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Seabird monitoring in Britain and Ireland

Identification of Sooty Terns and Great Skuas



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Editorial

Roger Riddington
Spindrift, Eastshore,
Virkie, Shetland ZE3 9JS
Tel: 01950 460080
editor@britishbirds.co.uk

'News & comment' material to
Adrian Pitches
adrianpitches@blueyonder.co.uk

Subscriptions & administration

Hazel Jenner
4 Harlequin Gardens,
St Leonards on Sea,
East Sussex TN37 7PF
Tel & fax: 01424 755155
subscriptions@britishbirds.co.uk

Design & production

Mark Corliss
m.corliss@netmatters.co.uk

Advertising

Mathew Hance, Digital Spring Ltd,
Adam House, 7-10 Adam Street,
The Strand, London WC2N 6AA
Tel: 020 7520 9326
BBAdsales@digital-spring.co.uk

Guidelines for contributors

See www.britishbirds.co.uk

British Birds

Editorial staff Roger Riddington (Editor),
Caroline Dudley, Peter Kennerley
Editorial Board Dawn Balmer, Ian Carter,
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Secretary Nigel Hudson, Carn Ithen, Trench
Lane, Old Town, St Mary's, Scilly TR21 0PA;
secretary@bbrc.org.uk

Notes Panel

Angela Turner (Chair), Will Cresswell,
Ian Dawson, Jim Flegg, Ian Newton FRS,
Malcolm Ogilvie

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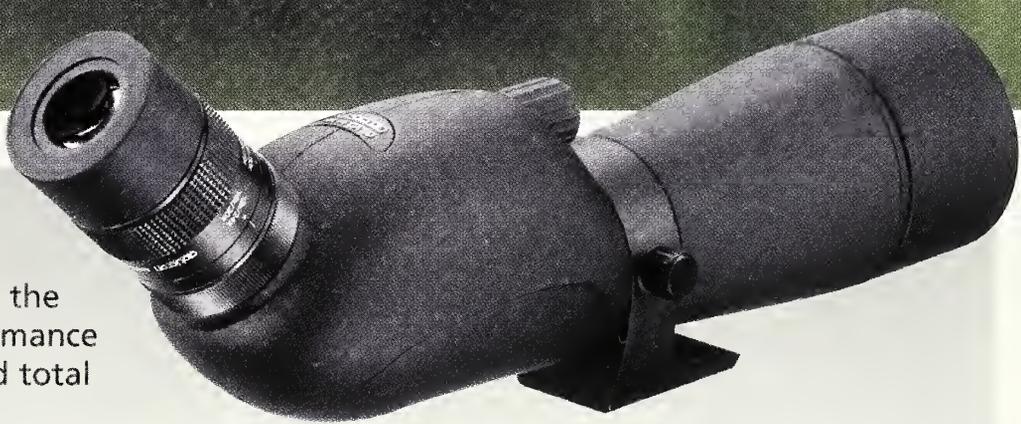
Front-cover photograph: Juvenile Great Skua *Stercorarius skua*, off Galicia, Spain, October 2007.

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Martin Heubeck's review of the development of seabird monitoring in Britain & Ireland is the third and final paper in our short series to commemorate Stanley Cramp. His paper is a fascinating mix of history, methodology and seabird population ecology. The challenges of keeping track of our internationally important seabird populations are perhaps more varied than for any other group, although nocturnal burrow-nesters like shearwaters and storm-petrels are probably still on top of the podium when it comes to giving fieldworkers a headache.

Of the many and varied threats to seabirds, the impact of climate change on oceanographic conditions, in turn leading to major changes in the local availability of small fish such as sandeels, is the most obvious problem in my backyard. I find it hard to come to terms with the fact that the Arctic Skua is nosediving towards extinction in Britain, even though the evidence is all too obvious. It is not the only species suffering, of course; Martin, a near-neighbour of mine, was heard to remark the other day that 2013 could be shaping up to be the 'mother and father of all bad breeding seasons' in Shetland, which is unusual pessimism from him at such an early stage (mid May). There are plenty of other threats to seabirds too, the pollution incident off southern England earlier this spring involving over 4,000 seabirds and polyisobutene (PIB) being one recent headline (see *Brit. Birds* 106: 125 and 302–303). The fact that conservation bodies have been joined by NGOs and key figures in the shipping industry in calling for tighter controls is welcome. No-one is under any illusion about the difficulty of tackling climate-related issues, but coming up with effective measures to prevent marine pollution incidents such as this surely cannot be beyond us.

Continuing the seabird theme, Dick Newell, Steve Howell and Dani López-Velasco are an exciting new pan-Atlantic seabirding team who have made some inroads into the knotty problem of identifying large skuas. The small but growing number of records of southern skuas from southwest European waters are evidence of new challenges ahead for seawatchers and pelagic birders.

Roger Riddington



British Birds aims to: ❖ provide an up-to-date magazine for everyone interested in the birds of the Western Palearctic; ❖ publish a range of material on behaviour, conservation, distribution, ecology, identification, movements, status and taxonomy as well as the latest ornithological news and book reviews; ❖ maintain its position as the journal of record; and ❖ interpret scientific research on birds in an easily accessible way.

A celebration of global friendship – BirdLife International’s World Congress

Richard Porter

As one of the most important first steps in the protection of biodiversity, friendship is a concept I always introduce when sharing ideas on conservation with young biologists in the Middle East. With friendship comes trust, and a willingness to engage in discussions and arguments without the fear of being wrong – or feeling awkward, suspicious or stupid. No matter how much or how little we know, how well or how poorly qualified we are, we are all equal – and establishing that is an important foundation for ensuring wise action. After all, we all share the same vision, and we are all striving to achieve the same conservation goals.

This month sees friendship on a global scale – BirdLife International’s World Congress in Ottawa. Held every four years, it will attract BirdLife partner organisations from over 100 countries – all of whom are leading conservation organisations. The UK partner is the RSPB, in the USA the National Audubon, in Iraq it’s Nature Iraq, in Australia



it’s BirdLife Australia, and so on. I often liken BirdLife to the United Nations of wildlife conservation bodies.

Dr Marco Lambertini is the CEO of BirdLife and I asked him about his vision for global conservation.

Although it started off as ICBP [the International Council for Bird Preservation], this is really the 90th anniversary of BirdLife. What do you consider are its main accomplishments in the last 20 years?

ML: I believe that BirdLife has excelled in two main areas, science and capacity development. We have generated some groundbreaking concepts in and approaches to conservation science – such as the Important Bird Areas standards, which have become a global currency for conservation – and have recently triggered the development of the broader concept of Key Biodiversity Areas. More recently, I would highlight the threatened species, IBA and habitat indicators that, through bird data, effectively signal



StormPetrel1/flickr.com

180. The Critically Endangered Amsterdam Albatross *Diomedea (exulans) amsterdamensis* benefits from both the BirdLife Preventing Extinctions Programme and the Global Seabird Programme. With support from Species Champion VBN (BirdLife in the Netherlands), LPO (BirdLife in France) acts for this albatross at its breeding grounds on Amsterdam Island, while the Albatross Task Force works with fishing fleets throughout Southern Oceans to help reduce seabird bycatch.



Marco Lambertini/BirdLife International

181. The 100,000 ha of the Harapan rainforest in Sumatra, under threat from illegal logging and clearance from illegal palm-oil plantations, is one of the few remaining large dry lowland forest blocks in Sumatra. The site has now been set aside for forest restoration by the Indonesian Government and given to the direct management of a BirdLife coalition including Burung Indonesia (BirdLife partner in Indonesia) and RSPB (BirdLife partner in the UK). Based on the Harapan example, more forest restoration concessions are being developed all over Indonesia.

crucial trends in the overall state of biodiversity and ecosystems. These indicators have been officially adopted by inter-governmental mechanisms like the UN Convention on Biological Diversity.

Even more unique, perhaps, has been our contribution to building local capacity for conservation. This is the core of our model, and the development of the BirdLife Partnership, now close to 120 countries and territories in all continents, is testimony of our efforts to empower local civil society conservation organisations around the world. BirdLife has played a pivotal role in promoting the establishment of, first, national bird and then nature conservation organisations in key countries like Brazil, Indonesia, Madagascar, Seychelles and Fiji. Over the last 20 years we have strived to unite and support the largest partnership for birds and nature across the world.

What is the BirdLife model – and why do you think it works?

ML: We passionately believe that developing indigenous commitment, knowledge and local organised action is the only way to secure real and long-term impact for birds and nature. This is why our entire effort goes in supporting national conservation organisations and local groups. They *are* BirdLife. They are at the core of the organisation. Our model is designed to empower and to deliver durable and sustainable local capacity for conservation, with a unique flow, local to global. This means that partners work locally but are united by a shared strategy. They benefit from each other's experience, ultimately joining forces to tackle international threats and drivers of biodiversity loss. A model where the outcome is greater than the sum of the parts.

Remind us of how many birds are threatened globally.

ML: Too many, around 1,200 species, one in eight living bird species. And it won't get any better over the next few decades. It is crucial that we act now to prevent extinctions and conserve our 'natural capital', recognising species as the foundation of the functionality of the ecosystems.

What do you see as the biggest problems facing conservation?

ML: There is no doubt that the demographic explosion of the last 100 years in particular has pushed us to live outside the boundaries of what planet earth can offer us. This has generated unprecedented loss of natural habitats, biodiversity and vital ecosystem services. Land conversion, mainly to agriculture, and the emission of greenhouse gases in particular are reaching levels that could undermine the functioning of the global ecosystem.

What are your personal priorities for leading BirdLife into the next decade?

ML: Perhaps one internal and one external. Internally, we need to continue along the path of increasingly working together. People from different countries came together 90 years ago and founded BirdLife because they realised that international collaboration was key to address the emerging issues for birds and nature. The same principle is even more valid today. If we want to make a real difference for nature at local and global levels, BirdLife partners will need to increasingly align along common programmes, join forces and share resources. Externally, we need to win our case advocating the vital importance of nature for our own well-being, economic stability – and indeed for promotion of social justice and the equitable sharing of resources. Nature provides everything we need to be happy, healthy and to prosper. On the other hand we need to continue to develop local capacity. Take our Important Bird Areas. We have identified over 11,000 IBAs around the



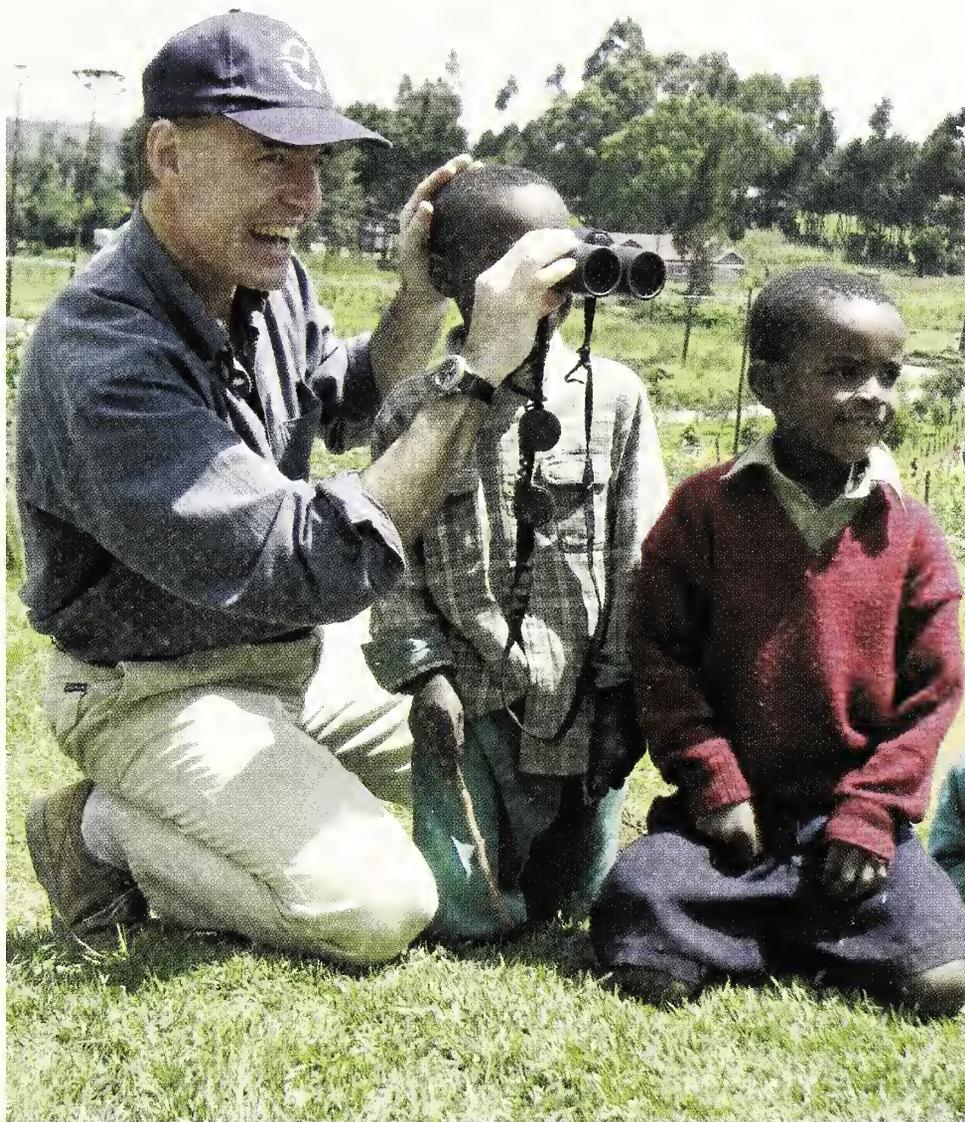
Jens and Hanne Eriksen

182. The Critically Endangered Sociable Lapwing *Vanellus gregarius* has benefited from the BirdLife Preventing Extinctions Programme, thanks to the actions of ACBK (BirdLife Partner in Kazakhstan) and support from the RSPB (BirdLife Partner in the UK) and Swarovski Optik. New breeding and wintering grounds have been identified and conservation measures implemented.

world and today we can count on 2,000 IBA local caretaker groups. My vision is to have a global Partnership in each country of the world and at least a local conservation group taking care of each IBA. And if we can manage to unite all this local energy, knowledge and passion to support each other and work together, it will be a truly unstoppable force for nature!

Are you honestly optimistic about the future for the wildlife on our planet?

ML: It is easier to be pessimistic than optimistic about the future. However, the growth in protected areas, the progress in legislation and enforcement, the development of consumer awareness and local action are all very positive trends, which let us hope for a better future for birds and biodiversity. Meeting so many dedicated young conservationists of the BirdLife Partnership in so many developing countries is perhaps for me the most uplifting and encouraging sign that we can achieve positive change. It is a fact that we have never been more aware of the impact we are having, the consequences we are facing and the solutions we can deploy. We have the knowledge and the means to make a difference. The commitment towards change is growing. This generation of women and men, not the previous, not the next one, has *the* great opportunity to turn the tide of the current ecological crisis into real sustainable living. Complex, difficult but so important and exciting. We cannot miss it.



David Thomas/BirdLife International

183. Marco Lambertini and friends. Working with people is at the heart of BirdLife's working model. Educating and inspiring young people to understand and care about wildlife is clearly one of the most valuable ways to build a conservation movement with a strong future.

Marco, thank you for taking the time to talk to *BB* readers. On behalf of *BB*, we send you our best wishes for the success of the World Congress in Canada in June. I'm looking forward to being at this international gathering – and enjoying myself. While conservation is a serious business, there's no reason why it can't be fun.

If you want to know more about BirdLife's World Congress or even attend, visit their website www.birdlife.org

News and comment

Compiled by Adrian Pitches

Opinions expressed in this feature are not necessarily those of *British Birds*

One airport grounded...

The RSPB has welcomed a recommendation ruling out, yet again, proposals for an airport in the Thames Estuary. The Transport Select Committee stated that the plans for a new hub airport in the estuary, the so-called 'Boris Island' trumpeted by London Mayor Boris Johnson, are too expensive and environmentally damaging, specifically mentioning the hundreds of thousands of birds that make the estuary their home.

The RSPB's Head of Conservation Policy, Sue Armstrong-Brown, said: 'Our fierce defence of the Thames Estuary has been recognised by the Transport Select Committee and we welcome its recommendation not to allow the development of an airport there. However, the committee's report goes on to state that there is a need to expand aviation in the southeast of England. It goes further and supports expansion at Heathrow. We are as opposed to that as we are to the inappropriate

development of the Thames Estuary.'

Aviation is the fastest-growing source of greenhouse-gas emissions in the UK and by 2050 aviation could account for one quarter of the UK's total greenhouse-gas emissions; yet there are no targets to contain this, and these emissions are still not counted in the UK's carbon budget system. However, the transport committee was convinced of the economic necessity of expansion put forward by the aviation industry. This was despite the recent submission to the UK Government of a new report commissioned by the RSPB with HACAN (Heathrow Association for the Control of Aircraft Noise) and WWF from CE Delft. The study found that once a city reaches a certain level of 'connectedness', further expansion is unlikely to significantly affect the economy. London already has six airports with seven runways and more flights than any other city in the world.

...But another airport cleared for take-off

Lydd airport in Kent, neighbouring Romney Marsh and the Dungeness RSPB reserve, has been given permission to extend its runway and handle up to 500,000 passengers a year. The plan was approved by Eric Pickles, the communities and local government secretary, and Patrick McLoughlin, the transport secretary, following a protracted dispute over an application first submitted in 2006. The growth of London Ashford airport, as it is formally known, is designed to ease air congestion in the southeast and create local jobs. The RSPB and the CPRE (Campaign to Protect Rural England) are examining the 365-page report to see whether they can seek a judicial review in the High Court.

Shepway District Council voted in favour of the expansion plan in 2010 but the scheme was called in by central government for assessment because of its national importance. Its approval allows the construction of a runway extension that can take Boeing

737 charter flights, and a new terminal building.

The RSPB's conservation director, Martin Harper, said: 'This is the wrong decision as it opens the door to real damage to Dungeness, to its wildlife and the quality of life for many of its residents and risks destroying a unique asset that is enjoyed by hundreds of thousands of people.'

Neil Sinden, policy and campaigns director at the CPRE, said: 'This is a terrible decision which threatens one of the few remaining areas of rural tranquillity in the heavily pressured southeast, and in a county once proudly described as the Garden of England. And it will not just alarm environmentalists.'

'There were many in the aviation sector who considered this scheme to be nonsensical and a non-starter. If there are any economic benefits, they will be heavily outweighed by the environmental damage that it will cause on so many levels. Campaigners are bound to consider all legal options to have this disturbing decision overturned.'

One of the worst UK marine pollution incidents for decades

The number of seabirds recorded washed up on beaches in two incidents along the English Channel coast earlier this year has passed 4,000. Now, leading wildlife conservation and animal

welfare charities and the UK Chamber of Shipping, supported by the wider industry body MaritimeUK, have come together as a single voice to call for an urgent review of the hazard classifica-

tion status of polyisobutene (PIB), which is the substance involved in these two incidents.

The Maritime and Coastguard Agency (MCA) is currently investigating the cause and culprit of these incidents. If it is confirmed that this disaster was the result of illegal activity, the UK Government and the International Maritime Organisation should ensure there is no obstacle to prevent those responsible from being brought to justice. To date, however, no-one has been successfully prosecuted for illegally discharging PIB from ships in European waters.

Currently, it is legal to discharge PIB in small quantities, based on certain conditions as set out by the international MARPOL Convention (International Convention for the Prevention of Pollution from Ships). However, the impacts of PIB on marine ecosystems, as well as the amount of PIB released routinely as part of legal shipping operations, are not well known or understood.

Alec Taylor, marine policy officer for the RSPB, said: 'The needless deaths of thousands of seabirds on our beaches has sickened and angered many people. With support from the shipping industry, we're hoping that the UK Government can push for tighter regulations preventing the discharge of PIB into the sea for good.'

Pollution programme manager at the Marine Conservation Society, Robert Keirle, said: 'The International Maritime Organisation must reclassify PIB as soon as possible under the International Convention on the Prevention of Pollution from Shipping.'

David Balston, director of safety and environment at the UK Chamber of Shipping, said: 'Although no regulation can eliminate the possibility of illegal activity, we strongly support an urgent review to see how best to help prevent a recurrence of the recent deaths and injury to wildlife.'

Trader in birds' eggs spared jail

The conviction of an Inverness man involved in trading the eggs of some of Europe's rarest birds has been welcomed by RSPB Scotland. Keith Liddell (53) pleaded guilty to 11 charges relating to the trading, or offering to trade, in eggs of a number of Europe's most threatened species including Griffon Vulture *Gyps fulvus*, Egyptian Vulture *Neophron percnopterus* and Lesser Kestrel *Falco naumanni*. He also pleaded guilty to two charges of unlawful possession of 338 eggs including a number of Scottish rare breeding birds, such as Slavonian Grebe *Podiceps auritus*, Black-throated Diver *Gavia arctica* and Osprey *Pandion haliaetus*.

