# BRITISH WILDLIFE

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The Asian Yellow-legged Hornet · The Wash St Helena: Island of Endemics · Larger Water Beetles of Britain and Ireland What Does 'Traditional' Management Really Mean?

### BRITISH WILDLIFE

#### THE MAGAZINE FOR THE MODERN NATURALIST

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## The Asian Yellow-legged Hornet: the implacable advance of a bee-killer

#### **Karine Monceau and Denis Thiéry**

he Asian Yellow-legged Hornet Vespa velutina, known also as the Asian Hornet, is among the most harmful of all the invasive species listed by the European Union. A relatively recent arrival from China, it is of concern chiefly because of its likely impact on the European Honeybee Apis mellifera. The newly arrived insect was first spotted in Europe in 2004, near Agen, between Bordeaux and Toulouse, in south-west France. The European population's starting point appears to have been when a single female mated with four males (Arca et al. 2015); it is striking that the enormous numbers now present - there are probably more than 50,000 nests in France alone - appear not to have suffered because of this genetic bottleneck. The insect rapidly colonised several other countries, including Spain, where it has reached the island of Mallorca, Portugal, Italy, Germany and, more recently, Belgium and Switzerland. It was officially recorded in the Netherlands for the first time in summer 2017. The first confirmed UK sighting occurred in 2016, in Gloucestershire, with a second a year later in The Asian Yellow-legged Hornet nest that was discovered in Gloucestershire in 2016. National Bee Unit

north Devon. Both UK records resulted in the discovery of nests, which were subsequently destroyed. Sightings have been reported also from the Channel Islands; the first in the British Isles was on Alderney in 2016, with several more nests discovered in the following summer on both Guernsey and Jersey.

#### **Ecological impact**

The hornet forms a large colony, founded by a single queen, which begins laying its eggs in April and produces thousands of individuals each year. A huge amount of protein is required in order to feed the larvae during the colony's growth, and this is obtained mainly from other arthropods, including honeybees, the latter comprising one-third to two-thirds of the hornet's diet, depending on the environment (Villemant *et al.* 2011). Wild pollinators clearly must suffer, but we are sorely lacking in reliable data. More research has been conducted on the highly predatory Asian Yellow-legged Hornet's effect on commercial apiaries, where workers hunt during the summer, typically



Hornet larvae inside the nest. Karine Monceau

hovering, or 'hawking', near a hive entrance and catching returning honeybees by hooking them with their front legs (Monceau *et al.* 2013a). They then cut the captured bodies into pieces, extracting sugars by licking the haemolymph (a fluid equivalent in most invertebrates to blood) before discarding all but the thorax, which is carried back and fed to the larvae in order to provide them with protein. In Asia, the insect preys largely on the Asian Honeybee *Apis cerana* and on the European Honeybee, which has been introduced there (Ken *et al.* 2005; Yang 2005).

Asian Honeybees (known also as Eastern Honeybees) defend their colonies from raiding hornets by deploying a so-called 'bee-carpet', in which large numbers mass at the entrance of a hive as a deterrent, or by 'heat-balling', whereby they engulf the predator, making its body temperature rise to a lethal level (Ken *et al.* 2005; Tan *et al.* 2007, 2010, 2012, 2013). Massed honeybees also sometimes

synchronously wobble their abdomens as a visual warning, a behaviour known as 'shimmering'. European Honeybees cannot defend themselves as effectively against attacks by hornets; they do sometimes display the bee-carpet reaction, but their attempts at heat-balling are nowhere near so efficient as those of their Asian counterparts (Arca et al. 2014). The mere presence of Asian Yellowlegged Hornets is a significant source of stress to the bees, resulting in reduced foraging by workers from attacked hives, with obvious consequences for the survival of colonies over winter (Arca 2012) and, probably, reducing the ability of attacked bees to learn the scent of, and thus avoid, the predators (Wang et al. 2016). This stress may also interact with the negative effects of neonicotinoid pesticides, further reducing a bee's ability to avoid predators (Tan et al. 2014).

The Asian hornet may, in addition, be a vector of pathogens such as Israeli Acute Paralysis Virus, which infects European Honeybees in China and in France (Blanchard *et al.* 2008; Yañez *et al.* 2012). Finally, the Asian Yellow-legged Hornet is potentially a direct competitor of the native European Hornet *Vespa crabro*, the latter being a predator of many common farmland pests, although early studies have yet to find clear evidence of the occurrence of such competition (Monceau *et al.* 2015b).

#### **Economic impact**

Beekeeping has in the last few decades suffered several crises, these caused by such factors as the use of pesticides, the Varroa Mite Varroa destructor, the parasitic microsporidian Nosema apis (the pathogen responsible for the disease nosemosis), and agricultural change, all of which

Asian Yellow-legged Hornet workers hawking outside a honeybee hive in France. Karine Monceau



#### The Asian Yellow-legged Hornet: the implacable advance of a bee-killer

Queen



The Asian Yellow-legged Hornet is smaller and darker than the European Hornet, and the largely black abdomen, thorax, and top of head help to identify the Asian species. The Asian Hornet is considerably larger and darker than the Common Wasp and similar species, but could potentially be confused with the Median Wasp; the thorax of the wasp, however, has characteristic yellow 'tick' marks, while in the hornet it is plain black. The nest of the Median Wasp is superficially similar to that of the Asian Hornet, but is much smaller and is typically constructed lower down in bushes, rather than high in the canopy. Richard Lewington

#### The Asian Yellow-legged Hornet: the implacable advance of a bee-killer



A diagram illustrating the annual life cycle of the Asian Yellow-legged Hornet. Karine Monceau & Denis Thiéry

have weakened honeybee colonies. The Asian Yellow-legged Hornet adds yet another problem, although its effects are difficult to separate from those of the others. While beekeepers in south-west France have reported losses of up to 30%, probably from multiple causes, there has been no appropriate assessment of the hornet's overall impact on honey production. Nest removal can also be costly for land owners, as private pest control companies charge several hundred euros for each nest that they destroy.

#### The impact on human health

While the male Asian Yellow-legged Hornet may bite to defend itself, it is only the female that can sting. As a member of the Vespidae – the family that includes nearly all known social wasps – it can, unlike honeybees, sting several times. In its native range it is considered highly aggressive (Martin 1995), but this seems not to be the case in Europe; nevertheless, it is aggressive near its nests and will actively defend them from intruders. In France, analysis of the number of annual incidents of human envenomation by bees and wasps has failed to find evidence of any increase in the years since this species arrived in the country (de Haro et al. 2010). Its sting is more serious than a bee's and people have suffered anaphylactic shock because of multiple stings, leading to roughly 20 deaths in mainland Europe. Although the species is, so far, extremely rare in the UK, there have been several reports about 'killer Asian hornets' in the media, even if, in virtually every case, what had actually been seen was a native European Hornet. Confusion also arises from the term 'Asian hornet', which in fact covers 22 species of hornet found in Asia, including the European Hornet, the Oriental Hornet V. orientalis, and the Asian Giant Hornet V. mandarinia and its subspecies the Japanese Giant Hornet V. m. japonica. The last-mentioned, known in colloquial Japanese as the Giant Sparrow Bee, is able to destroy a honeybee hive within a few hours, and has been responsible for attacks on humans in Japan and China (Ono et al. 2003).

#### What should be done?

After 13 years in Europe, the invasive hornet has become a real concern in many countries. As the 'invasion' expands, the cost of management increases dramatically (Simberloff et al. 2013), and the cheapest, most effective way of dealing with the problem therefore is to take immediate action to stop the insect's advance before it becomes established. In the UK, an early report of workers preying on honeybees near Tetbury, in Gloucestershire, in 2016 enabled officials from the National Bee Unit quickly to locate and destroy the nest (Defra 2016). Everyone should be aware of the risk and should report sightings to the GB Invasive Non-native Species Secretariat. Recent simulations suggest that most of the UK could be colonised within two decades, once nesting is established (Keeling et al. 2017). Unfortunately, in France, the country with the largest population of the Asian Yellow-legged Hornet in Europe, none of the control techniques (below) has been able to stop this invasive species' advance.

#### Trapping

Trapping is a classic control method, one which can be performed at different times in the year in order to target different stages in the Asian Yellow-legged Hornet's life cycle. Traps can be set in spring to catch queens and in the summer and autumn to catch workers and emerging gynes, those females destined to become queens (Monceau et al. 2014). To date, only traps baited with food have been used, a technique that has attracted controversy because it is not specific to a single species, and is especially problematic when trapping queens in spring. In fact, queens represent only a small percentage of overall catches, which comprise chiefly flies and butterflies (Monceau et al. 2012). In addition, there is little evidence on the efficacy of this method (Monceau & Thiéry 2017); an assessment of the true impact and efficiency of the spring trapping of queens needs to be carried out as a matter of urgency. During a colony's growth, trapping by means of either sugar-based baits in June, July and October or protein-based baits, usually fish, in August can locally decrease predation pressure in apiaries (Monceau et al. 2013a, 2015a, 2015b). This type of trapping has limited side-effects on local insect populations because these are made up predominantly of honeybees, which are not attracted by the traps. Toxic baits, such as growthinhibitors and insecticides, have also been tested but, in the absence of a specific bait targeted at the Asian Yellow-legged Hornet, these should be avoided because of the effect that they could have on the health of honeybees, and wider concerns about the environmental impacts of pesticides. This problem could, however, be solved by using pheromones as species-specific mediators. Recent studies have revealed the presence in the antennal lobe of male Asian Yellow-legged Hornets of

A graph showing the number of hornets captured in traps with different baits at different points in the workers' flight season. Karine Monceau & Denis Thiéry



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several macromolecules that could be linked to sex pheromones (Couto *et al.* 2016). A recent study by Wen *et al.* (2017) identified sex pheromones from the Asian Hornet, and these should be tested for use in trapping devices.

#### **Natural enemies**

Asian Yellow-legged Hornets in Europe may host a number of different pathogens. Darrouzet et al. (2015) and Villemant et al. (2015), respectively, found a parasitic fly (Conopidae) and a nematode that kills the hornets. The fly, however, is unlikely to be used as a biological control because it is a generalist parasitoid (something which eventually kills rather than only parasitising the host) of social wasps, sawflies, bees and ants. Several entomopathogenic (capable of causing disease in insects) fungi - Beauveria bassiana and Metarhizium strains - can efficiently infect and kill workers (Poidatz et al. in press); a queen trapped in the UK was found to be naturally infected by a Beauveria species. Natural predators include the Eurasian Jay Garrulus glandarius, the European Bee-eater Merops apiaster and the Badger Meles meles. Honey-buzzards Pernis apivorus are specialist predators of insects such as these, having scalelike feathers around their bill and eyes to prevent stings, and one has been observed feeding at an Asian Yellow-legged Hornet's nest near Bordeaux (Monceau et al. 2014). The European Bee-eater and the Honey-buzzard are both rarities in the UK, so the potential for biological control by these natural enemies is restricted, but more predators will surely emerge; domestic chickens foraging in apiaries, for example, are known to eat hornet workers.

#### Nest destruction

Nest destruction is probably the most effective control method, because it ensures the destruction of the colony (Thomas 1960; Spradbery 1973; Hölldobler & Wilson 2008). Before the emergence of the first workers in the spring, the nest, coloured grey, is no larger than a golf ball, and thus almost impossible to detect. Later in the cycle, the much larger nests, which can be up to 80cm in diameter, are often at the tops of the trees and are well camouflaged until the leaves fall. At Woolacombe, in north Devon, where a nest was discovered in September 2017, bee-inspectors followed the flying direction of workers from different apiaries and found the nest where the flight paths intersected. At the time of writing, however, it is too early to know whether the destroyed colony was the only one in the area. Early detection methods using harmonic radars are being studied (Milanesio *et al.* 2016, 2017), as is nest destruction by means of drones. A drone belonging to the Jersey Fire and Rescue Service was this summer reported to have been attacked by a swarm of Asian Yellow-legged Hornets as it was used to investigate a nest.

In 2016, at least one female, either actively, by flying across the English Channel, or passively, by hitching a lift on a boat or vehicle, arrived in the UK and founded a nest, which was destroyed. In the following year, a second nest was also destroyed, one hopes before reproduction took place, but the origin of the queen is uncertain: was it another one that came from across the Channel, or could it be a descendant from the 2016 nest in Gloucestershire? It remains particularly important, therefore, that people react at an early stage and contain any invasion before a colony can become established. We believe that the experience in other invaded countries, more precisely the lack of a quick reaction, should serve as an example of how not to do it. The French government took about eight years before legislating on this species, by which point eradication was impossible. The Asian Yellow-legged Hornet is among 37 alien species listed by the EU as harmful to native biodiversity, and we believe that the most effective way of tackling this problem is at a European level. The UK should monitor its beehives closely, destroy Asian Yellow-legged Hornet nests where and when it can, and be aware that if this fails the next step will be to learn to live with this invader.

#### References

For details of references, see https://britishwildlife. com/site/suppl-dec-17-hornet.

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#### **Robert Burton**

My soft spot for moles has lasted for 70 years, ever since I played Moldy Warp the Mole in a school play based on Alison Uttley's *The Tales of Little Grey Rabbit.* (I wore a black velvet waistcoat and a jockey cap.) Moles are at once the most obvious and the most secretive of our mammals. Their manifestation is very obvious on my lawn, which is not too much of a disaster because it is more rough grass than manicured sward. Nevertheless, when a mole moved in some 15 years ago I was soon fed up with clearing a barrowload of molehills per day.

As I had hoped, the production of molehills dwindled when I presumed that the tunnel system had been completed. In succeeding years, the lawn lay largely unblemished except for a burst of eruption in spring, when, I presume, the tunnels were refurbished after the winter rains. This year there was no sign of the mole, so I presumed that it had died. Then there was a rash of new workings in late summer in a part of the garden that had previously been left clear. Had a new mole arrived, taking over the old tunnel system and

extending it?

I have been writing 'presume' because I do not know what has been happening under my lawn. This has for long been a problem for anyone trying to study moles. You cannot learn much from molehills, although there have been some interesting attempts. One of my favourite stories in the history of natural history concerns Henri le Court, who left Paris to escape the horrors of the Revolution and retired to the country to study moles. He attempted to measure their speed underground by inserting a line of straws along a mole tunnel. Having ascertained that there was a mole present, he blew a horn down the tunnel. The terrified mole fled, knocking the straws as it went. 'Spectators affirmed that its swiftness was equal to the speed of a horse at a good round trot.' A good try, but a slow walk would be more accurate.

The difficulty of observing moles in the wild has led to some fanciful folklore. Fairy rings have been blamed on moles burrowing in circles, which, by loosening the surface soil, increase its fertility and promote a lush growth of grass. It has to be said that some of the old natural-history books have been hardly less whimsical. Le Court did at least try the experimental approach, and a number of naturalists, including my father, studied moles by systematically investigating the tunnel systems. The break-through in the study of mole behaviour came with Gillian Godfrey and Peter Crowcroft tagging individuals with radioactive cobalt and following them with a Geiger-counter. There is an obvious drawback to this technique, and it has been superseded by the ubiquitous radio-tag.

Without investing heavily in time and technology, I cannot track my moles and have to rely on old-fashioned observation and speculation. Over the years, moles appear to have targeted my own and neighbouring gardens while there have been very few signs of activity in the adjoining pasture and arable fields. Yet there are sufficient molehills to show that these places must be inhabited. The answer is that they are living in a network of tunnels at depths of up to 150cm that have existed for generations. The way to see signs of these tunnels is to keep watch where ditches have been cleared, at working faces of sand and clay pits or road-widening schemes. With the right consistency of soil, the tunnels remain patent so that it is possible to see the basic layout. I have twice seen nests revealed by the excavator 80 or more centimetres underground, complete with balls of leaves and, in one case, the decomposing body of a mole.

Despite an emphasis on adaptations in anatomy, physiology and behaviour for a subterranean life, moles must spend a considerable time on the

surface. They may leave traces in the form of shallow furrows once called rutting angles or, pace le Court, traces d'amour. The names suggest a link with courtship behaviour, but this is only partly true as the furrows can be found year-round. A mole outside its system of tunnels could be described as like a fish out of water. Yet it seems to manage. When young moles cut the apron strings and leave their mothers' tunnel systems, they often live above ground for a short time until they can find an untended patch of ground in which to

set up home. During this time they fall prey to a variety of predators, from owls to cats, and in mid-summer significant numbers are taken by Tawny Owls. This suggests nocturnal activity, but a lucky few people have watched moles foraging on the surface by day.

I should be grateful that one manifestation of moles is missing from my garden. At least they have not disfigured it with a 'fortress', a pile of soil 60cm high and 100cm across, or more, that protects a nest at the surface. Such a monstrous edifice would also indicate that the garden is liable to flooding.

### **Classic Wildlife Sites**

## The Wash

#### Will Brown

The Wash is one of the most important coastal wetlands in Europe, renowned particularly for its huge populations of wintering and migratory waterbirds. In terms of its conservation importance, it is the largest estuarine system in the British Isles, and it contains the biggest Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR) in England. Its intertidal saltmarshes and mudflats, vast in extent and with high biological productivity and lack of disturbance, support the country's greatest concentration of waterbirds and Harbour Seals *Phoca vitulina*.

Despite its size and importance, the Wash has been profoundly altered by land reclamation since medieval times, resulting in extensive habitat loss and an artificial modern shoreline. There is a dramatic transition in landscape character across the man-made sea banks: inland lies one of the country's most intensive and rich arable regions, while beyond lie marshes and mudflats, which represent one of its last wildernesses.

The Wash has been the location of some important and pioneering conservation work. It had a Actively accreting Spartina anglica saltmarsh colonising mudflats. Note the complex intricate pattern of drainage rills. Will Brown

significant formative influence on Sir Peter Scott, the founder of the World Wildlife Fund (WWF) and Wildfowl and Wetlands Trust (WWT), who lived here during the 1930s.

#### Formation and change

The Wash represents the unfilled section of the fenland basin and was formerly a much larger inlet of the North Sea. Fluvioglacial processes created a breach in the Cretaceous chalk between Norfolk and Lincolnshire, and this was widened into a basin by subsequent glaciations. During the Quaternary, cycles of marine incursions and retreats resulted in the deposition of fine clays and silts (Boreham *et al.* 2010).

The historical coastline of the Wash had formed by the Iron Age, with a slightly elevated silt ridge around the shoreline separating the saltmarshes from the undrained freshwater peat swamps of the interior fenland. A number of Romano-British settlements were established along this ridge. By the early medieval period these had become prosperous, with recently enclosed rich grazing marshes and the profits of the wool trade funding the building of magnificent churches. During the 13th century, the two principal Wash ports of Boston and King's Lynn were the most important outside London and were members of the Hanseatic League, trading across northern Europe.

#### Land reclamations

An estimated 47,000ha of land have been reclaimed from the Wash since Saxon times (Davidson *et al.* 1991) – more than in any other British estuary – the majority since the 17th century. Reclamation of saltmarsh was achieved through enclosure, drainage and the construction of new sea banks. The process

**Below** Map of the Wash. *Right* Map showing historical changes in the coastline of the Wash. John Plumer





of reclamation pushed the coastline farther out towards the sea, and Wisbech and Spalding – both former ports at the head of the Nene and Welland estuaries – now lie some ten miles from the modern shoreline.

Even after the drainage of the interior fenland under Cornelius Vermuyden in the 17th century, the tidal rivers of the Wash were prone to siltation, which impeded discharge of floodwater into the sea. The shrinkage of the peat fens meant that water had to be lifted, against gravity, from land below sea level into the Wash.

It was not until the late 19th century, with the advent of steam pumping engines, the installation of tidal sluices and the creation of new artificial 'cuts' – straight, deep channels constructed to discharge water quickly into the sea – that the drainage of the Fens, and the uncoupling of its intimate connection to the Wash, was finally completed. Piecemeal reclamation of the Wash saltmarshes continued well into the second half of the 20th century. A proposed 1981 reclamation at Gedney Drove End was successfully opposed at Public Inquiry, and the outcome, along with strengthening conservation legislation, effectively ended the era of continuous land take for agriculture (Chatters 2017).

#### The environment of the Wash

The Wash stretches from a line between Gibraltar Point NNR, in Lincolnshire to Holme Dunes NNR, in Norfolk, occupying approximately 66,654ha. Five rivers discharge into the Wash, collectively draining around 12% of England. From an anticlockwise direction, these are the rivers Steeping, Witham, Welland, Nene and Great Ouse. The Wash is more of a tidal embayment than an estuary and, despite its considerable freshwater input, is dominated by marine inputs and processes.

The majority of sediment within the Wash is thought to derive from offshore material and eroding sections of coastline, including the till cliffs of Holderness (Evans *et al.* 1987). The sediment is distributed around the Wash by tidal currents, which deposit progressively finer material from sand dunes at the outer margins to large mudflats in the sheltered interior. Just under half of the Wash consists of intertidal sandbanks, mudflats and saltmarsh. Although the majority of the water is very shallow, there are several deeper channels and a maximum depth of 50m in a central trench called 'The Well'.

Despite the appearance of uniformity, the habitats of the Wash are highly varied. They range from shingle, sand-dune and saline-lagoon complexes at the edges to large areas of saltmarsh and intertidal mud and sand. Sublittoral habitats include areas of mobile sand, fine clay, coarse gravel and mixed sediments. In more sheltered and stable substrates, there are rich biogenic reef communities.

#### Habitats

#### **Saltmarshes**

The Wash contains approximately 4,228ha of saltmarsh, the largest area in Britain, accounting for about 10% of the national total. It occurs around three-quarters of the estuary in a band between 500m and 2km in width. In contrast to the majority of saltmarshes in southern Britain, those on the Wash have been growing in extent since the cessation of land reclamation. Following reclamation, the high-and low-water marks move seaward to re-establish equilibrium, the new sediment supply resulting in a rapid growth of vertical elevation and lateral accretion (Pye 1995).

A consequence of historical reclamation of the upper marsh is that the majority of saltmarshes in the Wash comprise immature and species-poor low-marsh and middle-marsh communities. There is an under-representation of botanically diverse high marsh, the best examples of which are the unreclaimed sections of Frampton, Kirton and Holbeach Marshes, which show a complex pattern of dendritic creek systems and diverse vegetation mosaics.

The pioneer zone is characterised by extensive areas of Common Glasswort *Salicornia europaea* (NVC SM6), sometimes interspersed with Common Cord-grass *Spartina anglica* (NVC SM8). The middle-upper marsh (the Atlantic salt-meadow communities) has mosaics of Common Saltmarsh Grass *Puccinellia maritima*, Sea Aster *Aster tripolium* and Sea Purslane *Halimione portulacoides*, the last being particularly dominant along creek edges and better-drained areas of marsh.

The Wash has the largest area of scrubby, halophilous vegetation in Britain, containing the nationally scarce Shrubby Sea-blite *Suaeda vera*. This is an SAC habitat, forming on the upper marsh at the transition to sand and shingle, such as around Gibraltar Point and Snettisham. Small Cord-grass *Spartina maritima*, occurs on the Wash saltmarshes at one of its most northerly locations in Britain (and the rest of Europe). This is the only native species of cord-grass growing on the upper marshes, often in association with Common Sea-lavender *Limonium vulgare*, the mauve flowers of which are a colourful feature of the saltmarsh in late summer.

Historically, the majority of the Wash saltmarshes were grazed but only about half are under grazing management today. Low-density grazing has the potential to enhance the structural and botanical diversity of the vegetation – creating mosaics of shorter grass for grazing Wigeon *Mareca penelope* and Brent Geese *Branta bernicla* and taller areas for nesting Redshank *Tringa totanus*.

Recent monitoring indicates a decline in the area of pioneer *Salicornia* and other colonising annuals, which is likely due to erosion at the saltmarsh edge, but an increase in the area and species richness of the Atlantic salt meadows, possibly because of the beneficial effects of an increase in light/moderate grazing (Ahern Ecology 2015).

#### Intertidal mud and sand

Vast expanses of mud and sand characterise the Wash, accounting for around 40% of its area and contributing to its international importance for waterbirds. Substrates range from fine marginal mud adjoining the saltmarsh to offshore banks of drying sand with intriguing names such as 'Old Bell Middle', 'Thief Sand' and 'Roaring Middle'. There is a progression from sandflats, occurring between the low-water mark and 1.7m AOD (above ordnance datum, i.e. height above mean sea level), to mudflats, accumulating from this level to the limit of pioneer saltmarsh at 2.1–2.4m AOD (Pye 1995).

The mudflats have a high biological productivity. The tidal flows bring a continual supply of sediments, supporting a faunal community of marine worms, molluscs, crustaceans and bivalves feeding off the detritus, algae and zooplankton. The diversity of the flats is low, comprising a small number of species, but their biomass and densities are exceptionally high, with an abundance of burrowing polychaete worms *Arenicola marina*, *Nephtys hombergii* and *Lanice conchilega* and the tiny gastropod *Hydrobia ulvae*. The mudflats also support high densities of Cockles *Cardium edule*  and Mussels *Mytilus edulis*, which have long been commercially harvested.

#### Shingle, sand-dune and lagoon habitats

Sand-dune and shingle complexes that are exposed to higher wave energy have formed at the outer edges of the Wash. Gibraltar Point NNR has a dynamic series of actively accreting sand dunes extending seawards, with freshwater and saltwater marshes formed in their lee.

RSPB Snettisham contains a nationally important vegetated shingle spit, behind which is a series of saline lagoons (former gravel pits) that function as important high-tide roosts for tens of thousands of waders. Between Old Hunstanton and Holme Dunes NNR is a dynamic complex of shingle spits, saltmarsh and sand dunes. Both Holme Dunes and Gibraltar Point support breeding colonies of Little Terns *Sternula albifrons* and Natterjack Toads *Bufo calamita*.

#### Bird study on the Wash

The spectacle of enormous skies filled with restive flocks of birds – darting over the shifting stage of sand and sea – is part of the magic of the Wash between autumn and spring and has inspired both amateur and professional naturalists alike.

During the early 1930s, Sir Peter Scott rented a secluded lighthouse at the mouth of the River Nene, where he set up a studio and painted evocative portraits of wildfowl on the local marshes. Scott's period on the Wash marked an important transition in his career: from an initial focus on recreational wildfowling and painting, he developed a broader concern for the conservation of wildfowl and their habitat which led to his founding the WWT after the Second World War.

While at the lighthouse, Scott developed a detailed knowledge of wild geese through catching and observing them at close quarters. His early trials of catching flocks of geese by rocket-netting was refined and expanded by the Wash Wader Ringing Group (WWRG), established in 1959, now the largest and longest-running wader study group in the world.

The WWRG employs mist-netting on the saltmarsh to catch birds under darkness. It was its development of canon netting, however, that led to an exponential increase in numbers of waders caught, while the group is increasingly using



#### Wader flock at RSPB Snettisham. Ann Miles

coloured rings as a way of increasing records through resightings. Since its inception, the WWRG has handled over 300,000 waders, and analysis of its dataset has significantly improved our understanding of wader migrations and lifecycles.

#### **Birds of the Wash**

The Wash supports the largest population of wintering waterbirds in Britain, with a five-year mean peak (2011–16) of 345,440 individuals and annual highs of more than 400,000. It is noted particularly for its huge numbers of Knots *Calidris canutus islandica* that migrate from Canada and Greenland. Knots gather in flocks of tens of thousands and create spectacular displays each side of high tide as they move between their roosts and their foraging grounds. The former gravel pits at

The Wash Wader Ringing Group setting mist nets on the saltmarsh at high tide. Rob Robinson

RSPB Snettisham support the largest high-tide roost on the Wash.

Other wading birds in significant quantity include Grey Plover *Pluvialis squatarola*, Dunlin *Calidris alpina*, Bar-tailed Godwit *Limosa lapponica*, growing numbers of Black-tailed Godwit *L. limosa* and Oystercatcher *Haematopus ostralegus*. The majority of species feed on the invertebrate-rich mudflats, the Oystercatchers and Knots foraging primarily on shellfish such as Cockles.

The WWRG dataset has revealed the vast distances that the majority of waders travel to reach the Wash, most breeding in the High Arctic and either passing through the Wash to refuel and moult or staying over winter. Up to 50,000 Pink-footed Geese Anser brachyrhynchus from Greenland and Iceland winter on the Wash, with Snettisham

#### **Colour-ringed Turnstone feeding on Cockle.** Ruth Walker





their favoured roosting site. Dark-bellied Brent Geese breeding in Siberia overwinter on the Wash, where they graze the short grass around saltmarsh pools.

