicts between walkers and motor vehicles. Use of the track by motor vehicles has caused erosion in places, but surveys have indicated that this is due mainly to farm vehicles which must use the Path for access to fields and farm buildings. One of the main purposes of the survey was to find out to what extent the Path was being used by motor vehicles and how many people used it as a long-distance Path.

The interviews were carried out on two Sundays and one weekday by officers of Wiltshire, Oxfordshire and Berkshire County Councils, assisted by members of the National Conservation Corps. Interviewers were located at sixteen sites along the Path which included all the most popular locations and access points for visitors. Arrival counts were also carried out to obtain figures for the total number of visitors. In all, one thousand five hundred and seventy five questionnaires were completed. Since only one member of each family or group was asked questions on its behalf, these represented a total of four thousand nine hundred visitors to the Ridgeway. It is, of course, impossible to judge how representative these were of all visitors, but for the survey dates it was estimated that around 60-65% of total visitors to the sites were represented in the survey.

The busiest site was Hackpen Hill in Wiltshire, with well over a hundred cars in total on each survey Sunday, and over five hundred visitors on one of these days. Also in Wiltshire, Barbury Castle was busy as the County Council had recently opened a Country Park with a large car park right by the Ridgeway. Closer to Reading, Betterton Down and East Hendred Down were also particularly busy. White Horse Hill would feature in this list, but the car park and Horse are a short distance away from the Ridgeway and interviews and counts were carried out on the Path itself.

Hardly surprisingly, the vast majority of visitors had reached the Ridgeway by car, 5% had walked to the Path and only very small numbers had motor-cycled, pedal-cycled, rode up on horseback or used public transport. On average, visitors stayed for one and three quarter hours, but nearly a quarter spent less than half-an-hour. Almost three-quarters of all visitors did walk for some distance, but others stayed close to their cars, sitting, picnicking or playing games. Well over half of those walking said that they would be, or had been, walking for less

than two miles. Only 6% of all the people interviewed were long-distance walkers. Evidence of people driving for any distance along the Ridgeway was small, most people drove to their parking spot and then left the car. However, the Path is used occasionally for car or motor cycle rallies and it is these which give most cause for concern to the walker or naturalist. Nature study and archaeology were considered together in the questionnaires as minority-interest activities and were noted by only 7% of interviewees. There were also many interesting minority activities such as releasing pigeons, flying kites, playing the guitar, or the gentleman who came up to the Ridgeway for his Sunday morning bagpipe practice.

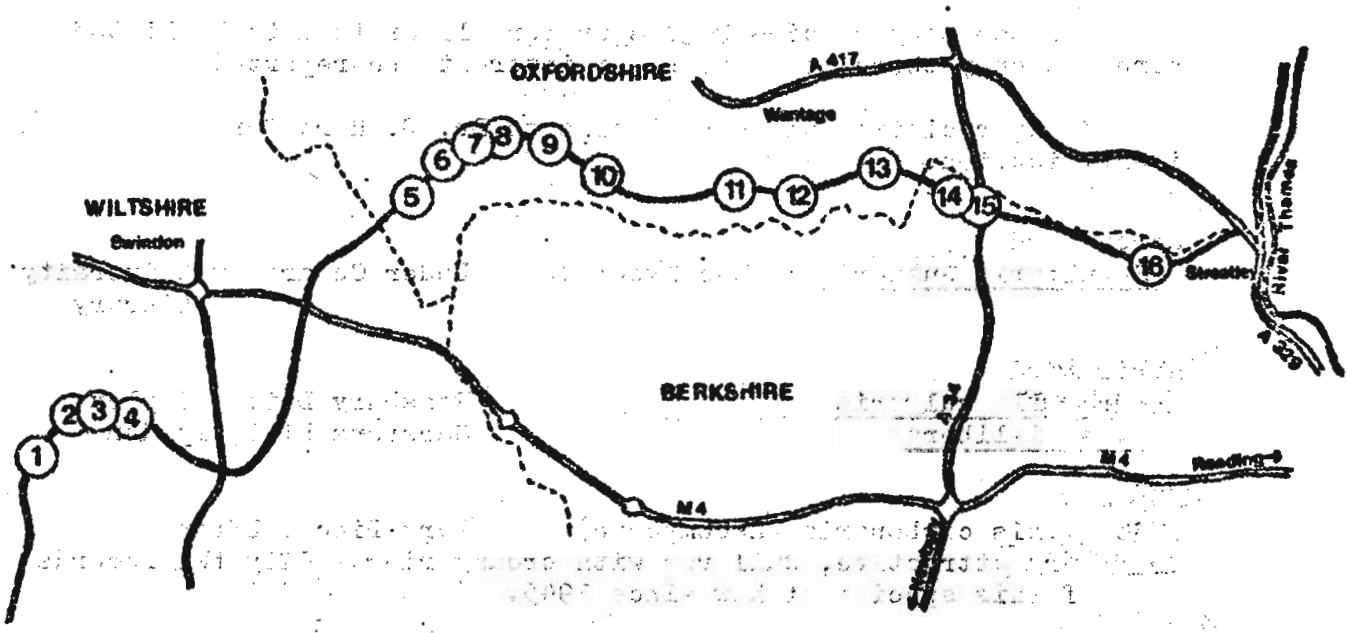
Most visitors to the Ridgeway came from a fairly local area; overall, 43% of the groups interviewed had travelled less than ten kilometres. Sites such as White Horse Hill or Wayland's Smithy, where there are well-known features of interest, tended to attract visitors from further afield and also more people visiting the Ridgeway for the first time. Sites on major roads, such as Gore Hill on the A34, also attracted visitors from a wider area as they were used as transit stops for travellers on longer journeys.

Visitors were asked if they would like to see any changes made. Long-distance walkers, particularly, felt that water taps, camp sites and hostels should be provided along the route. Others felt that the Path needed better surfacing. The need for better signposting or information about the Path was also mentioned. The largest number of comments concerned the use of the Path by vehicles. When asked specifically whether they objected to vehicles driving along the Ridgeway, 68% of visitors said that they did, at any rate outside the well used parking areas.

To ban traffic on any section of the Path involves the introduction of a Traffic Regulation Order with appropriate signs banning motor vehicles. As an experiment, Oxfordshire County Council imposed such an order during the summer of 1975 on the stretch of the Ridgeway between White Horse Hill and Pigtrough Bottom. Following a public enquiry in 1976, at which bodies representing motorists and motor cyclists protested vigorously against the Order, the Inspector reported that he felt there were insufficient reasons for imposing such an Order.

The survey showed that, overall, the Ridgeway was chiefly a local recreation area. The average visitor drives to one of the well-known parking areas and walks a short distance along the Path, but does not reach the more remote stretches, either on foot or by car. Use of the Path as a long-distance route was, in 1975, comparatively light. Several books have been published about the walk since the survey was carried out. It would be interesting to know whether these have encouraged more people to tackle this fascinating and most attractive walk.

THE RIDGEWAY



SURVEY SITES

1. Hackpen Hill
2. Barbury Castle(west)
3. " " (car park)
4. " " (east)
5. Ashbury Hill
6. Wayland's Smithy
7. Woolstone Hill
8. White Horse Hill
9. Blowingstone Hill
10. Pigtrough Bottom
11. Letcombe Castle
12. Betterton Down
13. East Hendred Down
14. Bury Down
15. Gore Hill
16. Starveall Farm