In sentencing Liddell to 220 hours of community service, Sheriff Gordon Fleetwood said: 'This is a direct alternative to prison. I have to take into account the number and seriousness of the charges – and that you were aware that your activities were criminal – and balance that with your previous good character.' Speaking after Liddell was sentenced, Ian Thomson, Head of Investigations at RSPB Scotland, confirmed that this has been one of the most complex enquiries in which the RSPB Investigations team has been involved, and that Liddell, whose activities posed a significant threat to rare breeding birds not just in Scotland but farther afield, was 'very fortunate to have escaped a jail sentence'.

In fact, this case was part of one of the largest-ever egg-trading enquiries in the UK. An associate of Liddell's, Andrew Seed, was convicted for similar offences in Co. Durham in 2010. The investigation revealed a network of individuals using the internet to facilitate swapping and purchasing

of the eggs of protected birds, with connections to Europe, the USA and Australia. Three men are under investigation in Sweden following the seizure of 6,000 eggs, while in Finland over 10,000 eggs were seized from another individual.



Bill Coster/FLPA

184. Lesser Kestrel *Falco naumanni*, just one of the species exchanged in the egg-trading ring involving Keith Liddell; Extremadura, Spain, April 2005.

New breeding species choose nature reserves

A new study by scientists at the University of York and the RSPB shows that bird species that have colonised the UK in recent decades breed initially almost exclusively in nature reserves and other areas specially protected for wildlife. Jonathan Hiley, a PhD student at York, said: 'Nature reserves provide ecological "welcome mats" for new arrivals.'

Published online in *Proc. Roy. Soc. B*, the study shows that, of the 20 wetland bird species that bred for the first time in the UK since 1960, 18 bred first in protected areas, which were crucial as the population established and grew. Once established in reserves, the birds began to spread out into other locations and their range expanded. For some southern species, such as Little Egret *Egretta garzetta* and Cetti's Warbler *Cettia cetti*, these arrivals appear to be in response to a changing climate. For others, such as Common Crane *Grus grus*, it's a response to other factors, such as recovery from historical loss of habitat or persecution. The mainstay of traditional conservation has been to establish protected areas to provide a refuge against loss of habitat and other threats.

Ironically, this study comes at a time when the value of such protected areas is being questioned in some quarters because climate change and other

factors cause animals to move away from their traditional haunts and into new regions. However, species that are shifting their ranges also need high-quality places to move into. For birds at least, it appears that the current network of protected areas in the UK is still providing these refuges. According to Jonathan Hiley: 'This study shows that the hugely important role that nature reserves and protected areas play will continue undiminished in the future.'

Co-author Richard Bradbury, of the RSPB, said: 'Many species have been able to colonise, or recolonise, the UK only as a result of tremendous recent efforts by conservationists to recreate and manage large wetland areas. But we must not forget that the changes in our climate, which brought many of [these species to Britain], may prove catastrophic for wildlife in the long term if they continue unabated.'

Avalon Marshes, on the Somerset Levels, is a prime example of a 'welcome mat' laid out for potential new colonisers to Britain, with the first breeding records in Britain of Great White Egret *Ardea alba* in 2012 (*Brit. Birds* 106: 258–263) and Cattle Egret *Bubulcus ibis* in 2008; while Britain's second breeding record of Little Bittern *Ixobrychus minutus* occurred there in 2010.

Spoonie supporters fork out £1,500

The sponsored run along the North Norfolk coast organised by the Oriental Bird Club on 5th May raised a whopping £1,500 for Spoon-billed Sandpiper *Calidris pygmaeus* conservation. The money has been donated to the conservation breeding programme for this Critically Endangered shore-

bird at WWT Slimbridge. OBC Council member Mike Edgecombe said: 'We hope next year to make this event even bigger. So if anyone feels like taking part, by cycling, running or simply walking the North Norfolk coastal path, then put the provisional date of 4th May in your 2014 diary.'

Liben Lark erratum

Further to the update on Liben Lark/Archer's Lark *Heteromirafr archeri* in Ethiopia (*Brit. Birds* 106: 244), Nigel Redman has pointed out that the outlying population at Jijiga was actually discovered by Hadoram Shirihihi in 2004. This was subsequently confirmed by local birder Merid Gabremichael and then reconfirmed by David Hoddinott in 2011.

BB grant to the Isle of May Bird Observatory

A BB grant of £400 has been awarded to the Isle of May Bird Observatory appeal. The money will go towards the reconstruction of the observatory building. This Observatory is well known to many BB readers as a key migration site, and as the base for some excellent long-term studies of seabirds.

OSME in summer

The Summer Meeting of OSME, the Ornithological Society of the Middle East, the Caucasus and Central Asia, will be held on Saturday 6th July at BTO Headquarters, Thetford, Norfolk. Doors open at 10.00 am and non-members are welcome. The general theme is 'Monitoring Bird Populations in the OSME Region', and speakers include Maxim Koshkin (Macqueen's Bustard in the Kyzylkum Desert), Wouter Vansteelant (Raptor counting in Georgia), Chris Bowden (Bald Ibis – Syria, Turkey and the Arabian flyway), and Rob Sheldon (White-headed Ducks in Central Asia). Contact Ian Harrison at secretary@osme.org for further details.

Yellowhammer dialects

Most birders will be familiar with how some bird species have subtly different songs in different regions of the UK – regional dialects, comparable with the variation in accent of human speech. The Yellowhammer *Emberiza citrinella* is an ideal species for studying such geographical variation in bird song, particularly the distribution, evolution and function of song dialects. Over ten different Yellowhammer dialects have been identified in Europe, at least some of which are present in the UK. In studying bird vocalisation at a large scale, the involvement of volunteers is invaluable; for example, a novel citizen science project run by researchers from the Charles University in Prague, along with the Czech Society for Ornithology (the Czech BirdLife partner), provided a detailed map of dialect distribution in the Czech Republic in just two years (2011–12).

Following this success, a Yellowhammer Dialects Project has been launched, with the support of the RSPB and Forest & Bird (the New Zealand BirdLife partner). Its aim is to compare the distribution of dialects in the UK and New Zealand, with involvement of the public in both countries, to evaluate dialect evolution after colonisation. British Yellowhammers were introduced to New Zealand by acclimatisation societies in the late nineteenth century; fortunately, the numbers of birds and places of releases were recorded. Following introduction they spread so rapidly that by the early 1900s they were regarded as serious pests. The distribution of their dialects in this newly colonised territory may reflect the spread of the founder populations as well as local cultural evolution. To get some insight on this, the project seeks information about dialects in both



Mike Lane

185. Singing Yellowhammer *Emberiza citrinella*, Scotland, June 2009.

countries. Your contribution by recording and submitting Yellowhammer song recordings, from anywhere in the UK, would be extremely valuable. No specialised equipment is needed to record the song in sufficient quality to allow dialect identification (most digital cameras or newer mobile phones are sufficient). To learn more and get involved, visit the project webpage www.yellowhammers.net

In praise of... 'BB'

The *British Birds*-sponsored satellite-tagged Cuckoo *Cuculus canorus* has returned safely from Africa to the site in Scotland where he was trapped and tagged last spring. 'BB' arrived back at Loch Katrine, near Stirling, on 1st May, hot on the heels of his fellow Scottish Cuckoo 'Chance', who was tagged at the same location in 2012. They were the only survivors of five birds caught and satellite-tagged in Scotland last spring. Five birds were also trapped in Wales but only one of them, 'David', has successfully completed his return migration to Tregaron in Ceredigion.

'Chris', the sole surviving English Cuckoo, returned to Norfolk for the *second* time in May 2013 after his initial capture in 2011 and return in 2012.

This innovative BTO project www.bto.org/cuckoos has provided new insights into the routes that Cuckoos take on autumn and spring migration – and where they winter (the Congo). For 'BB' autumn migration may already be approaching: he left the UK on 18th June in 2012. Safe journey 'BB'! www.bto.org/science/migration/tracking-studies/cuckoo-tracking/scotland/BB

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Censusing and monitoring breeding seabirds in Britain and Ireland

Martin Heubeck



Richard Allen

Abstract This is the third and final paper in a series to mark the research interests of former *BB* editor Stanley Cramp. Along with Bill Bourne and David Saunders, Cramp co-authored the first of three landmark texts that document the national surveys of British and Irish seabirds – Operation Seafarer (in 1969–70), the Seabird Colony Register (1985–88) and Seabird 2000 (1998–2002). This paper charts the progress of seabird monitoring in Britain and Ireland, mainly during the past 50 years, highlighting developments in methodology and some of the key results and changes in seabird populations.

With a long and varied coastline, situated where the waters of the deep Atlantic mix with those of the continental shelf, Britain and Ireland hold internationally important populations of a diverse range of breeding seabirds. Most are colonial, nesting in habitats as varied as the salt-marshes of the Solent and the sea cliffs of St Kilda. Large, spectacular seabird colonies attract thousands of tourists each year and can now be regarded as valuable assets to

coastal economies, rather than as resources to be exploited, as was generally the case in the nineteenth century. However, apart from any intrinsic or financial worth of seabirds, governments now have international obligations to report on their conservation status and that requires information on population sizes, trends, and (ideally) the factors underlying the demographic process (Tasker 2000). Developing the ability to do that with some degree of confidence has been a process that

has evolved over at least 40 years, in which many individuals have played key roles. Summarising this story inevitably involves some partiality in terms of species and geographic focus.

Early enquiries and surveys

The population explosion of the Fulmar *Fulmarus glacialis* in the late nineteenth and early twentieth centuries elicited much interest among ornithologists, and an account of its status and distribution in the British Isles up to 1911 (Harvie-Brown 1912) was followed up by further enquiries in 1934, 1939, 1949 and 1959, mostly organised by the BTO, and analysed in great detail by James Fisher and George Waterston (Fisher & Waterston 1941; Fisher 1966). With a limited number of colonies, the Northern Gannet *Morus bassanus* was another candidate for early investigations and population estimates (Gurney 1913; Wynne-Edwards *et al.* 1936), while other surveys were organised for Black-headed Gull *Chroicocephalus ridibundus* in 1938 (Hollom 1940) and Great Black-backed Gull *Larus marinus* in 1956 (Davis 1958). By 1957, John Coulson and Edward White had begun counting Kittiwake *Rissa tridactyla* colonies in northeast England and southeast Scotland and, having collated historical data

and realised that numbers had increased considerably in those regions (Coulson & White 1958), an enquiry into the species' distribution and status was added to that of the Fulmar in 1959, with questionnaires covering both species being returned by almost 500 observers. For Kittiwakes, this elicited varying degrees of information with, for example, a detailed census of Fowlsheugh (North-east Scotland) giving a total of 12,880 nests, breeding being confirmed at Horn Head (Co. Donegal) but with no indication of colony size, and breeding only being suspected at Marwick Head, in Orkney (Coulson 1963). Nevertheless, the 1959 enquiry provided a baseline for much of Britain and Ireland against which subsequent counts could be compared (Coulson 1983).

The 1960s: the Seabird Group and Operation Seafarer

By the early 1960s, studies of the breeding biology and ecology of individual species or species groups were being undertaken (for example, *Larus* gulls: Harris 1964, Brown 1967; Manx Shearwater *Puffinus puffinus*: Harris 1966, Perrins 1966; Gannet: Nelson 1966) and longer-term studies on others had begun (e.g. Fulmar: Dunnet *et al.* 1963; Kittiwake: Coulson & White 1958). The RSPB, ICBP (International Council for Bird Preservation) and others had been concerned about the effects of chronic oil pollution on seabird populations since the 1920s (see Barclay-Smith 1956 and Bourne 1968 for reviews), and while the RSPB had organised some beached bird surveys in the early 1950s, there was recognition of the need to improve recording and monitoring of this. There was also a developing interest in seawatching and the factors governing the movements of seabirds. Systematic observations were being made at the Irish observatories of Cape Clear, Tory Island and Malin Head and by 1965 there were attempts to co-ordinate timed observations at other Irish headlands and islands, through the 'Atlantic-Seawatch' scheme. Meanwhile, an increasing number of publications had been reporting on local studies, or expeditions to particular seabird colonies and remote islands on the west coasts of Scotland (e.g. Anderson *et al.* 1961) and Ireland (Cabot 1963), but with little



Eric and David Hosking

186. James Fisher, at the 15th International Ornithological Congress in The Hague, the Netherlands, in 1970.

co-ordination of these activities or interpretation of data in a national context.

In the summer of 1965, Bill Bourne circulated a 'proposal for the formation of a British Seabird Society' to some 222 people, with the aim of improving liaison and information sharing between those interested in the study of British seabirds. Among the suggested objectives was the organisation of systematic investigations, and top of the list of these was 'systematic censuses of breeding populations'. The outcome was the formation of the Seabird Group at New College, Oxford, on 6th January 1966, with the formal support of the BOU, BTO and RSPB. Chaired by George Dunnet and with Bill Bourne as Secretary, the Group immediately formed a Census Committee, chaired initially by James Fisher and with Raymond O'Connor as Secretary, and began the planning for a complete census of the breeding seabirds of Britain and Ireland: 'Operation Seafarer' (named, at James Fisher's suggestion, after the seventh-century poem). The urgency of this task and the paucity of information on colonies and their numbers were highlighted by the *Torrey Canyon* oil spill in March 1967, and attempts that summer to assess its impact on the breeding seabirds of Cornwall (O'Connor 1967).

The Seabird Group's Executive Committee met in February 1968. The receipt of generous grants from various bodies, including the WWF/RSPCA/RSPB 'Torrey Canyon Appeal', had allowed the employment of a full-time organiser for Operation Seafarer; David Saunders, who had been warden of Skomer Island, was duly appointed. The Group recorded its thanks to Stanley Cramp for his efforts in obtaining these grants; he was co-opted onto the Executive Committee as the BOU-nominated Representative, and then persuaded to replace George Dunnet as Chairman, a position he held until 1974.

David Saunders spent the spring and summer of 1968 meeting local observers to assess coverage requirements, and published a list of suggested 'expedition' locations in the October 1968 issue of *Seabird Bulletin* (6). It had been anticipated that 95–99% coverage of the British and Irish coast might be achieved and, by the end of the 1969 seabird breeding season, more than 1,000 observers

had participated in Operation Seafarer, with financial assistance given to 30 expeditions, groups and individuals. The few remaining sections of coast were surveyed in 1970. The logistical achievement of completing this task and analysing the mass of data gathered simply cannot be overstated, especially in our modern world of e-mails and computerised databases. The results were published in *The Seabirds of Britain and Ireland* (Cramp *et al.* 1974), which drew together a wealth of detail about what was known about breeding numbers prior to the census. At the same time, the difficulty of obtaining meaningful counts of certain species and the need for research into more accurate census and monitoring techniques was fully recognised.

The 1970s and early 1980s: survey techniques and monitoring

During the 1970s and into the early 1980s, work on refining survey techniques and improving the accuracy of counts for a number of species progressed steadily. For Common Guillemots *Uria aalge* and Razor-bills *Alca torda*, this included investigating when numbers at colonies were most stable, and determining what level of change could be detected by repeated counts of individuals (Lloyd 1975; Birkhead & Hudson 1977; Stowe 1982a; Wanless *et al.* 1982). By the early 1980s, recommended techniques had also been developed for Black Guillemots *Cepphus grylle* and Puffins *Fratercula arctica* (Seabird Group 1980), terns (Bullock & Gomersall 1981), skuas (Furness 1982), and gulls (Wanless & Harris 1984).

In 1969, the Seabird Group had replaced the cyclostyled *Seabird Bulletin* with a printed *Seabird Report*, the first journal in the world devoted to seabirds, in which many of the post-Operation Seafarer surveys and investigations of the 1970s were published. (Retitled *Seabird* in 1984, the journal continued until 1998, when it was replaced by the quarterly *Atlantic Seabirds*, published jointly with the Dutch Seabird Group from 1999 to 2006. For various reasons, this arrangement was dissolved and the Seabird Group resumed publishing *Seabird* annually in 2008.)

The first attempt to monitor annual changes in cliff-nesting seabirds was made by

the RSPB and the Seabird Group, who from 1971 to 1979 organised repeated counts of Fulmars, Kittiwakes, Common Guillemots and Razorbills in study plots at 34 colonies throughout Britain and Ireland (Stowe 1982b). The selection of colonies was largely dictated by the availability of observers able to make repeat visits, and the frequency of visits within a season and between years varied considerably between colonies. Despite these difficulties in sampling and interpretation, it was concluded that even relatively small changes could be detected by repeated counts at study plots – but whether such changes were representative either of whole colonies or of regional populations required further investigation. The results suggested that the Fulmar population continued to increase during the 1970s, as did Common Guillemots generally, and Razorbills in north and east Britain, but that changes in Kittiwake numbers showed much local and regional variation.

By the mid 1970s, North Sea oil developments had focused attention on northern Scotland, with the construction of oil exporting terminals at Flotta in Orkney and Sullom Voe in Shetland, and there were corresponding fears that losses to oil pollution could have an impact on seabird populations. In 1974, the Nature Conservancy Council (NCC) contracted the Institute for Terrestrial Ecology (ITE) to design a monitoring scheme for detecting changes in the seabird colonies of national importance in Shetland (Harris 1976; Richardson *et al.* 1981). This formed the basis of the Shetland Oil Terminal Environmental Advisory Group's (SOTEAG) seabird monitoring programme in Shetland, which began in 1978 and complemented work already underway on Fair Isle, and the NNRs of Noss and Hermaness. SOTEAG, formed in 1977, examines and advises on the environmental implications of the Sullom Voe Terminal, including its associated tanker traffic and activities in the West of Shetland region; its Monitoring Committee designs and manages a comprehensive environmental monitoring programme of which the seabird studies are one element. Similar work began in Orkney in 1976 (Wanless *et al.* 1982) and in each island group a monthly beached bird survey scheme was also

established. In the Moray Firth, cliff-nesting seabirds were resurveyed in 1977–84 and the RSPB established monitoring plots at colonies in east Caithness in 1980 (Mudge 1986); appropriately, much of the funding for these studies in northern Scotland came from the oil industry.

Two events in the early 1980s tested the newly established national monitoring schemes, and highlighted the difficulty of demonstrating any impact of even large-scale mortality events on breeding populations. In the first, tens of thousands of Common Guillemots and Razorbills were killed by oil pollution in the North Sea in winter 1980/81, particularly along the Skagerrak coast of southern Norway and western Sweden. Analyses of ring-recovery rates and biometrics indicated the age classes and regional breeding populations likely to have been most affected, but it was acknowledged that monitoring techniques at the time were insufficiently accurate to detect single-figure between-year percentage changes in breeding numbers (Baillie & Mead 1982; Anker-Nilssen *et al.* 1988). Baillie & Mead (1982) also advised that: 'the possibility of producing regional indices of changes in auk numbers should be considered'.

The second incident, unrelated to oil, was the February/March 1983 wreck of auks in eastern Britain, when over 28,000 birds were collected from beaches, with Razorbill the commonest casualty (Underwood & Stowe 1984). Again, physical examinations and ringing recoveries were used to indicate age groups most affected and their breeding origins (Hudson & Mead 1984; Jones *et al.* 1985). Recovery rates of adult Razorbills from colonies in Orkney and Shetland were particularly high, and while reduced numbers of individuals were recorded in monitoring plots at some colonies there in 1983 (Benn *et al.* 1987; Dunnet & Heubeck 1995), studies on Fair Isle suggested a buffering effect on breeding numbers through increased recruitment of first-time breeders (Riddiford 1984). Similarly, more intensive work on the Isle of May had detected increased overwinter mortality of Razorbills and Puffins in 1982/83, but with no effect on breeding numbers in 1983 (Harris & Wanless 1984).

The Seabird Colony Register, 1985–88

In autumn 1983, NCC and the Seabird Group began planning a second full census of breeding seabirds of Britain and Ireland, to be called the Seabird Colony Register (SCR). By then NCC had established its Seabirds Team, based in Aberdeen, and Clare Lloyd was appointed project officer for the census, working alongside the NCC team. The intention this time was not just to repeat the Operation Seafarer census and produce another book, but to also establish a computerised database that would become a single reference source for breeding seabirds. As well as the census results, this database was to include counts made since Operation Sea-

farer, and become the repository for data collected in the future (confusingly, both the census and the database were called the SCR). Fieldwork was scheduled to begin in summer 1985, and the project was launched at the Seabird Group's second International Conference, in Staffordshire in February 1985, appropriately themed *Population and Monitoring Studies of Seabirds*.

Over 600 people participated in the census, most fieldwork was completed by the end of summer 1987, and the results were published in *The Status of Seabirds in Britain and Ireland* (Lloyd *et al.* 1991). As with Operation Seafarer, coverage was limited to the coast, although dedicated surveys of Great *Stercorarius skua* and Arctic Skuas

Table 1. Population estimates for seabirds breeding in Britain and Ireland. Figures in roman type are taken from the species accounts in Mitchell *et al.* (2004) and may differ from those published in Cramp *et al.* (1974) and Lloyd *et al.* (1991); for a full explanation see pp. 41–47 in Mitchell *et al.* (2004). Figures in italics are estimates taken from the original publications.