The saltmarsh plants attract winter flocks of passerines to forage on their seeds and these, in turn, bring roaming birds of prey such as Hen Harrier *Circus cyaneus*, Merlin *Falco columbarius* and Peregrine Falcon *F. peregrinus*. Barn Owls *Tyto alba* are regularly seen quartering the upper marsh, sea banks and adjoining arable dykes. In winter, they are joined by Short-eared Owls *Asio flammeus*, which are occasional breeders here.

The Wash saltmarshes are nationally important for breeding Redshanks, and the Outer Trial Bank – an artificial island constructed during the 1970s as part of a freshwater feasibility study – now supports thousands of Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *L. fuscus*.

#### Mammals

#### Seals

The Wash contains the largest population of Harbour Seals in Britain, and possibly the largest in Europe outside the Waddenzee. The reason for their abundance is the sheltered and shallow waters, the wide range of fish prey, and the numerous undisturbed offshore sandbanks and mudflats, which they use to haul out during low tide and to undergo pupping (June–July) and post-breeding moults.

Seals were traditionally hunted for their fur, and the practice of shooting young seals for their pelts continued in the Wash under government licence until the mid-1970s. The seal colony in the Wash is the best studied in Britain, having been monitored since the 1960s. The population was badly affected by outbreaks of phocine distemper virus in 1988 and 2002, which reduced numbers by 52% and 22%, respectively (Thompson *et al.* 2005). The 2014 count, however, was the highest recorded and estimated the population at 4,020 adults and 1,802 pups (Thompson 2015).

A recent trend has been the growing number of Grey Seals *Halichoerus grypus* foraging in the Wash, perhaps as a consequence of its location midway between the burgeoning breeding colonies of this species at Donna Nook and Blakeney Point. The growth in Grey Seal numbers raises unknown questions about their potential competition, and interaction, with the resident Harbour Seals.

#### Other mammals

The large expanse of grassland on the sea banks and tussocky saltmarsh fringing the Wash supports high densities of small rodents such as voles, which are important prey items for owls and raptors. Brown Hares *Lepus europaeus* are often encountered on the upper marsh, which they use with the adjoining arable land for breeding and foraging. Anecdotal observations indicate that the Wash hinterland still supports good numbers of hares compared with inland areas, possibly as a result of the greater habitat diversity and moderating effect of large areas of grassland on transient arable crops.

#### Invertebrates

Other than the mudflat fauna already mentioned, invertebrates have received comparatively little attention. The saltmarshes of the Wash and North Norfolk are some of only a handful of places in

Harbour Seals haul out on mudflats at the mouth of the River Nene. Will Brown



Britain with surviving populations of the Scarce Pug Moth *Eupithecia extensaria*, a Red Data Book species whose larval foodplant, Sea Wormwood *Artemisia maritima*, is vulnerable to overgrazing.

Saline lagoons are a priority habitat and designated features of the Wash SAC. They occur at several locations, including former borrow pits, ditches and remnant creeks in arable fields adjacent to the sea wall. The largest areas are the former gravel pits at Snettisham, the new lagoon at Freiston Shore and Moulton Marsh, which support a limited but specialised and scarce community of lagoonal species, such as the sand shrimp *Gammarus insensibilis*, the mud snail *Ventrosia ventrosa* and the isopod *Idotea chelipes*.

#### Conservation

#### Designations

The Wash is covered by a plethora of conservation designations, reflecting its size and its importance for nature conservation. It was first notified as a SSSI in 1972, and, as mentioned above, it is the largest in England, covering 63,135ha. The SSSI formed the basis for the subsequent Special Protection Area (SPA) designation of 1988, which lists as qualifying features 21 species of bird occurring in internationally important numbers.

The Wash and the North Norfolk Coast are designated as a combined Special Area of Conservation (SAC), protecting more than 100,000ha of coast between Gibraltar Point and Blakeney Point. The south-east corner of the Wash forms part of the largest NNR in England, and it is also classified as a 'Wetland of International Importance' under the Ramsar Convention.

The network of Marine Protected Areas (MPAs) is brought together under the Wash and North Norfolk Coast European Marine Site (EMS), which works collaboratively with 20 regulatory organisations through a management scheme. Three advisory groups, composed of local representatives such as wildfowlers, fishermen and conservationists, provide a forum for discussing management matters.

#### **Fisheries management**

The shallow and productive waters of the Wash are an important spawning and nursery ground for many species of flatfish. The Wash shellfishery was valued at £3-million in 2015 and is underpinned

by Cockles and Brown Shrimps *Crangon crangon*, the latter representing more than 90% of the UK's total catch.

The Wash's Cockle and Mussel fishery has traditionally been handworked. However, the introduction of hydraulic suction dredging in 1986, combined with a reduction in minimum landing size and natural mortality, caused a sharp decline in stocks during the 1990s (Dare *et al.* 2004). This led to the closure of the Mussel fishery.

Mussel and Cockle spat are important prey items for waders such as Knot and Oystercatcher. Declines in overwinter survival rates of these species on the Wash during the 1990s have been linked to falling stocks and overfishing (Atkinson *et al.* 2003). Stocks gradually recovered during the 2000s, although the Mussel fishery remains closed owing to poor settlement.

A notable success, however, has been the revival of Cockle stocks, helped by a switch from a predominantly dredged fishery to smaller-scale and more traditional techniques using the boat's propeller to wash the Cockles into circles and then hand-raking them into bags (with a limit of 2–3 tonnes per boat).

There are current challenges over the possible impact of shrimp-fishing on vulnerable sublittoral habitats such as biogenic reefs of *Sabellaria spinulosa* and mixed sediment, which are also qualifying features of the SAC. The beam trawlers used in shrimp-fishing have the potential to damage these habitats and may therefore contravene the Habitats Regulations. There is currently a lack of available evidence on the exact impacts, and so the Eastern Inshore Fisheries and Conservation Authority (Eastern IFCA) is mapping the sublittoral habitats of the Wash and undertaking impact assessments of beam trawling, using field trials and comparisons of different gear types.

Given the current uncertainty, the Authority has taken the difficult decision to implement closures of certain fishing grounds, using the precautionary principle of the Habitats Regulations. The closures have caused concern among some Wash fishermen over the future impact on their livelihood.

Such problems highlight the complexities of fisheries management, the importance of good dialogue between stakeholders, and the need to translate science into flexible and adaptive policy.



Aerial view of RSPB Frampton Marsh with the sea wall separating the mature saltmarsh from the new freshwater wetland. Tormod Amundsen

#### **Renewable energy**

The Greater Wash is one of three strategic areas in England designated for major growth in offshore wind energy. The first scheme was the 194MW Lynn and Inner Dowsing, constructed in 2009 off the Skegness coast. Currently, there are three operational windfarms and a further three consented schemes under construction, including the 900MW Triton Knoll.

While none of the windfarms is located inside the Wash EMS, sections of transmission cabling pass through the designated area and have the potential to harm sensitive and protected habitats such as *Sabellaria* reefs, disturb Cockle beds and damage saltmarshes by trenching.

There are also concerns over collision risk from turbines to birds using the SPA. In 2012, the proposed Docking Shoal scheme was refused permission on the grounds of potential impacts on Sandwich Terns *Thalasseus sandvicensis*, the main UK breeding stronghold of which is the adjacent North Norfolk coast. With the Greater Wash also proposed as a potential SPA because of its importance for seabirds, the need for schemes that balance the demands for green energy and nature conservation will be critical.

#### **Conservation management**

For centuries, the Wash has been regarded as a vast empty space that could be filled with grand engineering schemes or be chipped away to yield productive farmland from marshy waste. Recognition of its environmental and conservation importance is only very recent.

During the 1970s, there were proposals to barrage sections of the estuary in order to construct

large freshwater storage bunds. Feasibility studies were undertaken and two trial banks constructed on mudflats near Terrington, which remain standing today as seabird sanctuaries.

Ecology formed part of the feasibility studies, with an assessment of the impact of the scheme on waders by means of invertebrate-sampling, ringing data and population-modelling (NERC 1975). This represented one of the earliest and best examples of an ecological-impact assessment, and it highlighted the importance of the Wash. The proposals were eventually shelved owing to declining water demand and growing conservation awareness.

The Crown Estate owns the majority of the foreshore around the Wash and leases the grazing and wildfowling rights. Wildfowling has a long history around the Wash and remains an important cultural activity. It is regulated through a network of clubs that receive consents from Natural England.

The RSPB, too, is a significant landowner, with reserves at Snettisham, Frampton Marsh and Freiston Shore. It has delivered ambitious wetlandhabitat creation at the latter two reserves. The managed realignment at Freiston Shore, completed in 2000, was one of the earliest such in the country and resulted in 66ha of new saltmarsh and 15ha of saline lagoon.

Ironically, the land at Freiston Shore, which was the first around the Wash to be returned to the sea, was the site of the last reclamation undertaken by HM Prison North Sea Camp in 1983. The reclamation left a narrow marsh frontage and a bank vulnerable to erosion, and a cost-benefit analysis revealed that it was more expensive continually to maintain this than to allow it to revert back to saltmarsh (Badley & Allcorn 2006). The approach of the Wash Shoreline Management Plan for the majority of the Wash is to 'hold the line' of existing flood defences. Although there has been a recent trend for net accretion of saltmarsh and mudflat – theoretically enhancing their natural defence function – under the scenario of elevated sea-level rise, this may be reversed to net erosion, resulting in the loss of protected intertidal habitat and necessitating compensation through local realignments. In an area with internationally important designations but at significant risk from tidal flooding (over 80 lives were lost around the Wash in the 1953 tidal surge), there is a need carefully to balance flood defence and nature conservation.

Since 2004, the RSPB has created a major new wetland reserve at Frampton Marsh on former arable land adjacent to the sea bank. A new visitor centre has been constructed, along with 19ha of reedbed, 21ha of freshwater wader scrapes and 110ha of wet grassland. The location of the new foraging, roosting and nesting habitats adjacent to the existing saltmarsh and intertidal mudflats has attracted large numbers of waders (35 different wader species were recorded in 2015, more than at any other RSPB reserve).

Ten years ago, Frampton supported no breeding waders (apart from Redshank on the saltmarsh). The 2017 survey there recorded 44 pairs of Lapwings *Vanellus vanellus*, 81 of Avocets *Recurvirostra avosetta* and 16 of Ringed Plovers *Charadrius hiaticula*. Frampton is also one of very few sites in the country to have regular lekking Ruffs *Philomachus pugnax* (John Badley pers. comm.).

The significance of both new reserves is not confined merely to the creation of new wildlife habitat. They also serve to restore a previously lost link between the intertidal habitats of the Wash and the freshwater habitats of its fenland hinterland. Furthermore, in a region dominated by intensive arable farmland with limited public access, they provide opportunities for people to connect with these special landscapes.

#### Visiting and access

The coastline of the Wash is publicly accessible via the sea banks for the majority of its length, a notable exception being the section between the mouth of the Great Ouse and Wolferton (part of the Royal Sandringham Estate). The coastline between the Great Ouse and the Nene forms part of the NNR and is promoted as the 'Peter Scott Walk'. There are proposals to make Scott's former residence at the East Lighthouse open to the public, while good views of the lighthouse are available from the Nene bank at Guys Head (TF493257).

Although the saltmarsh is easily accessible from the sea wall, the presence of large tidal creeks and soft mud necessitates great care and respect. Potentially the safest places to access the saltmarsh, and observe its transition to mudflat, are the causeway to the Inner Trial Bank (TF542263) and the track from the sea wall to the targets at RAF Holbeach (TF460311). The latter is an active bombing range and access is strictly limited outside firing times (Monday–Friday).

The RSPB reserves at Freiston Shore, Frampton Marsh and Snettisham, with their carefully managed habitats adjoining the saltmarsh and mudflats, are perhaps the best places to get on to the Wash. Snettisham is the finest location at which to watch the spectacle of vast wader flocks as they are driven off the mudflats by a rising tide to roost on the gravel pits. The RSPB advertises the optimum times for viewing, which are generally between August and April and 1–2 hours before a high tide of 7m or more. Flocks of Pink-footed Geese can also be seen flying overhead between their roosts and inland foraging grounds (best between mid-November and late January at dawn and dusk, and avoiding periods around a full moon).

At the edge of the estuary, the NNRs at Gibraltar Point and Holme Dunes are where the intertidal mud and saltmarsh of the Wash grade into sanddune and shingle complexes.

The South Lincs RSPB organises guided boat cruises between April and October, operating from Boston into the Wash. These are an excellent way to observe birds and seals from the perspective of the water.

#### References

For details of references, see https://britishwildlife. com/site/suppl-dec-17-wash.

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## Habitat management news

#### **Compiled by Conservation Management Advice, RSPB**

#### Restoration of moth abundance in re-created species-rich grassland

Calcareous grassland, a European priority habitat, is noted for its diverse botanic and invertebrate interest, but has declined considerably in extent as a result of changes in land use.

A recent paper, published in Biological Conservation, assesses the way in which moth abundance and the number of moth species are affected by the restoration of species-rich semi-natural grassland from intensively farmed arable fields, and compares moth populations in restored habitats with those of existing semi-natural chalk-grassland systems. Such restoration is a priority under higher-tier agri-environment schemes, but there are relatively few studies that compare biodiversity in restored habitats with that in control and reference sites. For land-managers, there is therefore a lack of available advice on how best to implement restoration schemes and maximise their benefits for insects.

Moths were chosen for this study because of their diversity, their known habitat associations and their long-term declines, the last being linked predominantly to agricultural intensification. There is also evidence to suggest that moths are important pollinators, while the defoliation of plants by larvae has been found to increase nitrogen retention in soil organic matter. Furthermore, both adult moths and caterpillars



Calcareous grassland at Salisbury Plain; this habitat is recognised for the diversity of plants and invertebrates that it supports. Richard Revels

are primary sources of food for insectivores.

This landscape-scale field study compared the abundance and diversity of calcareous-grassland specialists, grassland generalists and other moth species in three habitats: arable fields (control), arable fields that have been restored to flowerrich grassland (treatment), and semi-natural calcareous grassland (reference site).

The study aimed to answer two key questions:

 How do moth abundance and species occurrence on the treatment sites compare with those on the control and reference sites? The hypothesis was that abundance and species occurrence would be lowest on the control sites, higher on treatment sites, and highest on reference sites.

2. On treatment sites, how are moth abundance and species occurrence affected by the frequency of calcareous-grassland plant indicators, the time since restoration was started, and the extent of semi-natural calcareousgrassland habitat in the wider landscape? It was expected that moth abundance and species occurrence would increase with the frequency of calcareous indicator flora, with ecological maturity of the restoration site. and with connectivity to other calcareous grassland.





Small Elephant Hawkmoth *Deilephila porcellus* on its foodplant Lady's Bedstraw *Galium verum*. Restoration schemes may be able to increase the abundance of target invertebrate species by introducing calcareous-grassland indicator plants. Richard Revels

The predictions applied primarily to those moth species associated with calcareous grassland, but it was expected that patterns of abundance and occurrence of grassland generalists and other moth species would be similar to those.

A total of 32 former arable fields, now restored to species-rich grassland, was selected from 22 farms across southern England. The selected fields sat on underlying chalk, had been restored for at least three years, and varied in their level of connectivity to existing highquality calcareous-grassland habitat.

On the restored grassland sites, it was found that the abundance of calcareous-grassland specialist moths was almost eight times that on arable fields. There was, however, no significant difference in moth abundance and species occurrence between restored grassland and semi-natural calcareous grassland. The only group of moths that was more abundant on semi-natural grasslands was that associated with late successional habitats, suggesting that woody vegetation could be a key feature for maintaining insect biodiversity on chalk grassland. Where indicator plants had become established on restored grassland sites, calcareous-grassland moths were more numerous. It seems possible, therefore, that the abundance of target insect groups could be increased if a site is actively enhanced by the introducing of calcareous-grassland indicator plants.

The authors conclude that, even over a short timespan (e.g. three years) and at large distances (e.g. up to 7km) from semi-natural calcareous grassland, the restoration of species-rich grassland from arable fields can have a positive effect on moth populations.

#### Reference

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## St Helena: the island of endemics

#### **Amy-Jayne Dutton**

A view towards Sandy Bay, St Helena. Amy-Jayne Dutton

There are few places in the world that can rival the remoteness of St Helena. Situated in the South Atlantic, more than 1,000 miles from the nearest major land mass, this tiny island is most commonly known for being the location of Napoleon Bonaparte's incarceration. St Helena has far more of interest than just its human history, however, with spectacular scenery, unique habitats and an incredible diversity of endemic species. Indeed, despite being similar in size to Jersey, the island is home to approximately one third of all species endemic to the United Kingdom and its Overseas Territories. A number of remarkable plants and animals have been lost in the time since humans colonised, but work is now being undertaken to ensure that those which remain are protected.

he fascinating natural history of St Helena is not immediately obvious when one is driving around the island. This small, rocky outpost is the remnant of two volcanoes which emerged from the Atlantic around 14 million years ago. It is incredibly remote, lying 1,800km off the coast of Africa and 3,200km from South America. Such isolation has allowed the development of an ecosystem consisting of many unique plants and animals, including plant species whose nearest relatives have long since been lost from the continental mainlands (Cronk 1987). Its position and formation mean that there are no native land mammals and only one endemic land bird, but the lists of endemic plants and invertebrates are considerably more impressive. To date, 502 endemic

species have been officially recorded from St Helena – approximately 30% of the 1,549 UK Overseas Territories endemics (Churchyard *et al.* 2016) – yet, as there are thought to be more than 460 endemic invertebrates alone, the true number is likely to be significantly higher.

The island's periphery appears steep, dry and imposing. The capital, Jamestown, is nestled in one of the valleys on the northern, leeward side of the island, and has been part of the initial vista greeting travellers ever since the East India Company settled the island in 1659 (Ashmole & Ashmole 2000). As of 2017, passage on the Royal Mail Ship (RMS *St Helena*) remains the usual way of reaching the island, for both locals and tourists alike. Departing from Cape Town, the ship takes five days to arrive



The RMS St Helena in James Bay. Amy-Jayne Dutton

and brings new supplies approximately every three weeks. The island is set to become more accessible, however, with the successful start of a commercial air service from South Africa in October 2017. Easier access will help to unlock St Helena's potential as an exciting new tourist destination, with its unique military past and natural history offering plenty of interest. Once on the island, visitors are typically impressed by the fact that such astounding views and diverse vegetation can be found in such a compact area.

Average annual temperatures are 22–27°C in Jamestown, but just a short, winding, upwards journey away, at Hutt's Gate, which sits at an altitude of 600m, this falls to 14.5–18.5°C. Average rainfall is also remarkably variable: 175mm of rain falls on the outer edges of the island, while the upper summits – known as the Peaks and reaching an elevation of 823m – receive an average of 1,050mm per year (Ellick *et al.* 2013). This variation in climate has produced a number of different habitat zones on the island, each supporting distinctive, endemic biota.

Many of St Helena's species are listed as globally threatened on the IUCN Red List, and actions are being taken to protect endemic flora and fauna. Feral goats and pigs have now been eradicated from the island and thus no longer threaten the few remnants of native vegetation, while increased awareness has stopped the clearance and exploitation of endemic species. Nevertheless, St Helena's wildlife continues to face challenges. Most conservation work is focused on plants, but the associated improvement in native habitats benefits a large suite of other species. Habitat restoration also has more wide-ranging benefits for the island, including prevention of soil erosion and improved hydrological function. St Helena's biodiversity value is not restricted to its flora, however, and conservation work is constantly developing in order to incorporate new information and techniques, and to further protect the island's special species.

#### Plants

The landscape of St Helena today would be virtually unrecognisable to the original Portuguese discoverers of 1502. Areas of native vegetation, once extensive across the island, are now rare, and are interspersed with plantation forestry, pasture, and stands of invasive plant species such as Whiteweed Austroeupatorium inulifolium, African Fountain Grass Pennisetum setaceum and Pheasant-tail Fern Nephrolepis cordifolia, among others. Wild Mango Schinus terebinthifolius is common, and has taken over many valleys. Often, exotic plants were introduced to provide food or useful materials, or simply for their visual appeal, but many are now growing out of control. Some are highly effective at dispersing and can outcompete slowergrowing native flora, which restricts native plant regeneration and is problematic for management; successful vegetation management requires considerable planning and time commitment, with manual vegetation control, replanting and moni-

#### A view towards Lot's Wife. Amy-Jayne Dutton





The invasive New Zealand Flax, covering sides of the Peaks. Amy-Jayne Dutton

toring needed in order to minimise reinvasion by exotic species.

The interior of St Helena was originally covered in extensive forests of endemic gumwoods and other native trees and ferns, but these unique plants are not adapted to cope with grazing pressures, and goats, introduced by sailors, quickly devastated the vegetation. Early settlers also harvested plants indiscriminately, cutting trees for fuel and stripping bark for tanning, which, when coupled with grazing, took a heavy toll on the woods (Ashmole & Ashmole 2000). While there were attempts by some early governors to slow the destruction of the native vegetation, these often came as too little, too late. In many areas now devoid of native vegetation, names such as Levelwood, Bottom Wood and Longwood provide the only indication of their original, forested state. There are historical references to the Great Wood (Melliss 1875) but nothing remains of it, and the land is so badly eroded that it is difficult to imagine that any trees could ever have existed there. On the dry, rocky slopes in the south-western corner of the island, among boulders and patches of the endemic Boneseed Osteospermum sanctaehelenae and other small herbs, it is still possible to find small, broken pieces of St Helena Ebony Tree Trochetiopsis melanoxylon, a species that was likely driven to extinction as early as 1800 (Lambdon 2013). As with many parts of the island, precipitous drops and gravelly slopes mean that this is not a place for the faint-hearted.



Black Cabbage Tree in flower. Amy-Jayne Dutton



The endemic gumwood Commidendrum robustum. Amy-Jayne Dutton

On the high, moist interior of St Helena, areas of native vegetation have been widely cleared for pasture. Even on the steep Peaks, cloud-forest vegetation was removed in order to plant New Zealand Flax *Phormium tenax* for use in the rope and string industry. This industry supported the island's economy in the early 20th century but collapsed in the 1960s, leaving thick swathes of flax monoculture which cannot be recolonised by native species without substantial manual clearance and vegetation management. Despite this, the Peaks retain the largest areas of predominantly native vegetation, with species such as St Helena Tree Fern *Dicksonia arborescens*, Black Cabbage Tree Melanodendron integrifolium and Jellico Berula bracteata. It is a wonderful thing to walk the tracks through the cloud forest, surrounded by species that are found nowhere else on earth. Less than 40ha of this habitat remains, restricted primarily to the uppermost crest of the high central ridge (Lambdon 2013). Elsewhere, areas of native vegetation are extremely scarce: aside from restoration areas and a few tiny patches of Commidendrum woodland, most native plants are restricted to remote and inaccessible edges of the island, where they have been able to escape the historical clearance by humans and browsing by goats. These plants now persist in highly fragmented subpopulations and little is known about their specific habitat requirements, which creates problems when attempting to conserve them.

Owing to the challenging terrain, there are still hard-to-reach parts of the island that receive little or no conservation attention. Visits to some of these have occasionally resulted in rediscoveries of biota thought to be long extinct, giving a small measure of hope that other such species may persist in similarly inaccessible areas. In 1980, for example, two bushes of the ebony *Trochetiopsis ebenus* were discovered on a cliff, after the species had been assumed to have been extinct for more than 100 years. Cuttings of this shrubby species were carefully taken, and many plants and seedlings have now been established across the island. Individuals can now be found also in collections in the UK,

Cloud-forest vegetation. Amy-Jayne Dutton



most notably in the temperate house of the Royal Botanical Gardens at Kew and at the Eden Project in Cornwall.

Propagation of native herbs, shrubs and trees in nurseries is an important part of the conservation strategy on St Helena, and complements fieldwork aimed at clearing invasive plants. Where possible, this work involves the careful collecting of seed, and sometimes cuttings, from a number of individuals within the population in order to provide a more diverse and robust genetic stock. Surviving populations of native plants, along with their associated invertebrate species, are bolstered by cultivation and replanting, and by the careful translocation of suitable material between vegetation patches.

Propagation efforts have been successful, too, for other plant species with dwindling adult populations. A number of restoration areas are now present and these contain young specimens of rare, endemic species, including the She Cabbage Tree Lachanodes arborea, the last wild individuals of which died in 2012 (Lambdon & Ellick 2016). The St Helena National Trust's Millennium Forest, located close to the new airport, is a gumwood restoration area which is openly accessible and encourages the general public, locals and tourists alike, to get involved and learn about St Helenian species. The project is slowly transforming a dry and denuded area back into a green oasis. Many endemic invertebrates can now be found among the leaves of this young forest, demonstrating that they will recolonise if suitable habitat becomes available.

Attempts to propagate other species have proven to be a greater challenge. Populations of the False Gumwood *Commidendrum spurium* and Bastard Gumwood *C. rotundifolium* have been reduced to just a handful of wild plants (two individuals in the case of the False Gumwood), but selfincompatibility limits the success of rearing seed of these species (Eastwood 2002) and sustained efforts have been needed to maintain a cultivated stock (Lambdon 2013).

Endemic plant species are used to represent the Overseas Territories in ceremonies elsewhere in the world, such as the National Service of Remembrance. For this, Kew produces a wreath, made up of plants from St Helena and other Overseas Territories, for the Foreign Secretary to place on the Cenotaph. While the composition of



St Helena Tree Ferns. Amy-Jayne Dutton



Young gumwood trees in the Millennium Forest. Amy-Jayne Dutton

the wreath varies from year to year, it has previously included ebony and Old Father Live Forever *Pelargonium cotyledonis*. The latter is another rare St Helenian endemic, but one that can be found as an unusual pot plant in other countries after it was introduced into the horticulture market in the years before modern controls on exports.

#### The return of the Wirebird

Birds are found across the island, flitting through areas of vegetation, hopping across the open plains and nesting on rocky cliffs. On coastal walks, it can be a little unnerving how close the White Tern *Gygis alba* will fly overhead. These pretty seabirds, known by islanders as Fairy Terns, lay their eggs in trees and on window ledges, where chicks have no nest for their protection and so must cling on with strong feet. Perhaps unsurprisingly, St Helena has a low diversity of landbird species and, unlike the seabirds, the vast majority of these have been brought to the island by humans. Common Mynas *Acridotheres tristis* are abundant; in town, their noisy calls at dawn and dusk can be enough to drive residents to distraction. Mynas are relatively recent arrivals, having been introduced in the 1800s to control cattle ticks, but the species is now well established to the point of being a pest.

The most iconic, and the only endemic, landbird is the St Helena Plover Charadrius sanctaehelenae, known locally as the Wirebird owing to its long, stalk-like legs. In the distant past it would have inhabited the sandy beaches surrounding the island, but, as these were covered by rising sea levels, the species was able to move inland to make the open plains instead its home (Ashmole & Ashmole 2000). One of the easiest places to spot this species is the golf course at Longwood, where, even from a distance, its distinctive bobbing walk quickly identifies it. When defending its nest, the species performs a characteristic 'broken-wing' display aimed at luring danger away. Vegetation encroachment reduces the availability of the plover's favoured habitat, and, as a ground-nesting bird, it is vulnerable to predation by introduced species.

**St Helena Plover, known also as the Wirebird.** Amy-Jayne Dutton



The Wirebird was in serious decline, being listed as Endangered and then Critically Endangered on the IUCN Red List. Intensive conservation efforts have been undertaken for this species and, more than a decade after these were initiated, its prognosis has improved; in 2016, the population reached 500 adult birds, leading the IUCN to downgrade its status to Vulnerable (Birdlife International 2016). Conservation work for the species includes the managing of vegetation to create and maintain areas of open ground for breeding, a programme of feral-cat and rodent control, and educating and informing owners of pet cats, which can pose just as great a problem as their feral counterparts.

#### Invertebrates

While St Helena's special plants and birdlife deservedly receive plenty of attention, the island's less conspicuous inhabitants are by no means forgotten. There is a growing global awareness of the importance of invertebrates, and efforts are being made to describe, understand and value the huge range of species that is found on St Helena. As native plants have become rarer, the invertebrate species that are dependent on them have also suffered. It is likely that many species were lost before they were even discovered, as the massive reduction in vegetation cover of certain plants, such as the gumwoods, could easily have proven catastrophic for some of the invertebrates that were reliant on them (Ashmole & Ashmole 2000). Invertebrates associated with specific habitats, rather than specific plant species, have also been negatively affected by changes in habitat composition. Two high-profile insect species have become extinct in the last century: these are the St Helena Giant Earwig Labidura herculeana and the Giant Ground Beetle Aplothorax burchelli. Another species believed to have been lost is the St Helena Darter Sympetrum dilatatum, and the watercourses where it dwelt are now choked with non-native plants.