Species and count unit	Operation Seafarer (1969–70)	Seabird Colony Register (1985–88)	Seabird 2000 (1998–2002) [+ inland]
Fulmar (AOS)	308,960	536,577	537,991
Manx Shearwater (AOS)	<i>175,000–300,000</i>	<i>250,000–300,000</i>	305,072–374,067
European Storm-petrel (AOS)	unknown	<i>70,000–250,000</i>	94,000–162,000
Leach's Storm-petrel (AOS)	unknown	<i>10,000–100,000</i>	36,742–65,193
Northern Gannet (AOS/AON)	137,661	186,508	231,549
Great Cormorant (AON)	8,010	10,806	11,560 [13,628]
Shag (AON)	33,876	42,970	32,306
Arctic Skua (AOT)	1,039	3,388	2,136
Great Skua (AOT)	3,079	7,645	9,635
Mediterranean Gull (AON)	0	1	113
Black-headed Gull (AON)	74,927	77,573	79,392 [141,890]
Common Gull (AON)	12,983	15,471	21,475 [49,780]
Lesser Black-backed Gull (AON)	50,035	64,417	91,323 [116,684]
Herring Gull (AON)	343,586	177,065	147,114 [149,177]
Great Black-backed Gull (AON)	22,412	20,892	19,691 [19,713]
Kittiwake (AON)	447,967	539,645	415,995
Sandwich Tern (AON)	12,073	16,047	14,252
Roseate Tern (AON)	2,384	550	790
Common Tern (AON)	14,890	14,861	14,497
Arctic Tern (AON)	52,288	78,764	56,123
Little Tern (AON)	1,917	2,857	2,153
Common Guillemot (Ind)	652,175	1,182,791	1,559,484
Razorbill (Ind)	167,683	176,135	216,087
Black Guillemot (Ind)	–	38,048 (UK)	39,316 (UK) 42,683 (UK + RoI)
Puffin (AOB)	452,069	506,626	600,751

Key: AOS=Apparently Occupied Site, AON=Apparently Occupied Nest, AOT=Apparently Occupied Territory, AOB= Apparently Occupied Burrow, Ind=Individuals.

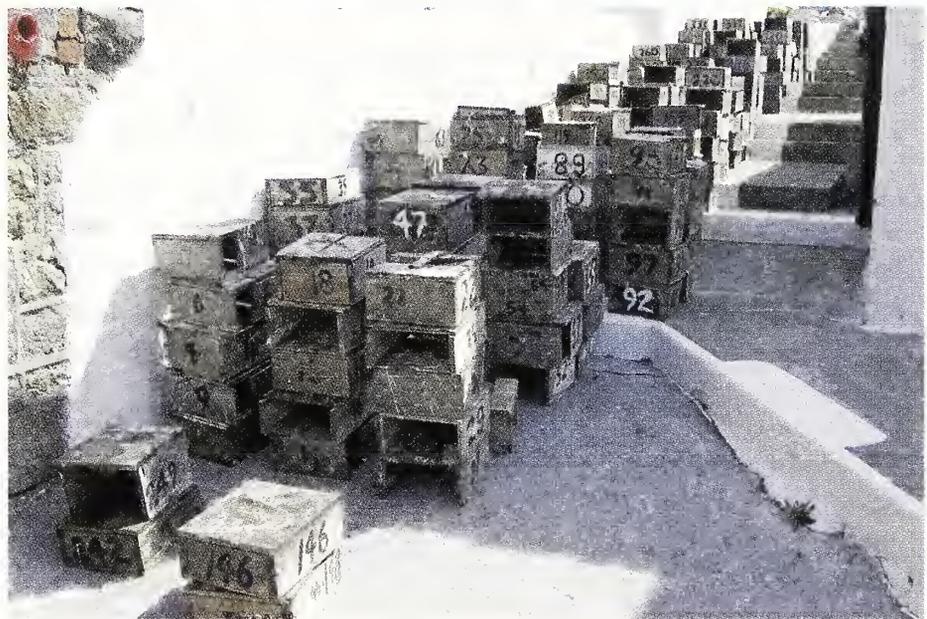
S. parasiticus had been carried out in Orkney in 1982 and Shetland in 1985 (Meek *et al.* 1985; Ewins *et al.* 1988), and the results of a 1980 census of tern colonies in the Northern Isles were also used (Bullock & Gomersall 1981). Coastal coverage was virtually complete in Britain and Northern Ireland for the SCR, but less so on the west coast of Ireland, where some estimates had to be made based on changes since Operation Seafarer along coasts surveyed in both censuses. The problem also remained of proving breeding of the nocturnal shearwaters and storm-petrels, far less obtaining population estimates, and while all Manx Shearwater colonies known to have been occupied in 1969–70 were at least revisited, the number of breeding pairs at many could only be estimated in orders of magnitude.

Despite some methodological differences in the two censuses, regional comparisons could be made with Operation Seafarer results for many species, with more detailed comments on population changes using data from published counts and more regular monitoring in the 1970s and early 1980s. Most species had increased between the two censuses (table 1), none more so than the Common Guillemot, which was calculated to have increased by 5% p.a. during 1969–82, to about 1.1 million individuals (Stowe & Harris 1984). The SCR total of 1.2 million individuals was remarkably close to that estimate, and monitoring counts suggested that numbers in north and east Scotland and southwest Britain had begun to decline prior to the census.

The increase (+74%) and expansion of the Fulmar population was no great surprise, nor was the 35% rise in Gannet numbers, with six new colonies having formed since Operation Seafarer. Overall, Great Cormorant



Richard Nairn



Laura Glenister



Laura Glenister

187–189. Each spring, BirdWatch Ireland's seasonal wardens deploy 600 nestboxes on the tiny island of Rockabill, Co. Dublin, to help boost breeding numbers and success at Europe's largest Roseate Tern *Sterna dougallii* colony.

Phalacrocorax carbo and Shag *P. aristotelis* numbers had also increased, except in northern and western Scotland for the former, and Orkney and Shetland for the latter. Arctic and Great Skuas had increased in Orkney and Shetland, and both species had spread and increased elsewhere in northern and western Scotland. The greatest change in coastal populations of *Larus* gulls was a halving in numbers of Herring Gulls *L. argentatus*, which had been subject to culling and other control measures in many regions of Britain and Ireland, and which had increasingly taken to nesting in urban situations. One addition to the British list of breeding seabirds was Mediterranean Gull *L. melanocephalus*, with birds present at five sites in 1986. A progressive decline and redistribution had occurred in the well-monitored Roseate Tern *Sterna dougalli* population, with half the British and Irish breeders now confined to the tiny island of Rockabill (Co. Dublin). Differing coverage in the two censuses meant it was difficult to interpret changes in Common *S. hirundo* and Arctic Tern *S. paradisaea* populations, although the former appeared to have decreased in England and Ireland but increased in Scotland, while a resurvey of the latter in its Orkney and Shetland stronghold in 1989 suggested that numbers had fallen by 50% there since 1980. Differences in count units bedevilled comparisons of Razorbills, but the conclusion that numbers had either increased since Operation Seafarer or remained stable in some regions was broadly supported by monitoring data; an exception was western and southern Ireland where mortality in static fishing nets may have contributed to a population decline. For the first time, a population figure for Black Guillemots derived from pre-breeding counts of adults could be given for most of the UK, but numbers in Ireland remained largely unknown. Assessing changes in Puffin numbers was even more difficult than for the other auks, although it was clear that numbers had increased markedly in eastern Scotland and northeast England, but had probably declined in western Ireland.

The Seabird Monitoring Programme

In 1986, while the SCR census was still underway, the NCC began funding work to collect data on seabird breeding success. Initially, this was largely co-ordinated by Mike Harris (ITE); who had been commissioned by NCC to develop low-input monitoring methods, review the aims and objectives of existing seabird monitoring schemes, and recommend a strategy for the future (Harris 1987, 1989; Harris & Forbes 1987). The main elements of this were to be:

- The establishment of four geographically strategic Key Sites where, under contract to NCC, detailed information would be collected on seabird diet and survival, as well as breeding success and changes in numbers. These were to be Fair Isle (Shetland), where the Bird Observatory had been conducting monitoring counts since 1971; the Isle of May (Fife), wardened by NCC and where ITE was conducting research on seabird ecology; Skomer (Pembrokeshire), wardened by the Dyfed Wildlife Trust and with a long history of research on seabirds by Oxford University; and Canna (Highland), to which Bob Swann and colleagues had been making annual expeditions since 1969.
- Existing schemes elsewhere would be encouraged to place greater emphasis on monitoring breeding performance using standard methods, and NCC funding would be made available (via the Seabird Group) to groups and individuals to assess seabird productivity more widely.
- A post would be created within NCC to administer and co-ordinate seabird monitoring activities throughout Britain and Ireland, and produce an annual report.

The Seabird Monitoring Programme (SMP) was formally established in 1989. Paul Walsh was appointed as co-ordinator and *Seabird Numbers and Breeding Success in 1989* (Walsh *et al.* 1990) was the first of 18 published annual reports on the state of seabirds in Britain and Ireland. Initial population indices (1986–89) and figures for breeding success were provided for 20 species, and attention was drawn to the limited informa-

Note: Counties/regions used in this paper are the standard recording area names used by *BB*, and these may differ in some cases from the region names used by the Seabird Monitoring Programme.

tion being gathered on others (e.g. Common *Larus canus* and Great Black-backed Gulls). Notable events in 1989 included an almost complete breeding failure of Lesser Black-backed Gulls *L. fuscus* on the Pembroke islands, while the problem of Brown Rat *Rattus norvegicus* predation on Manx Shearwaters on Canna was highlighted (subsequently resolved by eradicating the rats).

Data on Kittiwake breeding success in 1989 were given for 57 colonies, showing a significant decrease with increased latitude on the North Sea coast of Britain, but an opposite trend on the west coast of Britain and in Ireland. In fact, an analysis of the 1986–88 data had already been published, which showed that a latitudinal decrease in breeding success between colonies in Caithness and Shetland in 1986–87 extended right down the east coast of Britain in 1988, when success was generally lower than in the preceding two years (Harris & Wanless 1990). For several years there had been concern over the breeding performance of some seabird species in Shetland due to a reduced availability of sandeels (Ammodytidae) (Heubeck *et al.* 1987; Martin 1989; Monaghan *et al.*

1989), but now the situation there could be compared with that nationally in the same season.

A Steering Committee of the SMP, comprising the main organisations involved in seabird monitoring, met annually to discuss results and future surveys; by the time of the tenth SMP report (Thompson *et al.* 1999), regional population indices could be plotted for a number of seabird species, and the significance of trends calculated. Notable changes between 1986 and 1998 included significant increases of Gannets at Fair Isle, Troup Head (North-east Scotland) and Great Saltee (Co. Wexford), of inland breeding Great Cormorants in England, and of Common Guillemots and Razorbills in Wales. In contrast, the continued effect of the wreck of Shags in eastern Britain in winter 1993/94 (Harris *et al.* 1998) on breeding numbers in southeast Scotland and northeast England was particularly evident, as was a progressive decline in Kittiwake breeding success in eastern Scotland.

These SMP reports usefully pulled together within a single document key findings that were otherwise dispersed in



Daniel M. Turner

190. Changing fortunes: more Kittiwakes *Rissa tridactyla* now nest on buildings and other man-made structures along the River Tyne in Northumberland/Co. Durham than on Noss NNR in Shetland; Tyne Dock, July 2009.

numerous unpublished or internal reports, or would be published formally only after a lag of several years. Results were presented separately for different regions of Britain and Ireland, while themes common to particular breeding seasons could be identified, which in 1998 were a combination of bad weather across much of the country (flooding Manx Shearwater and Puffin burrows and affecting other ground-nesters) and a lack of availability of preferred food in some areas. To mark the ten years of the SMP, a symposium was held at Durham University in April 1999 at which results from some longer datasets were presented, and published in 2000 in a Special Issue of *Atlantic Seabirds* (Vol. 2, No. 3/4).

Playback techniques and the seabird monitoring handbook

Most incubating male Manx Shearwaters, but virtually no females, respond to a recording of the male call; to use this to estimate the colony size it is necessary to know the number of potential burrows, the proportion sampled, the number at which a male responded, and the response rate. Confounding factors include the task of counting (or estimating) the total number of burrows in large colonies, and the scale and representativeness of the sampling strategy. The technique was first trialled in the UK on Skomer

in 1983 (James & Robertson 1985), but it was not until 1998 that it was used to derive a total of 151,000 breeding pairs of Manx Shearwaters in the Pembrokeshire ‘super-colony’ of Skomer, Skokholm and Middleholm (Smith *et al.* 2001). The use of playback for censusing European Storm-petrels *Hydrobates pelagicus* was developed largely through fieldwork on Mousa, Shetland, by Ratcliffe *et al.* (1998), who found that response rates to the male ‘purr’ call could vary between years, and according to the colony where the recording was made and the volume at which it was played. It was recommended that, for each survey, a colony-specific response rate should be calculated, which would take at least a week of fieldwork to determine, and this technique was then extended to Leach’s Storm-petrels *Oceanodroma leucorhoa* using the male ‘chatter’ call.

A comprehensive manual of standardised techniques for monitoring numbers and breeding success of each seabird species was published in 1995 (Walsh *et al.* 1995). The approach used in the *Seabird Monitoring Handbook* was then extended to a much wider range of UK species in *Bird Monitoring Methods* (Gilbert *et al.* 1998), which included details of the playback method for storm-petrels. These two volumes have since proved indispensable, especially for seasonal reserve wardens, who may have had little or no experience of seabird monitoring.

For some species, monitoring of breeding success involves checking plots at intervals throughout the breeding season; for example, the handbook recommends every 7–10 days for Shags, although does not stipulate that the observer should report how many checks were made and over what period. As an example of bias this can introduce, Shag



Chris Perrins

191. David Boyle inspecting Manx Shearwater *Puffinus puffinus* study-plot burrows, which are used for establishing response rates to playback of the male call; Skomer, Pembrokeshire, June 2007.

breeding success was reportedly higher on Mousa in 2011 (1.04 fledged per apparently incubated nest: eight checks, 27th April to 20th July) than at Sumburgh Head (just 16 km to the south, where the corresponding figures were 0.30, 29 checks, 4th April to 9th August). Reducing the number of checks at Sumburgh to the eight most closely matching those on Mousa meant that breeding success

there would have been overestimated by 80%, because 42% fewer apparently incubated nests were detected. Although 2011 was an unusual season (with many early failures), and success on Mousa was undoubtedly higher than at Sumburgh, the difference was certainly not as great as the reported figures indicated. Some figures published in SMP reports have been based on even fewer visits (e.g. 1.98 for Shags at Hermaness in 1993, the highest value in Britain that year, but based on only three checks), yet are given equal weight to those derived from more intensive monitoring.

The Seabird 2000 census

The decision by a steering group representing the key bodies to undertake a third full census of breeding seabirds rather than more extensive sampling posed a number of challenges over and above the field effort achieved in the SCR census. For the first time, inland-breeding Cormorants, skuas, gulls and terns would be counted at the same time as coastal colonies, while Black Guillemots in the Republic of Ireland were to be censused by pre-breeding counts. Moreover, a major objective of the Seabird 2000 census was to apply the playback method to improve knowledge of the distribution and abundance of storm-petrels and Manx Shearwaters. In addition to contributions from the Steering Group partners, funding for the



Alessio Di Leo

192. Fights between food-stressed Common Guillemots *Uria aalge* can be severe, and lead to increased egg and chick losses in poor breeding seasons; Sumburgh Head, Shetland, June 2011.

census came from a variety of sources, notably the EU INTERREG programme and the oil and gas industry. Ian Mitchell (JNCC) was appointed overall co-ordinator, liaising with a network of 45 regional co-ordinators.

Fieldwork began in 1998 and was scheduled to be completed by 2001, but the outbreak of foot-and-mouth disease in March 2001, with associated access restrictions, meant that many surveys had to be postponed until 2002. Nonetheless, Seabird 2000 was a major success, and *Seabird Populations of Britain and Ireland* was published in the spring of 2004 (Mitchell *et al.* 2004). For some species, comparison with SCR counts was relatively straightforward but for others there were differences in coverage, or in whether counts were made from land or sea. Fulmars remained the second most numerous breeding seabird, but there was only a slight overall increase since the SCR and some regional declines. Much new information was gathered on Manx Shearwaters, especially in Ireland, where the presence of a substantial colony was confirmed on Great Blasket, Co. Kerry (3,584 AOS), and a previously unsuspected one was discovered on Cruach, Co. Galway (3,286 AOS). The first comprehensive survey of European Storm-petrels resulted in a British and Irish estimate of 82,820 AOS at the 95 colonies surveyed (with a further 42,000 AOS estimated at Irish colonies not visited), while the first quantita-



193. American Mink *Mustela vison* have long been known to predate smaller seabird species, but these Great Cormorant *Phalacrocorax carbo* chicks found in a mink cache were taken from the edge nests of a colony of 35 pairs on An Glas Eileanan, Sound of Mull, July 2002.

tive estimate was made for Leach's Storm-petrel. Gannets continued to increase and Britain and Ireland held c.68% of the world population by 1999/2000. Britain and Ireland also held 40–45% of the world population of Shags, but while numbers appeared to have increased in England (+12%) and Wales (+16%), there had been decreases in the larger populations in Ireland (-27%) and Scotland (-32%).

A substantial decrease in Arctic Skuas since the mid 1980s was evident, with declines of 39% and 42% in the Orkney and Shetland strongholds respectively being only partially offset by further increases in north-west Scotland and the Outer Hebrides. Within an overall 26% increase in Great Skua numbers, there were also rapid increases and range expansion in western Scotland, and the species was recorded breeding for the first time in Ireland (Co. Mayo). In contrast to the colonisation by Mediterranean Gulls, there had been some major regional declines in Black-headed Gull numbers since the SCR, particularly in inland Ireland (e.g. by 80% in Co. Mayo and 90% in Co. Galway). Lesser Black-backed Gulls had expanded their range and increased generally, particularly those nesting on roofs. Herring Gulls showed contrasting fortunes: a population collapse in

Ireland (particularly in the northeast and southeast), a lesser decline in Scotland (but an increase in the roof-nesting birds in Aberdeen to 3,350 AON, the largest urban colony in the world), and increases in England and Wales, where roof-nesting birds accounted for 27% and 13% of the respective totals. Since the SCR, a few Yellow-legged Gulls *L. michahellis* had begun breeding in England. An overall 23% decrease in the British and Irish Kit-

tiwake population masked opposing regional trends of major decline in Orkney (-46%) and Shetland (-62%) but substantial increase (+30%) in Northern Ireland.

Sandwich Terns *S. sandvicensis* showed a slight decrease in numbers, but Roseate Terns continued their gradual recovery, albeit confined largely (97%) to three colonies: Rockabill, Co. Dublin (618 AON), Lady's Island Lake, Co. Wexford (116), and Coquet Island, Northumberland (34). Overall, Common Tern numbers had probably declined only slightly since the SCR, but marked decreases in western Scotland and the Northern Isles, and a contraction of their inland breeding range in England and Scotland were apparent. A large decline (since 1980) in Arctic Terns in the Northern Isles had been anticipated, owing to long-term problems with sandeel availability, while decreases in western Scotland were attributed to predation by American Mink *Mustela vison*. The overall Little Tern *Sternula albifrons* population had also decreased by 25% since the SCR, a trend probably driven by low breeding success at many colonies.

The most abundant seabird, the Common Guillemot, continued to increase, although at a slower rate than in the 1970s and early 1980s and with evidence of declines in the

Outer Hebrides. The total count of Razorbills was also higher than in the SCR (by 23%) but with some notable regional exceptions, while improved coverage of Rathlin Island (Co. Antrim) elevated this to the largest colony in Britain and Ireland (20,860 birds). Black Guillemots had increased in Shetland (+31%) but decreased in Orkney (-15%), as well as along much of the Scottish coast from Caithness west and south to the Kintyre Peninsula; in many areas predation by mink was believed to have been a contributory factor. In contrast, the smaller populations of Black Guillemots on the Isle of Man and in Northern Ireland had doubled, while 3,367 birds were counted in the first pre-breeding census of the Republic of Ireland. Probably the most dramatic increase in any seabird species between the SCR and Seabird 2000 was a trebling of Puffins in eastern Britain (from Northumberland north to North-east Scotland), to 147,700 pairs.

The new millennium

'The breeding season of 2004 was the least productive on record, particularly so in the Northern Isles and in many colonies along the east coast of Britain.' So began the summary to the SMP report for 2004 (Mavor *et al.* 2005). Work in Shetland in the early 1990s had shown that, even in a year of very low sandeel availability and low breeding success for surface-feeding species (1990), Common Guillemots were able to adjust their time budgets and increase their foraging effort to maintain a moderate level of productivity (Monaghan *et al.* 1994), a situation which continued throughout the 1990s (fig. 1). In 2004, however, conditions were such that no Common Guillemot chicks fledged on Fair Isle and only a handful did so at Sumburgh Head, which was

unprecedented in the history of the SMP, while the three monitored colonies in Orkney, and those at North Sutor (Highland) and on the Isle of May experienced their lowest success on record. In contrast, breeding success was high at Handa (Highland), the only other Scottish colony monitored that year. Another notable event in 2004 was the gradual desertion of Foula (Shetland) by Shags, which in the Seabird 2000 census was by far the largest colony (2,277 AON). Non-breeding on this scale had not previously been recorded in Shetland and breeding numbers on Foula had not recovered by 2008, when a period of several years

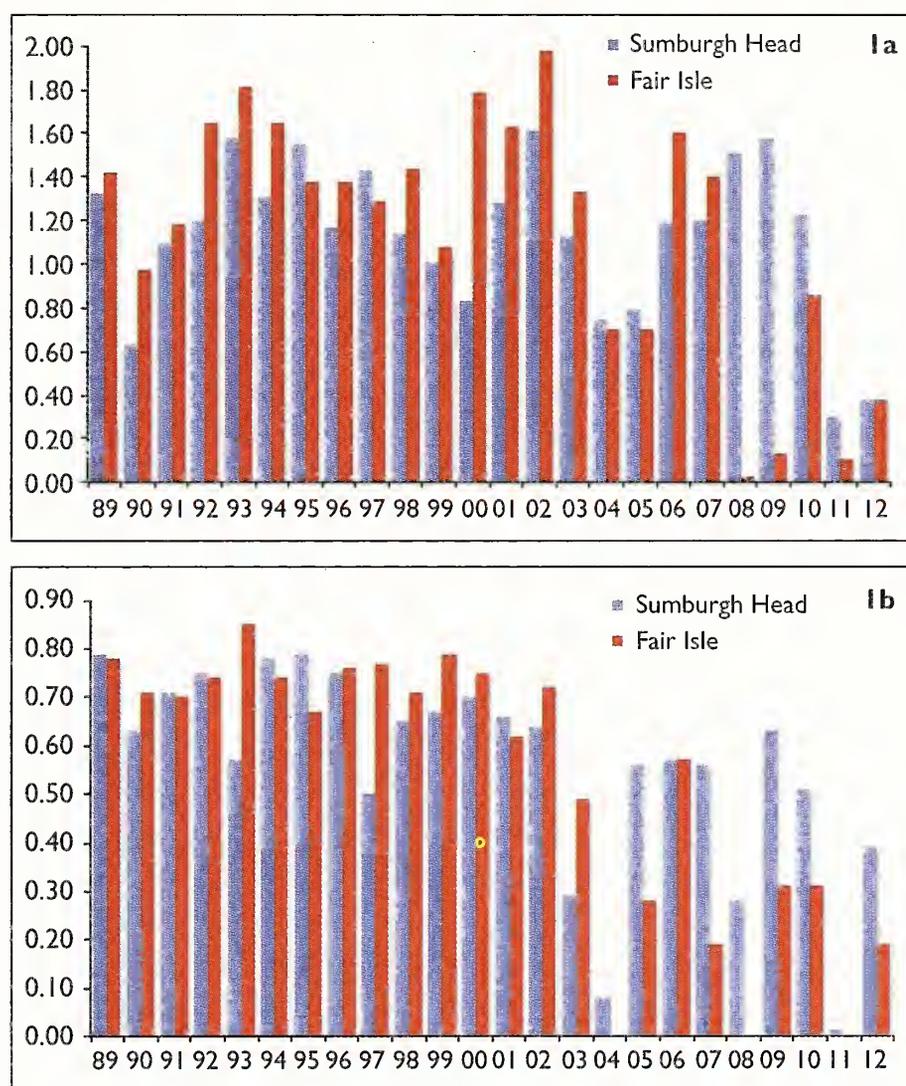


Fig. 1. Breeding success of Shags *Phalacrocorax aristotelis* (1a) and Common Guillemots *Uria aalge* (1b) in study plots at Sumburgh Head, Shetland, and on Fair Isle, 1989–2013 (chicks fledged per AON/AIA respectively). Until 2008, the greatest difference in Shag success at the two colonies was in 2000, when heavy seas washed out many nests at Sumburgh Head; extensive non-breeding began on Fair Isle in 2008 and at Sumburgh Head in 2011 and success figures exaggerate the number of young fledged relative to previous years since only a small proportion of (presumably the fittest) adults attempted to breed. Lower Guillemot success in the single plot at Sumburgh Head in 1993 and 1997 was also largely due to weather; laying was late and colony attendance low at both colonies in 2003, since when breeding success has been notably erratic.

of non-breeding and low success began on Fair Isle, or by 2011 when the phenomenon spread to the southeast Mainland of Shetland (fig. 1).

One of the most extensive SMP datasets is that for Kittiwake breeding success. Frederiksen *et al.* (2005) looked at 42 colonies and identified geographic clusters where success varied synchronously, and related these clusters to known aggregations of sandeels and variation in sandeel recruitment. They proposed six regions (Shetland, Orkney, East Scotland, East England, Irish Sea, West Scotland) that explained spatio-temporal variation in breeding success and suggested that, while the 13 regions used by the SMP to summarise Kittiwake success were biologically well founded, some regions could be merged – for example, the Farne Islands (Northumberland) were better included in East Scotland. Frederiksen *et al.* (2007) found that overall breeding success was negatively correlated with February/March sea-surface temperature in the previous year – through its influence on the recruitment of larval sandeels and the abundance of 1-group (one-year-old) fish the following spring – and that within the six regions this relationship was significant in East Scotland and Orkney. Such an understanding of the processes influencing the fortunes of seabirds would have been impossible without the extensive network of dedicated observers contributing to the SMP.

Population changes of nocturnal petrels

Seabird 2000 data have now been used to assess subsequent changes at several major colonies of nocturnal petrels using playback. Some 94% of British and Irish Leach's Storm-petrels breed on four islands in the St Kilda group, with a total of 45,433 AOS estimated in 1999/2000. The largest colony (27,811 AOS) was on Dun, where resurveys in 2003 and 2006 found that numbers had decreased to 14,490 and 12,770 AOS respectively. The most likely explanation was predation by Great Skuas, which colonised St Kilda in 1963 but more recently increased from 42 pairs in 1986 to a peak of 240 in 2000 (Newson *et al.* 2008). Bioenergetics modelling suggested that in 1996 skuas consumed

almost 15,000 Leach's Storm-petrels, and while the number of breeding storm-petrels was unknown then, it was believed that such a level of predation could have an impact at the population level (Phillips *et al.* 1999). This predation continued during the 2000s, when it was shown that skuas actively hunted Leach's Storm-petrels at night and that, in contrast to some nocturnal petrels in the southern hemisphere, those on St Kilda showed no behavioural avoidance to the presence of skuas or their calls, possibly because there has been insufficient time since the two species came into contact for such behaviour to evolve (Votier *et al.* 2006; Miles *et al.* 2013). On North Rona, the only other island where significant numbers of both Leach's Storm-petrels and Great Skuas breed (1,084 AOS and 18 pairs respectively in 2001; Murray *et al.* 2010), a resurvey in 2009 found 713 Leach's Storm-petrel AOS, a decrease of 34%, but no evidence of a change in the smaller population of European Storm-petrels on the island (Murray *et al.* 2010). Great Skuas and a declining population of Great Black-backed Gulls are believed to predate both species of storm-petrels on North Rona, but no dietary studies have been undertaken in recent decades.

The largest European Storm-petrel colony in Britain during Seabird 2000 was on Mousa in Shetland (6,800 AOS in 1996, later revised to 5,400), which has long been a popular destination for visitors, with special night-time boat trips to see the storm-petrels nesting in the prehistoric broch. They also breed in dykes (stone walls), boulder beaches and other areas of loose rock, and the RSPB, which has managed the island as a reserve since 2001, has designed boardwalks and paths to guide visitors away from sensitive locations. Mousa is a Special Protection Area for European Storm-petrels and any fears that this designation might be incompatible with (controlled) tourism were allayed by a resurvey in 2008, which indicated that the population had doubled since 1996, to 11,780 AOS (Bolton *et al.* 2010). A demographic model based on breeding productivity on the island, and published survival estimates, also suggested an increase in breeding numbers on a similar scale, although there is no explanation yet for this favourable status.

More recently, a census of Manx Shearwaters on Skomer in 2011 produced a figure of 316,000 breeding pairs, far in excess of the 1998 estimate of 101,000 pairs, which was arrived at using a very different sampling strategy (Perrins *et al.* 2012). The effort involved in censusing nocturnal petrels will always be considerable, and for large colonies the final population 'figure' will of necessity be an estimate that is the mid-point of a large statistical range. It seems, however, that field methodology and statistical analyses have now developed to the stage whereby favourable or unfavourable conservation status can be determined with some certainty.

Recent changes to the SMP

The SMP report for 2006 (Mavor *et al.* 2008) was the last to be published in hard copy. An online summary report is now updated annually in a standard format for each species, with graphs of trends in abundance, productivity and, where possible, diet, phenology and survival (www.jncc.defra.gov.uk/page-3201). One major change is that results are now summarised by political region: UK, Scotland, England, Wales, Northern Ireland, Republic of Ireland, all Ireland, Isle of Man, Channel Islands. This might have attractions for administrators in national agencies, but for some species it obscures important biogeographical differences – for example, the considerable regional variation in Kittiwake breeding success within Scotland in some years, which reflects local differences in sandeel abundance or in fish species fed to chicks (Bull *et al.* 2004; Frederiksen *et al.* 2005; Swann *et al.* 2008). Furthermore, graphs of productivity are now shown only if data produced a significant result for regional and/or year effects; otherwise only a regional long-term mean productivity value is given.

Another major change is that the SMP database is freely available online, both for access to monitoring and census data and for inputting new information in a standard format by those who collect it. In November 2009, the SMP partnership was extended, with the agreement of a Statement of Intent by 18 organisations to ensure 'that sufficient data on seabird breeding numbers and appropriate demographic and behavioural

parameters are collected – regionally and nationally – to enable their population and conservation status to be assessed, and to monitor the impacts of ecosystem pressures'.

The future

In 2009, JNCC commissioned the BTO to examine SMP data, and those from the SCR and Seabird 2000 censuses, for 11 species, to assess whether the current level of monitoring was sufficient to produce trends in abundance and breeding success at a regional/national scale that were sufficiently precise to detect changes relevant to policy decisions (Cook & Robinson 2010). Based on the results, various strategy options have been considered by the SMP Steering Committee but have yet to be implemented. Improvements to the SMP online database are also planned for 2013.

Perhaps the most immediate concern is updating the Seabird 2000 census figures. SMP data have shown some worrying trends in the last decade or so, as have some of the resurveys detailed above, and notable mortality incidents of auks include those of (largely adult) Razorbills in autumn 2007 (Heubeck *et al.* 2011) and Puffins in March 2013 (*Brit. Birds* 106: 242–243). Planning for the next national survey has already started, with fieldwork likely to begin in 2014. Since our knowledge of the location and size of seabird colonies has improved vastly since Operation Seafarer, this might seem a fairly straightforward task, yet there are some significant challenges, not the least of which is finance. The financial climate is very different from that in 1998, and not only is there likely to be constraints on the budgets of participating organisations, but increased fuel costs have made chartering boats much more expensive. Staffing priorities within these organisations may be less flexible than 15 years ago, and greater use may have to be made of volunteer counters than in Seabird 2000, which should be seen as an opportunity to introduce new observers to routine monitoring (potential new contributors to the SMP should contact roddy.mavor@jncc.gov.uk). Regrettably, the use of fast inflatable boats is likely to be much more constrained than in the free and easy days of Seabird 2000, particularly for surveying Black



194. Martin Heubeck and Mick Mellor counting seabirds at the Gaada Stacks, Shetland, in June 2009, taken from a 'guard boat', which had to be chartered because of a three-mile (4.8 km) restriction on the operational range of inflatables.

Guillemots when they were essential for covering long stretches of remote coastline. Doubtless these hurdles will be overcome, and a new book will hopefully appear by the end of this decade to add to the three landmark volumes of Cramp *et al.* (1974), Lloyd *et al.* (1991) and Mitchell *et al.* (2004).

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Martin Heubeck, University of Aberdeen (SOTEAG), c/o Sumburgh Lighthouse, Virkie, Shetland ZE3 9JN; e-mail martinheubeck@btinternet.com



Martin Heubeck has monitored seabird numbers and their breeding success in Shetland for SOTEAG since 1978 and was Shetland co-ordinator for the Seabird Colony Register and Seabird 2000 censuses. He is a co-author of *The Birds of Shetland*, and currently edits the Seabird Group's journal *Seabird*.

Appendix I. Kittiwakes in Shetland – a case study

In 1981, Mike Richardson undertook the first complete survey of Shetland's Kittiwake colonies, with the help of a small inflatable boat, which gave access to colonies invisible from the clifftop and those inaccessible to boats with a rigid hull. As well as counting AONs, and adults within colonies and at separate roosts, the location of each subcolony was described in detail (Richardson 1985). Also in 1981, Dave Pritchard replicated counts made from land by Mike Harris in 1974 (Harris 1976) and compared them with those made by Richardson. He concluded that land counts underestimated nest numbers by 36% and that declines recorded by SOTEAG in fixed plots at selected colonies were not representative of the

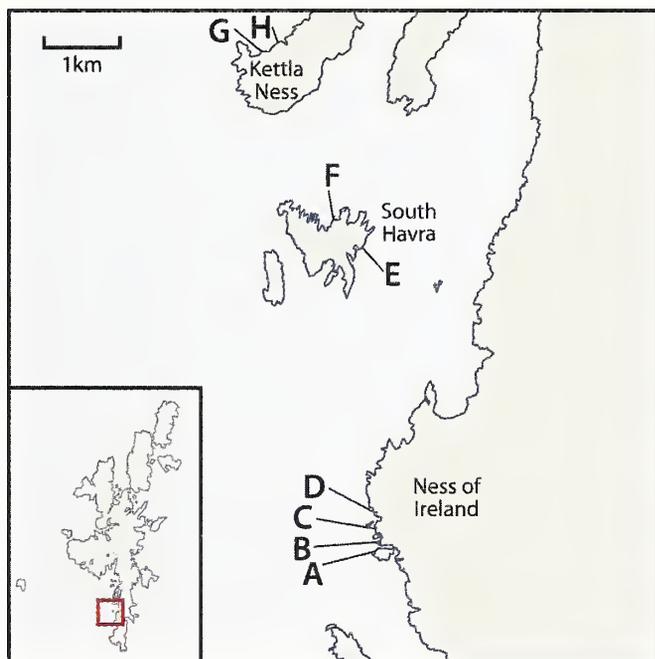


Fig. 2. Kittiwake *Rissa tridactyla* colonies, southwest Mainland Shetland (see text).

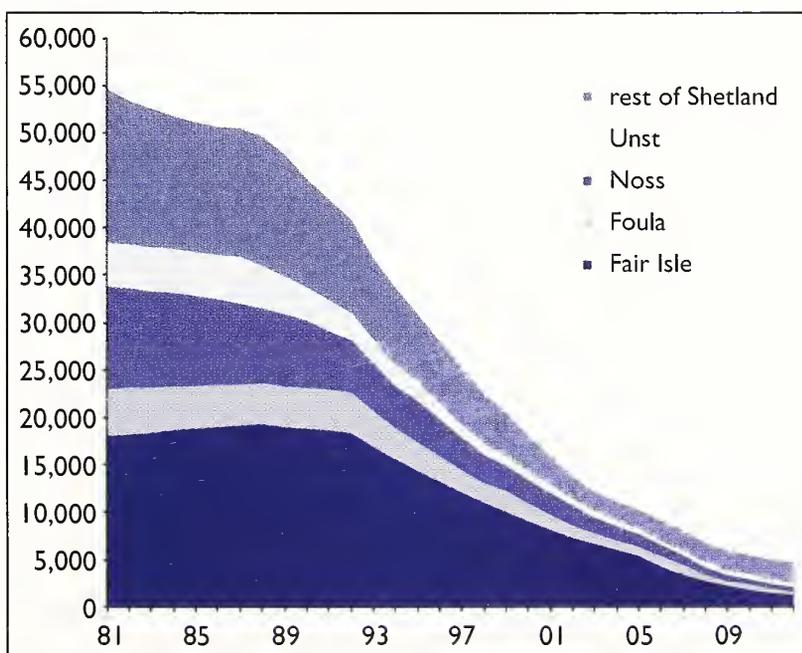


Fig. 3. The estimated size of the nesting population of Kittiwakes *Rissa tridactyla* in Shetland, 1981–2012.

wider population (Pritchard 1981). Comparison of SCR counts from the sea in 1985–87 with those from 1981 found considerable variation between colonies in the rate and direction of change, and since the late 1980s the population has been monitored by periodic surveys by inflatable boat of long stretches of coastline, recording known and new colonies and roosts (some of which have developed into colonies) at each breeding station (defined as colonies or colony groups at least 1.5 km apart) on 1:10,000 maps (Heubeck *et al.* 1986). Counting all nests (including ‘traces’) and adults helps take account of years of extensive non-breeding, or early breeding failure, and has allowed changes in numbers and distribution to be followed in detail.

One example is at the Ness of Ireland, in southwest Mainland, first counted for Operation Seafarer from land by David Saunders in 1969. Matching his record sheets with subsequent mapped counts identified four known subcolonies only 300 m apart along a convoluted stretch of cliff with numerous stacks. There was little change in numbers by 1981, although the smallest subcolony (A) had gone (fig. 2, table 2). By 1987, subcolony C in an open situation above a natural arch had all but disappeared, but a new one (D) had formed in a highly protected site in the back of a narrow cleft. By 1998, this grew to equal the fourth subcolony (B) on an open stack face, which disappeared between 1999 and 2003. This

pattern of abrupt disappearance of subcolonies in open situations and the formation or persistence of others in nearby, protected situations has occurred throughout Shetland, and strongly suggests that breeding adults were responding to predation by Great Skuas (Heubeck *et al.* 1997). Further circumstantial evidence for this was the recolonisation of South Havra and Kettla Ness by 2002, the two closest breeding stations to the north of the Ness of Ireland (4.0 km and 6.5 km, respectively). The single colony at South Havra (E), on a low but open cliff face, had been abandoned by 1989, but nine nests were present in 2000 increasing to 73 by 2007; in 2009 there was evidence

of illegal shooting at E and a new subcolony (F) was found in a protected site 400 m away, which was the only one remaining in 2012. At Kettla Ness, subcolony H was monitored for breeding success in 1989–93 but attacks by Great Skuas led to declining numbers and complete breeding failures in 1992 and 1993, and the station was abandoned by 1997. The increase between 2002 and 2009 at Kettla Ness mirrored that at South Havra, and monitoring of breeding success at H resumed in 2009, but by then Great Skuas were again attacking the colony, taking many chicks as they became half grown; success that year was 0.18 fledged per incubating pair, compared with 1.27 at another colony 3 km to the north. Monitoring of breeding success at Kettla Ness ceased in 2012, when a check from the sea found none of the nests at H and only five of the 13 at G to be active.

More worrying than these volatile changes have been rapid, recent declines at the three largest Shetland breeding stations of Fair Isle, Noss, and Foula. Numbers on Fair Isle peaked at 19,340 AON in 1988, but declined by 90% between 1997 (12,224 AON) and 2012 (1,225 AON), with the rate of decline having accelerated from 10% p.a. in 1997–2005 to

19% p.a. in 2005–12; this had been predicted by an analysis of breeding success and adult survival in the 1990s (Rothery *et al.* 2002). Similar declines have occurred on Noss (2,395 AON in 2000, 507 by 2010) and Foula (1,982 AON in 2000, 480 by 2012) and it is a sobering thought that more Kittiwakes now nest on buildings along the River Tyne than on either of these iconic islands (Turner 2010).

An annual population estimate, derived by calculating rates of change between sets of counts at each breeding station and projecting the trend until the next count (Heubeck 2002), shows that breeding numbers declined from 54,600 pairs in 1981 to 43,000 by 1991, 15,900 by 2001, and just 4,600 by 2012 (fig. 3). Over this period, 61 breeding stations are known to have existed, although only 30 have been occupied continuously, with 41 believed still extant in 2012. Surveys of some coasts have become less frequent in recent years, largely due to restrictions on the use of inflatables, leading to uncertainty over the current status of some small breeding stations. However, the most recent counts at breeding stations also total 4,600 nests and the 2012 estimate is probably accurate to within 200–300 pairs, representing a decrease of 92% in 32 years.

Table 2. Counts of Kittiwake *Rissa tridactyla* nests in subcolonies at three breeding stations in southwest Shetland, and the total number of adults present (excluding roosts). All 1981–2012 counts were in June from the sea, those at Ness of Ireland in 1969 were on 17th July from land; none was recorded from land at Kettla Ness on 14th July 1969. Nine nests and nine adults were present at South Havra (E) in 2000.