Nevertheless, within the extant species there are a number of distinctive and iconic invertebrates which could be used as flagships for the island, helping to conserve the habitats to which they belong and protecting any associated species in the process. One of St Helena's more charismatic endemics is the Spiky Yellow Woodlouse *Pseudolaureola atlantica*, which is listed as Critically Endangered. This species occurs at elevations above 740m on ferns and trees in the cloud forest, a habitat that supports a number of other Endangered and Critically Endangered plants and invertebrates, including the He Cabbage Tree *Pladaroxylon leucadendron*, St Helena Whitewood *Petrobium arboreum* and Ammonite Snail *Helenoconcha relicta* (Lambdon 2013; White & Pryce 2014). In 2015, the woodlouse was considered to be on the brink of extinction, with an estimated 50 individuals remaining in one single, small habitat patch (Lambdon 2015). Surveys of endemic cloud-forest trees later in 2015 and in 2016, however, found the species to be present across a larger area of the Peaks. The Spiky Yellow Woodlouse does not display the typical ground-

Spiky Yellow Woodlouse adults. Amy-Jayne Dutton



dwelling detritivore behaviour of most woodlouse species, living instead on the foliage of trees and ferns. From original descriptions, it was known to occupy the St Helena Tree Fern, *Diplazium* ferns and the St Helena Dogwood *Nesohedyotis arborea* (Vandel 1977), but a targeted Darwin Plusfunded project, which ended in 2017, revealed the woodlouse to be present on a number of other plant species, including non-natives such as the Bilberry Tree *Solanum mauritianum*.

Adult Spiky Yellow Woodlice reach approximately 10mm in length, yet the species is remarkably cryptic considering its bright yellow coloration and spiky appearance. Expert knowledge is needed to locate them, and individuals can occur high in the canopy, where they are difficult to spot, a fact which makes the establishing of the species' distribution and population size very challenging. Survey work is further complicated by the practicalities of moving around the steep terrain and sensitive habitats on the Peaks. One crucial finding from recent research efforts, however, has made detecting the species considerably easier: it was discovered, in November 2016, that the woodlouse glows under UV light. Surveys using a simple handheld UV torch (395nm) have provided an efficient method for recording populations at known locations, and for searching areas where the species is suspected to occur. As a result, knowledge of the Spiky Yellow Woodlouse's distribution and habits has improved; the population is now known to be larger than originally thought, and is currently estimated at 980 individuals. Use of UV light is a relatively novel survey method, and there is potential for this to be used to detect other rare, cryptic species that display fluorescence, or to differentiate between similar species that have different fluorescent patterns.

Although we have increased our knowledge of the Spiky Yellow Woodlouse, certain aspects of its biology and ecology remain less well known. It is believed to be a generalist, feeding on microalgae and fungi growing on fronds and leaf surfaces, as well as on spores, pollen and general detritus found on vegetation. The species has been observed to feed also on snail excrement and, like other woodlice, its own shed exoskeleton (Sutton 1972). Breeding takes place throughout the year, reproduction apparently occurring only in larger females, those over 9mm in length, which each carry up to 12 young in a brood pouch. Upon emergence, the young are already well developed and, although they appear to remain in close proximity to the adult, and may even be attended by it initially, will disperse within a week.

Habitat restoration work, including replanting of native plants and control of invasives, has been undertaken for the benefit of the woodlouse and other cloud-forest inhabitants, but, as elsewhere, the process is slow and the work requires long term commitment in order to prevent the re-establishment of non-native plant species. Restoration is ongoing, and is being led by the St Helena Government's Environmental Management Division and the St Helena National Trust.

#### A Spiky Yellow Woodlouse under UV light. Amy-Jayne Dutton



Young Spiky Yellow Woodlice. Amy-Jayne Dutton





A view down towards Sharks Valley. Amy-Jayne Dutton

The Spiky Yellow Woodlouse provides a positive example of a charismatic invertebrate benefiting from targeted conservation actions which have been informed by dedicated research and investigation. The support for this project highlights the value of the woodlouse as a flagship species, representing the cloud forest of St Helena's Peaks, along with all of the other rare plants and invertebrates associated with that habitat. For many other threatened species, however, there is a lack of basic biological and ecological knowledge, and this gap needs to be addressed if we are to conserve the full suite of St Helenian invertebrates.

#### The future

In addition to preserving and restoring remaining populations of native species, effective biosecurity is an important part of conservation efforts on St Helena, and this must be continued in order to prevent the arrival and establishment of additional problematic species. Fieldwork is complemented by education programmes, which explain why such care is essential for the protection of the fragile remaining natural ecosystems.

The depth of St Helena's natural heritage is truly special. The island is a unique place that supports a vast number of remarkable species, and the fact that many of these are small in stature should in no way detract from their value. As demonstrated by the Spiky Yellow Woodlouse, there is great potential for invertebrate endemics to be used as flagship species, helping to promote the conservation of different habitat types and thereby benefiting entire ecosystems. Ultimately, continued public engagement is crucial in generating interest in the island, as only by maintaining support for conservation will St Helena's incredible biodiversity be protected.

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**Amy-Jayne Dutton** worked as the Spiky Yellow Woodlouse Project Manager for the St Helena National Trust between May 2016 and August 2017. The St Helena National Trust is a conservation organisation working on both natural and built heritage projects, and it is actively involved in the promotion and delivery of a number of conservation initiatives across the island. This is the first in a series of occasional *British Wildlife* articles that will celebrate the natural heritage of the UK's 14 Overseas Territories. aturally opinionated

Mark Avery www.markavery.info/blog

### **Shifting baselines**

The concept of shifting baselines was brought into nature conservation and resource management by fisheries biologists, particularly Dan Pauly, in the mid-1990s.

What we regard as normal, natural, good or acceptable is often set by what we can recall from our youth, and so attempts to repair ecosystems often aim to restore them to a once-remembered state – even if a much richer state preceded it. Our aspirations are bounded by our experience.

It's true, isn't it? I wish that the countryside were as rich in birds as when I first walked through it – because I can remember Cambridgeshire when the purring of Turtle Doves was the sound of summer, and I can remember walking through wet fields on the Somerset Levels and flushing hundreds (yes really, hundreds) of Snipe. When I return to those places those birds aren't there, and I miss them – I miss them because I can remember them and not because someone told me about them: I was there, once, with them.

There is an upside to being tied emotionally to one's baselines, too. I am fairly sure that my thrill at seeing Red Kites (which I see nearly every day) is not just a result of their being wonderful living creatures, though they are, but also because there is a bit of me that feels that Red Kites are still rare even though I know perfectly well that they aren't any more. I think that I get a bonus thrill at seeing a Red Kite, above that experienced by a much younger observer, because of my low Red Kite baseline.

Shifting baselines apply also to our expectations of other aspects of life. From bank interest rates to sexism and racism, the old will have different expectations of what is normal from those of the young. And it applies to our expectations of organisations, too. The state did nature conservation much better in the past.

I doubt that there was ever a time when the statutory conservation agencies were as hopelessly poor as they are now (my view is formed from observation of Natural England, but I think it unlikely that things are very different elsewhere in the UK – but do shout if they are).

Although the government agencies were never perfect, the headlong decline and fall of Natural England started in 2010 with the arrival of the coalition government and a slashing of budgets, and a firm instruction for the organisation to come to heel. Before then, Natural England had behaved, at least sometimes, as a champion of nature (e.g. in creation of the Marine Act) in a similar way to that of its predecessor bodies English Nature (e.g. in its role in assessing the sustainability of GM crops) and NCC (in its role in opposing, yes opposing, afforestation of upland biodiversity hotspots). Since 2010, Natural England has been bullied and assaulted by government with cuts and with harsh words, and it is now no more than a flaccid and withered arm of the limp department that is Defra.

On the ground, local NE staff may well be doing their best, and will be doing some good, but this is despite the leadership from the top and not because of it. The likes of Derek Ratcliffe, Barbara Young and Martin Doughty were lions compared with the current fold of sheep. Alexander the Great said that he feared more an army of sheep led by a lion than an army of lions led by a sheep. The foot soldiers of Natural England are a motley bunch of animals; some are sheepish, but many have a good roar left in them if only they were led.

The wildlife NGOs which I meet bemoan the decline of state nature conservation. Enquiries which once would have led to a useful chat over a beer are now treated as Freedom of Information requests and get uninformative non-answers after a month has passed. NE rarely objects to a planning proposal these days, but merely gives advice for fear of annoying government's favourite stakeholders, the developers. There are few important reports and little comment on the state of nature. There is much talk of stakeholders and little action for nature. The sleeping sheep are dozing through a biodiversity crisis, apparently undisturbed.

And this is now regarded as normal – the baseline has shifted. That will make it very difficult to resurrect NE from its current position. Many of the staff who work there now are accustomed to its lack of impact and lack of ambition – they have not known anything different. It will take a lion or two to shake them out of that position. It feels as if we are as likely to hear Natural England roar again as we are to hear the purring of Turtle Doves on a summer's day. Baselines have shifted.

## In search of the larger water beetles of Britain and Ireland

#### **Peter Sutton**

have always been fascinated by water beetles and, since childhood, have spent many happy hours in pursuit of these remarkable aquatic insects. Early on, it was to admire the many aspects of these animals that made them so appealing, and I concur with Jonty Denton's comment in his *Water Bugs and Water Beetles of Surrey*: 'The pure streamlined form of a water beetle does more for me than any Ferrari.'

It was an article by Trevor Beebee in an early issue of *British Wildlife* (*BW* 2: 295–300), with its key for the identification of Britain's largest water beetles, that galvanised me to study these spectacular insects in greater detail. In the mid-1990s, I found myself in the fortuitous position of working at the same university as two fellow entomologists, David Bilton and Clive Turner, and it was these two scientists who, on fish-and-chip-fuelled visits to the Somerset Levels, introduced me to the largest and rarest of the six great diving beetle species to be found in Britain and Ireland, the King Diving Beetle *Dytiscus dimidiatus*.

These fruitful expeditions, coupled with a general lack of 'popular' literature regarding Britain's largest water beetles, culminated in the production of *The Larger Water Beetles of the British Isles*  A male Highland Diving Beetle Dytiscus lapponicus, Isle of Arran. Peter Sutton

(Sutton 2008), a small monograph which provided illustrations, life-histories, up-to-date distribution maps and other information about each species. This publication, undoubtedly helped by Richard Lewington's superb illustration of the Great Diving Beetle *Dytiscus marginalis* on the front cover, fared well and, for a time, I was happy that my work had been completed.

Two things were to change that. The first was a review of the book, which posed a valid question: if the larger water beetles included the *Acilius* species of lesser diving beetle, why did they not also include *Colymbetes fuscus* or the similarly sized *Graphoderus* species? Secondly, there was still no publication available that provided photographs of all the species described in the book. Accepting the photography challenge would allow me to undertake a journey in accordance with another line from Denton's Surrey atlas: 'The pursuit of our fauna will entail a tour of much of our great wild country from the Broads and coastal marshes to the tarns and lakes of the Highlands' (Denton 2007).

#### The start of a new quest

So began a mission to find and photograph these beetles in their natural habitats, from the

heathlands and coastal grazing marshes of southern England to the mountain lochans of Scotland and the peat moorlands of Ireland. It turned out to be an incredible journey, providing the opportunity to communicate and occasionally conduct fieldwork with some outstanding entomologists while, at the same time, allowing me to introduce the natural world to my three sons, who, from a very early age, participated in my searches with great enthusiasm.

The quest was aided by another stroke of luck when my father moved to the edge of the Somerset Levels, and I was once again able to visit the areas where, with David Bilton and Clive Turner, I had observed the King Diving Beetle, the Great Silver Water Beetle *Hydrophilus piceus*, the Lesser Silver Water Beetle *Hydrochara caraboides* and, another nationally scarce species, the beautifully marked *Hydaticus transversalis*. All of these were included in the remit of the study, which aimed to photograph species from the following genera: *Dytiscus* (six species), *Acilius* (two species), *Colymbetes* (one species), *Hydrophilus* (one species), *Hydrochara* 

Searching for the rare King Diving Beetle Dytiscus dimidiatus on the Somerset Levels. Peter Sutton







Great Silver Water Beetle Hydrophilus piceus from the marshes of Canvey Island, Essex. Peter Sutton

(one species), *Graphoderus* (three species, although one is considered to be extinct) and *Hydaticus* (two species).

The project was now in full swing and a number of key targets and locations were added to my list, including a species that ended up leading me the proverbial merry dance, the Scarce Lesser Diving Beetle Acilius canaliculatus. This former Red Data Book species (Shirt 1987) is known from mire habitats, including cutover bogs and shaded fens, and also from leaf-filled ephemeral pools in woodland (Denton 2007). It has been described as staging a remarkable recovery and is apparently now frequent in parts of the Weald (Foster et al. 2016), but for years I have searched here fruitlessly, even calling on the expertise of old friends to help in searching the places where it had last been found, or new sites which matched the described habitat, all without success.

Eventually, in order to find and photograph this distinctive beetle I had to make the journey north to the Humberhead Peatlands, in South Yorkshire, the largest area of lowland raised peat bog in the UK and a known stronghold of the species. This rich habitat provided a wealth of interest, among which were the largest congregations of Black Darter dragonflies *Sympetrum danae* and Common Emerald damselflies *Lestes sponsa* that I have ever encountered.

#### **High-quality wetlands**

It is worth recalling the words of Martin Hammond in his recent atlas, *The Water Beetles of Yorkshire* 



(2017): 'Any serious attempt to evaluate the biodiversity of an aquatic or wetland habitat requires some understanding of its invertebrate community.' Hammond goes on to explain that, for a variety of notable reasons, water beetles form a key part of any assessment of the ecological quality of wetlands. A good water-beetle fauna, therefore, indicates good habitat quality, and it has been a constant of my visits to the places that harbour our largest water beetles that they also contain an extraordinary array of other species, including many that are scarce and threatened.

Canvey Island, in south Essex, provides a classic example. I originally visited the flat coastal grazing marshes of this island to search its ponds and ditches for another of the six *Dytiscus* species, the Wasp Diving Beetle *D. circumflexus*. This large predator, with its characteristic yellow-and-black-banded underside, frequents these habitats, which are, to a lesser or greater extent, brackish; and it is the level of salinity that dictates, to some degree, which other species may be present. The marshes of Essex and Kent are characterised by this fauna, which includes water beetles such as *Agabus conspersus*, *Hygrotus parallelogrammus* and *Limnoxenus niger*, as well as the Scarce Emerald damselfly *Lestes dryas* and the Flecked General soldierfly *Stratiomys singularior*.

Until the recent range expansion of 'The Wasp', this species was generally thought to be associated with brackish water, to the extent that Frank Balfour-Browne – considered by many to be the father of water-beetle study – concluded that a *Dytiscus* larva found on the Canvey marshes was



Searching for the Scarce Lesser Diving Beetle: Denys Ovenden at a shaded woodland pond in Buckinghamshire (left); John Paul and Peter Hodge at a known Sussex site for this species (above). Peter Sutton



The Wasp Dytiscus circumflexus (adult female). Peter Sutton



Black Belly *Dytiscus semisulcatus*; the only member of the six British and Irish *Dytiscus* species with a black underside. Peter Sutton

likely to be only of this species, since no other Dytiscus appeared to be present (Balfour-Browne 1950). Last year, prior to finding the Great Diving Beetle and the Black Belly D. semisulcatus in the same ditch as The Wasp, I decided to test this theory and set up a pupation tank in accordance with the diagram and instructions in A Coleopterist's Handbook (Cooter & Barclay 2006). The larva behaved perfectly, vacating its pool of water and making a pupation chamber in the soil as expected. Upon checking progress a couple of weeks later, I found that the chamber had simply disappeared. A complete search of the soil did not confirm that it had moved elsewhere, but instead revealed the largest specimen of the soil centipede Haplophilus subterraneus that I have ever seen. After a brief, but loud, exclamation (I need not go into the detail), I was left kicking myself for not having vetted the soil for freeloaders prior to meticulously setting up the tank.

Canvey Island's marshes have given me some very memorable days, including the most recent, in late July 2017, when a perfectly timed visit coincided with the appearance of large numbers of recently emerged Great Silver Water Beetles, The Wasp and the Black Belly, the last being the only member of the Dytiscus clan with a black underside. The Scarce Emerald damselfly was present at the tail end of its season, and another pleasant surprise was the finding of more than ten individuals of the recently arrived Southern Migrant Hawker Aeshna affinis, or Blue-eyed Hawker as it is sometimes known. Having colonised from mainland Europe, this striking dragonfly species now appears to have become established in southern England. Another surprise came in the form of the Flecked General soldierfly and its rare parasite, the chalcid wasp Chalcis sispes, which, for some reason, reminds me of a racing motorbike-rider.

#### A challenging task

It is difficult to decide which beetle has been the most problematic to pursue, although the fact that I have never found *Graphoderus cinereus* probably places it at the top of the list. I revisited, on several occasions each, the places where it had been recorded previously, including Stanwell Moor, in Surrey, Canvey Island, and Studland, in Dorset, but to no avail. Having seen that Will Watson had once again found this species at Moccas Park (Watson



Larva of The Wasp *Dytiscus circumflexus* with a Nine-spined Stickleback *Pungitius pungitius*, on Canvey Island, Essex. Peter Sutton

2016), in Herefordshire, I obtained permission from Natural England to visit the Lawn Pond. *G. cinereus* was last recorded there in the 1970s, and since then it had been searched for, without success, by several notable entomologists and was presumed lost from this fascinating glacial kettlehole site. Once again, I was unable to locate this elusive beetle, but I found some other noteworthy species, including *Rhantus exsoletus* (which raised my hopes, as it also has the yellow underside that I was looking for) and, in what turned out to be an important record for the site, *Ilybius subaeneus*, which at first glance I assumed to be the similarly coloured *I. fenestratus*.

The critically endangered Spangled Diving Beetle Graphoderus zonatus, despite its rarity, proved to be an altogether easier prospect, since Jonty Denton was able to show me this species on a conservation day at its only known site in Britain, Woolmer Forest, in north Hampshire. I arrived on a sunny morning in mid-September, and was greeted by Denton with the words 'Welcome to the world's worst advertisement for conservation grazing.' The day was dedicated to removing plant and tree growth that was supposed to be suppressed by livestock, for the benefit of the Natterjack Toad Bufo calamita and other occupants of this heathland. It was in one of the shallower Natterjack-scrapes, which was choked with aquatic plant growth, that he collected the Spangled Diving Beetle, and this rare and beautiful insect was shown to the large team of conservation volunteers as they enjoyed lunch, a delight for all present. Several other finely marked species, including the Lesser Diving Beetle Acilius sulcatus and Hydaticus seminiger, were also

#### In search of the larger water beetles of Britain and Ireland

found and, once the procession of admirers had stopped crowding around the large white plastic bucket in which they swam, the specimens were carefully returned to their pool.

The final Graphoderus species, known as the Chequered History Beetle Graphoderus bilineatus - after its chequered history rather than its appearance - has not been recorded in Britain since 1910. Because of a misidentification of the original specimens, it was not until 1976 that it was realised that this species needed to be added to the British list (Angus 1976). There remains a slim chance that it may still exist undetected in East Anglian fen habitat, but I had to go to the Natural History Museum to get a photograph. The museum's statue of Darwin, plainly a man with a liking for water beetles, reminded me that it was when he saw a mollusc hitching a lift on a Great Diving Beetle's leg that he realised how these immobile-looking creatures moved around.

An almost dry Lawn Pond, Moccas Park (top), where *Graphoderus cinereus* was recorded again after an apparent absence of over 40 years. *Ilybius subaeneus* (bottom). Peter Sutton







Robert Angus, who unpicked the *Graphoderus* story in 1976, holding Carim Nahaboo's illustration of the **Chequered History Beetle** *Graphoderus bilineatus*. Peter Sutton

It was a great privilege to see the original specimens of the long-lost G. bilineatus in the entomology department, and to photograph some of those other beetles that I had not been able to find. These included the sulcate (grooved elytra) and non-sulcate forms of female specimens of The Enigma Dytiscus circumcinctus, a species that is a close contender for the 'most troublesome water beetle' title. The Enigma is a scarce species which has now disappeared from most of southern England (Foster et al. 2016). I failed to find it on my travels in Ireland - where it appears to be widespread, with a good number of post-1980 records - and focused my attention instead on the Pevensey Levels, where both Beebee and Denton had previously encountered it with some degree of regularity. Hundreds upon hundreds of miles have been amassed on my travels to this site, and my students found it hilarious that I would routinely complete a 350-mile round trip to look for a beetle that was not there. Again, I occasionally enlisted the help of others, including Evan Jones, who had recently completed a survey of another notable resident of the Pevensey Levels, the endangered Fen Raft Spider Dolomedes plantarius.

I was on my own when I finally caught up with this species. After checking the underside of countless Great Diving Beetles, I did a double-take on a specimen that appeared to be yellower than usual, and, in disbelief, stared at the sharp-pronged
metacoxal processes that I had spent such a long time in searching for. Standing there in the fading light, a solitary figure in the middle of nowhere, covered in foul-smelling mud, I raised my arms in triumph and grinned at the heavens. The beetle, a male, was in a reed-choked ditch, and to this day remains the only specimen of this species that I have found, despite extensive netting and trapping.

#### The journey ends

The final part of my quest was to search for the Highland Diving Beetle *Dytiscus lapponicus*, which led me to the mountains of the Isle of Arran, the most southerly location in Scotland where this species may be found. I had seen the beetle on the island previously, in 2011, but was driven to return for two reasons: the first was in order to experience once again the beauty of the landscape, where the complex of mountain lochans at the top of the northern plateau captures the sky in a mosaic of duck-egg-blue mirrors; and secondly, having read about the apparent climate-driven disappearance

Top Pevensey Levels, East Sussex. Bottom The Fen Raft Spider, a Pevensey Levels speciality. Peter Sutton





of this species from other areas of Scotland and Ireland, to see if this northern specialist was still there. These southerly populations of the species appear to be vulnerable, lying at an altitude (roughly 300m above sea level) at which others have been lost. My eldest son was five years old when we ventured up to the plateau in 2011, and we doggedly searched for the entire day in kind weather - in the company of the Common Hawker Aeshna juncea and Scotch Argus Erebia aethiops - before we found several specimens of the Highland Diving Beetle. The following day was less forgiving, and, having photographed the beetles, I had to return them to the plateau, which was now shrouded in low cloud. I toiled up the slope in the wind and driving rain while trying to negotiate the bogs, which had become treacherous in comparison with the previous day's journey. It was with relief that I returned the specimens to their rightful home. Afterwards, in order to summon the energy for the return journey, I sat on a rock, hunched over in wet-weather clothes that had revealed their shortcomings, and tried to eat a packet of crisps while the lochan hissed. As I did so, I was treated to the most exquisite apparition as a 'rain goose', the Red-throated Diver Gavia stellata, materialised from the greyness in front of me.

In late August 2017, I returned to the site, again with my eldest son, and now, being familiar with the habitat preference of the species, we searched the overhanging *Sphagnum* moss edge of the lochan pools. Within a short time, we had located a number of Highland Diving Beetles, as well as several specimens of another coleopteran species vulnerable to climate change, the Arctic Diver *Agabus arcticus*, and also *Rhantus suturellus*.

This brought to an end my photographic quest, which had expanded to include a cameo for the *Rhantus* species and an overview of brackish-water fauna generally. These species were included, along with others of note such as the Fen Raft Spider and the Scarce Emerald damselfly, to celebrate the diversity of life associated with our larger water beetles, and to highlight the fact that some of these increasingly rare and special assemblages continue to be at risk from habitat loss. My journeying had made it clear that many of the habitats which I visited were of prime importance in terms of the biodiversity which they contained, and that the studying of water beetles could provide a barometer of habitat health, quickly alerting us to environmental changes, including those linked to changing climate or pollution.

The closing weeks of my quest were somewhat blighted by my reading in British Wildlife about the plight of the Gwent Levels, the possible site of an extension of the M4 that could destroy or damage 125ha of SSSI habitats (Rappel 2017). This remarkable wetland is noted for its aquatic invertebrates, including the King Diving Beetle, which cannot be found anywhere else in Wales. Many of the water beetles that I have described are found at protected sites, and one would hope that (with the exception of those species that will be adversely affected by climate change) habitat loss should not be a significant factor in their survival. Unfortunately, these designations count for little or nothing in the face of new motorways, high-speed rail links, or even - and I kid you not - landfill sites (Sutton 2002). Until the protection of our remaining biodiversity is placed on an equal footing with economic considerations, our generation will inevitably be remembered for its failure to safeguard what is left of our natural heritage.

#### Acknowledgements

There are too many people to whom I am indebted to mention here, but they will appear in the appropriate section of a forthcoming book being distilled from this photographic quest, which includes paintings by Carim Nahaboo and Denys Ovenden. I must, however, express my sincere gratitude to Professor Garth Foster, and to my great friend and mentor Nick Holford, for their unrelenting support. Now is a good time to study water beetles, and in recent years some outstanding publications regarding the identification, distribution and life-histories of the aquatic Coleoptera have become available, including Foster & Friday 2011, Foster et al. 2014 and Foster et al. 2016.

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#### The Enigma Dytiscus circumcinctus (male) showing the sharp metacoxal processes (bottom) that distinguish this species from the Great Diving Beetle D. marginalis. Peter Sutton

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## What does 'traditional' management really mean?

#### Paul Dolman, Tom Williamson, Rob Fuller and Gerry Barnes

Physical disturbances, such as turf-stripping, may replicate past, intense land use. Neal Armour-Chelu

ver the past half-century, the contributions of Oliver Rackham and others have increased our knowledge of historical landscapes, but, in spite of this, we still know relatively little about historical land-use practices or their ecological outcomes. By the time the characteristics of particular habitat types were first recorded in the mid-late 19th century, by Richard Jefferies for example, they were already changing fast as a consequence of agricultural modernisation, industrialisation and unprecedented human-population growth. Yet, even before all of these far-reaching developments, landmanagement systems had changed radically over time, and had varied from place to place, resulting in a constellation of landscape types that were considerably more unstable and variable than those produced by modern conservation methods (Fuller et al. 2017). Population fluctuated both locally and nationally, and farming varied in response to markets in meat and grain, or the requirements of local and national industries.

Throughout western Europe, semi-natural habitats are often classified according to their past

exploitation (e.g. Tansley 1939; Ratcliffe 1977; EC 1992), and, within our surviving fragments of semi-natural vegetation, conservation management generally aims to continue the 'traditional' practices (those of pre-industrial, i.e. c. 1200-1750, landmanagement systems) which originally contributed to their character. While these practices have created many of the habitats that we value today, our ancestors were not, of course, carrying them out with any aim of increasing biodiversity. The wildlife value of traditional landscapes came as a fortuitous by-product of intensive land-stripping, vegetation clearance and exploitation by humans. These physically destructive processes created a landscape characterised by habitat heterogeneity at a range of scales, which provided suitable niches for a diversity of species.

Current management may attempt to mimic aspects of 'traditional' practices, but it arguably simplifies the character of wildlife habitats and thus, as the 'State of Nature' report (Hayhow *et al.* 2016) has shown, is failing to sustain the species with which they are particularly associated. Indeed, it is likely that the conviction that

#### Historical management: a wildlife panacea?

Past management practices created most of the environments that we now consider to be of key conservation importance, producing a diversity of habitats, in close proximity, which can seldom have been matched in the 'wildscape'. But they could also be inimical to biodiversity, and some of the landscape features currently regarded as of high conservation value are likely to have been considerably less frequent in past times.

#### Intensive grazing

Intensive grazing would have removed seed-heads, flowering herbs, dead stems and potential invertebrate overwintering sites such as tussocks; it was thus detrimental to many, although not all, invertebrate habitats (Lake *et al.* 2001; Alexander *et al.* 2005; McBride *et al.* 2011).