Ness of Ireland	1969	1981	1987	1989	1991	1993	1997	1998	1999	2002	2003	2007	2009	2012
A	5	0	0	0	0	0	0	0	0	nc	0	0	0	0
B	118	115	115	95	90	95	106	103	80	nc	0	0	0	0
C	74	88	1	2	0	0	0	0	0	nc	0	0	0	0
D	0	0	36	30	22	42	112	102	97	nc	26	69	41	47
Total nests	197	203	152	127	112	137	218	205	177	nc	26	69	41	47
Total adults at nests		361	182	168	135	216	257	258	210	nc	31	73	53	53
South Havra		1981	1987	1989	1991	1993	1997	1998	1999	2002	2003	2007	2009	2012
E		29	19	0	0	0	0	0	0	29	46	73	34	0
F		0	0	0	0	0	0	0	0	0	0	0	3	17
Total nests		29	19	0	0	0	0	0	0	29	46	73	37	17
Total adults at nests		93	28	0	0	0	0	0	0	46	68	84	54	22
Kettla Ness		1981	1987	1989	1991	1993	1997	1998	1999	2002	2003	2007	2009	2012
G		87	72	72	51	22	0	0	0	1	2	19	22	13
H		194	243	194	124	26	0	0	0	19	32	88	101	11
Total nests		281	315	266	175	48	0	0	0	20	34	107	123	24
Total adults at nests		446	nc	351	202	73	1	0	0	35	47	147	143	29

South Polar and Great Skuas: the timing of primary moult as an aid to identification

Dick Newell, Steve N. G. Howell and Daniel López-Velasco

Abstract The plumages and moult cycles of immature large skuas are poorly known, and some first-year Great Skuas *Stercorarius skua* can closely resemble some South Polar Skuas *S. maccormicki*. The most challenging birds are dark individuals in August–October with no active primary moult, and faded/moulting birds in May–August, which may be either first-year Great or older immature South Polar Skuas. Ageing is generally possible by careful observation of plumage coloration and pattern, in combination with leg colour, primary shape and primary wear. The breeding seasons of the two species differ by six months, but the moulting periods of adults of each species overlap broadly with the moulting periods of first-cycle birds of the other species. We show that, for birds of known age, primary moult score is a valuable tool for identifying immature Great and South Polar Skuas. Our data also suggest that South Polar Skuas take c. 150 days to complete their primary moult, similar to the time taken by Great Skuas.

The field identification of large skuas is among the thornier identification challenges facing birders today. Species limits remain unresolved and even the identification of southern skuas by genetic analysis may be fraught with confusion, as shown by the problems involving birds recently found in Britain (see Votier *et al.* 2007). Following most modern treatments (e.g. Malling Olsen & Larsson 1997), we consider large skuas to comprise the monotypic Great Skua (or Bonxie) *Stercorarius skua* of the North Atlantic, and three species of ‘southern skua’: Brown Skua *S. antarctica* (with subspecies *antarctica*, *hamiltoni* and *lonnbergi*), South Polar Skua *S. maccormicki* (monotypic), and Chilean Skua *S. chilensis* (monotypic).

To complicate matters, Brown Skuas of the race *lonnbergi* (hereafter Subantarctic Brown Skua) hybridise commonly with South Polar

Skuas, mainly on the Antarctic Peninsula; Brown Skuas of the race *antarctica* (hereafter Falkland Brown Skua) hybridise locally with Chilean Skuas in eastern South America; and there is at least one case of a mixed pair of South Polar and Chilean Skuas, on the Antarctic Peninsula (Devillers 1978; Parmelee 1988; Reinhardt *et al.* 1997; Ritz *et al.* 2006). Interestingly, no interbreeding has been reported among the three taxa of Brown Skua.

Skuas spend much of their lives at sea and typically do not return to the breeding grounds until at least 2–3 years of age. Consequently, the appearance of birds in their first 1–3 years of life is poorly known; unsurprisingly, most identification literature focuses on adults and, to a lesser degree, juveniles in fresh plumage. We know of no published attempt to critically describe the plumage features of immature birds in

any species of large skua.

In this paper we discuss ageing and the timing of moult of large skuas as an aid to species-level identification, particularly for birds up to two years of age. The timing and location of moult in skuas relates to the breeding season, which for Great Skuas is in the North Atlantic in the northern summer, whereas the southern skuas breed in the southern hemisphere in the austral summer.

In the context of Western Palearctic birding, the main identification issue is the separation of the common and variable Great Skua from South Polar Skua. Chilean Skua is a relatively distinctive taxon (e.g. Malling Olsen & Larsson 1997); since it is unknown from the North Atlantic, we do not consider it further, other than to note a backcross hybrid South Polar \times (South Polar \times Chilean) Skua reported from eastern Canada (Köppen & Scheil 2001). Brown Skua is somewhat more problematic, and will be discussed further below.



Richard Bonser

Fig. 1. Example of moult scoring for a large skua, here a Great Skua *Stercorarius skua* (for details see plate 205). This bird shows five fully grown new inner primaries (P1–P5), each scoring 5; P6 is between a third and half grown and scores 3; P7 is missing or in pin, score 1; and the outer three primaries are retained from an older generation, score 0. Total primary moult score 29.

Methods and terminology

With increased pelagic birding trips in the North Atlantic has come a concomitant increase in good-quality images of skuas, which allow plumage and other details to be evaluated. In total, we examined images and specimens that represent 190 moulting South Polar Skuas and 139 moulting Great Skuas, as well as many images of non-moulting birds.

Since the large skuas breed in, and migrate between, different hemispheres, seasonal terms such as summer and winter are unhelpful when comparing species. For discussion of moult we use the Humphrey-Parkes system, as modified by Howell *et al.* (2003). Put simply, skuas have an annual moult and plumage cycle: adults have one wing moult per year, following the breeding season. The first moult cycle extends from fledging in juvenile plumage to the initiation of the second-prebasic moult at about one year of age, when moults become largely aligned with the adult cycle. However, it is

important to note that the first plumage cycle of large skuas includes an 'extra' wing moult (Howell 2008; see also discussion of Great Skua, below), termed a 'preformative moult'. In other words, rather than the juvenile primaries being retained for a little over a year, until the time when adults are moulting after the breeding season, first-year birds have an additional wing moult. This feature is common to a number of species sharing similar life-history traits, such as the smaller skuas (Howell 2007, 2010).

We number primaries from the innermost (P1) to outermost (P10), and calculate primary moult score as the sum of the individual scores for each of the ten primaries (see fig. 1). Scores range from 0 (old), through 1 (missing or in pin) via the progressive growth of new feathers to score 5 (fresh, full grown with no sheath); see Ginn & Melville (1983). Hence, primary moult scores can range from 0 (all

primaries old) to 50 (all primaries new). One potential drawback of this method is that it assigns equal scores to feathers of different sizes – the short inner primaries (P1–P3) grow more quickly than the outer primaries (P8–P10; Howell 2010). Consequently, a bird may go from score 0 to 15 in 2–3 weeks but might require 2–3 months to progress from score 35 to 50. Frequently, the timing of primary moult is represented as a linear (or circular in *BWP*) timeline. While this has the merit of simplicity, it can obscure differences in timing that become more obvious when displayed in a format that plots primary moult score against date (e.g. figs. 2, 4 & 5).

Status and occurrence of the larger skuas in the North Atlantic

The Great Skua breeds in the northeast Atlantic, mainly in Iceland and Scotland; it occurs as a widespread migrant south as far as equatorial waters and west to North America (Furness 1987; Malling Olsen & Larsson 1997), while a few remain in the North Atlantic throughout the year (Magnusdottir *et al.* 2012).

The South Polar Skua is a regular migrant to the western North Atlantic during May–October, but its status in the northeastern North Atlantic is not well known (Devillers 1977; Malling Olsen & Larsson 1997; Howell 2005). Until recently, it was suggested that adult South Polar Skuas remained near the breeding grounds (e.g. Malling Olsen & Larsson 1997), based on the paucity of records of adults in the northern hemisphere. Since then, however, studies using geolocators fitted to breeding adult South Polar Skuas from King George Island in Antarctica have revealed that 95% of birds migrated to the northern hemisphere after breeding (Kopp *et al.* 2011). Of these, about 75% visited the North Atlantic; in a clockwise loop migration, the birds initially moved north in the western Atlantic but on their return headed southeast towards the coast of West Africa. This corroborates observations of South Polar Skuas moving south off the coast of Senegal in October (Newell *et al.* 1997). The remaining 25% visited the North Pacific and thus switched ocean basins from their breeding grounds in the South Atlantic. The Pacific birds also followed a clockwise circuit,

heading northwest initially and returning south via the northeast and central Pacific.

Observations from Californian waters suggest that most South Polar Skuas occurring there are immatures (Howell 2004), and the tracking data from Kopp *et al.* also suggest that adults remained farther offshore. One possibility is that adults make a narrower and quicker loop migration than non-breeding immatures, which might explain the lack of adults in shore-based studies. We suspect that most South Polar Skuas reaching western Europe will be first-year birds or other pre-breeding ages.

Although there are no confirmed records of Brown Skua in the North Atlantic, birds showing the plumage characters of Brown Skua have been recorded very rarely in the western North Atlantic. It has been suggested that such records involve hybrids that inherit the migratory traits of South Polar Skuas (Parmelee 1988; McLaren & Lucas 2004; Howell 2005). Regardless of their true identity or parentage, such birds could cause identification headaches, but thankfully they appear to be rare in the North Atlantic. For example, off North Carolina, <1% of southern skuas seen well have shown characters of Brown Skua (J. B. Patteson pers. comm.; SNGH pers. obs.).

Breeding adult Subantarctic Brown Skuas fitted with geolocators have not ventured farther north than 25°S (Markus Ritz pers. comm.), and both adult Subantarctic Brown and Falkland Brown Skuas appear to spend the majority of their time south of 35°S (Phillips *et al.* 2007). Little is known of the at-sea movements of the subtropical race *hamiltoni* ('Subtropical Brown Skua'), but we know of no evidence that it has occurred in the northern hemisphere. Hybrids have not, to our knowledge, been the subject of tracking studies.

There are very few claims of South Polar Skua in European waters. A well-photographed bird in Dorset in January 1996 was followed by birds of proven southern origin in Scilly in October 2001 and East Glamorgan in February 2002 (Millington 2000; Moon & Carrington 2002; Scott 2002; Votier *et al.* 2004, 2007; Newell 2008). There is also a UK specimen from Great Yarmouth, Norfolk, taken in October 1869, which appears to be

South Polar (genetic analysis confirms that it is not a Great Skua), but this bird is not accepted on grounds of unknown provenance (Newell 2008). Indeed, the difficulties in getting records of South Polar Skua accepted may have led people to believe that the identification challenges of the southern skuas were insurmountable. More recently, however, a bird photographed off the Canary Islands in 2005 has been accepted as a South Polar/Brown Skua (see plate 219) (Dies *et al.* 2007; Winkel 2009) and three South Polar Skuas were found off Lanzarote, Canary Islands, in September 2011 (see plates 210 & 215; López-Velasco in prep.). Further candidate South Polars in Spain (see plates 211 & 212) and Portugal (plate 220) have come to light as a result of preparing this paper.

It seems likely that more South Polar Skuas will be found and documented in European waters in the coming years, especially given the increased incidence of autumn pelagic trips. We suspect that birds on/seen from land will remain rare and mainly involve unhealthy individuals (in North America, large skuas are only exceptionally seen from shore). Thus, given typical views for a land-based observer, specific identification is often problematic.

An overview of ageing and identification

Observers who are very familiar with both Great and South Polar Skuas may perceive subtle structural differences between the two, just as many birders do with large gulls, even though bill, wing, and tarsus measurements all show considerable overlap (Malling Olsen & Larsson 1997; Pyle 2008). Thus, although South Polar often appears to have a more compact body and relatively long, narrow wings, such differences are difficult to quantify, and species identification is usually based on plumage features.

It is helpful to understand how the appearance of large skuas changes through successive moult cycles. However, since no studies have addressed the appearance of known-age 'subadult' large skuas, our descriptions of plumage are in some cases provisional. As well as plumage, leg colour and the shape and wear of the primaries can help observers to age skuas.

Plumage

As adults, Great and South Polar Skuas are notably variable in plumage, and South Polar is often described in terms of dark, intermediate, and pale (or 'blond') morphs; we prefer to refer to such birds as types, since they are not strictly discrete morphs. Despite considerable variation, adult birds are relatively distinctive and should not pose identification problems if seen well (see, for example, Malling Olsen & Larsson 1997 and Sibley 2000).

Adults

South Polar Skuas are cold-toned (ranging from blackish-brown to dirty cold buff on the head and body), with generally plain head, neck, and upperparts except for a patch of narrow, pale buff or gold streaks on the hindneck, and occasional pale streaks on the upperparts (plates 197 & 198). **Great Skuas** are warm-toned, with extensive pale buff and gold streaking and mottling on the head, neck, and upperparts (plate 199).

Juveniles

South Polar Skuas fledge in about February, and show cold, vinous grey (sometimes described as 'battleship grey') head and body plumage contrasting with dark upperparts; there is no evidence of pale or dark types. As birds progress through their first calendar-year, the grey often wears and fades to a dirty, pale brownish (plates 200 & 207), and such birds can be mistaken easily for blond adults. The preformative wing moult starts between July and September and is presumed complete in December–February (Howell 2004; Pyle 2008; this study). The post-juvenile (formative) head and body plumage attained by September–October of the first calendar-year is typically dark grey-brown (plates 201 & 202).

Subsequent moults follow the adult cycle, and after completion of the second prebasic wing moult (in September–October of the second calendar-year), there appears to be some variation in tone of body plumage (e.g. plate 196) but we have seen no truly 'blond' birds in the North Atlantic. By their third calendar-year, South Polar Skuas may resemble adults but still lack well-developed hackles. Some may be blond by this age, but the

'textbook' pale blond types are found mostly in the Ross Sea region (south of New Zealand) and not to be expected in the North Atlantic. In the Atlantic sector of Antarctica, the majority of adult South Polar Skuas are dark (Devillers 1978; Malling Olsen & Larsson 1997). Birds of all types, at least from their second year onwards, can exhibit fine golden streaking on the sides of the neck, as well as smooth pale scalloping on the flanks.

Juvenile Great Skuas fledge in about August and are rather variable in plumage (plates 203 & 209). Although three of the ten captive juveniles of Bearhop *et al.* (2008) were dark, only around 2% of larger samples have been considered as truly dark morphs (Malling Olsen & Larsson 1997; DL-V pers. obs.). Most juvenile Greats have variably rufous-toned underparts, a dark hood and contrasting dark upperparts, with broad, paler, crescent-shaped subterminal markings on the scapulars and wing-coverts. Dark juveniles are appreciably darker and more uniform overall but still have a darker hood, while the paler subterminal marks on the scapulars and coverts can be much subdued and appear virtually lacking. Dark juvenile and first-year Greats cause the most confusion with South Polar Skua. As wear reduces contrast even further and the plumage fades during their first-summer, they may become even more like South Polar Skua (e.g. Howell 2005). Over their first spring/summer, Great Skuas undergo a complete moult (plates 204–206, 208).

The full range of appearance shown by Great Skuas following their first complete (preformative) moult – usually by late August of their second calendar-year – is poorly known. However, a critical examination of 53 photographs of 2CY Great Skuas off Galicia and Asturias, Spain, suggests that all 2CY birds have distinct and often extensive pale, warm spotting and streaking on the neck and upperparts after their first-cycle moult, suggestive of adults. We should keep an open mind to the possibility that a Great Skua after its first-cycle moult could retain unmarked scapulars, even though we know of no examples. The upperwings of these 2CY birds are relatively dark and uniform, similar to many South Polar Skuas. In general, however, these typical birds do not pose identification

problems (e.g. plates 205 & 208).

Following a complete moult in their second winter (technically a second prebasic moult), with wing moult probably starting in autumn, on an adult-like schedule, it appears that all Great Skuas largely resemble adults and pose no major identification problems.

The shape and wear of the primaries

The shape of a fresh juvenile primary is narrower and more pointed than later-generation primaries. Assessing whether a primary is rounded or pointed in a photograph can be difficult since, although a pointed feather never looks rounded, no matter what angle you view it, a rounded feather *can* look pointed, especially if the web is flexed and the tip rotated. Moreover, the primaries may be extensively worn at the time when it is most relevant to assess feather shape making an objective assessment even more difficult. In summary, a rounded feather is older than the first generation, but if it looks pointed then caution is needed (plate 197). Our examination of images of known-age birds suggests that the shape of the longest primary coverts is unhelpful for ageing large skuas, at least from photos, *contra* Pyle (2008). Thus, although first-generation primaries, along with primary coverts and scapular feathers, are narrower, this may be of limited use for identification in the field or from photographs.

First-generation feathers are weaker than subsequent generations so the feather tips can become extremely worn, resulting in damaged or ragged primary tips. Sometimes the shaft is the only part of the tip that remains or the tip is broken off completely. Such an appearance points to first-generation feathers. Older feathers may become obviously bleached, but not as worn as first-generation feathers, and they tend to remain intact.

Leg colour

As with smaller skuas (e.g. Howell 2007), most juvenile/first-year large skuas have extensively pale tarsi, which can be shown by good photos – usually as birds take off from the water (e.g. plate 195). Birds in their second year can retain distinct pale blotches on the tarsus (e.g. plate 196), but the legs often appear dark. It is

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195. South Polar Skua, Monterey Bay, California, USA, 30th September 2006. A first-cycle bird with obvious pale tarsi and four juvenile outer primaries still to be replaced. Head and body plumage appears to be a mix of faded juvenile and new post-juvenile feathers; the final plumage tones resemble a juvenile but with a paler hindneck. This bird did not fade to the same extent as the one in plate 200, which may reflect individual juvenile feather quality and perhaps less time spent in sunny latitudes.

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196. South Polar Skua, Monterey Bay, California, USA, 15th September 2008. A presumed second-cycle bird, with pale spots on the tarsi (shown more clearly in other images). Note that P10 is almost fully grown and also the lack of pale hackles on the hindneck. In the second year, polymorphism starts to become apparent, and this bird may become a paler-morph adult.

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197. South Polar Skua, North Carolina, USA, 27th May 2008. This dark-morph individual is just starting primary moult, much too early for the first-cycle moult. Note how the primary tips can appear relatively tapered (in the main image), but they are intact. The apparent shape depends on the angle of the primaries. The inset (another image of the same individual) shows the normal, rounded shape for an older bird, demonstrating that care should be taken with assessing the shape of primary tips for ageing.

198. South Polar Skua, North Carolina, USA, 27th May 2008. This light-morph adult is in worn plumage, with relatively distinct pale streaks on the upperparts, enhanced by bleaching. Most South Polar Skuas in the North Atlantic are darker than this. Note relatively rounded primary tips.



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199. Great Skua, off Cariño, Galicia, Spain, 1st October 2009. This may be a full adult in prebasic moult. It usefully illustrates the character of the exposed primary tips of an older skua, which are bleached yet rounded and still intact. The primary coverts, sometimes mooted as being blunter tipped on adult birds, appear relatively tapered.



Juan Sagardia

200. South Polar Skua, Baja California Sur, Mexico, 20th August 2010. The cold grey-brown tones of the juvenile head and body plumage often bleach to 'blond' by autumn, which accounts for at least some (if not all) claims of blond adults off the west coast of the USA. Note the relatively pointed, bleached primary tips.



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201. South Polar Skua, Bodega Bay, California, USA, 14th October 2011. Post-juvenile head and body plumage, as here, is typically cold, dark brown, and is different from the faded juvenile plumage (cf. plate 207). This first-cycle bird displays the wing-moult timing typical for this date, about four months later than adult wing moult, with P1 new, P2–P3 growing, and P4 shed.

John Shemilt



202. South Polar Skua, off Long Island, New York, USA, 6th November 2011. This is a late date for a South Polar Skua at this latitude. This bird has a primary moult score of 30, typical of a first-cycle southern skua on this date, or an older Great Skua. A second-cycle Great Skua would have fresher, less tapered outer primaries, while a third-cycle Great would surely not appear so uniform. A hybrid origin may be impossible to rule out for some darker southern skuas like this, but its plumage appears to be within the range shown by presumed first-cycle South Polar Skuas observed in California.

José Ardaiz



203. Great Skua, Asturias, Spain, 11th November 2006. This is a typical juvenile, with orange-buff fringes to the scapulars and wing-coverts, as well as a contrasting dark hood.

204. Great Skua, off Cape Hatteras, North Carolina, USA, 25th May 2004. See also other images, published in Howell (2005). Superficially resembling a South Polar Skua, this bird has a primary moult score of at least 16 (based on flight shots) and conspicuously bleached, pointed outer primaries, thus fitting a first-cycle Great Skua (it falls just to the left of line B in fig. 5). Other support for Great Skua comes from the conspicuously large bill, and remnants of buff subterminal marks to the juvenile scapulars.



Steve N. G. Howell

205. Great Skua, Azores, 2nd June 2011. This first-cycle bird still retains the outer three juvenile primaries and appears typical of many first-summer Great Skuas. Note the ragged, bleached primary tips. Plumage-wise, it might be confused with an adult Great Skua (primary moult timing excludes an adult), but not with a South Polar Skua.



Richard Bonser

206. Great Skua, Cornwall, 2nd August 2008. A darker first-cycle bird at the end of its first primary moult, but not confusable with South Polar Skua (given good views). Note the dark hood and distinct warm pale streaking on the neck and back.



Gary Thoburn

Steve N. G. Howell



207. South Polar Skua, Baja California Sur, Mexico, 20th August 2010. Although a 'textbook' South Polar Skua has contrastingly blackish underwing-coverts, this is not true of juveniles and some older immatures. This first-cycle bird is starting moult, with PI shed. Note the ragged, slightly worn primary tips. This is the same individual as shown in plate 200.

not known when the pale markings are lost, and we are aware of anecdotal reports that older Great Skuas may show a few pale spots, perhaps only visible in the hand (and that on some dark juveniles the pale areas may not be easily visible). Thus, while the presence of extensive pale markings on the tarsi is a good feature for first- or even second-year birds, an apparent absence of pale markings does not necessarily indicate an adult.

Overall, most plumages of Great and South Polar Skuas are distinctive, assuming that birds are seen well. However, a small number of immature Great Skuas (especially from spring to autumn of their second calendar-year) may closely resemble South Polar Skuas. In such cases, correct ageing and primary moult score can assist with identification.

The timing of primary moult

Although the breeding seasons of the two species are six months apart (South Polars fledging in February, Great Skuas in August), their

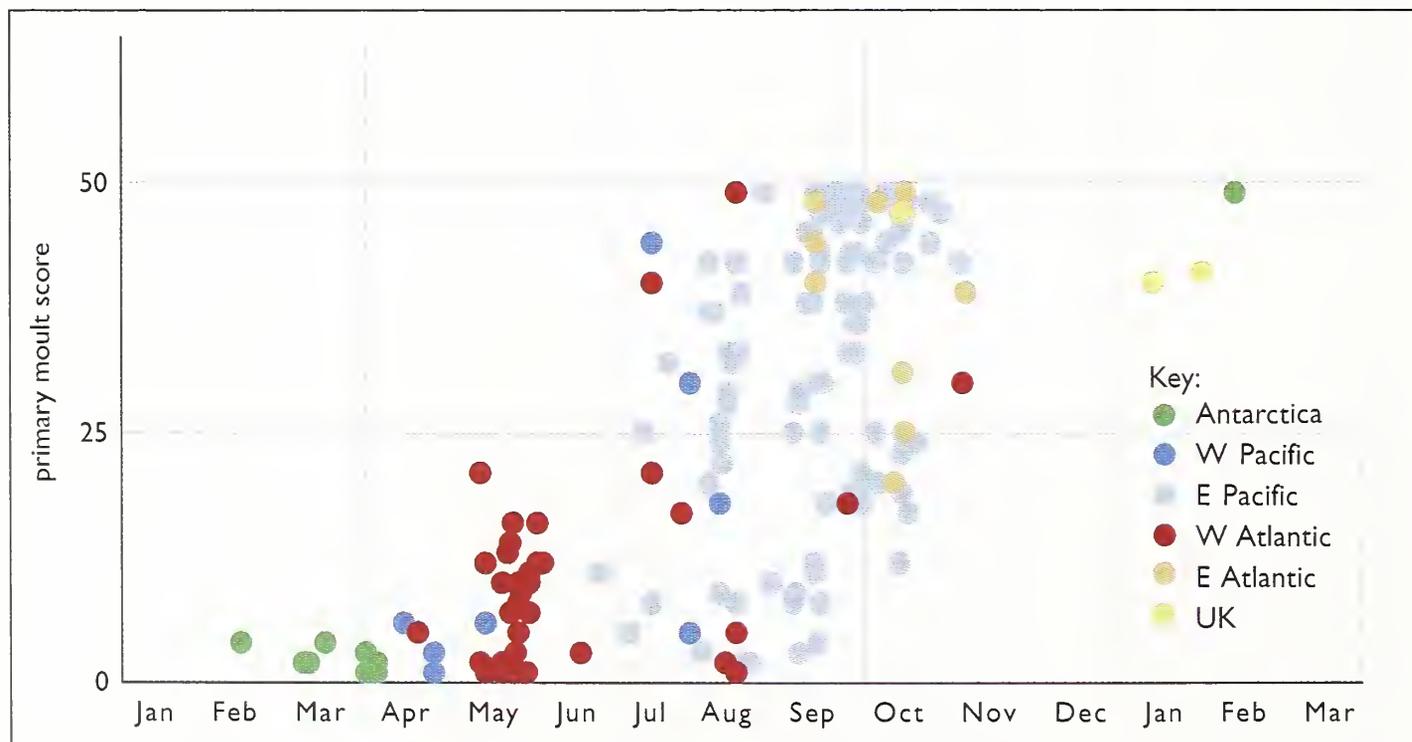


Fig. 2. South Polar Skua *Stercorarius maccormicki* primary moult scores. The Antarctic birds on the left would be older than first-years, whereas the bird on the top right (Balleny Island, with immature gonads; Higgins & Davies 1996) would be a first-cycle bird finishing primary moult. Birds from the eastern Atlantic and UK waters have not been included in the analysis for fig. 3; they are not accepted by any national committee.

moulting periods are remarkably aligned, except that the period of primary moult in first-cycle birds of each species roughly overlaps that of older birds in the other species. South Polar adults moult ahead of first-cycle birds, whereas in Great Skua the first-cycle birds moult ahead of the adults (figs. 2, 4).

South Polar Skua

Fig. 2 shows the results of our examination of photographs and specimens in documenting the timing and progression of primary moult in 190 South Polar Skuas identified by plumage characters. While we cannot rule out the possibility that a few birds were hybrids with Brown Skua, wing-moult timing in the latter species appears broadly similar to that of South Polar so this should not affect our conclusions. None of the birds we used showed characters of Great Skua. In addition, 11 putative South Polars from the UK and the East Atlantic are included in fig. 2 (three from the UK, one from Spain, three from Lanzarote, one from La Palma, and three from Senegal), to show where they fit into the overall picture. To avoid circular reasoning, we did not use these putative birds in the analysis in fig. 3.

A number of the points in fig. 2 represent multiple individuals, in particular, 38 birds from California reported by Howell (2004): his categories of early, mid and late month have been plotted on the 5th, 15th and 25th of the month, and his primary moult categories of inner, middle and outer have been plotted as scores of 8, 25 and 42. A further ten birds, for which date was known only to month, were plotted at mid month.

The primary moult scores fall within a parallelogram. The slopes of the sides span a duration of about five months (150 days), mainly from April to August for earlier-moulting birds and September to February for late-moulting birds. The right side is poorly represented; we have no data after October because most birds are

then in the tropics or the southern hemisphere, with few observers to record them. Our data accord with results of Higgins & Davies (1996) and Malling Olsen & Larsson (1987), which do not support the widely held perception that primary moult in South Polar Skua is unusually rapid and takes only 45–60 days (e.g. Ginn & Melville 1983, a claim that appears to originate with Salomonsen 1976). We suspect that the most rapidly moulting adults might complete moult in about four months (120 days), but any shorter period seems unlikely for a bird of such size that relies on flight for foraging. Howell (2008, 2010) also implied that primary moult in South Polar Skua requires 5–6 months to complete and noted that first-cycle South Polars probably finish primary moult between November and February; this is consistent with the lack of birds in fig. 2 having low moult scores in October.

The initiation of wing moult does not progress evenly but shows a strongly bimodal pattern (fig. 3). The division between presumed ‘adults’ (birds in their second cycle and older, starting mainly in March–June) and first-cycle birds (starting mainly in July–September) is obvious and agrees closely with the moult initiation spans suggested by Howell (2004, 2010) and Pyle (2008). To produce the distribution of start

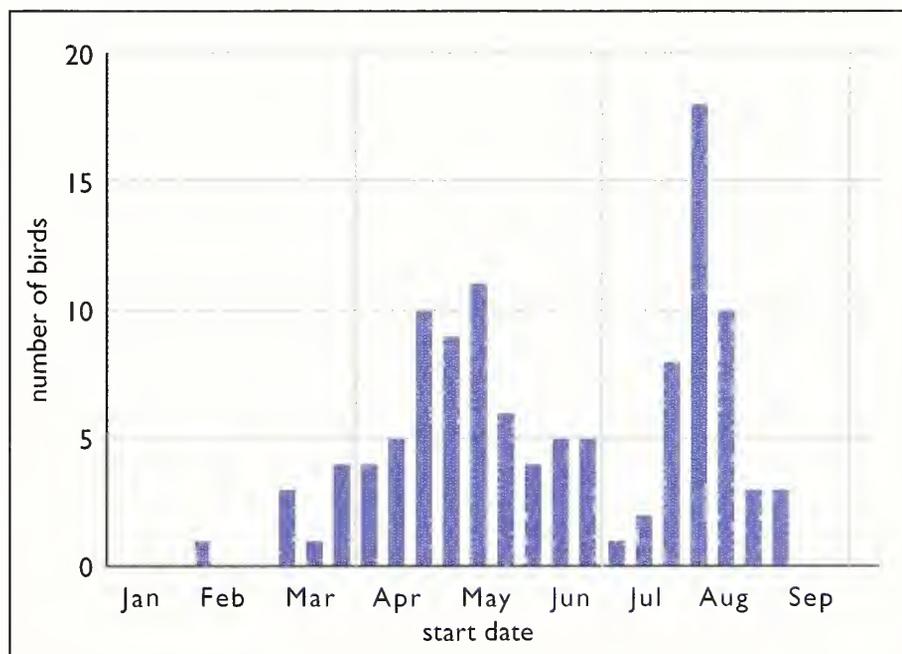


Fig. 3. South Polar Skua *Stercorarius maccormicki* primary moult: distribution of projected start dates, in ten-day categories, assuming that primary moult takes 150 days (see text). Eleven birds from the eastern Atlantic have been omitted from this analysis, as have birds with a primary moult score >35. We infer that the peak on the right represents first-cycle birds, and the broader peak on the left, older birds, including breeders.

dates in fig. 3, we chose a mean duration of 150 days to project the data points back to a start date; the same two peaks appear for a range of trial moult durations, indicating they are real rather than an artefact. To mitigate for the lack of observations after November, we did not include birds with a moult score greater than 35, which should give a truer balance between the two peaks.

From fig. 3 we conclude that the approximate separation of start date between older and first-cycle birds is in early July, with a potential overlap zone of less than a month, estimated by eye from the histogram shape. We used this to determine the position of line B in fig. 5.

Great Skua

None of the moulting Great Skuas we included in our analysis were contentious in their identification, mostly because of obvious plumage features. We found fewer examples of moulting Great Skuas than South Polar Skuas, and thus consulted *BWP* and Malling Olsen & Larsson (1987) for information on the timing of primary moult in Great Skuas, as summarised in table 1 and overlain in fig. 4 on our data from images

and specimens of 70 moulting Great Skuas. We also incorporated a dataset kindly provided by Rob van Bemmelen of 69 moulting Great Skuas in the North Sea: 61 of these birds fall in the zone of presumed second-cycle and older birds in fig. 4; five birds fall in the first-cycle zone; and three birds fall between the two zones but much nearer to the adult zone. These three birds include a known-age bird of 30 years, which had dropped P1 on 27th June, only slightly earlier than the early July starting date noted by *BWP* for failed breeders. Thus, a larger sample shows that some Great Skuas moult slightly earlier than our sample. This is not particularly surprising, and it does not affect our overall conclusions.

The combined data that we gathered lie in two bands: an early band starting in about February–March and a later one starting in August–September (fig. 4). The slope of both bands implies a duration of primary moult of about five months. Based on our studies and photos, most if not all of the latest moulting first-summer Great Skuas finish their first wing moult (preformative) by late August, in agreement with Malling Olsen & Larsson (1997) but in contrast to Bearhop

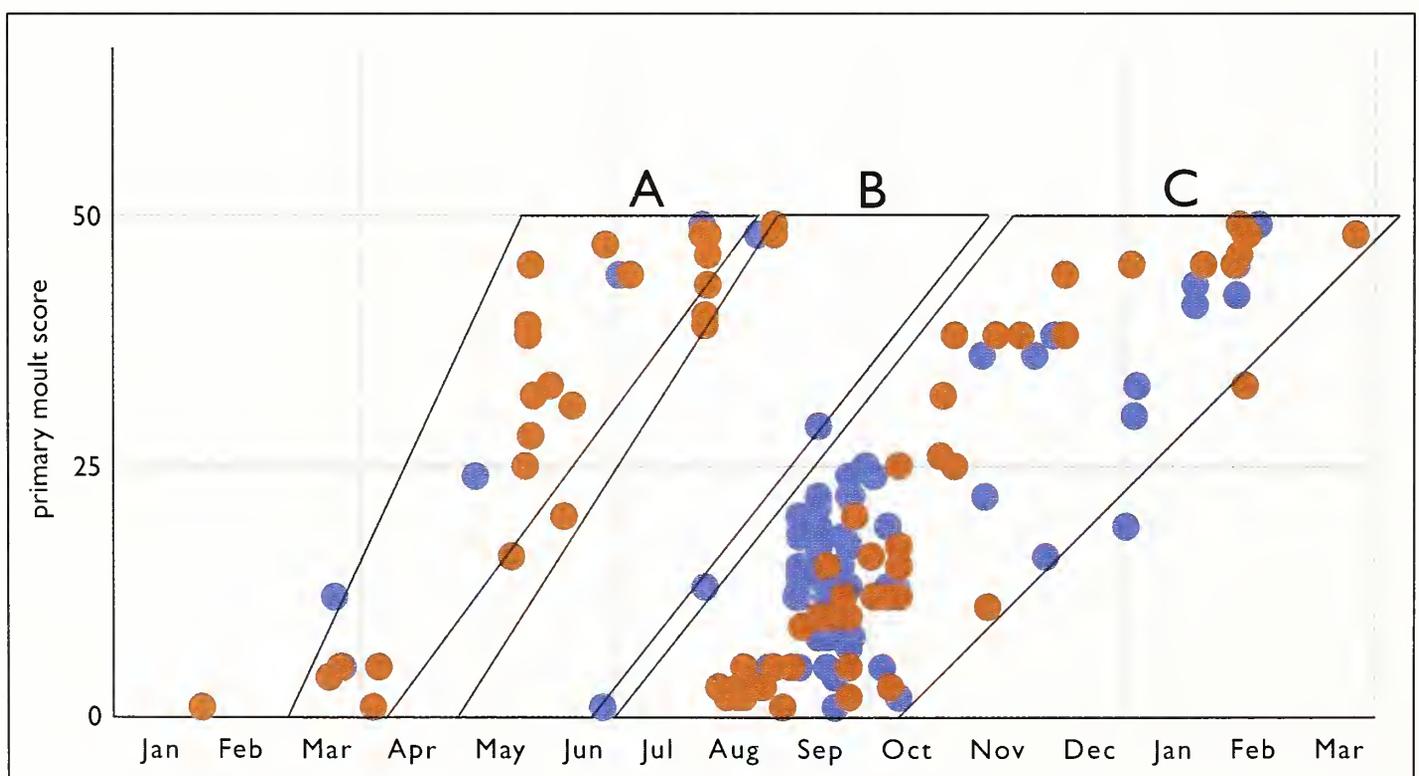


Fig. 4. Great Skua *Stercorarius skua* primary moult. Polygon A shows 1st-cycle, polygon B 2nd-cycle, polygon C 3rd+ cycle and adults, including failed breeders; derived from data in *BWP* and Malling Olsen & Larsson (1997), summarised in table 1. Red dots represent data from photographs and museum specimens; blue dots represent birds in the North Sea (data from Rob van Bemmelen). Note the lack of birds in the putative 2nd-cycle zone (see text). It is suspected that, in fact, 2nd-cycle birds move into the adult cycle following their 1st-cycle preformative wing moult (see text), and thus that the polygon C is actually the 2nd+ cycle.

Table 1. Summary of the timing of Great Skua *Stercorarius skua* primary moult, from BWP and Malling Olsen & Larsson (1997). These descriptions are used to construct the polygons in fig. 4.

	start	end
<i>BWP</i>		
juvenile	early March to early April	late July to mid August
subadult	late May	?
failed breeder	early July	January
adult	August to early October	February to mid March
<i>Malling Olsen & Larsson</i>		
juvenile	March to early April	early June to late August
second-cycle	May/June	August to October (November)
third-cycle	'adult minus one month'	'adult minus one month'
failed breeder	July	December/January
adult	August to early October	January to mid March/April

et al. (2008) and Pyle (2008), who reported that this moult can finish as late as October. As with anything related to moult, some exceptions may occur, but we found no field evidence of any first-cycle Great Skua that had not completed primary moult by early September.

The lack of observations of birds in the putative second-cycle zone (cf. table 1 and fig. 4) indicates either: (i) an error in published information or (ii) that birds of this age class were not sampled by the photos we examined, nor by Rob van Bemmelen. Given that no moult studies of second- and third-year skuas (of any species) have been based upon known-age birds, we wonder whether other authors assumed that second-cycle Great Skuas would moult in a similar fashion to large gulls, moulting their primaries later than first-cycle birds, but earlier than adults?

Votier *et al.* (2003) studied 12 captive Great Skuas that began their first-cycle primary moult in January–February, then started their second-cycle primary moult in September–October, before the first had finished. This suggests that Great Skuas may move from first-cycle timing to adult timing in their second calendar-year, which is consistent with the pattern revealed in fig. 4. However, it also implies a duration of at least



Dick Newell

208. Great Skua, Tenerife, Canary Islands, 3rd August 1997. A presumed first-cycle, paler-type individual towards the end of primary moult (moult score is c. 44). This illustrates how some first-cycle birds can resemble paler adult Great Skuas and are not confusable with South Polar, mainly because of the new pale streaking on the scapulars, although usually the wing-coverts are still extensively dark.

Norman van Swelm



Norman van Swelm

209. Great Skua, Maasvlakte, Rotterdam, Holland, 14th September 2001. This is one of the more likely plumages to be confused with (an older immature) South Polar. However, close inspection shows that it has pale buff tips to the scapulars, a darker hood and white marks on the tarsi, typical of a juvenile. As this bird fades and wears, it will appear more like a South Polar Skua.

eight months for the first wing moult, far longer than described in the literature or than inferred from data presented here. We assume that something about a captive environment slowed the rate of primary moult. Had these birds completed their first-cycle moult in 5–6 months, they would have finished it before commencing the second-cycle moult. It should be noted, though, that while adults are under time constraints to complete their moult between breeding seasons, first-cycle and other pre-breeding age classes lack such time constraints. Although first-year birds are less experienced at foraging and might be expected to take longer than older birds to fuel a complete wing moult, eight months would be an exceptionally long period for a normal, sequential wing moult in a healthy bird of this size. A late start to the second wing moult in some birds would also mean a late finish, and birds completing primary moult in March–April are probably second-summer (3CY) birds. Thus, adult-like birds moulting in late autumn but having relatively fresh outer primaries might be inferred as second-winters.

An immediate ‘follow-on’ (or even overlapping) second-cycle wing moult is typical of several species of long-distance migrants, including the smaller skuas (Howell 2007). That it also appears to be shown by Chilean Skua and Brown Skua (Howell 2008), in

addition to South Polar Skua, suggests that it could be an ancestral trait retained by Great Skua, which shares with Chilean and Brown Skuas a relatively short-distance migration. Pyle (2008) also reported this strategy for first-cycle Great Skua, with the second-prebasic moult following directly on from (or overlapping with) the first-cycle (preformative) wing moult.

We consider that the early band in fig. 4 consists of first-cycle birds, with older birds (second-year and older) in the later band. Study of known-age second-year Great Skuas could help to confirm (or refute) the moulting period we and others suggest for this age class.

Application of primary moult score to identification

In this section we come to the crux of our paper and describe how to interpret a primary moult score using fig. 5, which shows the primary moult scores of our samples of Great and South Polar Skuas plotted against date.

The two lines A & B have a slope corresponding with a moult duration of 150 days. Line A is drawn by eye to include all Great Skuas in the earlier band, which we believe are first-cycle birds. Line B is drawn through a start point coinciding with the ‘valley’ dividing the two modes in fig. 3. It so

happens that this line also contains all but three of the later-moulting Great Skuas to the right. These two lines divide the moult chart into three zones. **Left of line A** is *either* a first-cycle Great Skua or an older (i.e. older than first-cycle) South Polar Skua. **Between lines A & B** is a moult score/date combination *unique* to an older South Polar Skua. **Right of line B** is *either* a first-cycle South Polar or an older Great Skua. Any point close to line A or B could, of course, belong to the zone the other side of the line.

The identity of birds to the left of line A can thus be resolved provided that they can be aged. A first-cycle Great Skua may retain some of the subterminal pale marks on the wing-coverts and scapulars, while some birds display extensive white marks on the tarsi and the outer (old) primaries are often heavily worn and ragged. An older South Polar Skua will show thin, creamy terminal fringes to the scapulars and wing-coverts; although some birds may show some white marks on the tarsi, they would not be extensive, and the outer unmoulted primaries may be faded, but would still be intact. However, some Great Skuas can be confusing when the subterminal scapular and covert marks become hard to distinguish, especially in birds that started out as dark-type juveniles.

Care is still needed with birds between

lines A & B, because relying on a single identification feature is not always safe. For example, the three Great Skuas lying near line B in fig. 5 were all obvious, heavily streaked Great Skuas, one being a 30-year-old ringed bird. Therefore, a critical examination of a bird's plumage should find features that are consistent with South Polar and not consistent with Great Skua. For example, South Polar should show a uniform back and wing-coverts, with no obvious contrasting hood or cap. The age of South Polars in this zone should be beyond first-cycle, so the primary tips should be more rounded and not worn and ragged.