#### Dead wood

Demand for fuel was often so high that dead wood in the form of fallen trees and branches must have been rare, judging from the frequency with which people were convicted for 'hedge-breaking' (removal of wood from hedges). In 1807, Howlett described how, in Essex, the traditional method of erecting well-constructed dead hedges, to protect regrowth after coppicing, was being abandoned, for they were 'sure to be torn up... by the destitute poor, who from deficiency of wages, are utterly unable to purchase fuel, and compelled to steal it, or perish with cold' (Young 1807). Nor was there as much dead wood and heart-rot in ancient trees as we usually assume. Most timber trees were felled before they reached 50 years of age (Bailey & Culley 1794), and even pollards, having reached middle-age, were usually taken down and replaced. 'Pollards usually, after some Lopping, grow hollow and decay... The Produce of their Head is less, and of slower Growth' (Hale 1756). Middleton, railing against the dominance of old pollards in the hedges of East Anglia, commented disparagingly that these were 'of every age, *under perhaps two hundred years*' [our italics] (Middleton 1798).

#### Disturbance

The density of people working in the countryside would have been far, far greater than it is today, rendering many areas unsuitable for those mammals and birds unable to withstand significant levels of disturbance. The very low numbers of deer that evidently existed across most of lowland England before the 20th century is clear enough testimony to that.

traditional management systems are insufficient for conservation is based on a poor understanding of what these actually involved, and of what they achieved. The management of individual land parcels, including those that we think of today as 'semi-natural', was far from static, and this raises important questions about how we can restore them to a meaningful baseline. More importantly, in failing to understand the real processes that made certain suites of species characteristic of particular places, we may be unable to sustain these species into the future. In this article, we elucidate the real character of past management systems and suggest how the principles that they embody could be used to develop innovative new conservation techniques.

### How did 'historical' land management benefit wildlife?

While we often bemoan the intensification of agriculture that has occurred over recent decades,

land-use was in fact, in many ways, more intensive in the past than it is today, but also more complex and heterogeneous. Historical management systems generally shared a number of features that were of key importance to wildlife, and these can be summarised as follows (Fuller *et al.* 2017):

Nutrient depletion and intensive ground disturbance On many land parcels, not only was much of the vegetation regularly removed, but a significant proportion of the topsoil was too. Furthermore, the daily movement of livestock between pastures and fallows served repeatedly to deplete nutrients in the former. Regular physical disturbance created the early successional habitats required by ruderal plants and invertebrates associated with open ground (Key 2000; Dolman *et al.* 2012), while nutrient depletion would have slowed the subsequent rates of vegetation development, ensuring that suitable habitat was continuously available for species with limited dispersal ability.

#### Multi-scale habitat heterogeneity

Heterogeneity existed at numerous scales, from farming regions down to individual land parcels, and, while this was merely a fortunate by-product of management, the spatial juxtaposition of landscape elements and microhabitats is important to many specialist invertebrates with complex lifecycles. Examples would have included such ecotonal structures as saum and mantel at woodland margins, enriched scrub at heathland margins and terrestrial-wetland transitions (Kirby 1992, 2001; Alexander et al. 2005). Fine-scale heterogeneity is also important, such as within grassland and heath, where the juxtaposition of exposed mineral soil, short swards, ungrazed nectar resources and well-vegetated overwintering sites are vital to many invertebrates (Dolman et al. 2010). In addition, historical modes of exploitation often ensured dynamic mosaics of growth stages, as in woods managed by coppicing. In general terms, rigorous exploitation helped to maintain suitable conditions for those species that depend upon both early and later successional stages.

#### Localised stability and continuity

Although historical management often involved regular disturbance, many land parcels were characterised by long-term stability in their overall use. In wood-pastures, for example, this benefited many macro-fungi and species of dung beetle, as well as saproxylic and other species that require continuity of old-growth structures associated with veteran trees (Kirby & Drake 1993). The historical landscape thus provided both stability and continuity, and areas of rapid (and often cyclical) change.

#### Controlled grazing

Grazing was, in most circumstances, intense. Livestock underpinned the arable economy by supplying manure and traction, while most farmers attempted to maximise the production of meat, milk, wool and leather. But grazing, especially its timing, was organised in ways that remain insufficiently explored. Moreover, in certain circumstances, it was limited or curtailed entirely, which created the distinctive suites of species that we associate with meadows and coppices.

Below, we describe the historical management of different land types in relation to these four key features, and explain how this would have contributed to their wildlife value.

#### Heaths and other commons

Lowland heaths are a good example of all this complexity. Most were common land, occupying areas of leached, acid soils, and with vegetation characterised by Heather Calluna vulgaris and heaths Erica, gorse Ulex, Broom Cytisus scoparius and grasses such as Sheep's-fescue Festuca ovina. Modern conservation management typically aims to maintain open, treeless landscapes, dominated by dwarf-shrubs, to suit the Dartford Warbler Sylvia undata and other birds, but, in the past, heaths displayed much deviation from this perceived ideal. Most developed from grazed woodland, often in prehistory (Groves et al. 2012) but sometimes as late as the 18th century. Not surprisingly, the line between wood and heath was often blurred, with wood-pasture heaths forming an intermediate and ecotonally complex landscape type once common but now largely lost (Barnes et al. 2007).

Heaths and downland were, for centuries, managed in a way that ensured constant depletion of nutrients. Current conservation policy is based largely on light grazing, but heaths were usually grazed very intensively in the past, and often by Rabbits *Oryctolagus cuniculus* as well as sheep (Sheail 1971). They served a vital role in 'sheepcorn' farming systems, in which sheep were grazed on them by day, and folded (restricted to confined patches, the locations of which were periodically changed) on arable land by night, intensively dunging it (Kerridge 1993). This practice was eroded by the adoption of new crops and rotations, and subsequently by the use of artificial fertilisers.

In a similar manner, the function of heaths and other 'wastes' as major sources of fuel, something that shaped their character in critical ways, declined as canals and railways spread the use of coal throughout England (Warde & Williamson 2014). Bracken *Pteridium aquilinum*, Heather and gorse were regularly cut for thatch, fodder and animal bedding, but mainly as fuel (Webb 1998). Thomas Blenerhasset described how Horsford Heath, in Norfolk, was in the 17th century 'to Norwich and the Countrye heare as Newcastle coales are to London' (Barrett-Lennard 1921). Areas might be set aside for the extraction of these materials, intermingled with those exploited by grazing. Heather was usually harvested as turves, which included both the vegetation and a square of combustible roots, while burrowing Rabbits and the excavation of sand and gravel produced large areas of exposed substrates. In the late 16th century, Cawston Heath, in Norfolk, was described as having 'Sand and gravell... cast upp in such great heapes uppon the playne grownd by reason of the digging therof that ther will noe grasse growe upon the said grownde in a verie long tyme' (quoted in Whyte 2009). Heaths were, moreover, sometimes less permanent environments than we usually assume, for they might be ploughed up on a casual basis or on a long rotation - a practice especially characteristic of the East Anglian Breckland but common in other districts too. A court held in 1637 heard how the demesne farmer of the manor of Blythburgh and Walberswick, in east Suffolk, 'used to plow such parte of the said walke or heath as they would; & when any part thereof was sowen with corne, the inhabitants of Walberswick did not put their cattle upon such places soe sowen untill the corne was reaped... And that it appearses by the rigges and furrowes on most parte of the heath, that the same have usually byn ploughed' (Ipswich Record Office HA 30: 50/22/3.1).

So, our simplified understanding of heaths, based on observations made at a late stage in their history, is misleading. Heaths displayed much variation over both space and time, and recurrent disturbance, rather than long-term stability, was a characteristic feature. It is not, therefore, surprising that a biodiversity audit of Breckland revealed that, of the 72 Breckland specialities, at least 35 require open habitats characterised both by grazing and by significant levels of disturbance (Dolman et al. 2012). Current agri-environment schemes and reversion programmes, which encourage the maintenance of a landscape of permanent and lightly grazed heathland, thus fail to deliver the crucial microhabitats and ecological processes on which biodiversity really depends.

Similar observations apply to other forms of common land. For example, fens and mires, formed in valley peats, were also exploited in complex ways involving a mixture of grazing and the systematic extraction of rough hay, reeds, Saw Sedge *Cladium mariscus* and peat. Patterns of exploitation similarly changed over time and varied from location to location, depending on demographic and market conditions, peat extraction, for example, declining with the spread of coal use.

Traditional land management was likely to have been favourable for a number of Breckland specialities, including Spanish Catchfly *Silene otites* (a), Bur Medick *Medicago minima* (b) and Spring Speedwell *Veronica verna* (c). Tim Pankhurst







Conservation management of fens has generally emphasised cutting and vegetation harvest, but, in places, particular benefits have been brought by active interventions which mimic the regular disturbances effected by past management, such as the re-creation of turf ponds.

#### Woodlands

Not all semi-natural environments were originally common land, subject to frequent or continuous grazing, but all were intensively exploited in complex and varied ways. Private, enclosed woods were managed by regular coppicing, something that maintained both structural and species diversity within limited areas, not least because individual woods were usually divided into separate 'fells', cut in turn. Particular herb species, such as Wood Anemone Anemone nemorosa, flourished through the creation of cycles of light and shade, but the prominence of such ancient-woodland indicators also reflects the fact that coppices were among the few areas in the pre-industrial countryside that were not subject to any significant degree of grazing, stock being admitted only late in the rotation, if at all (Barnes & Williamson 2015). These plants have poor resistance to grazing and were thus probably uncommon in the grazed woodlands from which most coppices were originally enclosed in the early Middle Ages.

As in other contexts, assemblages that we value today were largely the consequence of management systems, rather than being in any meaningful sense 'natural'. The dominance of oak Quercus as a timber tree resulted from deliberate selection or planting, and the understorey was also modified by 'weeding' unwanted shrubs and by deliberate planting. Ash Fraxinus excelsior, in particular, was regularly planted or plashed in vacant spaces (Lowe 1794; Stevenson 1809) and sallow Salix and Hazel Corylus avellana also appear to have been widely established in the understorey. A lease from 1612 for South Haw Wood in Wood Dalling, Norfolk, bound the lessee to plant sallows in cleared spaces following felling (Norfolk Record Office BUL 2/3, 604X7); the tithe files of 1836 describe how there were 35 acres of coppice wood in Buckenham in the same county, 'part of which has been newly planted with hazel' (The National Archives IR 29/5816; Barnes & Williamson 2015). There were both spatial variations and temporal changes in management, tied to wider economic systems. In parts of northern and western England, for example, the demand for pit timber ensured the adoption, by the 18th century, of particularly long coppice rotations of 20 years or more (Bailey & Culley 1794).

#### Hay meadows and arable land

As with woodlands, hay meadows were usually private, and were grazed only after the farmer had removed the hay. This shaped their biological character, allowing tall, bulky species to flower and set seed, although mowing regimes varied greatly over space and time (Peterken 2013). Arable land similarly needed to be protected from stock for much of the time, although it was invariably grazed after the harvest and during the fallow period. Much was farmed as open fields, containing many people's strips, subject to varying degrees of communal regulation and to seasonal common grazing. Open fields were hugely diverse in form (Hall 2014), but in the most developed systems, found in the Midlands, they occupied almost the entire area of each parish. It is sometimes assumed that such landscapes provided few habitats for anything other than arable weeds, but this again is to underrate the complexity of early landscapes. Narrow, unploughed 'balks' often separated the individual cultivated strips, while other areas of unploughed ground, managed as pasture or meadow, were often present, running in ribbons through the furlongs (Williamson et al. 2013). Combined with the adjacent strips of arable land, these provided a fine-grained mix of perennial and ruderal elements. The balks were subject to episodic grazing during the fallow season and after harvest, providing refuges for stress-tolerant grassland perennials that would be unable to survive either in ungrazed closed swards or under conditions of constant grazing. Babington, in 1860, memorably bemoaned how, as a consequence of enclosure in west Cambridgeshire, 'the "balks", with the various plants which grew upon them' had been 'destroyed by the plough. Thus the native plants have suffered... Where they were once abundant they are now rarely to be found.' This complex landscape of episodically grazed and scuffed grassland, arable land and ruderal fallows is entirely missing from the modern repertoire of semi-natural habitats.

Much farmland in England, especially in the south-east and the west of the country, always lay



Stripping a plot at Weeting in order to provide suitable habitat for species favouring bare, disturbed ground (a); a plot immediately after stripping (b) and the same plot after three-and-a-half years (c). Bev Nicholls

in hedged fields. Elsewhere, hedges proliferated steadily through the 16th, 17th and 18th centuries, as open fields were progressively enclosed. Like everything else, hedges were managed with remarkable intensity in order to ensure that they remained stock-proof and to provide an abundance of firewood in this fuel-hungry world. Some were plashed or laid every ten to 15 years, and others were coppiced; either way, they were subjected to regular and repeated cycles of change, and they provided a high degree of ecological heterogeneity, enhanced by the fact that different hedges on a property would be at different stages in the cycle of management.

#### Lessons for the future

Given the present, highly fragmented state of habitats, the act of simply mimicking 'traditional management' may not be enough to sustain particular species. Furthermore, there are important conceptual problems, as we have noted, involved in such an approach. Apart from the fact that much about past practices remains unknown, the manner in which these clearly changed over time makes re-establishment to a particular 'baseline' essentially arbitrary. Indeed, the semi-natural habitats themselves have an arbitrary character: they are accidents of history, shaped by now redundant economic systems as much as by natural processes (Dolman *et al.* 2012; Williamson 2013). They represent only some of the environments that once existed, and just a small subset of all those which might have been created, and sustained, had different forms of management developed, under different economic, technological or social conditions.

The adoption of a range of complementary strategies in order to maximise opportunities for wildlife in a rapidly changing world would seem to be the most appropriate way forward. One of these would be rewilding, particularly where extensive areas of land can be deployed for conservation, although it is not yet known whether this approach would provide the full suite of conditions needed by priority biodiversity without further intervention. A second would be a continuation of the established policy, of managing key habitats along 'traditional' lines, although with greater attention paid to the true character of past land-use systems. This brief review, however, also suggests a third route. Already, large-scale wetland habitats are being actively designed in order to promote certain species, or



guilds of species, such as the RSPB's new reserves on former agricultural land at Lakenheath, in Suffolk, or at Wallasea Island, in Essex, where water levels, grazing regimes and vegetation-harvesting are directed towards specific conservation objectives (Ausden *et al.* 2014).

But we could go further, especially with terrestrial habitats. The absence of historical stability, and therefore of a baseline model for particular habitats, blurs the distinction between the replication of 'tradition' and the adoption of new practices. New systems of intervention could be devised which would create a range of habitats and landscapes that have never existed before, but which might be of considerable benefit to certain endangered species or groups of species. Conservation could apply, in novel ways, the key principles that shaped wildlife diversity in managed landscapes in the past. For example, anthropogenic sites with low nutrient status could be created by the addition of mineral or industrial spoil, or by managing mineral-spoil heaps or other brownfield land; and experiments could be made with the adoption of more diverse physical-disturbance practices, especially on heathland but also on former low-grade farmland acquired by conservation bodies. Which of these three broad approaches should be adopted in which contexts will depend on many factors, including

#### What does 'traditional' management really mean?

the availability of land, the resources available for conservation, the requirements of existing wildlife at different sites, and the vision of those championing conservation in the future. It is, however, possible that, by studying the past, we can learn not only how to improve 'traditional' management but also how to devise quite new modes of intervention.

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For details of references, see https://britishwildlife. com/site/suppl-dec-17-trad-man.

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Below A regenerating stripped plot: patches of open ground provide niches for a number of plant and invertebrate species. Bev Nicholls



### Flying kites a view from Wales

**James Robertson** 

As I live down a farm track, unexpected visitors are Auncommon. I was away when Joanna answered an insistent knock at the door. Our farm, as usual, had drawn the short straw for a rigorous inspection to see that we were fulfilling every last dot and comma of our Glastir agri-environment scheme agreement.

After spending several hours in examining the paperwork and walking around the farm measuring the sward height with a ruler, our inspector decided that he would come back to check that we had erected the twenty bat and bird boxes required to get us into the scheme.

I was home the next day, so I had the pleasure of showing him the bits of infrastructure so necessary to the wellbeing of birds and bats. On the way, I pointed to a piece of heathy woodland under a Glastir agreement which had recently been bulldozed ahead of ploughing and reseeding. 'Surely this can't be allowed under Glastir?' I queried. 'None of my business' he answered, and literally turned his back.

Were not agri-environment schemes intended to help farmers to help the environment? Glastir is a poor scheme by all accounts. But it can bring benefits for nature so long as its implementers on the ground are trained and encouraged to see that it does. This captures a wider truth. We have some impressive environmental

law in Wales, notably the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016. What matters, though, is for fine implementation to match fine legislation. Laws need to be translated so that future generations truly enjoy 'a biodiverse natural environment with healthy functioning ecosystems'. Public bodies need to examine their decisions to the benefit of nature if their 'biodiversity duty' is to have any real value.

The evidence of high-profile schemes tells another story. How can a 15-mile six-lane motorway across the most sensitive slice of the Gwent Levels, cutting through four SSSIs, conform to the Welsh Government's own legislation? How is it that its independent wildlife watchdog, Natural Resources Wales, can withdraw its ecological objections to the scheme and still fulfil its statutory purposes? Then there is the decision to downgrade the primacy of conservation in the report on protected landscapes

Welsh NGOs united recently in condemning the Welsh Government's draconian cut of 15% to its environment budget. It represented, they claimed, a gap between Ministers' pledges on environmental issues and their actions. The Minister countered that much of the money was still there, having been transferred to Local Authorities. With so many other calls on Local Authority resources, such arguments look like sophistry. The message which the cuts send out is that, when times are hard, the environment is expendable.

All is not gloom and doom. It is time for me to quarter the country, looking for environmental good-news stories hiding in the long grass. Or, in the case of Bitterns, in the reeds, where they are booming, while Marsh Harriers, along with Ospreys, soar, or at least increase. Large-scale HLF and LIFE funding is earmarked for sand dunes and raised mires.

When the biggest landowner in Wales decides to restore and create new wildlife habitats on 10% of its land over the next ten years, it deserves our thanks. This is what the National Trust intends to do, and it has the practical skills, expertise and proven track record to deliver gains for nature on several thousand Welsh hectares, for example by pulling back boundaries to create a broader corridor for nature along the coast. Its other ambitions include converting half of its farmland to high-naturevalue farming. Its strength lies in its ownership of land. Outside their nature reserves, conservation bodies struggle to make a tangible difference for wildlife.

When I look closely at the ground, at each wet curlew-field, then up at the powerful bodies which claim to be safeguarding Welsh nature for future generations, the two do not connect. As the announcer on my local train service has it, we should all 'mind the gap'. It is a gap into which wildlife can so easily disappear. 'Most projects in the

environmental field are some kind of scam – there is money for meetings,

ideas, exchanges, but something real does not necessarily happen.' I found these words in *Orison for a Curlew*, spoken by a Hungarian Romanian called Dr Kiss. This graceful, bittersweet volume by Horatio Clare mourns the almost certain passing of the Slender-billed Curlew and honours its eye-witnesses and champions. Like dedicated conservationists the world over, theirs is a story of love and loss. It is ours, too. We watch and we grieve, powerless to halt nature's retreat. And yet...

Alongside our own insignificance is the wonder of being alive, surrounded by life. Half full or half empty, what remains in the glass is simply overwhelming. That we can appreciate it and exalt in it makes us the lucky ones.

# Wildlife reports

compiled by

#### **Guy Freeman**

#### Weather for September and October 2017

 $\Delta$  t the start of September, high pressure brought dry, sunny weather to many parts of the UK, but conditions were generally unsettled for the rest of the month, being either bright and showery or warm, wet and cloudy, depending on the wind direction. The first named storm of the autumn, storm Aileen, passed through on 12th-13th, bringing high winds, including a maximum recorded gust of 83mph at The Needles, on the Isle of Wight. Overall, temperatures were slightly below the long-term average, and rainfall was mostly higher than normal

October saw the arrival of two named storms: ex-hurricane Ophelia, on 16th, and Storm Brian, on 21st-22nd. Ophelia brought strong winds and heavy rain to Ireland, causing extensive damage, while the impacts of Brian were mainly restricted to south-west coasts. In general, the month was warm, wet and cloudy, and some unusually high temperatures were recorded, including a maximum of 23.5°C at Manston, Kent, on 16th, associated with Ophelia. Temperatures were 1.8°C above the long-term October average, and rainfall, although higher in parts of western Scotland, north-west England and Northern Ireland, was below average overall. **Guy Freeman** 



#### Mammals

report in The Observer of 15th AOctober suggests that the highly controversial, multi-million-pound, annual slaughter of **Badgers** Meles meles may soon become history. An expanded Badger cull is scheduled for autumn 2017, during which 33,500 animals will be killed in an effort to stop the spread of bovine tuberculosis (bTB). As reported in The Observer article, however, Dick Sibley, a leading vet, believes that a pioneering Devon farm will be able to demonstrate a way to eradicate the disease without slaughtering any Badgers. Although the trial was halted earlier this year, when two new tests to identify better the presence of bTB in cattle were deemed illegal, it now appears that government regulators have changed their minds and given permission for the trial to go ahead. The vet's work was supported by rock star turned activist Brian May. whose Save Me Trust has started a four-year programme of vaccinating

Badgers on a Devonshire farm against bTB. Farmers, as well as wildlife campaigners, are becoming more critical of the existing cattle test for bTB, which misses many cases of the disease and thus leaves undiagnosed cows to spread the disease within herds. In 2015, it appears that 16% of English bTB 'breakdowns' were detected in abattoirs after supposedly healthy cows had been slaughtered. Sibley is pioneering two new techniques for detecting the disease: the phage test and gPCR. The phage test, developed by microbiologist Cath Rees of Nottingham University, uses a bTB-invading virus to 'hunt' for the live bacterium. On the Devon farm where it is being trialled, use of this technique is detecting bTB in cows months before they test positive with the traditional 'skin test': 85 cows have tested positive when the phage test was used, despite all being declared diseasefree after skin testing. Nonetheless. farmers need to know if the infected cows are infectious. To find out, Sibley employs the second test, qPCR, which was developed by Liz Wellington, a life sciences professor at Warwick University. This test detects bTB in dung, thereby showing if a cow is 'shedding' and thus spreading the disease. If a cow is found to be shedding it is slaughtered, even if the conventional test suggests that it is healthy. Both professors have given Sibley free use

#### Wildlife reports

of their new technologies, and these have shown that supposedly healthy cows are the 'hidden reservoir' of bTB on the farm. In the article, it is pointed out that 'TB in cows - as well as humans – is traditionally a disease of bad living conditions'. At the Devon farm, efforts are made to improve hygiene standards: barns are kept airy, with fewer cows in each compared with a typical dairy farm, and walkways are cleaned three times a day. Furthermore, as dung falling into drinking troughs is likely to be an important mode of disease transmission, water is regularly changed and is held in 'tipping troughs' that are kept scrubbed clean. Having studied each cow's history, Sibley considers it likely that mothers often spread the disease to their calves at birth. This problem is being addressed by building a new maternity unit with rubber floors that will be disinfected after every delivery. Colostrum, the crucial first milk that boosts a calf's

immune system, is collected from each mother, but is pasteurised before it is fed to the calves so that it will not spread disease.

Congratulations to the Sorby Natural History Society (SNHS), which, on Sunday 26th March 2017, completed its 44th Annual Colin Marsden Memorial Hare Walk through the Peak District National Park. This involved tramping 18 miles along the traditional route established by Colin Marsden in 1973 and plotting each sighting of Mountain Hares Lepus timidus. The total for the day amounted to 162 live hares and ten dead ones. and, although this was a lower number than in previous years, it was considered to be a good result nonetheless. In spite of patchy densities, good numbers were recorded between Margery Hill and Outer Edge and to the south of Margery Hill. The really big shock, however, was that of finding only two hares east of Broomhead

Mountain Hare in the Peak District; the annual Colin Marsden Memorial Hare Walk aims to survey populations of the species within the National Park. Mark Evans Moors, Hobson Moss and along Dukes Drive. In previous years dozens of hares have been seen at these locations, but the latest observations could perhaps be linked to accounts of systematic shooting of hares in winter 2016.

In contrast to the above. the Daubenton's Bat Myotis daubentonii Annual Monitoring Survey recorded the highest count of the species for seven years at a site along the River Derwent, at Grindleford. This was the 19th consecutive survey and makes it one of the most valuable data sets in the National Bat Monitoring Programme. It proved to be a great night, still and warm, with plenty of bat activity: 222 Daubenton's Bat passes were recorded by means of the standard methodology. It appears that the site is the 30th best for the species in the UK out of 1,343 sites surveyed, and the second best in the East Midlands out of 98 surveyed. Gordon L. Woodroffe,

Mammal Society





#### Birds

Decently, the main talking point Kamong birders has been the arrival of unprecedented numbers of Hawfinches Coccothraustes coccothraustes - have you seen one? Since mid-October, a recordbreaking influx of the species has been underway and, as of early November, there are still new reports coming in daily. Many thousands of the birds have been recorded. the majority in southern Britain, especially central England. The largest count so far is of 115 over Steps Hill, Buckinghamshire, on 23rd October, but groups of



Hawfinch, Devon; the record-breaking influx of this species has been one of the highlights of the 2017 autumn. Tim White

30-50 individuals have been relatively common. Reasons for the influx are not clear, but it is likely that the species had a good breeding season in eastern and southern Europe, prompting mass dispersal, and/or there has been a failure in food crops, causing the birds to erupt. It will be interesting to see how many Hawfinches will stay here for the winter. So, have I (Dawn Balmer) seen one? Yes, I saw four in west Cornwall, in late October, while on holiday, although I have also been gripped by the one that my husband saw as it flew over our house in Thetford!

A Buff-bellied Pipit Anthus rubescens was at Tawin, Co Galway, on 12th September, and one was on Mainland, Shetland, on 4th–6th October. Birders in Shetland also enioved a mini-influx of Arctic **Redpolls** Acanthis hornemanni in early October, including both Hornemann's Arctic Redpolls A. h. hornemanni and Coues's Arctic Redpolls A. h. exilipes, and small flocks of Parrot Crossbills Loxia pytyopsittacus. Pallas's Grasshopper Warblers Locustella certhiola were at Burnham Overy, Norfolk, from 17th to 24th September, and in Shetland on Fair Isle on 22nd September and Mainland on 1st October. A Black-billed Cuckoo Coccyzus

erythropthalmus was on Mainland on 18th September. Britain's first Eastern Orphean Warbler Sylvia crassirostris was on St Agnes, Isles of Scilly, from 27th September to 17th October, although it was often elusive; the last Cornish record of an orphean warbler was in 1991. but at that time the eastern and western forms had not been split as separate species. Pechora Pipits Anthus gustavi were recorded on Foula, Shetland, on 27th September and 8th October. For many people, the bird of the autumn was the twitchable **Scops Owl** Otus scops at Ryhope, Co Durham, from 27th September to 5th October, although it was not seen at its daytime roost every day during this period. There was a good run of birds from North America during the prolonged westerlies, including a Rose-breasted **Grosbeak** Pheucticus Iudovicianus on St Agnes, Isles of Scilly, from 29th September to 1st October, and single Cliff Swallows Petrochelidon *pvrrhonota* in October on Tresco on 2nd–3rd before moving to St Mary's (both Isles of Scilly) until 6th, at Porthowarra, Cornwall, on 7th and at Spurn, East Yorkshire, on 22nd. A Cedar Waxwing Bombycilla cedrorum was on St Agnes during 3rd–9th October, the seventh record for Britain (there have been two

in Ireland), and a Scarlet Tanager Piranga olivacea was at Mizen Head. Co Cork, from 3rd to 6th October (the fifth Irish record). A **Blackpoll** Warbler Setophaga striata was at Blacksod, Co Mayo, from 7th to 15th October, and another was on North Uist, Outer Hebrides, on 23rd of that month. A first-winter White-crowned Sparrow Zonotrichia leucophrys on Foula, Shetland, from 8th to 11th October may well have been the same individual as that seen in the Faroe Islands on 7th October. On St Mary's, Isles of Scilly, at least one Wilson's Snipe Gallinago delicata was at Porth Hellick from 10th to 31st October, and one was at Lower Moors during 3rd–6th November. From the east, a female Siberian Rubythroat Calliope calliope reached Bressay, Shetland, on 8th October and, the star of the autumn, a male Siberian Blue Robin Larvivora cyane on North Ronaldsay, Orkney, was found in a shed, caught by hand, ringed and released. There have been

The male Siberian Blue Robin captured on North Ronaldsay, Orkney. Tom Gale



three previous British records of this last species, one of which was also on North Ronaldsay, on 2nd October 2001. Wales' third **Rock Thrush** *Monticola saxatilis*, a male on the slopes of Blorenge, near Abergavenny, Gwent, delighted birdwatchers from 12th October to 3rd November. A **Short-toed Treecreeper** *Certhia brachydactyla* was trapped and ringed at Samphire Hoe, Kent, on 16th October.