Birds to the right of line B should be straightforward to resolve, because all older Great Skuas will have obvious streaks on the scapulars. Second-cycle Great Skuas may have uniform wing-coverts, so if only the wings (and not the scapulars) are visible, then it may be difficult to resolve such birds (as in plate 211). South Polars in this zone will mostly be first-cycle birds, so their unmoulted primaries should look worn and ragged, they will look cold-toned, will lack streaks on the coverts and scapulars, and will lack any dark contrast about the head.

While the above deals with birds that are in active primary moult, we still need to deal with birds that are not in active primary

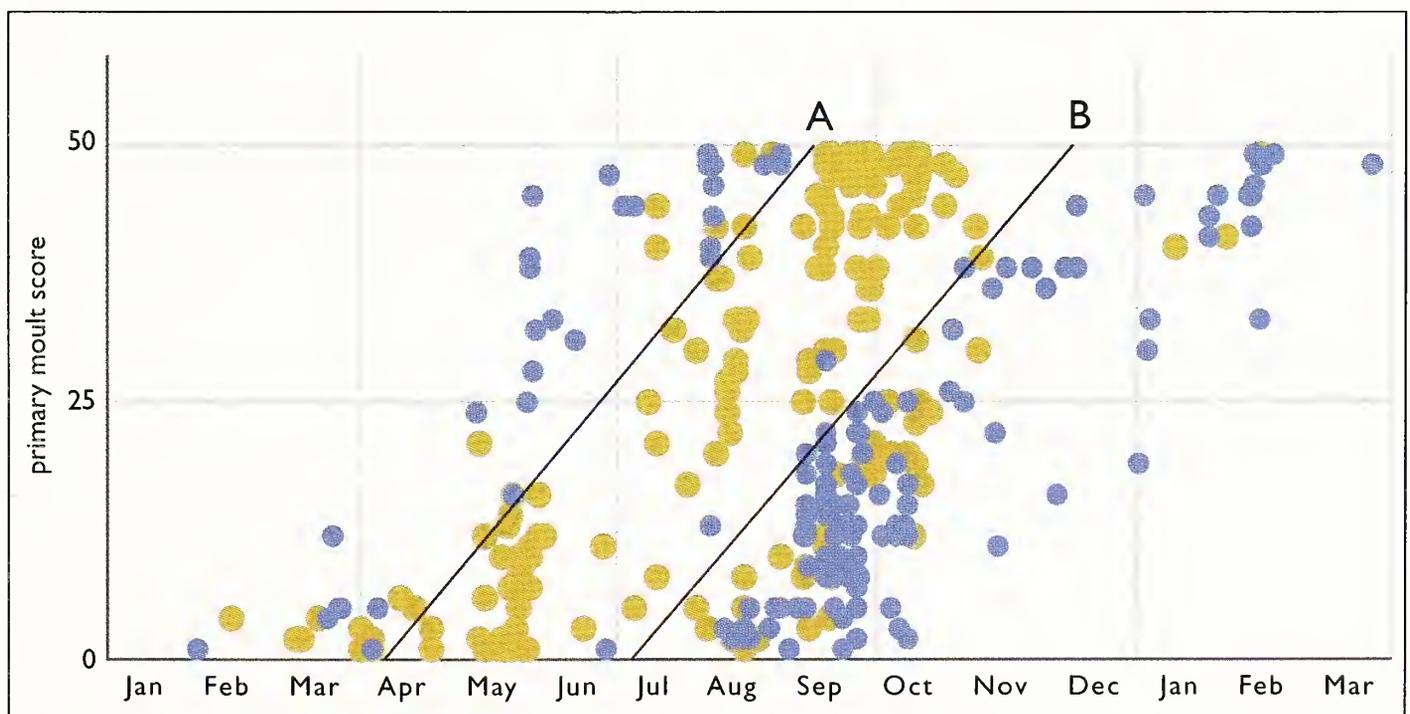


Fig. 5. Comparison of moult timing in Great *Stercorarius skua* and South Polar Skuas *S. maccormicki*. Blue dots represent Great Skua, orange dots South Polar. Line A, derived from Great Skua data, is fitted by eye to include all early moulting birds. The position of line B is derived from fig. 3. Note that the three Great Skuas just to the left of line B each showed plumage characteristics of older Great Skuas.



Gorca Ocio

210. South Polar Skua, Lanzarote, Canary Islands, 11th September 2011. This individual has a primary moult score of c. 45, strongly suggesting South Polar (see fig. 5). Moreover, the lack of streaking on the wing-coverts or scapulars, small bill, obvious golden collar and compact appearance all point towards it being a 2CY (or older) South Polar Skua.



Marcel Gil/SEO-BirdLife

211. Probable South Polar Skua, with Great Shearwater *Puffinus gravis*, off Galicia, Spain, 12th October 2011. The primary moult score of c. 20 corresponds with that of first-cycle South Polar or older Great Skua. The worn, bleached, outer primaries appear relatively tapered and suggest a first-cycle bird, which also fits a southern skua. The newly moulted feathers look cold and grey, while warm dark colours may be explained by the early morning light. However, with an image of this quality we consider that the bird is best left undetermined.



Marcel Gil/SEO-BirdLife

212. Possible South Polar Skua, off Galicia, Spain, 11th October 2011. This bird is not in active primary moult, and the mixed-age feathers in the wing-coverts indicate that it is not a juvenile (1CY) Great Skua. The choice lies between a 2CY Great Skua and a 2CY or older darker type South Polar. Most 2CY Great Skuas should be actively moulting on this date, but a 2CY South Polar would have completed primary moult. Furthermore, its small bill, compact feel, shortish tail and cold appearance, are all compatible with a South Polar. It also shows a hint of a collar on the back of the neck, which is supportive, but not definitive. A view of the scapulars is required to resolve birds like this.

213. South Polar Skua, Senegal, October 1995. The primary moult score of c. 30 is near to line B in fig. 5, which indicates a first-cycle or older South Polar, or an older Great Skua. The complete lack of streaking on the scapulars or other pale marks, apart from narrow pale fringes, would be inconsistent with an older Great Skua, but consistent with South Polar. The primaries appear to be pointed and faded indicating that this is probably a first-cycle bird. The exposed secondary bases, caused by missing greater coverts, are not unusual on ICY South Polar Skua (e.g. see plate 195).



Dick Newell

214. Great Skua, off Scilly, 10th October 2003. This fresh-plumaged bird, with uniformly dark wing-coverts, is probably a first-cycle bird that has recently completed its primary moult and appears to be just starting its second-cycle (PI on the left wing seems to be falling out).



Bryan Thomas

215. South Polar Skua, Lanzarote, Canary Islands, 11th September 2011. This second-cycle (or older) bird, just completing its primary moult, shows a number of features indicative of South Polar, including smooth scalloping on the flanks and a pale collar. It would be rare for a Great Skua to have this primary moult score on this date. Note that some brown feathers are visible in the underwing-coverts.



Juan Sagardia

José Ardaiz



216. Great Skua, Asturias, Spain, 28th October 2006. A dark juvenile showing reduced buff fringes to the scapulars and wing-coverts. Even dark juveniles still show a darker hood.

Luke Seitz



217. Great Skua, Nantucket, Massachusetts, USA, 28th August 2010. With P10 still growing, this bird is a 2CY completing its first-cycle moult. The coarsely marked scapulars and plain wing-coverts are typical of this age.

Tomas Crespo



218. Great Skua, off Gijon, Spain, 29th October 2011. A pale juvenile, with broad buff fringes to the scapulars and wing-coverts, as well as an obvious dark hood. This bird is unlikely to fade or wear into a plumage confusable with South Polar Skua.

Edwin Winkel



Edwin Winkel

219. Presumed South Polar Skua, La Palma, Canary Islands, 6th October 2005. This bird was accepted by the Spanish rarities committee as a 'southern skua'. It is just finishing primary moult, with P10 nearly fully grown. It appears to be a perfectly normal second-cycle or older South Polar, with nothing to suggest Brown Skua. Note that fresh wing-coverts and scapulars of some South Polars can show small, cold pale tips, which are different from the extensive warm golden colour of most second-generation or older back feathers of Great Skuas.

Alexandre Leitão



Alexandre Leitão

220. Presumed South Polar Skua, Portugal, 7th November 2007. With a primary moult score of c. 32, this bird falls to the right of line B in fig. 5, which could fit an older Great Skua, but it also fits a first-cycle South Polar. The compact structure and overall appearance point towards South Polar. This may be the first record of South Polar Skua for Portugal.

Martin Løfgren/Wild Bird Gallery



Martin Løfgren/Wild Bird Gallery

221. Great Skua, Madeira, 30th May 2011. The uniform plumage, with a white blaze on the forehead might suggest a classic South Polar Skua. However, the bleached, pointed and unmoulted outer primaries, and ragged tail feathers suggest first-generation feathers. With a primary moult score of c. 21, this is consistent with a first-cycle Great Skua, and inconsistent with first-cycle South Polar Skua. The dark cast to the head also gives a plumage clue to its true identity, while the pale fringes to the scapulars and wing-coverts look like the worn remnants of juvenile feathers.

moult, such as dark-type juvenile Great Skuas, before they have started their first-cycle primary moult, any time between August and the following February. These could be confused with dark older South Polar Skuas that have completed their primary moult. Some Great Skuas at this stage can look remarkably uniform, but a close examination, probably requiring good photographs, should still reveal the pale sub-terminal marks on the wing-coverts and scapulars, as well as a contrasting dark hood.

The captions to plates 210–222 provide our reasoning for the identification of a number of birds, which illustrate our points about ageing, moult, and species identification, and include discussion of some points not made above. For example, first-year South Polar Skuas (and perhaps some older immatures?) do not necessarily have solidly blackish-brown underwing-coverts, a feature often considered typical of South Polar Skua (see plate 207).

The identifications of all birds in this discussion are ours, and these mostly agree with the identifications by the observers. A number of these birds have not been accepted by relevant national committees. We also encountered images of birds that were

not sufficiently clear to allow evaluation of the necessary features. Such birds are best left unidentified, until perhaps other features may be revealed by further study. This emphasises that in field conditions (and particularly during seawatching), a fair number of large skuas are best left unidentified. But, given very good views and, preferably, good images, the separation of South Polar Skua from Great Skua is often relatively straightforward.

Summary and conclusions

The breeding seasons of Great and South Polar Skuas differ by six months but the moulting periods of adults of each species overlap broadly with the moulting period of first-cycle birds of the other species. Consequently, if a bird can be aged, its wing moult is often diagnostic for identification. As a general outline (see figs. 2, 4, 5), adult Great Skuas undergo wing moult mainly during July–March, compared with July–February for first-cycle South Polar Skuas. Conversely, older South Polar Skuas undergo wing moult mainly during March–October, compared with March–August for first-cycle Great Skuas. In all cases, there is a span of about 2–3 months in the start and end dates for a



Tom Johnson



Tom Johnson

222. Presumed South Polar Skuas, western Georges Bank, Massachusetts, USA, 13th June 2012. These similar birds appear to conform to the expected appearance of a South Polar Skua. However, the primary tips appear bleached and pointed, yet not sufficiently worn for this age of Great Skua. With a primary moult score of c. 18, this is too advanced for a first-cycle South Polar (by almost three months), and falls to the right of line A in fig. 5 – unique to older South Polar. We believe that the appearance of these birds, combined with this moult score, overrides the possibility that these are first-cycle primaries and that both are second-cycle (or older) South Polar Skuas.

given wing moult (adult Great Skuas typically start primary moult sometime between July and September, etc.).

Ageing can often be achieved by careful observation of general plumage coloration and pattern, in combination with leg colour (extensive whitish areas indicate a bird in its first 1–2 years of life), primary shape and primary wear. Given known age and primary moult score, species identification can often be achieved by plotting the bird's primary moult score on our fig. 5.

We refute the common assumption that South Polar Skuas lack brown in their underwing-coverts. Young birds in particular have wing linings that are not uniformly blackish-brown. Conversely, dark Great Skuas can show apparently wholly blackish wing linings.

The idea that South Polar Skuas moult their flight feathers in only 45–60 days is not supported by our study. We conclude that South Polar Skuas take about 150 days to complete their primary moult, similar to the time taken by Great Skuas. Our observations also do not support the timing of primary moult reported for second-cycle Great Skuas in *BWP* and Malling Olsen & Larsson (1997); we suggest that the second-cycle wing moult starts in the second calendar-year, after completion of the first-cycle wing moult.

Finally, this should be regarded as a work in progress. Some of the assertions and suggestions made here need more supporting data. Indeed, the ideas in this paper could be regarded as a working hypothesis, where we invite people to provide more evidence to support or refute our conclusions. More images are needed of moulting skuas, as shown by the areas of sparse data in fig. 5, particularly South Polar Skuas after October and dark first-cycle Great Skuas. Three issues in particular call for further work:

- 1) What is the nature of variation in the appearance of second-calendar-year Great Skuas in autumn, following their first complete (preformative) moult? While we found no examples of Great Skuas at this stage with unmarked scapulars, we really need a larger sample to confirm this.
- 2) Can data from known-age second-year Great Skuas confirm our inferences about

the timing of their wing moult, immediately following on from the first cycle?

- 3) What is the nature of variation in the appearance of first-cycle hybrid South Polar × Brown Skuas, and to what extent do such hybrids occur in the North Atlantic?

Acknowledgments

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R. G. Newell, Old Beach Farm, 91 Green End, Landbeach, Cambridgeshire CB25 9FD;
e-mail dick.newell@gmail.com

Steve N. G. Howell, PO Box 423, Bolinas, California 94924, USA

Daniel Lopez-Velasco, C/Pablo Laloux, 10, 6° izda, Salinas, 33450, Asturias, Spain;
e-mail: dskater20@gmail.com



Dick Newell went on his first pelagic trip, with the late Jim Enticott, on an Irish trawler in 1965. He has been fascinated with skuas and other seabirds ever since. His most recent obsession is with Common Swifts *Apus apus*. **Steve Howell** is a senior field leader of birdwatching tours for WINGS/Sunbird, and a research associate at the California Academy of Sciences. His interests include bird identification challenges, biogeography, tequila and chocolate. **Daniel Lopez-Velasco** will never forget his first skua – a dark-morph Arctic – during a seawatch in September 1997, when he was ten years old. Now, after having seen several tens of thousands of skuas, he still feels the same excitement whenever he sees one. Dani is a medical doctor who now works as a tour leader for Birdquest, and organises pelagic trips off northwestern Spain and Lanzarote, Canary Islands.

A species is what I say it is

The chaotic state of species-level taxonomy highlighted by Nigel Collar in his Bernard Tucker Memorial Lecture (*Brit. Birds* 106: 130–142) could be reduced if the different regional bodies that produce official lists for their areas of concern could agree among themselves on taxa of common interest. The BOU and the AOU, apparently considering the same evidence, disagree on the status of transatlantic splits such as Eurasian/Green-winged Teal *Anas crecca/carolinensis*, European/American Herring Gull *Larus argentatus/smithsonianus*, and Little/Least Tern *Sternula albifrons/antillarum*.

Some years ago, at a meeting on avian taxonomy at the Linnaean Society, I made the suggestion that the various regional bodies that produce official lists should pool their expertise and produce an officially agreed World List. In response I was told that a similar proposal had been made at a previous IOC, but the only visible development along those lines was the creation of the IOC English names committee, whose remit was to standardise English vernacular usage. It has since morphed into a taxonomic committee and its world list (at [www.worldbird-](http://www.worldbird-names.org)

[names.org](http://www.worldbird-names.org)) now has several hundred more species than other lists available in print or online, all of which disagree to some extent with each other, quite apart from other opinions in field guides and monographs.

The ‘taxonomy’ sections of the species accounts in *HBW* are replete with suggestions that more than one species is possibly/probably/almost certainly involved and it will be interesting to see what the promised BirdLife International/*HBW* list comes up with.

The existence of the AERC is evidence that some international co-operation is possible so it is difficult to see why a body such as an international taxonomic committee cannot be established. Regional bodies would have primacy over any taxa which are endemic to their area of concern, but suggestions for splitting cosmopolitan species could be agreed only on an international basis.

My proposal would involve the taxonomic equivalent of an international records committee to consider all proposals for taxonomic change at all levels, with one international agreed list instead of the present competing alternatives.

F. M. Gauntlett, 55 Larkfield Avenue, Harrow, Middlesex HA3 8NQ;
e-mail fmgauntlett@live.co.uk

I enjoyed reading Nigel Collar’s recent paper and I agree that, at least in theory, avian taxonomy could often benefit from a more rigorous approach – but is this truly practical? The word ‘science’ is often taken to imply a field in which results are objective and reproducible by others, yet under this definition would avian taxonomy qualify as a science? I think not, although one day it may achieve this distinction. So why pretend that it is?

Collar claimed that we have a ‘new democracy of taxonomists’, yet avian taxonomy still seems a rather undemocratic field, which is hardly surprising: democracy exists only in a dictionary, and is not a valid biological condition. Thus, publication in peer-reviewed journals, while in principle a

good process, is still laced strongly with nepotism and politics. And the purview of taxonomy seems largely to have been transferred from aristocrats, with the leisure time for study, to students in genetics labs, following the whims of their advisors and the convoluted trails of funding.

The main practical difficulty is time. It requires time to gather and analyse data, and then go through the hoops of peer review, which can be a significant barrier to professional students, let alone to the average birder. For most of us, if taxon A looks and sounds quite different from taxon B, and even lives in a different habitat, why should we spend the time, sometimes years, writing a paper to elaborate the obvious? And

perhaps even then have it rejected for publication based on editorial whims vs. objectivity? Nature does not lend itself to intellectual domestication, and species cannot realistically be reduced to statistics, despite the well-intentioned formulae of Isler *et al.* (1998) or Tobias *et al.* (2010). The human eye and ear can often evaluate differences that may be difficult and/or time-consuming to quantify, differences that may have more relevance to species limits than subjective scores of subjective numbers.

Some years ago, I elevated 24 taxa to full species in a very undemocratic 'this is the way it is' approach (Howell & Webb 1995). In fact, I did take the time (and it was a lot of time) to write papers supporting species status for eight of those 24, and six of those eight splits were accepted by the AOU; four others have since been elevated to species by the AOU, and 18 of the 24 are now recognised as species by the IOC (Gill & Donsker 2013). The others remain as 'official' subspecies, despite clear differences in morphology, vocalisations, etc. These 24 species were, to my mind, obvious splits, quite distinct from the fuzzy-zone splits of bean geese or redpolls that Collar mentioned; and thus I refrained from splitting a host of other taxa. Today, however, my increased knowledge of Mexican birds would lead me to recognise a further 28 'new' species without hesitation (e.g. Eisermann & Howell 2011, Howell 2012a,b). But to publish all the data to explain and justify these splits to hearing-impaired people lacking cognisance of biogeography would take more time, or patience, than I have.

Thus, while I agree in principle with Collar that a good case for splitting 'will marshal the relevant facts... and present the findings clearly, fully, and untendentiously', do we really have *time* for this in the current extinction crisis? Has the BSC instead come to stand for Bureaucratic Species Concept? Will our pretensions to high standards and

principles be the death of us, and also of many species of birds?

In today's business-driven world, scientists have been very cleverly trapped by their own ethics: for something to be accepted as a species, ornithologists may have to spend years, and a lot of money, rigorously proving what is obvious, if only to self-justify their standing as 'scientists'. Meanwhile, developers (a term I use loosely) happily clear-cut forests and degrade habitats. Years later, the bird that was 'only a subspecies' is extinct, but at least we now have data to show that it was actually a species. And so-called science marches onwards, in a backwards kind of way. Some might say this is only Darwinian, for businessmen are smarter than biologists, not constrained by unrealistic ethics, and so they deserve to inherit what is left of the world.

It would be nice, not to mention expedient for conservation, if there were less painstaking ways to review and accept self-evident truths, to acknowledge many valid species that are languishing as subspecies on 'official' lists. To be consistent with the 'logic' of present taxonomists, and to be truly scientific, we should go back and painstakingly re-evaluate every single species ever named and split and accepted on lists today. Yet we don't do this. And why not? Because it simply makes sense just by looking at them that they are, well, species. So why be hypocritical and not use that same, common-sense logic when going forward? In this way, conservation would not be compromised by bureaucracy more than it already is.

Perhaps, in some cases we should shed the cloak of faux democracy, embrace hypocrisy, and admit that a species *can* be 'whatever I say it is'. The onus should instead be on those who disagree with such-and-such being considered a species to publish long-winded, statistically overburdened papers to argue otherwise. If not, we all waste our time while biodiversity burns under our noses.

Steve N. G. Howell, PO Box 423, Bolinas, California 94924, USA

Taxonomy and systematics arose out of a desire and a necessity to catalogue and pigeon-hole nature (for various purposes, notably conservation, we need to define species). Since nature is a continuum, and evolution hasn't

been paused to aid us, this results in an artificial construct. In our search for a definition of a species there has been much debate (see, for example, Greenwood 1997, Helbig *et al.* 2002, Maclean *et al.* 2005, Tobias *et al.* 2010). The

Biological Species Concept (BSC) is one way of approaching this, and is intuitively the most 'natural'. However, as with all species definitions, arbitrary decisions must be made – we must accept that arbitrariness, and attempt to minimise it.