A juvenile drake White-winged Scoter Melanitta deglandi was on Unst and Yell, Shetland, from 16th to 23rd October, the first juvenile of either form of White-winged Scoter to be recorded in Britain. A Yellow-billed Cuckoo Coccvzus americanus on St Agnes, Isles of Scilly, on 20th October was in poor condition and was later taken into care, where it died. On the same date, a long-dead Black-andwhite Warbler Mniotilta varia was found on a ship that docked at Seaforth, Lancashire, In Co Cork, in October, Ireland's second Common Yellowthroat Geothlypis trichas was at Toe Head on 28th, and there were three **Grey-cheeked** Thrushes Catharus minimus: one at Galley Head during 19th-22nd. another nearby at Rosscarbery on 20th–23rd and one at Red Strand on 26th. A Two-barred Warbler Phylloscopus trochiloides plumbeitarsus was at St Aldhelm's Head, Dorset, on 15th–18th October (first identified on 17th), an adult Ross's Gull Rhodostethia rosea was at Fenham Flats, Northumberland, briefly on 29th October, and on the following day a juvenile Ivory Gull Pagophila eburnea flew past Papa Westray, Orkney.

Dorset had an excellent spell for rare waders, with a **Stilt Sandpiper** *Calidris himantopus* at Lodmoor and then at sites in the Poole Harbour area from 11th September to 2nd November, a **Least Sandpiper** *C. minutilla* from 11th to 19th September (present at Lodmoor with the Stilt Sandpiper!), and a long-staying **Spotted Sandpiper** *Actitis macularius* at Abbotsbury from 17th September to 4th November at least. A Least Sandpiper was present also at Seaton Marshes, Devon, for a single day on 12th September.

Waders have recently been the subjects of a couple of interesting science stories. Many of our 'commoner' waders are, of course, in decline in the UK, and, as predation of nests and young is an important contributory factor, an understanding of which predators are the most responsible for mortality of eggs and chicks is a key step in managing their impact. In wet-grassland habitats, predation during the night tends to be by mammals, such as Red Foxes Vulpes vulpes, Hedgehogs Erinaceus europaeus. Stoats Mustela erminea and Weasels M. nivalis, whereas predation in the daytime is typically by birds, such as raptors and corvids. The time at which predation occurs can therefore provide vital clues to the culprit's identity. While this can be recorded relatively easily for nests, using temperature dataloggers and nest cameras, it is extremely difficult to determine the time at which chicks are preyed on. A recently published study on predation of Lapwing Vanellus vanellus chicks used technology to address this challenge. combining data from automatic radio-tracking stations (ARTS), which constantly search for and record signals from radio tags, with findings from more conventional field techniques.

Across 15 sites, almost 180 Lapwing chicks were ringed and fitted with tiny radio tags. At each site, one or two ARTS were installed, each comprising a multidirectional antenna mounted on a 4m pole and connected to a receiver. Chicks were recorded as preved on if ARTS data indicated a sudden change in tag signal and chick remains were recovered subsequently, or if the tag signal and chick disappeared (before the lifetime of the battery) and its parents were no longer calling for it or alarm-calling. The predator could usually be identified on the basis of the exact time of predation. provided by ARTS data, and the location and characteristics of

remains. Interestingly, while there were more davtime predation events, predation at night was more intensive and predation by mammals (day and night) had a larger impact than did predation by birds. A total of 87% of chicks was preved on, most by foxes. In the UK, lethal fox control is common on wet-grassland sites that are managed for waders. The fact that foxes still account for a high proportion of chick predation suggests that these control efforts are largely ineffective. Until this point this 'difficult-to-detect' mammalian predation of wader chicks was unproven, and the results of this study highlight the importance of not making assumptions about predation based on observations of predator abundance or predation events alone. (Ibis 2017, doi: 10.1111/ibi.12523)

The drumming of a male Common Snipe Gallinago gallinago during courtship is one of the most wonderful sounds of summer. Generated by vibration of their outermost tail feathers, it plays a key role in the establishing of a territory and in mate attraction, but a recent study suggests that it is not just the sound that is important. The coloration of these feathers can, it seems, also act as an honest signal of male guality. Scientists studied the variation in rusty-brown melanin pigmentation in the birds' tails by using spectrophotometry in order to measure brightness (an indicator of total melanin content, as brighter feathers have less melanin) and redness (red chroma) of the outermost tail feathers in juvenile and adult Common Snipe. In both sexes, structural quality declined with brightness (lower melanin content), which suggests that melanisation may alter the mechanical properties of feathers and, in males, enhance the quality of courtship drumming. The team also found that as redness increased. so did measures of body condition, suggesting that this pigmentation may act as an honest signal of condition. (Ibis doi: 10.1111/ ibi.12530).

Dawn Balmer (BTO) and Juliet Vickery (RSPB)



**Reptiles and amphibians** 

Research that was published earlier this year highlights a new potential threat to Europe's wild snakes in the form of a fungal skin disease. The disease was discovered as a result of an international collaborative study, which was led by the Zoological Society of London along with other partners, including the US Geological Survey.

Snake fungal disease is caused by the fungus *Ophidiomyces ophiodiicola* and can lead to symptoms, including skin lesions, scabs and crusty scales, which, in some cases, can result in the death of the infected animal. A similar disease has contributed to wild snake deaths in North America, having first been recognised in the eastern states around a decade ago. The discovery of snake fungal disease in Europe is the first example of wild populations outside the central and eastern United States being affected.

The disease was discovered as a result of an analysis of samples collected from wild snakes in the United Kingdom and the Czech Republic between 2010 and 2016. These samples confirmed the presence of the disease in Europe for the first time, and indicate the need for further research to help us to understand fully the significance of the disease for Europe's already precarious snake populations.

The snakes affected were **Grass Snakes** *Natrix helvetica* from the UK and a single example of the closely related **Dice Snake** *N. tessellata* from the Czech Republic. The analysis found that the fungus strains from Europe are different from those identified previously in North America, which suggests that, rather than being introduced across the Atlantic, the disease could have been present ('below the radar') in European snakes for some time.

Snakes are notoriously difficult animals to monitor, even for simple reasons such as determining presence or abundance, and any attempts to monitor their health present an additional set of challenges. It is hoped that this study will represent an important milestone and one that will encourage a greater focus on understanding the threats to the health of these animals. In addition, comparing the way in which snake fungal disease affects wild snakes on different continents may help to shed more light on the factors that are causing the disease to emerge and help managers to identify mitigation strategies.

It is sad to witness the emergence of fungal pathogens affecting first amphibian and now reptile species. Chytrid fungal infections have been closely monitored in UK amphibian populations for some time, and one of the most recent studies, undertaken during 2016 and 2017, was carried out by the Cambridgeshire and Peterborough Amphibian and Reptile Group, which has been monitoring a population of Midwife Toads Alytes obstetricans. Any toads that were encountered were swabbed for the amphibian chytrid fungus Batrachochytrium dendrobatidis, but the results from the first batch of these swabs were received from the Institute of Zoology at London Zoo and were, thankfully, negative.

These important research projects demonstrate that there is still a lot to learn about the lives and the health of all of our reptile and amphibian species.

Howard Inns, Amphibian and Reptile Conservation Trust

Grass Snakes could potentially be threatened by the recently discovered snake fungal disease. Richard Revels





#### Dragonflies

he final period of the dragonfly flight season is traditionally a fairly quiet time, as the number of species still on the wing gradually declines. In recent years, however, the Willow Emerald Damselfly Chalcolestes viridis has provided important highlights, late August through September having come to be seen as the best time for finding new sites for this recent colonist that is spreading rapidly throughout south-east England. The year 2016 saw a major range expansion, no fewer than four counties recording the species for the first time, but, sadly, 2017 has turned out to be much more low-key. Although the species reappeared at most of the

sites where it was newly discovered during 2016, few new sightings were made in these, or other, areas at the edge of its range, and those that were tended to be only a few kilometres from previously established sites. In Buckinghamshire, for example, a new sighting at Knowlhill on 12th September is only 5km from Tattenhoe Park, in Milton Keynes, where Willow Emeralds first appeared in 2016 and where a good population is now present. The one apparent exception to this general trend of limited range expansion was in southern Kent. where numerous records were made during late summer and autumn along the Royal Military Canal in the Appledore–Bilsington area, some 20–30km south of previously known sites. The high numbers seen and the long stretch of canal that was occupied do, however, rather imply that there has been a population in this area for some time, but that it is only now that it has been discovered. The lack of any major range expansion during 2017 is in some contrast to the rapid expansion seen in previous years; perhaps the species has 'overstretched' itself recently, and now needs to build

those populations at the edge of its range before further expansion takes place.

Although the autumn was a fairly quiet period for resident species, a number of migrants did produce important records. Following major invasions of Red-veined Darter Sympetrum fonscolombii during the spring, it was widely expected that there would be autumn emergences of locally bred, second-generation individuals, and these duly came to pass. Presumed breeding localities reported were well scattered, with multiple sightings of tenerals and/ or immatures made at sites in Cornwall (on The Lizard). Dorset. Kent, Suffolk (at Landguard and Minsmere), Norfolk (at Kelling Water Meadows), Warwickshire (at Marsh Lane NR), East Yorkshire (at Spurn and Oakhill) and even as far north as Lancashire, where immatures were noted at Ainsdaleon-Sea between 28th August and 8th September. The species' breeding productivity, however, was clearly rather low. At Minsmere, for example, where up to 15 adults had been seen in spring, only a handful of tenerals or immatures were noted during early August, and

Vagrant Emperor on the Isles of Scilly; there have been a number of recent reports of this species. Josh Jones



none was seen thereafter. At nearby Hollesley, where an even larger influx had been noted in spring, no second-generation emergents were discovered at all. The one breeding site to buck the trend a little was Oakhill, near Goole, in East Yorkshire, where immatures were noted between 8th September and 5th October, including a peak count of 13 on both 13th and 22nd September. As expected, emerging individuals did not hang around for long and instead dispersed, presumably migrating back south; as a result, no fully mature individuals were noted at Oakhill during the autumn. In addition to records from these breeding sites, single Red-veined Darters were observed at a few other sites in England and Wales during September and October. These records likely refer to individuals dispersing from breeding sites in Britain or elsewhere in northern Europe, although some limited, fresh immigration from the south cannot be ruled out. Of particular interest are sightings from Dungeness, Kent, on 2nd September and 8th October, and from Skokholm Island, Pembrokeshire, on 12th September and 3rd October. Intriguingly, the latter site is just across the sea from the Wexford area, at the south-east tip of Ireland, where Red-veined Darters are known to have bred during 2017, tenerals having been discovered there in September.

Other migrants to appear during the autumn included the Lesser Emperor Anax parthenope, continuing its run of good showings from earlier in the year with a record at Trimingham, Norfolk, on 17th September, quite a late date for the species to be seen in the UK. Since there are very few breeding sites in East Anglia, and certainly none in Suffolk, two males of the Black Darter Sympetrum danae reported from the Suffolk coast at Dunwich Heath, on 3rd October, may well also be Continental immigrants. Perhaps the highlight of the autumn, however, was the appearance of good numbers of Vagrant Emperor Anax ephippiger. This nomadic species, whose

strongholds are in sub-Saharan Africa, was once highly erratic in its arrivals on our shores, but it is now being seen with some regularity. In October 2017, individuals were either seen well or photographed at Falmouth, Cornwall, on 2nd, on several of the Scilly Isles between 5th and 9th and again, on the island of Bryher, on 29th, in a garden at Gorton, Manchester, on 18th, at Portland, Dorset, during 25th–27th (several individuals), at Keyhaven, Hampshire, on 28th, and near West Bexington, Dorset, on 30th. In addition, early October produced several other, less well-documented sightings that probably also referred to Vagrant Emperors. These included reports from the Lizard Peninsula, in Cornwall, and from Start Point and Dawlish Warren, in Devon.

No doubt one of the reasons for the large number of Vagrant Emperor sightings during the autumn was the prevalence of warm winds from the south from late September to early October, seen most dramatically during the arrival of ex-hurricane Ophelia, which brought Saharan dust and smoke from Iberian bushfires to large parts of England. This warm weather also had an effect on our resident species, resulting in a number of unusually late sightings. Three Banded Demoiselle Caloptervx splendens were seen at Weldon. Northamptonshire, on 15th October, while a Small Red-eyed Damselfly Erythromma viridulum reported from Buckinghamshire, on 3rd October, is the joint latest ever sighting of this species in the UK. Several early-October records of **Blue-tailed** Damselfly Ischnura elegans (for example, near Romsey, Hampshire, and at Goole, East Yorkshire) are of interest, too, as are records of an **Emperor** Anax imperator at Dawlish Warren, Devon, on 3rd October, a Keeled Skimmer Orthetrum caerulescens at Falmouth. Cornwall, on 2nd October, and Brown Hawkers Aeshna grandis at Sound Heath, Cheshire, on 26th October and Bramshill, Hampshire, on 28th October. At the time of writing (early November), species such as Southern Hawker Aeshna

cyanea, Migrant Hawker A. mixta and Common Darter Sympetrum striolatum are still being reported regularly, along with the last few individuals of Willow Emerald Damselfly, and it will be of interest to see just how long the 2017 dragonfly season lasts. Adrian Parr.

#### **British Dragonfly Society**



#### Butterflies

fter rather dismal weather and attenuated butterfly numbers during August, there were no great expectations for September. Nevertheless, many species soldiered on and some of the multi-brooded ones did rather well. Most obvious and ubiquitous, except in the far north-west was **Red Admiral** Vanessa atalanta: many day counts exceeded 20 and some were substantially higher. such as the 182 reported from a Derbyshire site on 22nd September. Small Copper Lycaena phlaeas also did well in southern and eastern England. At both the beginning and the end of September, more than 100 Small Copper were reported from a Lincolnshire site, and 76 were counted in 90 minutes at a Hertfordshire site, where the species was found egg-laying in October. Small Heath Coenonympha pamphilus fared well, too, with widespread reports and some good counts for the time of year. including 30 at a Suffolk site on 7th September. Indeed, the Small Heath continued to flv into October at many sites, and a most remarkable report of this butterfly came from East Lothian on 20th October. Some fear that the third brood of Wall Lasiommata megera is driving its



The Geranium Bronze, in Dorset, was presumably imported with ornamental plants. Colin Lamond

Red Admirals have had a good autumn, with high numbers present through October. Richard Revels



decline, but the butterfly showed no signs of altering its propensity to indulge, wherever the weather encouraged it. Thirty-nine Wall flew at a Lancashire site on 2nd September, two mated pairs were seen in Sussex on 28th September, and the species continued to fly into the third week of October along southern and south-eastern coasts.

It has been a warm year overall, and in September this, combined with improving weather from the first week of the month. produced late individuals and extra generations, including: Small Pearl-bordered Fritillary Boloria selene on 1st (Radnorshire), Pearlbordered Fritillary B. euphrosyne on 2nd (Sussex), Dingy Skipper Erynnis tages on 2nd (Shropshire), Grizzled Skipper Pyrgus malvae on 2nd (Shropshire and Surrey), Marbled White Melanargia galathea on 2nd (Sussex), Small **Skipper** *Thymelicus sylvestris* on 5th (Derbyshire), White Admiral Limenitis camilla on 5th (Essex), Scotch Argus Erebia aethiops on 9th (Highland), Duke of Burgundy Hamearis lucina on 14th (Cumbria), Gatekeeper Pyronia tithonus on 17th (Derbyshire), Silver-washed Fritillary Argynnis paphia on 19th (Dorset), Peacock Aglais io larvae on 26th (Devon) and, best of all, Northern Ireland's latest ever Purple Hairstreak Favonius guercus on 16th, in Co Tyrone, which was a first for the county.

Queen of Spain Fritillary Issoria lathonia remained as the star migrant species. A small number flew at a Sussex site from late August until 10th September. During the same period, we learnt of **Monarch** Danaus plexippus in Dorset and Sussex on 2nd September, although both were seen in areas close to butterfly-breeders, and another of unknown origin in Nottinghamshire, on 13th. There were no reports of any Monarch along west-facing shores, where they would normally appear if they travel, wind-assisted. across the Atlantic. A Geranium Bronze Cacyreus marshalli was discovered with imported plants in Dorset on 14th September, and a Long-tailed Blue Lampides

boeticus was reported in Kent on 28th. This fairly weak showing of scarce migrants contrasted with the fortunes of **Clouded Yellow** Colias croceus and Painted Lady Vanessa cardui. The Clouded Yellow, in particular, became guite numerous at its favoured eastern and southern sites. During September, it was reported from 13 English counties and from Co Down, Northern Ireland, and was more widespread and present farther north than the Painted Lady, which was reported, usually singly, from 11 counties, as far north as Lincolnshire

October's weather was beneficial for butterflies, having little rain and average temperatures that were well above the long-term norm. In response, butterflies of various species continued to fly beyond the dates that we might expect, so that it was easily possible to see 10 species in a day in southern England. A Meadow Brown Maniola jurtina in Derbyshire on 10th October was remarkable, but the latest was on 28th, in Surrey. A Purple Hairstreak in Lincolnshire, on 14th October, was an outstanding new county 'late record'. Brown Argus Aricia agestis flew in many counties, and almost to the end of the month in Essex where it was reported on 29th. Brown Hairstreak Thecla betulae, however, was reported in October only from Surrey, at two different sites on 6th, and some other species that would normally be prevalent were rarely reported, such as Greenveined White Pieris napi and Holly Blue Celastrina argiolus.

The Red Admiral continued to do very well through October. Reports of 20+ were common, but, to judge from reports of 80 in Co Durham on 6th, 112 on the Lincolnshire coast on 25th, and 500+ moving through Suffolk on 25th, the species appeared to be moving south-east and congregating near the coast. Clouded Yellow numbers remained reasonably high, and Suffolk again had large assemblies at single sites, including 20 on 15th and 19 on 25th. Sussex and Dorset also reported it as widespread and guite numerous, with 15 at a Dorset site on 28th, for example, but the

species was retreating south, the most northerly report coming from Bedfordshire. Painted Lady, while never seen in large concentrations, was reported more widely and farther north in October than it had been in September, in 14 English counties that included Cumbria and Yorkshire.

Otherwise, migrants in October were scarce. The only report of a possible migrant was that of a **Camberwell Beauty** *Nymphalis antiopa* at Felixstowe Dock, Suffolk, on 12th October, but it may have arrived with cargo.

A rather stark contrast to the generally positive autumn news of UK butterflies was provided by the results of Big Butterfly Count 2017 (see www.bigbutterflycount.org). This year's count, run by Butterfly Conservation and Waitrose, took place from 14th July to 6th August. Recorders spotted the lowest average number of individuals (just 10.9) of the 20 target species (18 butterflies and two day-flying moths) per 15-minute count since this citizen-science project began, in 2010. Counts of some widespread species, such as the three common whites (Large White Pieris brassicae, Small White P. rapae and Greenveined White), decreased by more than a third compared with those from Big Butterfly Count 2016, and Small Tortoiseshell Aglais urticae numbers remained low. After the warm spring, however, several abundant, single-brooded summer species, such as Marbled White and Ringlet Aphantopus hyperantus, were already well past their peak when the Big Butterfly Count started this year, and their apparent large declines must therefore be treated with caution.

Fortunately, a recently published analysis comparing Big Butterfly Count data with those from the long-term, standardised transect counts of the UK Butterfly Monitoring Scheme (UKBMS) shows that such phenological anomalies can be corrected retrospectively by using climate data. The key finding of this study, led by Dr Emily Dennis of Butterfly Conservation, was, however, that, despite all the potential pitfalls in the Big Butterfly Count methodology (non-standardised sampling by often inexperienced recorders and no verification of records prior to analysis, for example), the scheme produced butterfly population trends that closely matched those from the UKBMS (see Dennis *et al.* 2017, available at: http://onlinelibrary.wiley. com/doi/10.1111/cobi.12956/full).

This rather surprising result must be due, at least in part, to the large amount of data gathered each year by Big Butterfly Count. The 2017 event was no exception and proved to be the most successful yet, with more than 60,400 participants undertaking 62,547 counts during July and August. There were also some positives to take with regard to the species in Big Butterfly Count 2017. Red Admiral had its best ever result, with abundance 75% higher than in the previous summer and three times that recorded in Big Butterfly Count 2015; it was the second most abundant butterfly recorded, behind Gatekeeper. The Comma Polygonia c-album, too, fared well, increasing by 90% after a relatively poor year in 2016, as did Small Copper and Common Blue Polyommatus icarus. Big Butterfly Count will be back from 20th July to 12th August 2018.

If you have not already done so, please pass on any butterfly sightings to your county recorder as soon as possible. Recorders' contact details can be found in the 'recording and monitoring' section of the Butterfly Conservation website. Booking is now open for Butterfly Conservation's international symposium on 'The ecology and conservation of butterflies and moths' (6th–8th April 2018, at Southampton University) via the website.

As always, if you have any observations concerning butterflies, please contact Butterfly Conservation on 01929 400209, www.butterfly-conservation.org, Facebook, or Twitter (@RichardFoxBC), or e-mail nick.bowles@ntlworld.com. Nick Bowles and Richard Fox, Butterfly Conservation



#### Moths

here was so much news about immigrant moths in the previous report (BW 29: 53–55) that we did not have space to cover news of our rarer resident species. The following account provides an example of what can sometimes be discovered by surveying sites that are not well known, have no reputation for supporting rare insects, and have few, if any, records of moths. One such site is Swaddywell Pit, a nature reserve of the Langdyke Countryside Trust, near Helpston, Northamptonshire. On the night of 18th June, the British Entomological and Natural History Society (BENHS) held a field meeting here, which I attended. During the meeting we found three individuals of the Dotted Fan-foot Macrochilo cribrumalis, a new species for the

*cribrumalis*, a new species for the site, in two traps that had been set near the lake by Paul Black. This result indicates that a breeding population is likely to exist here. The Northamptonshire county list, compiled by John and Brenda Ward and published in 2015, includes only two records of the Dotted Fan-foot, although there have subsequently been two more reported on the Moths of Northamptonshire website; all records have been of single individuals.

A major aim of the BENHS meeting at Swaddywell Pit was to see if we could find the **Concolorous** *Photedes extrema* (a Red Data Book species), and in this we were successful, as two individuals were recorded on a grassy bank some distance from the lake. We were pleased to record the **Leopard** *Zeuzera pyrina*, **Ruddy Carpet** *Catarhoe rubidata*, **Lesser Cream Wave** *Scopula immutata*,

Mere Wainscot Photedes fluxa, a female Fox Moth Macrothylacia rubi, the Bordered Sallow Pyrrhia umbra, Round-winged Muslin Thumatha senex, Silky Wainscot Chilodes maritima, Small Rufous Coenobia rufa and Cream-bordered Green Pea Earias clorana, and also to update records of the Six-belted Clearwing Bembecia ichneumoniformis, three males of which came to a pheromone lure on the sunny morning after the light-trapping. We were surprised also to record two Scarlet Tigers Callimorpha dominula, both in Malcolm Hillier's traps on the upper grassland. This species had never been seen in this area previously, despite frequent light-trapping and other recording having been carried out over the past 30 years in nearby Helpston and Werrington. Since the 1990s, however, there have been several records elsewhere in Northamptonshire of individual Scarlet Tigers, which are assumed to be vagrants, the most recent on 2nd July 2010 at Wellingborough (D. Larkin)

The BENHS returned to Swaddywell Pit on 22nd July for another field meeting, which produced the first records for the site of **Webb's Wainscot** *Globia sparganii*, the **Bulrush Wainscot** *Nonagria typhae*, **Fen Wainscot** *Arenostola phragmitidis*, **Scallop Shell** *Hydria undulata* and **Bordered Beauty** *Epione repandaria*, among others, as well as another individual of the Concolorous to add to those seen there on 18th June.

We shall return to news about the rarer resident species of moths in the next issue, because, once again, there is much news to report on the many influxes of immigrant moths which took place during September and October 2017. Much of the following news is as expected at this time of year, and will therefore be heavily summarised in order to allow space for the more unusual records. A major highlight has been the numbers of **Clifden** Nonpareil Catocala fraxini, known also as the Blue Underwing, which have been recorded in 2017. There appear to have been substantial

immigrations of the species from both the south and the east, but also further evidence of colonisation of new ground, continuing a pattern which has been evident for the last decade. For example, Sue Clarke reported that she captured four Clifden Nonpareil on both of the nights of 25th and 26th September in her garden near Redlynch, on the Wiltshire/Hampshire border, just north of the New Forest. Examples such as this, of multiple individuals in one trap in one night, were unheard of ten years ago, but are becoming more frequent. At the time of writing. Sue had recorded some 15 individuals in her garden this year, and four or five in nearby woodland. Sue reported also that various other nearby trap-operators had caught several this year. We have previously included reports from Sue in this column, and these show that not only is the moth now seen annually at this site, but also its numbers are increasing. Paul Brock has in previous years reported finding several Clifden Nonpareil resting on walls at the railway station at Brockenhurst, in the New Forest, and in 2017 he has seen more again. It is now clear that the species is breeding successfully in many such places, scattered across southern England, although I am still unaware of any reports of caterpillars being found. In 2016, it was clear from the records that Berkshire had been colonised, and in 2017 there have been a number of sightings in Oxfordshire. All of these records make it increasingly difficult to distinguish the genuine immigrants, which are still evident at coastal localities, from wandering residents. On 13th September, one reached Brailes, in Warwickshire (Chris Irvin, per David Brown).

Another feature of the autumn of 2017 has been the substantial and prolonged immigration of the **Scarce Bordered Straw** *Helicoverpa armigera*. Judy Dunmore in Sheringham (Beeston Bump), on the north Norfolk coast, reports a total of 42 Scarce Bordered Straws at her garden trap between 7th August and 22nd September, with peaks of seven on 26th August and 3rd September. These are her



The Concolorous (above) and Webb's Wainscot (below). Paul Waring



first records of the species since she began trapping, in 2009. It is a pity that she missed trapping in 2006, when an unprecedented 11,700 individuals were reported to the national recorder for immigrant moths – Sean Clancy. In that year, many of us were encountering Scarce Bordered Straws everywhere we went light-trapping, including in northern Britain, but in the long term there was no evidence of successful

#### Wildlife reports

colonisation, with very few recorded in 2007 and 2008. When Sean writes his reports on immigration for the *Entomologists' Record* and *Atropos* magazines, it will be very interesting to see how the number of Scarce Bordered Straws recorded this year compares with that for 2006.

In September and October, there were fair numbers of the more widely recorded migrant species such as the Silver Y Autographa gamma, Dark Sword-grass Agrotis ipsilon, Pearly Underwing Peridroma saucia, Convolvulus Hawkmoth Agrius convolvuli, Delicate Mythimna vitellina, White-speck M. unipuncta, Vestal Rhodometra sacraria, Gem Orthonama obstipata, Hummingbird Hawkmoth Macroglossum stellatarum, Rustydot Pearl Udea ferrugalis, Rush Veneer Nomophila noctuella, and Palpita vitrealis, especially on the south and east coasts of England. On the night of 19th October, 23 Vestals were reported on Portland, Dorset (per Atropos), and 54 on The Lizard, Cornwall (David Brown).

The less frequent and more unusual species included the **Golden** Twin-spot Chrysodeixis chalcites, Portland Ribbon Wave Idaea degeneraria. Bloxworth Snout Hypena obsitalis, Dark Crimson **Underwing** Catocala sponsa, **Rosy** Underwing C. electa, Death'shead Hawkmoth Acherontia atropos, Silver-striped Hawkmoth Hippotion celerio, Cosmopolitan Leucania loreyi, **Passenger** Dysgonia algira, Radford's Flame Shoulder Ochropleura leucogaster (at least a dozen), Small Mottled Willow Spodoptera exigua, Dewick's Plusia Macdunnoughia confusa, Four-spotted Footman Lithosia quadra (in Warwickshire on 25th September per Stan Taylor, as well as elsewhere outside the known breeding areas), Plumed Fan-foot Pechipogo plumigeralis, Splendid Brocade Lacanobia splendens, Clancy's Rustic Caradrina kadenii, Blair's Mocha Cyclophora puppillaria, Crimson-speckled Utetheisa pulchella (including one in Northern Ireland on 25th October. per Atropos), Ni Moth Trichoplusia ni, Slender Burnished Brass

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Thysanoplusia orichalcea, Flame Brocade Trigonophora flammea, Purple Marbled Eublemma ostrina, Small Marbled E. parva, Sombre Brocade Dichonioxa tenebrosa, and Red-headed Chestnut Conistra erythrocephala.

A **Scar Bank Gem** *Ctenoplusia limbirena* was reported on the night of 14th October at Coverack, The Lizard, Cornwall (John Foster), and a second on 18th October on St Marys, Isles of Scilly (per Atropos). The second British record of

**Chevron Snout** *Hypena lividalis* was trapped at Buckland, Surrey, on the night of 18th October (per Atropos) and a **Latreille's Latin** *Callopistria latreillei* was reported at the end of October on The Lizard, Cornwall (Bob Arnfield).

Full details of almost all of the above immigrants can be found on the Flight Arrivals section of the Atropos website (www.atropos.info/ flightarrivals).

As always, I thank all the abovenamed individuals, organisations and websites, and others involved in the above-mentioned projects, and all other correspondents. **Dr Paul Waring** 



#### Beetles

New beetles continue to be added to the British list at an unabated rate and five additional species are noted here, although how many of these are established as breeding species remains, as usual, uncertain.

The weevil subfamily Cryptorhynchinae is a large one in the Western Palearctic, but a small one in Britain, with only four, rather distinctive species on our list up to now. Mark Telfer (Telfer & Stüber 2017), however, has recently discovered a further species, *Onyxacalles gibraltarensis*, at a site



Stenoria analis is likely to arrive in the UK soon, if it is not here already. Steven Falk

in East Kent. Several specimens have subsequently been found there, and the beetle is probably associated with decaying wood. In view of the fact that the species' natural distribution appears to be restricted to small areas of northern Morocco and southern Spain, it is obvious that this weevil should be considered to be an introduced non-native species, established in the wild.

Another new British species of weevil is *Anthonomus spilotus*, added by Morris *et al.* (2017). There were already 13 species of *Anthonomus* on the British list, many of which are rather similar in appearance. Unlike most recent additions, this species was found initially in large numbers, as a pest species in pear orchards near Maidstone, Kent. The larvae develop in vegetative buds, while the adults feed on young twigs and buds. Two other species in the genus, *A. pyri* and *A. pomorum*, also attack pears, as well as apples, and in view of the long history of study of fruit-tree pests in Kent it is considered likely that *A. spilotus* is a relatively recent introduction, perhaps from gardencentre material, rather than a previously overlooked British species.

The third new species, which is of some general interest, is a longhorn beetle, *Pogonocherus caroli*, the fourth species from this genus in our fauna. Specimens were collected as long ago as 2006, but the information has only recently been published (Rejzek & Barclay 2017). As these beetles were found in some of the oldest and largest native pine forests in Scotland, it would appear that it is a long-overlooked native species. It seems to be scarce over most of its rather limited European range, and the larvae develop in decaying branches of pine, from where the Scottish specimens were reared.

Two other new species are mentioned briefly here, but not in detail as they both belong to the subfamily Aleocharinae of the Staphylinidae, a large subfamily of mainly very small beetles which are very much the preserve of the specialist coleopterist and of little interest to the more general reader. *Tomoglossa brakmani* and *Dilacra lindbergiella* are both reported in volume 26 (2) of *The Coleopterist* (2017).

In the previous report I discussed oil beetles of the genus Meloe, and further records of these have continued to be submitted via Facebook. All British members of the Meloidae share the family's unique life cycle: the females lay large numbers of eggs, which hatch into small larvae, known as triungulins, and these then attach themselves to bees; the triungulins are then transported to the bees' nests, where they change into a different form which feeds on the bees' eggs, pollen and nectar. The very rare **Orange-shouldered** Blister Beetle Sitaris muralis is the only other member of the family that is native to Britain. This species is associated with colonies of the Hairy-footed Flower-bee Anthophora plumipes in old walls and other vertical faces, and in Britain is usually found in urban areas. It has apparently always been rare in Britain, and is now confined to a very few sites in southern England, although the exact number of these seems uncertain and, as its favoured habitat receives little attention from naturalists, it may well be overlooked. It now seems likely, however, that an additional species of Meloidae will colonise this country, if, indeed, it is not already present. This species, Stenoria

analis, is associated with the Ivy Bee Colletes hederae, which is itself well known for its recent arrival here and subsequent rapid, well-monitored spread. In view of the present abundance of the bee, it would seem highly likely that the beetle has arrived here also, but, although it has been found on Jersey, there are not yet any confirmed mainland records. One method for recording S. analis is to look for triungulin larvae on the thorax of the bee, and, as many photographs of the latter are being submitted to websites such as Facebook for confirmation of identification, this would seem to be a possible source of records of the beetle. The life cycle of this species is even more remarkable than that of the other Meloidae. Male bees are strongly attracted to clusters of triungulin larvae and actually attempt to mate with them, which suggests that the larvae have some form of chemical attraction which mimics the pheromones of female bees. As a result, large numbers of triungulins attach themselves to the male bees and are subsequently transferred to the females and hence to the nests of the bees, where they complete their development. All in all, this species would make a very interesting addition to our beetle fauna, although it is perhaps more likely to be found by hymenopterists than by coleopterists. There are numerous images of the beetle, and of bees with triungulin larvae, on the internet.

Another group of beetles that are often found by non-specialists is the burying beetles Silphidae, many of which turn up frequently in the light traps of lepidopterists. We have an active recording scheme for these beetles and I have now produced a much more detailed pair of identification guides, which can be found at www.coleoptera.org. uk/silphidae/home. I hope that this will encourage more moth-recorders to take note of these beetles and submit their records via iRecord.

The publication of status reviews of beetles continues, two more having appeared in August 2017. The first, by Keith Alexander, covers the Bostrichoidea and

Derodontoidea, the latter of which has only one British species. This publication includes the so-called woodworms and related species. among others. The second review, by Steve Lane, concerns the Histeroidea, sometimes known as clown beetles. Both groups include many relatively obscure, black or brown species, which may be difficult to identify. Indeed, while preparing the review, Steve became aware that many specimens of the genus Gnathoncus had been misidentified and, as a result, he and others have published a very detailed account of the four British species (Lane et al. 2017), correcting errors, made by both British and mainland European authors, that have led to previous keys being unreliable.

These status reviews, and numerous others, can be downloaded in pdf format from http://publications.naturalengland. org.uk/category/30001, and once again I would emphasise that they should be consulted when considering the true status of our beetles, rather than relying on reviews from the early 1990s which were based on much more limited information and are now often very out of date.

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#### **Richard Wright**



#### Flies

In my last report, on the subject of garden hoverflies, I noted that the numbers of **Marmalade Hoverfly** *Episyrphus balteatus* were increasing several weeks earlier than ever experienced in 30 years of monitoring at Peterborough. There was, however, no second peak at the 'normal' time, and although substantial inward migration was noted, on the Dorset coast for example, it was among the poorest years for this species. My soundings of other dipterists suggest that it was in general a poor year for hoverflies, apart from early in the season when the weather was particularly favourable. At least in the east of the country, the occurrence of hoverflies faded very rapidly after late July.

The Bulletin of the Dipterists Forum No. 84, incorporating reports from recording schemes and study groups, includes plenty of interesting information. Notably, following the publication of WILDGuides' Britain's Hoverflies, a UK Hoverflies Facebook group, managed by a team of eight people, has gained 3,150 followers within two months.

The Bulletin includes plenty on the subject of conservation, including 12 'Adopt a Species' reports, three of which refer to species that occur only in Scotland. The **Pine Hoverfly** Blera fallax falls within the remit of the

Work is being undertaken to protect the Pine Hoverfly in its Scottish strongholds. Steven Falk



project, which is employing a project officer for three years to work with this species and five others, including the Northern Silver-stiletto Fly Spiriverpa lunulata. There had been concern that the clear-felling of pines at a Pine Hoverfly reintroduction site might threaten the population, but reassurances have been given. Fonseca's Seed Fly Botanophila fonsecai is endemic and globally threatened, the entire known world population being confined to a small stretch of coast on the east side of Sutherland. The fly is known to occur on Coul Links, where plans to construct a golf course have resulted in public meetings and petitions, arguing either for (for economic reasons and for the benefit of golfers) or against (for conservation reasons and because of SSSI and SAC designations) the proposals. At my time of writing, Scottish Natural Heritage had not made a firm opposition statement. The larvae of a closely related species of fly feeds on seeds in ragwort Senecio flowerheads, but attempts to confirm the host plant of Fonseca's Seed Fly have failed thus far. The Aspen Hoverfly Hammerschmidtia ferruginea has its stronghold in Strathspey, but, reassuringly, a survey of a small population near Loch Ness located 30 larvae. This species is especially vulnerable because its larvae live under the bark of newly decaying Aspen Populus tremula, and hence it requires a continuous supply of recently dead trees.

Rare Invertebrates in the Cairngorms

Other species covered by the reports include the **Bog Hoverfly** Eristalis cryptarum, which in England is now confined to a very few sites on Dartmoor. The precise larval habitat is unknown, but research now aims to develop an environmental DNA technique for detecting the presence of the species from samples of bog water. much as the testing of pond water can reveal the presence of newts. In Dorset, it is heartening that the **Broken-banded Wasp-hoverfly** Chrysotoxum octomaculatum may not vet be extinct, although the only recent record was of a single individual, in 2015.

The Bulletin also comments on the (now well-publicised) Krefeld Entomological Society study, which revealed a 78% decline in the mass of insects on 12 nature reserves in north-west Germany over a 24-year period. In Britain, regrettably, there is no comparable dataset based on trapping. The Rothamsted Insect Survey light-traps provide some long-term data for the larger moths at least (along with aphids and patchy attempts at identification of other insects), and the UK Butterfly Monitoring Scheme has also proven invaluable. As the pollinator crisis has been brought to prominence, however, Lepidoptera alone will not provide a full picture of the problem. Recording schemes are important, but few have adequate historical data. Abundance data cannot be translated from occurrence data, and records of some fast-declining species are actually increasing because there are more recorders visiting appropriate places. Monitoring of fly abundance could be achieved by using Malaise traps to measure biomass, but that would not separate dominance by a large number of few species (perhaps large-bodied ones) from the same biomass comprising a great richness in species. For long-term trapping, other factors would need to be carefully monitored also in order to establish the cause of any changes in biomass, and the identification of flies to species level would be immensely time-consuming.

In my youth I was pretty much isolated as an entomologist, but, in 1962, I chanced to meet another dipterist. To me there were plenty of flies and other insects, but he said that he felt sorry for my generation because we would not experience how things were in the 1920s and 1930s, when good habitats and insects were so much more plentiful. Now, I find myself saying the same thing to new generations of entomologists with regard to my earlier years. In the 1940s and into the early 1950s, I remember the vigorous campaign against the scourge of the house fly, and the yellow, sticky flypapers littered with flies -

something beyond comprehension now that we live in such a sterile environment. Nowadays, it is rare to be annoyed by flies on a country walk or on a picnic, which seems like a good thing until one realises the wider implications. For each new generation, the clock starts ticking from the year when they are born, or at least the year when they become aware of the wildlife around them. What will the young dipterists of today be saying to the new generation in 2050, let alone 2100? **Alan Stubbs** 



#### **Marine life**

utumn is the time for storms and the year 2017 has been no exception. Storm Aileen blew in on 12th–13th September, and then ex-hurricane Ophelia on 16th–17th October, closely followed by storm Brian on 21st October. Storms such as these make autumn the time for beachcombing, and this year has seen some spectacular strandings. During September, huge numbers of Portuguese Man-of-war Physalia physalis were washed up along beaches in south-west Britain, including north Cornwall and Pembrokeshire. Dr Peter Richardson from the Marine Conservation Society says that he has never seen anything like it during 15 years of the society's national jellyfish survey. The press would have you believe that we are being invaded by killer jellyfish, but, although these strange creatures pack a hefty and sometimes dangerous sting (never pick one up with bare hands), they are not invading, but are simply being blown here by persistent strong winds coming in from the mid-Atlantic. It is quite possible that, as a consequence of climate change, there will be an increase in the extreme weather conditions which bring this species to our shores.

Although often mistaken for a true jellyfish, the Portuguese Man-of-war is in fact a complex animal, belonging to an order of hydroids known as siphonophores (Siphonophorae). Most hydroid colonies grow as small, often elegant, plant-like tufts, which are fixed to rocks or algae. These can be torn from their moorings by strong waves, and so can also be found scattered along our strandlines following storms. In contrast to typical hydroids, the Portuguese Man-of-war lives a permanent floating existence, with different individuals (polyps) within the colony dedicated to feeding, defence and reproduction, all suspended underneath an elegant, translucent float (Dipper 2016).

September saw the death of thousands of farmed salmon along the west and south-west coasts of Ireland, killed by an influx of the **Mauve Stinger** *Pelagia noctiluca*. This jellyfish is regularly encountered around western and southern coasts of the UK and Ireland, but generally occurs only in small numbers as it is usually a warm-water species. Similar kills occurred in 2013 and 2008, but more data are needed before such incidents can be attributed to climate change or other anthropogenic causes.

As well as beaching jellyfish and other pelagic drifting animals, violent storms can also dislodge and dump large numbers of swimming and crawling creatures. Immediately following Storm Brian, there were numerous reports of (mostly juvenile) Curled Octopus Eledone cirrhosa on beaches and in rock pools around Anglesey and the Llŷn Peninsula, in north-west Wales (see: www.beachstuff.uk/ octopus). Octopus breeding activity peaks between July and September, and so there are likely to be many juveniles around during October. With weaker 'suction power' than adults, the juveniles are more likely to be swept from their rocky lairs by strong waves.



There has been an unprecedented arrival of Portuguese Man-of-war on our shores this autumn. Hannah Jones

Common Starfish Asterias rubens are especially prone to mass beach strandings, and it is now thought that this may be due to a particular behaviour known appropriately as 'starballing'. When exposed to strong currents, starfish have been filmed bowling and bouncing along the seabed with their arms curled up. The reason for this behaviour is not known; it may be unintentional, but it could also be a means of helping these slowmoving animals to disperse to new areas. Whatever the reason, it may inadvertently lead to the animals' destruction if they are caught up in strong, wind-driven waves (Sheehan & Cousens 2017).

Beach litter is a huge problem in the UK and across the world but some initiatives are attempting to tackle this, one such being the MCS Great British Beach Clean which takes place every September. Results for 2017 are not available at the time of writing, but the 2016 report showed a small decrease in the number of litter items recorded per 100m. Nevertheless, over the beachclean weekend, there were still nearly 270,000 items collected, from 364 beaches, by 6,000 volunteers. Some beach litter, however, carries fascinating animals. Common Goose Barnacles Lepas anatifera live a drifting existence, attached to old logs, glass bottles, fishing floats and other similar debris. They make an arresting sight, with white, shiny shell plates covering the head (capitulum), supported on a long, brown stalk attachment. Several other, rarer species of goose barnacle may also wash up attached to seaweed, bird feathers and even dead cetaceans (Trewhella & Hatcher 2015).

In early September, I again joined up with others from the Porcupine Natural History Society (www. pmnhs.co.uk) for its annual field trip. This year we were based at Newcastle University's Dove Marine Laboratory and visited shores along the Northumberland and Co Durham coasts. The highlight was a boat trip out to the Farne Islands (Inner Farne) at the invitation of the National Trust. Normally, the rocky shores of the Farnes are out of bounds to visitors in order to prevent disturbance to birds and other shore life. By carefully lifting and then replacing boulders, we found a wide variety of crabs and other crustaceans, molluscs, worms and small shore fish, including a 15-spined Stickleback Spinachia spinachia, but it was the encrusting life that was most astonishing. While the tops of the boulders sported a dense cover of seaweeds. the undersides, resting on damp sediment, were covered in rich growths of encrusting sponges, sea squirts, bryozoans, hydroids and tube worms. These rich assemblages of sessile animals are encouraged by the clear, clean water, strong tidal currents and lack of human



Undisturbed boulders may support diverse communities of encrusting organisms. Frances Dipper

disturbance. This field trip was an excellent chance also to indulge a passion for seaweed-pressing. This is not just an art but also a science, as pressed specimens can be used to make important reference collections. Scour the strandline and seashore pools in autumn for delicate, washed-up red and green seaweeds; put them into a tray of water for their beauty to unfold in front of you; and, finally, slip a piece of art paper under them, drain off the water, and dry them between sheets of newspaper under a weight (covering the seaweed with a nappy liner or with material from tights prevents the newspaper from sticking). Try Bunker et al. (2017) for seaweed identification.

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Frances Dipper, PMNHS



#### Plants – England

While some plants have the advantage of producing bright, colourful flowers that have an immediate and obvious impact, the beauty of other, seemingly more drab species is not immediately apparent and can be fully admired and appreciated only when effort is taken to examine them more closely. In the latter group we might include sedges, such excellent indicators of habitat and with a 'hidden splendour' that is fully appreciated only under a hand lens. One major find this year was **Bog Sedge** Carex limosa on Bodmin Moor, Cornwall, by lain Diack. lain found a large patch of this delicate sedge, with its nodding heads fruiting, in a small runnel surrounded by rank, lightly grazed, Molinia-dominated mire. He considers the presence of Bog Sedge to be an indication of a top-quality mire, as the species appears to be one of those that disappears at the first hint of major drainage or nutrient enrichment. The site on Bodmin Moor is the first for this species in the south-west of England and is a long way from the nearest site – Crymlyn Bog, near Swansea - and farther still from the five

sites on the Dorset heaths (two of which support very small, precarious populations, with no records in the last 15 years) and four in the New Forest. Of the other English lowland sites, the sedge survives only at Wybunbury Moss, in Cheshire, having disappeared from the Norfolk Broads in the 1970s.

One of our rarest sedges is the **Large Yellow-sedge** *Carex flava*, a species known in Britain from only two localities, Roudsea Wood and Malham Tarn, which are both

Bog Sedge, which has recently been discovered on Bodmin Moor, well away from any known populations. Pete Stroh



in the north of England and both NNRs. In June 2017, however, a new population was discovered at Little Hawes Water, 30km north of Roudsea, by Ros Tratt and colleagues while they were undertaking a survey of the site. This remarkable find was confirmed by the BSBI sedge referee, Mike Porter, but, as word spread, it soon became apparent that this population was, in fact, the result of a hitherto unheralded introduction that took place in 1999, when mature plants were translocated from Roudsea Wood by Natural England (NE). The fact that this population has persisted for 18 years is remarkable in itself, as there are vanishingly few examples of successful long-term introductions of rare species. It is all the more noteworthy as it would appear that there has not been any management targeted specifically at retaining this population. Rob Petley-Jones, who oversaw the translocation while with NE, clearly had an outstanding eye for suitable habitat and, now that this 'forgotten introduction' has been refound, it seems like an excellent opportunity to understand more about the ecology of this species. It may also serve as a reminder that information on the whereabouts of such introductions, and the methods used to introduce them, is both useful and highly desirable. It is a matter of some irritation to us that we have so little idea of what is introduced and where, and, if anything, even more frustrating is how rare it is for there to be any long-term research carried out on the fate of these introductions.

Aquatic plants are sometimes perceived as difficult, and some are, but there are three excellent BSBI Handbooks (*Pondweeds, Waterstarworts*, and *Stoneworts*) to help with identification. As these plants receive relatively little attention, one can often find species that are new to an area, sometimes considerably extending their known range. In July 2016, **Narrow-fruited Waterstarwort** *Callitriche palustris* was found new to England within the 'drawdown' zone of Haweswater Reservoir, in the Lake District (a

#### Wildlife reports

Large Yellow-sedge at Roudsea Wood; a recently discovered colony nearby is now known to have been introduced. Kev Walker

stone's throw from the 'new' Large Yellow-sedge site, coincidentally), by Jeremy Roberts and Phill Brown (*BSBI News* 135: 38–39). It takes some experience to become familiar with this group, and one of the skills accrued over time is the ability to recognise plants that look subtly different from the common species which one would expect to find. In the case of Narrow-fruited Water-starwort, the clincher was leaf characters and the discovery of jet-black, heart-shaped ripe fruits. Using a grapnel to search for plants hidden beneath the waters can also produce the most unexpected finds. For example, at Little Oakley, in Kent, recorders surveying a brackish ditch hauled out *Zannichellia obtusifolia*, new to Britain and Ireland, and in the River Thames, in both Oxfordshire and Berkshire, the very rare **Loddon**  **Pondweed** *Potamogeton nodosus* was found by Frank Hunt. The latter species was thought previously to be extinct in the Thames (although it later emerged that the Environment Agency held a few post-1999 records for the Berkshire side), so many congratulations go to Frank, both for finding the plant and for realising what he had found.

Another pleasant surprise was the rediscovery of **Bladderseed** Physospermum cornubiense in South Devon, where it has always been very rare and was last recorded in 1977. Following Ian Bennallick's detective work, Mary Breeds, John Day and Hilary Marshall searched the old site near Blaxton and found one plant on a roadside verge. This is the only recent record of the species outside Cornwall; the population at Dorney Wood, Buckinghamshire, is assumed to be a long-established introduction. For the species' Cornish populations, the last Red Data Book noted a major decline since the 1970s in numbers of sites and, perhaps more importantly, in population sizes at its remaining sites, lack of management being cited as the principal reason for this decline. There are recent (post-1999) Bladderseed records from 46 monads in the county, but most of these records are of small numbers in these monads, no fewer than 18 of which are 'new' (they have no records prior to 2000), which is probably a reflection of recent. more intensive recording at the monad level rather than at the (more usual) tetrad or hectad level. Shading from trees or shrubs due to lack of management prevents plants from flowering and presumably fruiting, so that, although often perceived to be a plant of woodland, Bladderseed is more usually associated with open woodland and areas of Bracken Pteridium aquilinum and Purple Moor-grass Molinia caerulea, and often does well after burning.

Some plants are present in an area for many years, awaiting discovery, but others may have recently established following dispersal via a variety of vectors, including birds, wind, sea currents and people. On



Surveying of the Thames in both Oxfordshire and Berkshire has revealed the rare Loddon Pondweed. Frank Hunt

16th October 2017, 30 years to the day since the 'Great Storm', the imminent arrival of ex-hurricane Ophelia caused the light to dim and the sun to turn pinkish-orange. Ophelia had picked up a veil of Saharan dust and smoke from Portuguese forest fires, obscuring the sun and coating the nation's cars in grime.

This is not the first time that high winds have brought the Sahara to our doorstep and it may be more than 'dust' that such storms bring. Several orchids noted for their minuscule seeds could, conceivably, reach our shores on the wind. Lesser Tongue-orchid Serapias parviflora in south-east Cornwall (discovered in 1989, last seen c. 2008), Greater Tongue-orchid S. lingua in South Devon (present from 1998 to 2004) and Sawfly Orchid Ophrys tenthredinifera in Dorset (2014 onwards) are all, arquably, candidates for being windborne 'natural colonists'. Equally, these species may have arrived via

a 'helping hand', and at least two of the orchids mentioned above are readily available from specialist nurseries. In 2016 a second (and sizeable) colony of Greater Tongueorchids was discovered, this time near Tiptree, in Essex. Michael Waller and Sean Cole (BSBI News 136: 11-12) think that the orchid probably got there under its own steam, but they judge that longdistance arrival on the wind, while plausible, is unlikely. The nearest presumed native populations of this orchid are in south and south-west France, but there have been recent (post-2000) discoveries in Brittany.

The 'Saharan sand hypothesis' may seem a bit far-fetched, but Frank Horsman (*BSBI News* 136: 28–29) has suggested that seeds of some North American species, such as **Irish Lady's-tresses** *Spiranthes romanzoffiana*, could have reached Europe by being swept across on the high-altitude winds of the jet stream. Occurring locally in the west and north of Ireland and in western Scotland, this orchid has been seen in England at only a single locality, on the south-western edge of Dartmoor, where it was discovered in 1957. It was last seen there in 1993, although there are hopes that, with the right management, it could yet reappear.

Wild plants making giant leaps into new territories can do so without any assistance from humans, and we do them a disservice to presume otherwise. We might, however, also stop and think before, with the best of intentions, we try to quicken the journey by planting them in the wild ourselves. We learn little from such undocumented introductions. and, at worst, it muddies the biogeographical waters considerably when we attempt to study the way in which plants disperse and establish themselves naturally. David Pearman, Pete Stroh and Simon Leach



#### Lichens

Lichenologists, like other enthusiasts for wildlife, are often inspired to set themselves little quests in order to satisfy a niggle – not earth-shattering, but satisfying. So it was with Steve Price, who is the lichen recorder for Derbyshire and for the Sorby Natural History Society. This is Steve's account:

'Here is the story and the motivation (it is not every day I would walk ten miles in search of a lichen!): the upland species *Cornicularia normoerica* had been listed by Oliver Gilbert in the 1995 Derbyshire Red Data Book. On examination of the single record (made in 1993 by Rhodri Thomas) it was from millstone-grit boulders below the Horse Stone in the Upper Derwent Valley, and the Horse Stone is on the east of the valley, 1km into Yorkshire, not Derbyshire!

'The boulder field associated with the Horse Stone is of an easterly/ south-easterly aspect (somewhat sheltered from the impact of historic industrial pollution from the west and south-west) at an altitude of around 500m. Over the last couple of years, I have made a number of visits to sites of similar aspect, and similar or greater altitude to the Horse Stone in search of C. normoerica in Derbyshire. I did not find the target species, although there was usually something of a reward associated with these visits, e.g. Usnea cornuta on boulders below Fairbrook Naze, at the eastern corner of Kinder Scout, at just below 600m altitude. This species was previously considered extinct

in Derbyshire, having been last recorded further south in the county in 1831, by W. Wilson (specimen in the British Museum).

'On 10th August this year, I ploughed through the flowering heather up to Grinah Stones, a similarly-situated set of outcrops and boulder fields, high-up (590m altitude) on the Derbyshire side of the Upper Derwent. Here, I located 23 thalli of C. normoerica on five big boulders. I also found Ochrolechia frigida f. frigida, a second record for VC57, last recorded elsewhere in the valley by Oliver Gilbert. Plus, the usual hoped-for upland suspects: Cladonia luteoalba. Schaereria cinereorufa and four species of Umbilicaria (U. polyphylla, U. polyrrhiza, U. torrefacta and U. deusta). The VC57 (Derbyshire) taxa count does not now have to be reduced by one! The next job is to re-find it at the VC63 (SW Yorkshire) site

'The rocks on the plateau that have been fully exposed to the 300



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vears of airborne industrial pollution from the west are noticeably bereft of lichen cover. Yes, they really are bare, not even Acarospora fuscata! Oliver Gilbert had used the phrase "scrubbed clean by industrial pollution" to describe them. So, the boulders below the slope on the south-east and east sides have been offered some shelter. The pollution was obvious: I remember going for winter walks in the 1960s when snow that had been lying for a few days was covered in a layer of soot and the sheep were blackened by the same '

Steve added: 'Also, what a good week it was, as on 17th Aug on a Sorby NHS outing at Roystone Rocks (dolomitised carboniferous limestone) we found a stone with 14 decent (>20mm diameter) thalli of **Eagle's Claws** *Anaptychia ciliaris ciliaris*. This is a new site for the taxon in Derbyshire, and is now only the second known extant site for this rather special lichen.'

There have been some fascinating exchanges on the UK Lichens Yahoo forum, between Henk Timmerman in the Netherlands and colleagues in Britain, regarding 'imported' lichens. The deliberate or accidental importation of vascular plants over centuries is well known and well documented, as is the recent colonisation of Britain by various birds and insects. But what of lichens? Generally, it would be assumed that lichens would not easily survive as immigrants, whether arriving naturally or being imported. In previous issues of British Wildlife, I have mentioned increasing incidences of Goldeneye Teloschistes chrysophthalmus. This species seems to be 'on the move', popping up at scattered, mainly coastal localities in southern England, with some outliers farther inland in Wales. After appearing at a site, the species is not always refound subsequently, but it is suggested that, with climate change, T. chrvsophthalmus may

become more regular in Britain. Landscape management for the benefit of this stunning lichen, however, is also pertinent to its long-term establishment. The



Cornicularia normoerica on the Grinah Stones, Derbyshire. Steve Price

same is true also of *Vulpicida pinastri*, another lichen that seems to be somewhat transient in its behaviour: whether it will expand beyond its well-established locality in the eastern Cairngorms remains to be seen.

Mark Powell, Peter Earland-Bennett and Chris Hitch have reported on lichens new to southeast England, but which are known from the Netherlands and are regarded as having arrived naturally, perhaps as a result of changes in climate or improving atmospheric conditions. Mark commented that he was aware of surprisingly few reports of lichens imported, accidentally or deliberately, to the British Isles. The two cases that he cited referred to Caloplaca demissa on a large terracotta urn at Highgrove, and possibly C. calcitrapa on a travertine balustrade at Cleveden. In both of these examples. the lichens were brought along inadvertently on antique artefacts from southern Europe, imported in Victorian times to enhance the gardens or parterres of grand houses. Will they survive, and will they spread? Time will tell.

Because of the apparent rarity of imported lichens in the UK, it was with interest that Henk Timmerman wrote to British friends of an instance of lichens from Britain having been imported into a park in Amsterdam. In 2009, it seems that a large, granite standing stone was erected in Frankendael Park, and today Parmelia omphalodes, Pertusaria aspergilla, P. pseudocorallina. Rinodina atrocinerea and Xanthoparmelia tinctina – all lichens that are very rare in the Netherlands – are found on this stone. Henk said that he and his colleagues felt that 'Surely, this stone must have been hi-jacked from abroad...' They were right: the stone originates from Bodmin Moor, in central Cornwall. Henk will be writing a piece in the forthcoming Winter 2017 BLS Bulletin, giving the full story. To add a little twist to the tale, the BLS database suggests that X. tinctina appears not to have been found previously on Bodmin Moor, so there is now a new challenge - a quest to seek out and satisfy. Sandy Coppins,

British Lichen Society

## Conservation news

#### **DEEP BLUE**

#### Acid oceans

ceans are under siege, but, while many of the pressures upon them can be reduced, climatechange impacts and plastics in the environment are a double-whammy of fast-emerging problems that cannot be easily or quickly solved, if they can be solved at all. An eightyear German research programme has found clear indications that ocean acidification and warming, along with other environmental stressors, are harmful to marine life and compromise the important ecosystem services that oceans provide to humankind. The acidity of the ocean surface has, since the industrial revolution, increased by 30% already, and the effects on marine life will have been profound. See http://bit.ly/2yVFZUe to read the conclusions of the BIOACID project.

#### **Plastic deep down**

Plastic fibres have been found in marine animals in some of the deepest parts of the Pacific Ocean, at depths of nearly 11,000m. A study, led by scientists from Newcastle University, found microscopic fragments of plastic in every creature sampled from the bottom of the Mariana Trench and in half of the animals sampled in the New Hebrides Trench. The fragments identified include semisynthetic cellulosic microfibres, such as rayon, which is used to make textiles and other products, nylon, polyethylene, polyamide, and unidentified polyvinyls closely resembling polyvinyl alcohol or polyvinyl chloride – PVA and PVC. See http://bit.ly/2hATQcE for details.

#### Sea litter

A ccording to new government data, there has been a big increase in the quantity of litter that is present in the seas around Britain. In 2016, the amount of litter recorded was 158% more than in the previous year and 222% higher than the average for 1992–1994, although it was 75% less than the 'peak' year of 2003. The majority of litter (more than three-quarters) was plastic. Patrick Barkham reports on this in *The Guardian* of 3rd November (see http://bit.ly/2zeGb1e).

#### New sea plans

n its new marine strategy report, *The Way Back to Living Seas* (see http://bit.ly/2zX6wPA), The Wildlife Trusts asks the UK Government to embrace a new marine management system based on Regional Sea Plans and a nationwide network of Marine Protected Areas. This, it says, is necessary in order to achieve sustainable fishing and appropriate development in the marine zone, and to eliminate pollution.

#### **ON THE FARM**

#### **Too much slurry**

Slurry from intensive livestockfarming is increasingly causing

problems for nature and reducing the quality of air, rivers and streams, but regulations that restrict the development of big livestock farms and the handling of the waste which they produce are insufficient, ineffective and failing to protect either the public or the environment. Campaigns that aim to change this are now gaining momentum. At the forefront of this is Philip Lymbery, Chief Executive Officer of Compassion in World Farming and author of several books on intensive livestock-farming (Farmageddon and, more recently, Dead Zone - Where the wild things were). Another campaign is led by a group of people in south-west England (https://toomuchslurry.co.uk), but is aiming to spread its wings more widely – anyone with an interest in this subject is invited to sign up to news on the matter.

compiled by Sue Everett

The BBC TV programme Inside Out recently included a feature on slurry, exposing some of the problems experienced by residents in North Devon and also looking at the impacts of slurry-spreading on human health - see https://tinyurl. com/yab4lgw9. Ammonia (NH<sub>3</sub>) emissions from intensive livestockfarming are also in the spotlight with regard to climate change: for the second consecutive year, total EU emissions of NH<sub>3</sub> increased, by 1.7% from 2014 to 2015, as a result of higher reported emissions from the agriculture sector. For that period, the UK was one of 11 EU member states in which the ceiling or reduction commitment for NH<sub>3</sub>

was not attained and, without intervention, commitments to 2030 will not be met.

#### Slurry and bTB

Two new techniques for the early detection of bTB in cattle are being trialled at a farm in Devon. Read more about these in the mammals section of the wildlife reports (p. 121).

#### Extinction and livestock

he first international Extinction and Livestock Conference, organised by Compassion in World Farming and the Worldwide Fund for Nature (WWF), took place in October 2017, in London, The conference examined how global food and farming systems could be transformed to work for people, the planet and animals. It brought together diverse interests and began a process of acting as a catalyst for future collaboration and the development of solutions. Presentations are available via http://bit.ly/2szxWXY.

#### **Medicinal pastures**

question that has never been successfully answered through direct research or evidence review (despite its having been flagged as a UK cross-cutting research priority about 17 years ago) is that of what pharmaceutical benefits livestock gain from the variety of wild plants in a herb-rich grassland. A brief discussion on the Nibblers forum was sufficient to get one person interested in delving deeper, and Cath Shellswell of Plantlife has now published the first evidence review that looks into the nutritional and pharmacological benefits of speciesrich grassland. Again, just as nearly two decades ago, a huge hole in our knowledge is flagged up. It is about time that this gap was plugged -Cath's research will, one hopes, be followed up. Is the rye-grass always greener? An evidence review of the nutritional. medicinal and production value of species-rich grassland can be downloaded from https://tinyurl.com/yckytgqv.

#### **Rural and farming commission**

The RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) has established a new Food, Farming and Countryside Commission (see https://tinyurl.com/yawe6d2q) that is to host a new conversation in order 'to identify practical and radical solutions, ensuring future policy delivers what the nation needs from food, farming and the countryside'.

#### **Brexit and farming**

Greener UK (http://greeneruk.org/ Priority\_areas.php) has issued briefings on 'Four priority areas for a greener UK': farming and land management, fisheries, climate and energy, and environment and wildlife laws. The UK is expected to leave the EU at the end of March 2019, at which time any links between the Common Agricultural Policy and the UK will be severed.

In September, Wildlife and Countryside Link also issued a briefing document, Sustainable farming and land management policy for England (see https://tinyurl. com/yceho7jz). It proposes that there should be: (1) effective regulation: (2) comprehensive environmental land-management contracts universally available payments to address environmental issues common across the countryside. such as soil degradation, declines of widespread species, diffuse pollution and public access; (3) targeted environmental land-management contracts - for delivering specific gains for nature and ecosystem services; and (4) measures to promote sustainable, innovative and humane food production.

#### **Slipping** away

Environment Secretary Michael Gove has warned that soil fertility could be completely destroyed in some parts of the UK within the next 30–40 years. Mr Gove spoke at the parliamentary launch of the Sustainable Soils Alliance (https:// sustainablesoils.org) and has pledged his support for soil health, stating that Defra's new agriculture bill and a 25-year environment plan will reflect the concerns presented by the SSA. Mr Gove's speech was picked up widely, including in The Telegraph (https://tinyurl. com/yc5wcuwc) and The Daily Mail (https://tinyurl.com/y8wxss6y). He had already announced that there will be no 25-year food-and-farming plan, but that the environmental aspects of farming will be addressed within the Government's 25-year environment plan, for which no timeline is yet available. See https:// tinyurl.com/y7hprehs for Wildlife and Countryside Link's latest briefing on this subject.

#### PESTICIDES AND CHEMICALS

#### Which way for glyphosate?

**)** y the time this issue of *British* **D***Wildlife* hits the doormat, a decision will have been made on whether the world's most useful herbicide, glyphosate, will be awarded a new licence for its use in the EU. The European Parliament, by majority vote, agreed that it should be banned for agricultural use by 2022 and withdrawn immediately for household use. The decision will have profound implications. If it is banned, this could open up the possibility of beginning a transition towards a type of farming that is less reliant on chemicals. Many farmers no longer plough, but therefore rely on glyphosate-based herbicides (GlyBH) to kill weeds and cover crops prior to sowing their new crop directly into the ground. Many farmers and advisers say that this has major benefits, reducing soil erosion and runoff and rebuilding healthy topsoil. It is also incredibly useful for controlling competitive weeds as part of ecological restoration, and is the main tool used to kill some non-native invasive plants such as Japanese Knotweed. Residues of the pesticide, however, are found in soil, water, and the food which we eat, and in urine. Long-term systematic research into how it interacts with other pesticides in the environment

is lacking, but some studies identify adverse effects on honevbees, and the substance is toxic to aquatic organisms. Concerns have been raised by scientists, including a 'statement of concern', recently published in the British Medical Journal, about rising exposure to the herbicide among people, and the need for safety levels to be reviewed. Some adjuvants, used in commercial formulations to assist in the application of GlyBH, are much more toxic than the active substance itself. The herbicide has been instrumental in transforming entire landscapes, and so has played a key role in enabling intensive farming to supplant nature, with other associated consequences for the environment and people. For my review of this subject, see https://t.co/n4lV21P6JF. There is also a fully referenced paper available. Comments and edits are welcome.

#### Post-nics pesticides

What will take the place of neonicotinoids? Farming has a long way to go before embracing a system that is less reliant on chemicals. In France, two pesticides that contain the systemic insecticide sulfoxaflor were authorised in June 2016, much to the dismay of French beekeepers. The news channel Euractive (http://bit.ly/2xS28Qc) reports that, in October 2017, the environmental organisation Future Generations filed a lawsuit to prevent the pesticides from being marketed in France. Apparently, the chemical formula of sulfoxaflor allows it to escape the framework of the 'law for the reconquest of biodiversity'. In force since 8th August 2016, this law bans the marketing of neonicotinoid-based pesticides in France from September 2018. Sulfoxaflor was approved for marketing within the EU in 2015 and is licensed for ten years, despite data gaps in the ecotoxicologicalrisk assessment. The peer-reviewed risk assessment of sulfoxaflor (see http://bit.ly/2AJ0Bh9), upon which the licensing decision was based, concluded that 'a high risk to bees was not excluded for field uses'.

#### Nitrogen time bomb

itrogen that is applied on land to help to boost food production is accumulating below the soil but above the groundwater table, in geological strata within what is known as the 'vadose zone'. Unsurprisingly, the situation is worst in the intensive agricultural regions of the world, including intensively farmed areas in Europe. The long travel times of this nutrient mean that a massive pollution legacy is building up, one which is likely to affect groundwater, fresh water and shallow coastal waters. The authors of a recent study (see http:// go.nature.com/2zSFzzD) argue for policymakers to consider the matter of nitrogen storage in the vadose zone when designing mitigation measures aimed at reducing pollution. This, as well as previous research in the Thames Basin (see http://bbc.in/2jplvO5), demonstrates that attempts to use conventional nitrogen budgets to reduce the impact of agricultural nitrogen will fail to deliver on water-guality objectives, and that our rivers face a very long-term challenge from this legacy of agricultural-nutrient input.

#### Endocrine-disrupting chemicals

he European Commission is working on proposals that will designate biocidal substances as endocrine-disruptors (ED) – see https://tinyurl.com/ofh2u7j. It is expected that between 26 and 42 active ingredients in plantprotection products could be deemed 'endocrine disruptors' and cease to be available to growers. The list includes well-known substances such as cypermethrin (insecticide), propyzamide (herbicide), pendimethalin (herbicide), tebuconazole (fungicide), boscalid (fungicide), 2,4-D (grassland herbicide) and mancozeb (fungicide). According to an Impact Assessment published by the European Commission, 8.8% of fungicides. 7.3% of herbicides and 4.1% of insecticides could be lost as a result of being classified as ED under the

new proposals. Farmers say that there are a lot of triazole fungicides that are potentially endocrinedisruptors, and that if these are lost there will be no replacement products available to help farmers to control pests such as the Cabbage Stem Flea Beetle (for which they can no longer use neonicotinoids). Resistance is already a problem owing to a reliance on too few chemicals.

#### Pesticides and bees

ichael Gove has announced that the UK supports further restrictions on the use of neonicotinoids, owing to their effects on bees and other pollinators. This follows advice from the UK government's advisory body on pesticides, which said that scientific evidence now suggests that the environmental risks posed by neonicotinoids are greater than previously understood, thus supporting the case for further restrictions. A European Commission proposal, which suggests a ban on all outdoor use of the three neonicotinoid pesticides currently subject to a temporary ban (for use on flowering crops), is expected to be presented to an EU Council meeting in December.

#### Pesticidovigilance

recent study on insect declines in Germany (which featured in the editorial in BW 29.1) has received widespread publicity, but closer scrutiny of the research indicates that there are some problems with extrapolating the findings from that study to the wider countryside of Germany. Professor Ian Boyd, retiring Chief Scientific Adviser to Defra, critiques the study in his blog – see http://bit.ly/2ig9ZkC. Nevertheless, Prof. Boyd, in an article written jointly with Alice Milner (see http:// bit.ly/2yyWRAk - I have the full article, should anyone wish to see it), criticises the fact that pesticides have been authorised for use at industrial scales without understanding their effects on entire landscapes. And, as others have pointed out, the current way in which pesticides are

#### **Conservation news**

brought to the market is inadequate and needs to change. Boyd and Milner call for better regulation in order to control the use and effects of pesticides at a landscape scale. Likening them to antibiotics, they say that 'Both have been manufactured and supplied to market demand with little care taken to consider whether this is sensible. Both are often used prophylactically or as therapies of first resort, when sparing use would be more appropriate. Both are vulnerable to loss of efficacy because of resistance.' They also point out the limitations of existing safetytesting regimes that rely largely on testing a few species – a regime that has 'limited predictive power when chemicals are used widely' and when 'diffuse environmental effects that arise from ecosystem connectivity at a landscape scale... may still be appreciable'. Boyd and Milner highlight the lack of any systematic monitoring of pesticide residues in the environment, and say that 'no equivalent to MRL (permitted Maximum Residue Levels) in foods exists for the environment' while 'There is no consideration of safe pesticide limits at landscape scales.'

Many would agree that it is time for a sea change in the way in which chemicals used in the environment are evaluated. At the same time, societies need to work out better ways of not having to rely upon them. Where farming is concerned, this will require a systems transformation, something that should be planned for and adequately resourced, and that will require increased focus on independent research and a complete overhaul of agricultural education.

#### Antimicrobial resistance (AMR)

This is a growing problem for people and in livestockfarming. The Centre for Ecology and Hydrology is currently leading a cross-research council-funded 'AMR in the Real World' project, which aims to quantify the relative importance of a subset of antibiotics, metals, biocides and antibioticresistance genes for driving and maintaining antimicrobial resistance in freshwater systems. See http://bit. ly/2zFQdco for details.

#### **ON THE COAST**

#### **Tidal-lagoons review**

n Independent Review of the A feasibility and practicality of tidal-lagoon energy in the UK, led by the Rt Hon Charles Hendry, was published in January this year: see https://hendryreview.wordpress.com. Among the recommendations are: a National Policy Statement for tidal lagoons that can inform the consent process, where specific sites are designated by the Government as being suitable for development: the establishment of a new body (Tidal Power Authority) at arm's-length from Government, with the aim to maximise the advantages from a tidal-lagoon programme in the UK. Mr Henry also points out that there are 'only a limited number of sites around the country which would be suitable for tidal lagoons'. Subject to funding, the first to be built is likely to be the Swansea Bay Tidal Lagoon (see www.tidallagoonpower.com/ projects/swansea-bay) - construction is scheduled to start in 2018.

#### Trashed by Trump

ews channel *The Ferret* reports **N** that Scottish Natural Heritage is considering whether to remove the protected (SSSI) designation from Foveran Links (see http:// bit.ly/2hqtfeF). This is because of damage caused to the dune system by the Trump Organisation's golfcourse development there. The development has caused some habitat loss and other changes, such as the stabilisation of mobile dunes. Objectors to the boundary review say that, if the designation is removed, this will make it easier for another proposed development to proceed in the area, which is likely to cause further damage.

#### Severn Vision

A vision for the Severn Estuary has been published (http:// severnvision.org) by an alliance of organisations representing wildlife and landscape interests. This is the UK's largest coastal-plain estuary. with nearly 190,000ha of coastal, intertidal and subtidal habitat that is recognised internationally as being under threat. The vision sets out seven steps: to avoid further loss of nature: to restore nature: to use coastal habitats to reduce climatechange impacts; to use the estuary to help to reduce carbon emissions; to grow knowledge to enable better decision-making; to develop - in harmony with nature - tidal renewable energy; and to establish stronger governance.

#### **SPECIES NEWS**

#### Birdcrime

R SPB's *Birdcrime 2016* report (https://tinyurl.com/y8sblncw) reveals a minimum of 81 confirmed incidents of bird-of-prey persecution in the UK, but many illegal killings are going undetected or unreported. For the first time in 30 years, there were no prosecutions. The RSPB is calling for the introduction of a licensing system for driven grouseshooting, and asking police and other enforcing authorities to make full use of all existing powers to protect birds of prey.

#### **Back from the Brink**

This new project (see https:// naturebftb.co.uk) focuses on saving threatened and endangered species in England. Through 19 different projects, it aims to save 20 species from extinction and benefit more than 200 others, and it involves a partnership of seven conservation charities, which are also supported by Natural England and the Forestry Commission (England).

#### **ODDS AND SODS**

#### **Planetary warning**

As many as 15,000 scientists, from 184 countries, have signed a warning about negative global
environmental trends, such as a changing climate, deforestation, loss of access to fresh water, species extinctions and human population growth. The warning (World Scientists' Warning to Humanity: A Second Notice) is published in BioScience (2017 in press; DOI: 10.1093/biosci/bix125). A new independent organisation, the Alliance of World Scientists, has been founded to act as a collective voice on environmental sustainability and human well-being. Scientists who did not sign the warning prior to publication can still endorse the published warning by visiting http:// scientists.forestry.oregonstate.edu. I have signed, of course.

### **Beautiful burial grounds**

he Beautiful Burial Ground Project is a new project, starting next year, that will use citizen scientists to reveal the hidden heritage and wildlife of burial grounds across England and Wales. Caring for God's Acre, the charity running the project, says that burial grounds are surprisingly under-recorded - there are scant biodiversity data, as individual naturalists or groups rarely record there and, when they do, records go into national systems which are not site-specific but are instead based on Ordnance Survey grid squares. The project aims to change this. For details, see https://tinyurl.com/ k52by26. Caring for God's Acre also has a 'Botanical Companion' leaflet and other useful literature, including plans for making a minibaler, available for download via its website.

### **Monetising nature**

orporate Natural Capital Accounting, a new monitoring framework, has been found to be inappropriate when applied to some National Nature Reserves (NNRs). The research (see http://bit. ly/2yJ0bG0) was commissioned by Natural England. Initial accounts were developed for a plan to deliver a long-term goal for each NNR. They comprised long-term projections of costs, ecological indicators, environmental goods and services provided by the NNR, and their value. The accounts were partial, as not all services could be quantified and few could be valued. It was found that, if the accounts were used to monitor NNRs, the output would be complex, would be difficult to interpret and would cover only part of the purposes of NNRs.

### Welsh top bod

Natural Resources Wales has announced that Clare Pillman has been appointed as its next Chief Executive. Currently Director for Culture, Tourism and Sport at the Department for Digital, Culture, Media and Sport in Westminster, Clare will take up the post in February 2018. She takes over from Emyr Roberts, who was NRW's Chief Executive since it was set up in 2013. NRW is facing a 29% cut in its overall budget by 2019–2020.

### Flowers in woods

/here are the woodland wild flowers? Kate Holl, woodland adviser for Scottish Natural Heritage. describes woodlands full of wild flowers in places where herbivores are absent or are present at a low density. She visited woods in Iceland, France, the Isle of Wight and Norway, and her blog (see http:// bit.ly/2iSwOuk) also illustrates the rapid disappearance of woodland flowers soon after fences were removed from a woodland on the Isle of Mull. Kate concludes that Scottish woods could and should have far more flowers, and that, until herbivore numbers can be reduced 'to an ecologically beneficial level', many woods in this country will remain hollow examples of the ecosystems that they ought to be. Her research was funded via a Churchill Fellowship – see the link at the bottom of her blog should you have a good idea for a project.

### **Ecology in planning**

Ecologist Tim Reed, writing as a guest blogger (on Mark Avery's blog of 19th October), says 'when you scratch the surface of documents submitted along with a planning application, not all that glistens is made of gold'. His scrutiny of ecological data submitted with planning applications reveals a recurrent theme – 'unreliability'. More detail is given in his article, published in a recent edition of the CIEEM bulletin *In Practice* (95: 43–48). Ecological consultants are required to follow standards of survey and reporting in their work; it is extremely concerning to find out that often this is not happening.

### **Dogs and nature**

Rather few people have considered, in the round, the impact of dogs on nature, but it is a growing issue – dog ownership increased from 4.7 million dogs in 1965 to a peak of 9 million dogs in 2014 (dropping down to 8.5 million in 2016). Problems associated with dogs include increased disturbance, affecting ground-nesting birds such as those on riverbanks. and in-stream habitats such as spawning gravels; conflicts with livestock, which make conservation grazing difficult (and sheep grazing impossible on most urban-fringe sites); and deposition of nutrients and anti-parasite medication from urine and faeces. Miles King explores some of these in his blog 'Gone to the dogs' – see http://bit. ly/2jqfyQQ.

Is one way forward a robust dog-licensing scheme? A licence with a one-off fee of at least £100, that requires dogs to be chipped and to have samples of their DNA taken, and owner's details to be kept up to date (just as cars have registered keepers), would be a possibility. Such a scheme would enable dog attacks on livestock and dog-fouling offences to be traced to the perpetrator. A fee would also deter many people from keeping dogs, and, as a result, dog ownership would eventually decline further. The fee would also pay for enforcement and education, and perhaps would need to be implemented via an existing charity rather than through local authorities, which would potentially find many ways to siphon

off the money to cover their not insubstantial overheads.

### **Progress on peatlands**

Cince 2012, PeatlandACTION has set more than 10,000ha of degraded peatlands in Scotland on the road to recovery. The initiative recently entered a new phase, with £8 million to spend on continuing Scotland-wide peatland restoration in 2017–2018 Meanwhile validation for the UK's first Peatland Code Project is underway at Dryhope, in Scotland's Southern Uplands, where a 10km area of peat hags is being reprofiled and the vegetation restored. The Peatland Code is administered by the IUCN (see http://bit.lv/2z2aA3R) and provides a set figure for the carbon emissions of eroding peat and restored peat. To seek verification under the code, it is necessary to calculate the carbon saving made by undertaking restoration, after which the landowner signs a contract (minimum 30 years) and agrees to maintain the peat in its restored state for that length of time. Landowners are then eligible for carbon finance for the carbon that is saved over that period. In the case of the Dryhope project, the carbon finance came from Forest Carbon (www.forestcarbon.co.uk), which provides supplemental funding, separate from SNH's Peatland Action fund. The benefit of applying the Peatland Code means that the landowner agrees to a longer period of restoration (compared with only ten years in a purely Peatland Action-funded project); it also means that government funding will achieve more.

### Xylella measures

Following growing concern about the potential impact of the bacterium *Xylella fastidiosa* on the UK's environment, the Horticultural Trades Association (HTA), together with several garden retailers and growers, have embargoed imported stock from infected areas. *X. fastidiosa* can cause disease in a wide range of woody plants. One of its four subspecies attacks Pedunculate Oak and Wych Elm. It is likely, however, to affect other woody plants if it arrives in the UK – the potential for this cannot yet be predicted. In October, the European Commission's Standing Committee on Plants, Animals, Food and Feed approved increased measures against the pathogen. This followed a letter to the Commission by Michael Gove, who said that, if EU protections were not increased, the UK would consider its own national measures, which could include a suspension of high-risk imports.

### Brexit and the environment

ichael Gove has set out plans to consult on a new, independent body that would hold Government to account for upholding environmental standards in England after the UK leaves the EU. The official statement (see http://bit.ly/2hoi71P) says that 'Ministers will consult on a new independent, statutory body to advise and challenge government and potentially other public bodies on environmental legislation stepping in when needed to hold these bodies to account and enforce standards.' A consultation on the specific powers and scope of the new body will be launched early next year. The proposed consultation on the statutory body will also explore the scope and content of a new policy statement that will aim to ensure that environmental principles underpin policy-making.

### **Natural resources in Wales**

he Welsh Government has published a Natural Resources Policy (https://tinyurl.com/yayhqnyp), which is a statutory product of the Environment (Wales) Act. The focus of the NRP is the sustainable management of Wales' natural resources, to maximise their contribution to achieving goals within the Well-being of Future Generations Act. The policy sets out three national priorities: delivering nature-based solutions, increasing renewable energy and resource efficiency, and taking a place-based approach. It has also published

the first State of Natural Resources Report (see https://tinvurl.com/ vcbhvirz), which does not make for happy reading. Some 249 'priority' species have been assessed, in comparison with their status at the time of the last Biodiversity Action Plan report, in 2008. The data show that approximately one third (34%) are declining, 30% are improving, and the status of 36% has remained unchanged. The largest decline was in priority vertebrates (38%), which include birds such as the Curlew. The condition of the most extensive semi-natural habitats of mountain, moorland and heath within SSSIs ranges between 63% and 73% unfavourable. and the overall assessment of the conservation status of the 15 Annex I habitats associated with these semi-natural areas is either bad or inadequate.

One piece of good news is that, of the approximately 2,000km of drainage ditches on upland peatlands, at least 742km have been blocked – actions which will help to improve biodiversity, carbon storage and sequestration, and flood-risk management. There has been a continued decline in the length of managed hedgerows, despite progressive uptake of agri-environment schemes, resulting in increases in both relict and overgrown hedges, and the number of hedgerow trees has decreased by 3.9% (between 1998 and 2007). Fresh waters are not faring well, either: in 2015, 63% of all freshwater waterbodies defined by the Water Framework Directive were not achieving good or better overall status, while only one out of six freshwater habitat types were in 'Favourable Conservation Status'.

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Sad news. The Christmas Island Pipistrelle is no more. I do not know what they have been up to on Christmas Island but it's all over for the bat. It has been bowled out. 'Our activities as humans are pushing [such] species to the brink', comments IUCN's director-general, Inger Andersen. Evidently, his solution is for us to stop having activities. But there is another way of looking at the problem, and that is the stubborn refusal of some species to conform to the exciting modern world. They put you in mind of a class of recalcitrant kids. They ought to try a bit harder but they won't. However you set the bar, they are determined to fall over it. As an example, let me give you *The Moth Academy* (prop.: Mother Shipton; long-suffering class teacher: Twitcher).

We shall start with the Footmans. I've about had it up to here with the Footmans. What a bunch of lazy little slobs! There's Dingy Footman for a start, and he's well named, as well as smelly. There's the foul-mouthed Four-dotted Footman: and that lout.

the Red-necked Footman, and that his irritating sister, Rosy Footman, not to mention Crimsonspeckled Footman, who is currently off sick. I had a word with their Dad, Hoary Footman, at the last parents' meeting but I might as well have saved my breath.

I feel rather sorry for Peach Blossom. Why do parents give them names like that? What's wrong with Mary or Susan or Emily? If she's not careful she'll end up like that 'little angel' Small Seraphim, who is now modelling swimwear for low-end magazines, and I think we know where that's leading.

The Drinker: another low achiever, the big, hairy oaf. As soon as I find out where he's stashed his crate of malt whisky, I'm confiscating it.

The V Moth. Oh yes, he certainly loves making V-signs

behind my back and, looking at his marks, it's definitely not 'V for Victory'.

'The race is not to the swift, nor the battle to the strong.' And definitely not to this guy, 'Orange' Swift, that carrot-haired slacker. He would not win a race if all the others dropped out and he'd grown a third leg.

I could have done without the twins known as The Uncertain and The Confused. I suppose that we call them that because we never know which is which, not that it makes any difference: they are both clods.

As for those missing laptops, I have my eye on The Suspected. If I'm right, he will shortly be seeing the headmistress, Mother Shipton, for some 'moth-erly' attention! I do love my little jokes.

Our problem with Northern Rustic is that no one can understand a word he says. He thinks that he's studying 'mothematics'! He wandered into my office one day. 'What are you doing here, moth?' I shouted. 'Well, zur, 'appen t' light were on.'

When I find out the name of the 'Small Eggar' who has been lobbing eggs at the staffroom window, he'll be going the same way as Barred Red last term, out on his ear, that's where.

Speaking of which, just look at that pair of lovelies, Large Ear and Bloxworth Snout. I've seen more attractive piglets.

The hope of our class, Pale Shining Brown, will be unable to attend this term after that unfortunate incident in the gym involving Barred Red and Haworth Minor. They tell me that Brown made himself unpopular by picking holes in everything. Haworth Minor has been carpeted.

Dinner time! Cabbage, Dark Spinach and Creambordered Green Peas. We dare not give them meat.

Coxcomb Prominent, the class show-off, tells a joke. 'If you have a moth ball in one hand and a moth ball

in the other, what do you have? Answer: The undivided attention of a very large moth!' Evidently, young Coxcomb has not been paying attention in biology

class.

Garden Tiger, the school cat, has seen better days. We'd be better off with a Shark roaming the premises, or maybe a Woolly Bear. Absent this week: the seldom seen Scarce Tissue, who has another cold (a-tishoo!); and The Delicate, who is way too fragile to get out of bed in the

morning. Also Blair, who was continually teased by Blair's Mocha, a moth so stupid that he can't even spell 'mocker'.

I wish that we had a Ruddy Highflier, just one. As it is, we are bound to be Red-listed in the next Ofsted report. If I had my way, we would exclude the whole lot of them and start again with the butterflies.

## **Obituary**

### Trevor Poyser 1925–2017

Trevor Poyser, doyen of ornithological publishing, died on 2nd September 2017, at the age of 91. He would have chuckled at this description – 'Really? Don't you mean Dean, not doyen, or is that too American?' Then an anecdote: 'I remember when I was at Putnams, there was this chap...' delivered with a David Niven-esque drawl. And, if walking at the time (his favourite activity before an accident incurred during his regular BTO 'local patch' surveying, in his beloved native Derbyshire) put paid to his knee, he would have interrupted himself to point out a bird.

He had a remarkable life – so there were many stories. From childhood and schooling in Leek, in north Staffordshire, he was plunged into the War in 1944, as a glider pilot, in South-east Asia. At War's end he was drafted into the military police in India, in the turbulent phase before Partition, an experience that marked him deeply. Much later in life he researched the lives of First World War pilots by way of their letters, and wrote an unpublished novel based on those sources. One suspects that this was both an act of homage and a form of delayed therapy.

But when I first met him, in 1984, that was all in the past, and in the intervening years life had been good. Soon after demobilisation Trevor met and fell in love with Anna at a London School of Printing evening class; the two remained devoted to each other until Anna's death, in December 2005. Both worked in publishing, at various firms, honing production and editorial skills. In the 1960s, their lives were punctuated by a period of several idyllic years in a cottage in Provence (long before Peter Mayle made the region fashionable). On returning to London, Trevor had a stint as a director at Putnams before he and Anna set up T. & A. D. Poyser Ltd, in 1973, originally in Berkhamsted, west Hertfordshire, and later in Calton, just over the Derbyshire border in Staffordshire.

Seventeen remarkably creative and happy years followed, in which the Poyser imprint was placed on a series of monographs (including, among others, Hen Harrier, Kestrel, Peregrine Falcon, and Sparrowhawk), identification handbooks (notably the seminal *Flight Identification of European Raptors*) and atlases (of breeding and non-breeding birds of Britain and Ireland). These books hold a special place in the affection of ornithologists, perhaps rivalled only by the early New Naturalists. In part this is because the design – always white dust jackets, and beautiful layout and typography – was so distinctive, but the principal ingredient of success was good and clear writing. As a passionate but non-professional ornithologist, Trevor wanted books that



he would like to read – and he charmed and cajoled his authors to deliver the goods.

Much of the charm was applied via convivial hospitality in Calton, with authors and their families invited for long weekends, and work intermingling with walks, food, drink, talk. The ambience contained a whiff of the Bohemian London that Trevor and Anna had inhabited in the post-War years, plus something of the country house.

I was admitted to this select world when I set up the Natural History Book Service in 1985. My senior by three decades, Trevor became an invaluable adviser, stout supporter of the fledgling enterprise (which soon began to sell plenty of 'Poysers') and good friend. My family and I look back on the visits to Calton with great pleasure.

In 1990 Trevor and Anna sold up, retiring to north Norfolk. The Poyser imprint lives on, now under the aegis of Bloomsbury. In retrospect, the achievements of this remarkable couple were gravity-defying. The 1970s and 1980s saw the rise of big and complicated birdidentification guides, and Trevor's preoccupation with books that were a joy to hold and to read meant that he was therefore swimming against the prevailing current.

The Poyser legacy is both the list itself – classic studies that will retain their place on ornithological bookshelves – and the proof positive that good publishing is appreciated and rewarded, regardless of fashion. **Bernard Mercer** 

### **Book reviews**



### A Photographic Guide to Insects of Southern Europe & the Mediterranean

Paul D. Brock Pisces Publications 2017 412pp, colour-illustrated ISBN 978-1-874357-79-7 £27.50 (pbk)

For those of us who travel to the species-rich parts of southern Europe, identifying the insects which we see has always been a problem. Butterflies and dragonflies are well covered, moths, grasshoppers and crickets not too bad, but for all other groups it has always proved difficult. My main stalwarts for the last decade or so have been Chinery's *Insects of Britain and Western Europe* (surprisingly good, at least as far east as Italy and as far south as the Pyrenees) and Haupt's guide to the millipedes, arachnids and insects of the Mediterranean region (originally in German, but mine is in French), which is good but covers only about 300 species, and is not available in English.

So, when the call came to review Paul Brock's photographic guide to the Insects of southern Europe, I was delighted. It so happened that, at the time, I was already in Provence, clutching my own brand-new copy of the book, which I had pre-ordered many months before. The driest autumn for at least 150 years is not the ideal time to field-test an insect book, but, of the rather few non-butterfly species that we found, all were satisfactorily identified.

For me, this book is a guantum leap forward. The photographs are generally excellent, the species descriptions are clear, often with the defining features clarified, and there are distribution maps for every species (which must have involved a lot of work, or they are rather broad-brush, but, either way, they are a useful indication of where the insect might be found). The book covers 1,500 species, which, since the area contains an estimated minimum of 66,000 species, represents only 2.27% of the total. The selection, however, is limited to those that are reasonably conspicuous and identifiable in the field, so that most of those not covered may be of interest only to the specialist. In practice, it seems to be a well-chosen selection. There are no spiders or other non-insect invertebrates, but that probably makes sense. Perhaps they will come next.

Interestingly, the book covers the major groups well: there are about 80 species of dragonfly and damselfly, and over 250 species of butterfly included. I guess that the intention is to make this a one-stop book, a purpose which it achieves well. Personally, I would have been happy to have had fewer of these well-covered species and more of the little-known ones, but other readers may be glad to have it all in one volume.

Geographically, the book covers essentially the

European Mediterranean (not North Africa, although it is likely to be useful in the damper and cooler parts), extending inland to The Alps and central France. The more southerly countries, such as Spain, Italy, Greece and the former Yugoslavian countries, are covered fully, or as fully as a 2.27% coverage of species allows.

So, now to the key questions. Would I recommend this to a friend (or *British Wildlife* reader)? Unhesitatingly – it takes the possibilities for insect identification in southern Europe into a new realm. Would I buy it myself? Absolutely, I already had, and I would buy it again if I lost this copy. I also like the fact that it is produced by an adventurous, small publisher, and that publisher has done an excellent job of producing it, at a reasonable price. Incidentally, Pisces also produces two other UK insect books by Brock, which are well worth looking at.

Any criticisms at all? Essentially no, except that the author does that common thing of confusing 'i.e.' and 'e.g.', and my editor-girlfriend found a typo on the first page she looked at (although I failed to find any more). As any reader might observe, 'if that is all he has got to complain about...'.

Buy it, it is excellent! Bob Gibbons



### Carnivorous Plants of Britain and Ireland

Tim Bailey & Stewart McPherson, edited by Alastair S. Robinson Redfern Natural History Publications 2016 200pp, colour-illustrated

ISBN 978-1-908787-23-1 £12.99 (pbk)

We have only 13 species of insect-eating plant, namely three sundews, three butterworts and seven bladderworts, plus a couple of introduced pitcher plants, and three natural hybrids: a tiny but representative sample of a sizable world flora. This book is the first British field guide devoted to them, and each species or hybrid is thoroughly illustrated, mapped and written up. Most of what you would expect is here: a bit of evolutionary history and habitats, quite a bit about Darwin's experiments and on capture mechanisms, and even a short section on the unlikely medical uses of sundews and butterworts. The colour illustrations are lavish, the cover is waterproofed for field use, and the book is very good value.

All the same, I was disappointed. The authors' enthusiasm for these wonderful and eerily beautiful plants is not reflected in their writing. I wanted more on the discovery that we had not four bladderworts, as we had thought before 1990, but seven. I wanted to know why you rarely see more than a light sprinkling of open flowers even in the densest '*Drosera* lawns', and exactly when bladderwort species flower ('summer'

#### **Book reviews**

is not enough; in my limited experience, Common Bladderwort flowers in June, the *intermedia* group in August and September). I wanted to know whether the newly discovered *Utricularia bremii* has ever flowered in Britain. 'It can easily be confused with *U. minor*', state the authors, but that is putting it mildly. Without flowers it is practically impossible to distinguish the two. It might have been worthwhile to end with a section on the non-British European species. There are not all that many and they are always highlights of botanical tours.

This field guide is a long way better than nothing, but in their desire to be factual and scientific the authors have missed the magic.

### Peter Marren



### Woodland Development: A Long-term Study of Lady Park Wood

George F. Peterken & Edward P. Mountford CABI Publishing 2017 286pp, colour-illustrated ISBN 978-1-78639-281-7 £35 (pbk)

This is the story of Lady Park Wood, a story that is still ongoing. Characters appear and then drop out, sometimes to come back later in a different guise. Chance plays a strong role, alongside meticulous recording of thousands of tree stems. What is discovered turns out not to be what was perhaps expected at the beginning.

Even if you have read the papers that have come out of the Lady Park Wood research over the years, there will, I suspect, still be new insights from this book; it is also very convenient to have the story to date in one place. The book is written in George Peterken's usual clear, precise style, and is well illustrated with photographs. For its size, it is also reasonably priced.

The first three chapters introduce the wood which straddles the England–Wales border in the Wye Valley: how it came to be established as a reserve in 1944 by the Forestry Commission initially, and how it has been treated since. The next two set out how permanent transects were established by Eustace Jones from the Forestry Department in Oxford in the 1940s, and have been recorded at irregular intervals since through the measurement and plotting of all but the smallest stems in the transects. There is then a summary of what the patterns of mortality and regeneration, growth and stagnation tell us about the development of different stands within the reserve.

Six subsequent chapters form the core of the book. Each follows the fate of particular trees and shrubs, starting with Ash, Beech and oak, Limes and Wych Elm, birch and other short-lived trees, Field Maple and Hazel, and other minor components of the woody layers. Two chapters assess what the implications of the changes have been for different habitats (dead wood and open space etc.) and other species groups (ground flora, bryophytes, lichens and invertebrates etc.). The final four chapters broaden out to look at what the Lady Park studies can tell us about long-term studies generally, on natural woodland, on near-to-nature forestry and on the current interest in rewilding.

What conclusions or lessons do the authors' seem to have come up with, after all this work? Perhaps some that will surprise readers.

- What has been learnt about stand changes could probably have been discovered just as well by other methods, such as the study of chronosequences; but, of course, this itself can be said only because it has been confirmed by long-term studies such as those at Lady Park.
- Leaving woods with a long cultural history to minimum intervention may not be optimal for the conservation of some groups. Rewilding has to be at a much bigger scale than the Lady Park Reserve to maintain a wide range of species, but the outcomes are still likely to be unpredictable.
- What has happened at Lady Park reflects the particular nature of the site (for example, the fact that it is partly on a cliff, so that trees occasionally drop off) and particular events, such as the lasting effects of the 1976 drought on Beech growth. Other sites, subject to other events, would produce different results; generalisation has its limits.
- Long-term records have considerable potential to test ecological ideas and theories; but it is almost impossible to predict, at the time when first data collections are made, for which questions they may eventually be most useful.
- A story about a place and people can perhaps inspire people in conservation to think in a way that standard scientific papers do not.
- And, finally, that long-term studies are difficult to maintain, generally relying more on individuals' interests than on any sort of planned, institutional support (nice though this would be). Without George Peterken's commitment to the site in the early 1980s, the reserve itself, let alone the records, might well have been lost. Ed Mountford has played a key role in the more recent recordings. An increasing number of other researchers from Britain and the Continent have made use of the site and the past data. All depend on the original recordings made out of curiosity by Eustace Jones in the 1940s.

### Keith Kirby



### **Grassland Fungi: A Field Guide**

Elsa Wood & Jon Dunkelman Monmouthshire Meadows Group 2017 336pp, colour-illustrated ISBN 978-0-9576424-1-6 £19.99 (pbk)

There are now several pretty good field guides to fungi on the market, and also a growing number

of monographs on particular genera or related groups, but none of them addresses the fungi of a particular habitat. There is much interest in the fungi of seminatural grassland, from cottage lawns and churchyards to commons and uplands. Many of these are colourful and not too difficult to identify, and grassland fungi are now a recognised form of habitat assessment. Acidic grassland can be relatively poor in vascular plants but rich in fungi, especially defining species such as waxcaps, pinkgills, club fungi and earth-tongues.

This book pulls together experience gained in the still plentiful natural grasslands of the lower Wye Valley. It describes and illustrates most of the species that are identifiable in the field: some 170 species in all. It is clear, not too technical, and very well illustrated with colour images. It will be a boon to any field worker. The question is this: will it be as useful nationally as it is for the Wye Valley? The answer, perhaps surprisingly, is probably yes. The 33 species of waxcap (out of about 50 found in Britain) are those which are most likely to be found in natural grassland anywhere. For waxcaps it will perform from Cornwall to Caithness, and probably Holland and Denmark, too. For the other groups,

### Letters

### Small insect decline

y October issue of British Wildlife, with Dave Goulson's editorial on declining wildlife (BW 29: 1–2), arrived hot on the heels of an article on insect declines in The Daily Mail, to which I had replied the previous day. Where I live, in mid-Cheshire, this trend became noticeable to me three years ago, but it has been significantly worse this year. It is my habit to make daily walks in the countryside, which include walking footpaths through arable farmland and also the towpath of the River Weaver – a six-mile round trip.

In early spring, the first insects to appear are hoverflies, feeding on dandelions, and these are quickly followed by early butterfly species, such as the Peacock, Speckled Wood and Orange-tip. In this year, 2017, things did not live up to normal expectations thereafter. The butterfly numbers proved disappointing and the dragonflies and damselflies even more so.

Come mid-summer, there are many larger umbellifers along the Weaver towpath, and these are usually visited by a variety of bees and hoverfly species. These plants were hardly touched this year, however, and this trend was noticeable to a lesser extent in the two previous years. This is beginning to affect the local bird populations, too. This year there were fewer Chiffchaffs, Blackcaps, Whitethroats and Reed Warblers than there are normally. It was notable also that the local Swallows and House Martins departed several weeks earlier than usual and appear to have had smaller broods – I do not think that this had anything to do with the weather.

As for myself, I was born in 1930, in east Suffolk, and have since spent ten years in Surrey and 29 years in East Sussex, before moving to Cheshire. So, I have been around a bit and seen some changes!

Peter Friston, Northwich, Cheshire

### Lost biomass grazed out

Peter Marren

he editorial by Dave Goulson (BW 29: 1–2) refers to a study, based on trapping in nature reserves in Germany, that indicates a significant decline in the biomass of insects over recent decades. It is suggested that a similar decline may have occurred in the UK, and this impression is certainly supported by the experience of entomologists who have been active during this period.

identification and even taxonomic difficulties arise. The

100 species), a judicious mix of the common and more

easily identifiable ones, but, given that the standard key

there, mistakes are likely. The same can be said for earth-

begins with microscopic characters and proceeds from

tongues, of which only two out of 25 are described.

And half of the book is given over to fungi that are

certainly found in grassland, but which are of more

marginal interest so far as conservation is concerned:

mushrooms, puffballs, inkcaps, funnels, bonnets and so

on. The selection of only two brittlegills, two milkcaps,

whether it was worth including them at all.

two boletes and three fibrecaps does make you wonder

This is a well-produced and much-needed guide to

as to more experienced field mycologists. And it should

encourage others to become involved in field survey, or

just spotting fungi for fun, which is all to the good.

grassland fungi that should be useful to beginners as well

book has 15 species of pinkgill or *Entoloma* (out of about

The editorial discusses various factors that might explain this decline, but one that has been overlooked is the increase in numbers of herbivorous mammals. The editorial states that the nature reserves involved have not changed much over time, but there has been a substantial increase in deer numbers in both the UK and Germany, affecting many habitats – probably the studied sites among them. In addition, in the UK, conservation grazing has become very widespread, resulting in the introduction into many nature reserves of domestic livestock – cattle, horses or sheep, depending on the terrain and local preferences. Attention was drawn by Jonty Denton (BW 24: 339-346) to some of the negative consequences of relying on grazing as a conservation measure, which should, it is hoped, have led to some reassessment of its aims and effects.

It is fairly obvious that any grazing results in a reduction in the biomass of herbaceous and other accessible vegetation, and it clearly follows that there will be a corresponding reduction in the biomass of associated insects that rely on it for food or shelter. Advocates of grazing argue that this does not matter, because there will be benefits to those species that they are targeting to conserve, and that biodiversity is not diminished, or even (though with scant evidence to support this claim) that it has been increased. Comparable surveys before and after management changes rarely happen. The trapping study

#### Letters

in Germany did not address changes in biodiversity, but the overall reduction in numbers must have involved local extinctions.

There is, however, evidence of lost biodiversity in the New Forest. The recent letter by John Phillips (BW 28: 462) highlighted the dire situation there with regard to the decline in Lepidoptera, citing the increasing numbers of deer, cattle and ponies and encroachment by them into the woodland inclosures. These losses were documented by Andrew Barker and David Green in the report of a symposium (Newton 2010), in which declines in several insect groups were discussed. They noted that, of the 264 Lepidoptera species with conservation status that had records from the New Forest, only one half had been recorded since 1980, with the greatest losses in those species that are dependent on the woodland herb and shrub layers, closely followed by those of heathland, bogs and mires. It is probable that there have been similar declines and losses of other phytophagous insects in the New Forest and elsewhere, although this has yet to be documented. Those dipterists who have visited the New Forest over many years have noticed a general decline in the numbers and diversity of Diptera, including of saproxylic species (where loss of shelter, humidity and nectar sources may be significant). This may be regarded as anecdotal and lacking precise data, and information on New Forest Diptera is now being assembled in order to provide a baseline for future surveys.

Of course, grazing is not the only culprit in biomass loss. Where grass is not grazed, it is mown – for fear of being overgrown. This happens too frequently on roadside verges, which might otherwise provide more

of a reservoir of insects in heavily managed landscapes. To sum up, with such a chewed-up countryside, the losses are not at all surprising. **Reference** 

Newton, A. C. (ed.) 2010. *Biodiversity in the New Forest*. Bournemouth University.

Peter Chandler Melksham, Wiltshire

### Stinging Nettle – White Dead-nettle mimicry

was interested to read in David M. Wilkinson's admirable article 'On the scent of deception' (*BW* 28: 407–413) that he knows of 'no good evidence that the similarity in appearance between nettles' and dead-nettle species 'is mimicry, rather than just coincidence'.

In my experience, most browsing mammals avoid moving through a Stinging Nettle *Urtica dioica* bed, because, even though much of their body area may be well clothed with effective, protective hair, their sensitive noses are not (Burton

1976). Those animals that try to do so do not usually forget the consequences. They also avoid eating the plant (Rothschild 1961). Moreover, the Stinging Nettle's characteristic scent, although to my mind not unpleasant. is distinctive enough to reinforce the memory of its stings. Although I cannot present any definite evidence in support, it may well be that mammalian herbivores also avoid patches of certain species of dead-nettle that have a close resemblance to Stinging Nettles. I have noticed that the White Dead-nettle Lamium album may frequently be found growing in patches close to, or even among, Stinging Nettles, and may thus gain some measure of protection from browsing mammals, such as deer. Furthermore, the dead-nettle's slightly aromatic scent smells, to me, similar to that of the Stinging Nettle, although not so pleasant.

As is, of course, well known, a wide range of insects inhabits nettle beds, their larvae often feeding on the plant's foliage while presumably gaining some protection from birds and other predators by doing so. Some of these species are noxious and have apparently evolved the same odour as, or a similar one to, that of the Stinging Nettle, and advertise their presence by both their odour and their warning colour patterns. Thus, if this really is the case, the common protective system of the nettle community is the distinctive scent and this may, arguably, be an example of Müllerian mimicry (Rothschild 1961).

In addition to their camouflage, many other non-noxious, palatable insects obtain protection by living on Stinging Nettles, and birds such as the Common Whitethroat, Marsh Warbler and Nightingale, which

White Dead-nettles growing among Stinging Nettles. John F. Burton



often nest in nettle beds, also achieve some measure of protection from their predators by doing so.

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- Rothschild, M. 1961. Defensive odours and Müllerian mimicry among insects. Transactions of the Royal Entomological Society of London 113: 101–121.

### John F. Burton Heidelberg, Germany

### **Misplaced sentimentality**

Simon Barnes asks why many conservationists are wary of sentimentality towards wild animals (*BW* 29: 44). He goes on to highlight one of the main reasons (seemingly without realising it) when he refers to the Ruddy Duck cull, bemoaning the fact that it resulted in the loss of much public goodwill. And that is the point. An overly sentimental attitude towards this abundant, non-threatened, non-native species was a hindrance to conservation efforts aimed at securing the future of the White-headed Duck, a species under threat of global extinction. A similar point could be made about Grey Squirrel control in order to protect pockets of Red Squirrels, or Fox control to protect scarce ground-nesting birds.

Another significant issue is that the public often conflate animal welfare and wildlife conservation, aided and abetted by rehabilitation centres that rescue large numbers of animals from the wild each year. In the long term, this does not (in most cases) contribute in any meaningful way to wildlife conservation. Thirty years from now, the number of Hedgehogs living in Britain will be set by the prevailing conditions in our countryside: the availability of decent feeding sites and places in which to rear young – the carrying capacity of the environment. It will not be influenced by the thousands of underweight animals that are subject to an annual round-up, stuffed full of food and corralled into houses and outbuildings for the winter. Rehabilitation centres need funding and are often keen to portray this work as valuable for species conservation, a sleight of hand that works very well. That is understandably frustrating to those seeking funds for genuine conservation projects that will protect wildlife habitats and secure long-term, sustainable benefits.

Perhaps a final reason why conservationists shy away from sentimentality is the unpalatable but inescapable truth that animal suffering and areas rich in wildlife go hand in hand. Wild animals have a pretty hard time of it just trying to stay alive. If you help to protect an area of high-quality habitat, you are, unavoidably, helping to conserve an awful lot of animal suffering – disease, starvation, injury, and the inevitable deaths that tend not to be quick or painless. Of course, to complete the circle, every rescued Hedgehog nurtured through the winter is put back into the wild to take its chance. The more animals reared and released, the more competition there is for food and living space in a countryside that is increasingly hostile to this declining species. This can have only one outcome for those animals that do not compete successfully. Sentimentality can, at times, be misplaced and unhelpful, both for conservation and for the animals themselves.

#### lan Carter

### East Worlington, Devon

### Pollen record

read with great interest Miles King's account (BW 29: 27–33) of the recent conference at Knepp Castle entitled 'Freeing the Landscape'. It suggested that two speakers, Mike Allen and Professor Mick Crawley, had cast doubt on the accuracy - or even the scientific basis of pollen studies in deducing the vegetation cover of historic and prehistoric landscapes. By coincidence, a few days after reading the article I attended a public lecture by one of the country's leading palynologists, Professor Ralph Fyfe of Plymouth University. I was impressed by the lengths to which he and collaborators across Europe have gone to establish an accurate and credible relationship between free pollen quantities and actual vegetation. Samples have been taken from a large number and wide variety of contemporary sites, and both pollen and the quantity and types of vegetation growing on those sites measured. From these, a formula has been established to apply to pollen samples found in peat cores, correcting for the heterogeneous behaviour of different pollen types, especially trees as opposed to grasses.

Furthermore, the woodland/grassland balance resulting from these studies convincingly matches patterns of human colonisation and agriculture established by other archaeological methods.

It appears that no one at the conference was prepared to reply on behalf of palynology, so I think that it is important to record in your excellent journal that a very robust reply is in fact available. Readers can search online for 'POLLANDCAL network' for more details.

#### Tim Ferry South Brent, Devon

*Editorial note:* for a recent summary of the contribution that pollen analysis has made to ecology and conservation, see: Edwards, K. J., Fyfe, R. M., & Jackson, S. T. 2017. The first 100 years of pollen analysis. Nature Plants 3: 17001.

### The Vera Conference

As author of the book Ancient Oaks in the English Landscape, referred to by Jill Butler at the Knepp Vera conference in support of her challenge to perceptions of the primeval forest 'myth', as reported in British Wildlife (29: 27–33), I should like to make the following comments. Thank you to Miles for an excellent report on that conference. It is a pity that I could not attend myself, because I might well have represented the 'dissenting voice' that was rightly noted as missing.

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Palynology 'not a science'? I do not know Mick Crawley, but I would think that his negative view on palynology needs a comment. If you would read chapter eight of my book, it may also become clear why Jill Butler could perhaps have misquoted me.

Pollen diagrams do not reconstruct past vegetation structure (closed-canopy versus more open, treedominated landscapes) and no palynologist has ever made such a claim. All that they show is the relative abundance of taxa (mainly tree genera, but also shrubs and herbs) as indicated by deposited pollen. If grass pollen is 'scattered by wind', then so is tree pollen of wind-dispersed taxa such as birch and oak. Calibrations are needed for species which produce less pollen, and for insect versus wind dispersal mechanisms, as I explain in the chapter. Neither Clements nor Tansley ever used pollen diagrams to 'prove' their hypotheses of forest succession. The Frans Vera acolytes seem to misrepresent palynology. We would not know from those data whether or not the trees represented by the pollen and expressed as a percentage of the total pollen count stood in a closed-canopy forest.

The problem is this: when Frans Vera, Francis Rose, Keith Alexander, Ted Green and others talk about closedcanopy forest, they have in mind the young (plantation) forests of lowland north-west Europe. Leave these forests unmanaged and oak will be outcompeted by beech. We simply have no primeval forest with which to compare this, and only pasture woodland (not 'wood pasture', as this is the wrong translation of Domesday's silva pastilis) has truly ancient trees. It is a man-made landscape, maintained by domestic ungulates, with pollards or maidens left standing for centuries. To see primeval temperate forests, with large, open gaps and massive dead standing and fallen trees (for the ancienttree invertebrates), I recommend a visit to some of the Chilean national parks, containing Nothofagus and Araucaria, or the temperate rainforests of the US Pacific Northwest. The periodic 'hurricanes' (e.g. October 1987) in north-west Europe could create the same, but only in a few centuries from now under non-interference. Large herbivores are not needed and, at any rate, Britain had only the Aurochs and Ireland had none of Vera's 'drivers' of park-like woodland, and yet oak is as abundant in Ireland's pollen record as it is elsewhere in lowland north-west Europe. Quercus robur and Q. petraea have no need of big grazers for their long-term survival in the landscape. They require instead a more or less open forest structure, surely.

As a Dutchman who worked in the Netherlands before I came here, 25 years ago, I have known Vera's ideas for a very long time. Britain only now has this discussion, but we had it 35 years ago. It is all about how to manage nature reserves. Science is bent to serve arguments from both sides. Miles did a good job of trying to strike some balance, even though speakers from the opposite side were notably absent.

### Aljos Farjon FLS Honorary Research Associate, Royal Botanic Gardens, Kew





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