Following the BSC, which is less arbitrary than some alternatives since it has at its core a definition (that of reproductive isolation), we still require unnatural rules to delimit our species when faced with such problems as introgressive hybridisation and allopatric populations. How much hybridisation do we allow, and still accept two populations as separate species?

Reproductive isolation may be affected by one or more pre- or post-zygotic mechanisms. A zygote may not be formed because of various barriers, including mechanical ones to prevent copulation, or a behavioural mismatch. Or, a zygote may be formed, but various mechanisms may ultimately prevent that zygote when adult from undergoing meiosis successfully to produce viable

gametes and thus to reproduce itself.

In an allopatric situation much guesswork is involved. In the not-too-distant future it will be possible to carry out complete genome sequencing of individuals relatively cheaply. This will allow us to compare total genomic differences, or to compare specific sections of the genome, of two individuals. But arbitrariness is again involved. Do we compare genomes of two sympatric species and calculate percentage differences, or do we compare specific parts of the genome? Whichever we choose, setting the bar at which two individuals are considered different species will be arbitrary. Having decided on the height of the bar, we can then see if this threshold is reached when comparing two allopatric forms. We shall require rules, however, and they may well not be the same throughout the class Aves.

For many purposes we need this elusive definition and a way to assay it, but we should not kid ourselves that it is anything more than a man-made construct.

Clive F. Mann, 53 Sutton Lane South, London W4 3JR; e-mail clivefmann@gmail.com

Nigel Collar says much that I found myself agreeing with, but my overall view is that none of his concerns are sufficient to warrant a rethink of the consensus that has emerged over the last two decades.

No-one can doubt that avian taxonomy is in a much better place, in terms of accountability and community engagement, with the existence of published guidelines for assigning species rank than it was when the authority-based approach so effectively criticised by Sangster (1996, 1997) prevailed. However, I do feel that the criticisms of the BOU's guidelines (Helbig *et al.* 2002) are overly harsh. For instance, their allospecies category is described as ambiguous. I have no problem understanding it: allospecies rank is used when sister taxa are allopatric, and so proof that they are on separate evolutionary trajectories cannot be obtained, but when the indirect evidence suggests that, on balance, this point has probably been reached. While Tobias *et al.* (2010) raised pertinent questions about its detailed implementation, is there really any ambiguity in the concept itself? Are

there examples of decisions made by the BOU using this part of the guidelines which fall foul of that ambiguity? Wisely, no fire is aimed at the semispecies concept: this after all is hardly a BOU innovation (see for example Voous 1979).

Collar also claimed that the numbers of splits that would result from applying the guidelines to the British List would be comparable to the number that would result from applying the Phylogenetic Species Concept, thereby implying that the guidelines are a kind of PSC-by-stealth. I'm not aware of any serious attempts to apply the PSC in a British context, however, so how does he know how many splits that would generate? In any case, Collinson (2002) explained why this inference is mistaken.

The BOU guidelines should be viewed as a first attempt at introducing rigour and transparency into taxonomic decision-making. Like all 'written constitutions', once the guidelines came to be used in practice, it was only to be expected that amendments would follow, and it is obvious from a detailed

reading of Tobias *et al.* (2010), that the criteria proposed therein are exactly that. Let us just be clear, though, what the Tobias criteria are, and what they are not.

My understanding is that the Tobias criteria were conceived because of a need for a quick, practical mechanism for bringing consistency to species-level taxonomic decisions across and between taxonomic groups and zoogeographical regions, because when so many taxa are threatened with extinction, we don't have the time to wait for full and in-depth taxonomic reviews before deciding what is and isn't worthy of conservation. At that objective, they appear to succeed very well. If the criteria, as currently defined, are intended as something more than a good heuristic conservation decision-making methodology, though, I'm sceptical. A decision-making approach that *explicitly forbids the use of molecular data* surely takes us back decades. Fortunately, Tobias *et al.* (2010) acknowledged this weakness and expressed the hope that future work can develop a revised methodology that reconciles the two approaches.

Collar's plea for higher standards in the planning, execution and documentation of taxonomic studies is also impossible to disagree with. However, reality usually gets in the way of perfection: often, incomplete or flawed taxonomic studies are all that exist, and as users of them we need to be able to cope with this (the alternative is to ignore them). I'm doubtful about the claim that conservationists are being caused huge pain by this – the only cited example of wasted funds, the Peregrine Fund Cape Verde Kite rescue attempt, sounds like something from *Team America: World Police*; are there any better examples? I wonder if what he really meant to say was that those who work in the infrastructure which supports conservationists, synthesising and making recommendations based on all of this (sometimes conflicting) information have a difficult job. I agree, and sympathise, but the ability to successfully filter complex information is a key survival skill in the developed world in 2013 (just ask anyone who's had to choose a new smartphone recently).

In my view, the key flaw in Collar's text is that the exhortation to 'pull your socks up',

aimed at those proposing changes to species limits, is not matched by an equivalent message to those advocating the status quo. The reason why this omission is important is touched on when quoting Delacour & Mayr's views on Philippine broadbills: ornithologists of the mid twentieth century were rather too gung-ho in dismissing allopatric lookalike taxa as subspecies of polytypic species, regardless of whether this treatment was appropriate. Clearly, many of the lumping decisions made in this period were sensible, but many were not. Sangster (2009) documents hundreds of subsequent well-supported taxonomic splits which, taken together, convincingly demonstrate the scale of the errors made in this earlier period, and in doing so quashes any claim that the current ongoing splitting-dominated phase is a fad: this paper deserves a much wider audience.

Collar proposes that extreme caution must be applied regarding proposals for splitting, and while I understand his reasons, he doesn't propose any equivalent safeguards against the perpetuation through being *over-cautious* of errors like those Sangster has documented. Faced with such a pattern of errors, it is not tenable to maintain that those earlier decisions are close to sacrosanct and that exceptional evidence is needed before they can be overturned. In the light of Sangster's findings, I contend that what is needed is an approach whereby, whenever a taxonomic review is being conducted, rather than presuming 'everything is a subspecies until proven innocent', a more neutral null hypothesis would be 'It is not clear whether taxa X and Y have reached the point of speciation.' To split and to lump would then constitute alternative non-null hypotheses, each to be separately tested. With this approach, the competing options are compared on an equal footing rather than the dice always being loaded in favour of lumping. I firmly believe that this would result in the splitting/lumping pendulum settling in the right place more often, and sooner, than it does under the approach Nigel Collar favours.

My final point is about uncertainty. What is wrong with admitting when we just don't have enough information yet to make a

decision? In my collaboration with OSME on their regional list, we realised that, in many cases, the only sensible answer is currently 'don't know'; and yet have been able to publish a list (see www.osme.org/orl/simplified_orl_v2.3.pdf) that includes these cases, and signposts them through the use of parentheses in taxon names – e.g. *Cygnus (columbianus) bewickii*. This convention is not too different from the uncontroversial use of the *incertae sedis* concept for enigmatic higher taxonomic categories, and removes the problem of species 'winking in and out of

taxonomic existence'. No-one is saying that this uncertainty is permanent, and it serves to highlight priorities for further research. Whatever the eventual rank assigned to such taxa, full species status is no longer the prerequisite for conservation action that it once was, and it has never been a passport to fair and adequate levels of conservation resources anyway.

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Steve Preddy, Bristol; e-mail Steve.Preddy@blueyonder.co.uk

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Forked tongue no help to shared understanding

The April 2013 issue of *BB* was a riveting, in parts poignant read and I gave fresh thanks for the clear English of almost every sentence. Such immediacy of message has become rare in other, once as easily enjoyed periodicals, such as *Ibis* and *Bird Study*. This loss stems directly from the adoption by professional ornithologists (and their tutors and editors) of a needlessly complicated English vocabulary, particularly in its proliferation of unusual alternate words and terms. Such obfuscations frequently defeat the *Oxford Dictionary of English* (2nd edn, 2005) and so frustrate my attempts to keep up with the drift of more expert ornithology. Several pleas for the issue to amateurs of a glossary of new terms have been ignored.

The divergence in the once-shared tongue of (ageing) purposeful birdwatchers and (youthful) professional ornithologists was not specifically addressed by Peter Bircham in his amber-listing of the former tribe (*Brit. Birds* 106: 237–238). Yet it carries a clear risk of a closing shop in what should continue to be a readily accessible shared literature. Also, it can only exacerbate the much observed but little addressed decline in teenage attachment to the hobby of birdwatching and the resultant 'citizen science'.

Elsewhere in the April 2013 issue, there were honourable mentions of 21 great mentors to the current workforce of skilled amateur bird surveyors, the *sine qua non* of measured avian fortunes. Surely the 17 who

inspired me would vote against the essential plurality and freshness of amateur study being reduced to credits for rarities and fodder for the ever-multiplying sinks of amorphous websites. Amateur or professional, they all taught the basic disciplines of bird study (not least the need for constant reference to the literature) but not one ever

*D. I. M. Wallace, Mount Pleasant Farm, Main Road, Anslow, Burton on Trent,
East Staffordshire DE13 9QE*

The amateur ornithologist in Britain

Peter Bircham (*Brit. Birds* 106: 237–238) has very succinctly described how ornithology has moved into the mainstream of biological research. He is also right that there has been a significant decline of amateur studies published in the mainstream ornithological journals. However, I think there are two processes that have driven the greater professionalisation of ornithology. One is the widespread recognition that birds are excellent models for addressing a wide range of biological questions. The second occurs in all branches of science and that is progress: more is discovered and the tools available to answer new questions become still more sophisticated.

As the Editor of *Ringing & Migration*, I can confirm that we do publish from the papers that we receive and that we receive very few papers from amateur ornithologists! I would dearly love to get more papers from unpaid ringers; although there are an awful lot of data out there, it is an uphill struggle persuading ringers to write papers. We (me, the Ringing Committee and the BTO) do recognise the problems: it takes time to write a paper, the (current) technical format of scientific papers may be an unfamiliar writing style, and it is harder than it used to be to find something new and interesting to say. We also appreciate that statistical analyses used these days may appear complex and deter people; however, statistical methods are

introduced any impediment to joyous discoveries and their considered interpretations. Most crucially in fostering new mind application, they recognised the surge of new aspiration that came after the achievement of even a short personal contribution to published ornithology.

essential tools for getting the most from hard-won data. Amateur ornithologists are not alone in finding statistical methods to be a challenge, but professionals often have the advantage in that they will have people with the right skills working nearby whom they can ask.

For *Ringing & Migration* to be a worthwhile journal that amateur and professional ornithologists alike would be proud to publish in, we have to move with the times: ask interesting questions, use the best tools. The journal is probably unique in the level of advice and help offered to amateur authors to help them to get their work into print, but I do appreciate that we need to work harder at getting this across. It does take time and ornithological insight to write an interesting paper: time, motivation and insight are things that we can't provide, but we can (and do) provide advice and encouragement – we just need to be asked!

Finally, we also recognise that formal scientific papers in which hypotheses are formulated and tested are not the only important and interesting outputs of ornithological research; we also provide a forum for the dissemination of new techniques (ageing, sexing and identification criteria, marking methods and their safety, new statistical methods) essential for the development of ornithological science.

Chris Redfern, Editor, Ringing & Migration; e-mail chris.redfern@newcastle.ac.uk

I am sure Peter Bircham is correct that low numbers of scientific papers are written by volunteer (not amateur, please) ornithologists, but I suspect that it has always been a

minority of volunteers who have published the results of their studies in this way. The publication of work is incredibly important to ensure its full recognition and we should

all do our best to encourage more publication. I know from my own experience that the editors of our main journals do their utmost to encourage and help authors but they can only do so if papers are actually submitted. Any initiative that makes significant papers from bird reports and ringing group reports more widely available should be welcomed and this in itself may lead to more work making it to the mainstream journals.

However, this doesn't mean that the volunteer ornithologist should be 'amber-listed'. As someone who has worked as both a professional and a volunteer ornithologist, it is my view that the role of the volunteer has never been greater. Schemes such as WeBs,

BBS, BirdTrack, CES and RAS hardly existed in the 1960s, yet now their results, collected largely by volunteers, feed directly into policy and provide the core material in many scientific papers.

All of us surveying and studying birds as volunteers do so because we enjoy it and want to make a contribution. I am sure that Robin Prytherch will be very satisfied that the latest part of his excellent Common Buzzard *Buteo buteo* study is now published for all to see and admire (*Brit. Birds* 106: 264–279) and we need more good work of volunteers written up and published in this way; but we should also recognise that volunteers are contributing in many other ways too.

Ken Smith, 24 Mandeville Rise, Welwyn Garden City, Hertfordshire AL8 7JU;
e-mail ken.smith91@ntlworld.com

See also Talking point by Will Cresswell in this issue (pp. 361–362)

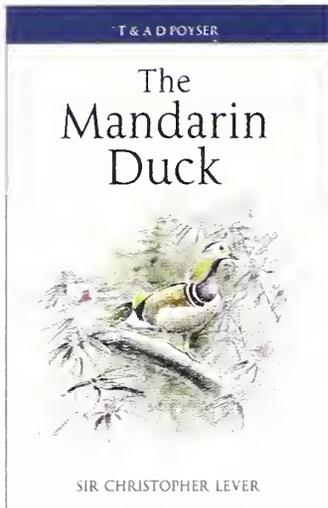
Short-term fluctuations in bird numbers

While the population estimates for British birds (*Brit. Birds* 106: 64–100) must have involved a prodigious amount of work and are very interesting, it is surprising that nowhere except in some notes do they discuss fluctuations in populations. Over the last decade we have had a series of cold winters and stormy summers, an exceptionally dry year and an exceptionally wet year, at least some of which would have led to enquiries in the past, but they are not discussed. If one looks (for example) at the

Waxwing *Bombycilla garrulus*, we are told that there are 11,000 in the UK in the winter, and while it is said in note 62 that there is a wide degree of variation between years, this is hardly a fair representation of our experience of Waxwings. The numbers of many other birds present in the winter also fluctuate with the weather and food supply, but nothing is said about this. Surely the BTO at least must have information bearing on such matters, and they require more attention?

W. R. P. Bourne, Ardgath, Station Road, Dufftown AB55 4AX; e-mail wrbourne82@yahoo.co.uk

Editorial comment Andy Musgrove replied: 'Bill raises a good point. Bird numbers are changing all the time, which is the reason why the year of each estimate is clearly tabulated in our paper. Some species are more prone to major fluctuations than others, and the figure of 11,000 Waxwings (calculated following the novel methods spelt out in the paper) was an average for 2006/07–2010/11, with the annual estimates varying between 365 and 36,160. Unfortunately, for most species, there is no straightforward way of assessing fluctuations in overall winter UK numbers, as the BTO (and partner organisations) does not have a winter equivalent of the Breeding Bird Survey to base it on. For waterbirds, the Wetland Bird Survey gives detailed annual trends, while Garden BirdWatch gives excellent information for a range of species in the garden environment. BirdTrack is becoming increasingly useful for showing more extreme fluctuations in abundance (see the graphs on the home page, blx1.bto.org), but its focus is on reporting rates (i.e. percentage of complete lists with species present/absent) and not on standardised count measures; deducing more subtle changes in abundance is not straightforward. However, I do agree that it would be both fascinating and valuable to be able to say more about the changes in all our wintering bird populations.'



The Mandarin Duck

By Christopher Lever

Poyser, Bloomsbury Publishing, 2012

Hbk, 256pp; colour illustrations

ISBN 978-1-4081-4963-8 Subbuteo code M21411

£50.00 **BB Bookshop price £45.00**

In the summer of 2012 I spent some time with Sir Christopher Lever, then in his 81st year. We were visiting Ramsey Island in

Pembrokeshire, to see (among other things) the early effects that the removal of an invasive species – Brown Rat *Rattus norvegicus* – has been having on the recovery of Manx Shearwaters *Puffinus puffinus* and other native species. A very positive effect, I'm happy to report. The removal of rats tends not to be problematic, politically. Killing them is often an unpleasant necessity and there are not many voices raised in their defence when it comes to undoing the ecological damage caused by their unfortunate island introductions. On our journey back to England we had time for a brief pause in the Forest of Dean, at a stretch of the River Wye that has become a stronghold for the Mandarin Duck *Aix galericulata*, another non-native and some might say alien invader.

Brown Rats and Mandarin Ducks are both introduced non-natives, yet the contrast in their impacts and how they are perceived could not be more stark. We spoke about Lever's latest book – now published and the subject of this review – and his particular interest in these ducks of Far Eastern origin. I recall the enthusiasm with which he described the first time he set eyes on a pair of Mandarins, as a young birdwatcher in the 1950s. It was in Windsor Great Park, on Virginia Water, where Berkshire meets Surrey. The birds made such an impression on the young man that he can trace his fascination, not only for them but for introduced species in general, to that morning. He describes this formative moment in the Preface to *The Mandarin Duck*.

Christopher Lever has now studied the history and ecology of introduced vertebrates for over four decades. At the age of 79 he was awarded a PhD by Cambridge University for this work, as well as authoring and contributing to an impressive list of natural history titles, including *Natu-*

ralised Birds of the World (Poyser, 2005), *They Dined on Eland: the story of the acclimatisation societies* (Quiller Press, 1992) and many others. He hasn't been afraid to challenge the orthodoxy that if a species is an introduced non-native, it must be a bad thing. He considers such an attitude 'as irrational as it is misguided'.

I always sense from Lever's books that he is driven by compassion for any introduced species that finds itself, through human agency rather than its own pioneering spirit, at large in an alien environment. Compassion hasn't always been one of the stronger themes of conservation, and I admire him for it. He is intrigued by any newcomer's interactions with a novel set of circumstances, and mindful that, although some introduced species do become severely problematic, it is a tiny percentage that do so.

With a UK summer population of around 7,000 birds, the Mandarin looks like it is here to stay. It is a protected species here, though may be vulnerable to lack of familiarity and misidentification (google 'mandarin duck shooting' to find out more). Lever carefully itemises the history of the species here, region by region, and in Europe and the USA, and casts new light on how it has succeeded where, for example, the closely related American Wood Duck *A. sponsa* failed. Key to this may have been the Mandarin's shedding of its inclination to migrate.

The beauty and extravagance of the birds – especially the male – is beyond dispute, and of course they may sometimes look out of place here. But perhaps they look out of place and improbable wherever they occur, even at home in icy Oriental wetlands. At face value, the Mandarin is an unlikely colonist of these islands, but the monograph may make you think again that this enigmatic species is mere ornamentation, or misplaced trophy of the vain. Lever's book brings out vividly the importance of these birds in Far Eastern culture, across their native range in China, Japan and Korea. They have long been symbols of fidelity and love. It is a reputation well earned, in fact, as the male attends



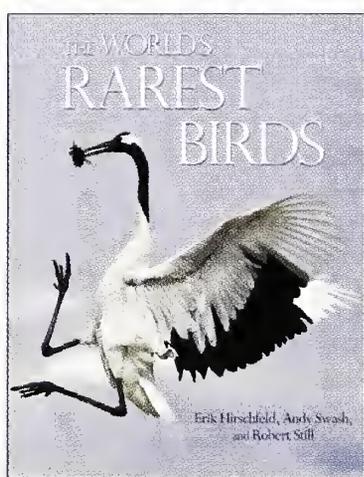
the nest-site during incubation and the family group for a week or two post-hatching.

In writing *The Mandarin Duck*, it is fitting that Lever has returned to the bird that first inspired his fascination with the fate and impacts of introduced species globally. It's not a controversial species, although some people are against it, in line with their default position on non-natives. That said, I almost wonder if the sight of a male Mandarin in his fullest glory might even be intimidating to other species. Mandarins certainly hold their own with other, bigger wildfowl, and I've watched them bossing more than their share of Berlin parks, for example. In the wild, as a skulking, woodland duck, it doesn't have too many

counterparts or competitors here but of course it may occupy those rare and precious nest holes that other species might have used. But generally speaking the Mandarin is a benign and pleasing addition to our avifauna, and it seems churlish to find objection to it without good evidence.

Christopher Lever is a (if not *the*) world authority on introduced species, and his contribution to the literature on this important, emotive and often controversial area of natural history has been immense. With this work he has done a first-class job of enhancing our understanding of an extraordinarily ornate and tenacious species.

Conor Jameson



The World's Rarest Birds

By Erik Hirschfeld, Andy Swash and Robert Still

Princeton University Press/WILDGuides, 2013

Hbk, 360pp; 877 colour photographs, 103 colour illustrations and 610 maps

ISBN 978-0-691-15596-8 Subbuteo code M21372

£34.95 **BB Bookshop price £31.00**

This book follows on from the *Rare Birds Yearbook* published in both 2008

and 2009. It is, however, an altogether more lavish tome than its predecessors. Beautifully designed and produced, it is laced with stunning photographs of some of the rarest birds on earth.

It covers 197 critically endangered and 389 endangered bird species, along with four now found only in captivity and a further 60 for which there is insufficient information to make a statement on their status – the so-called 'data deficient' species. This represents over 6% of all known bird species – a sobering thought.

The authors ran two international photographic competitions to capitalise on the rapid development of digital photography and birders' ability to penetrate every corner of the globe. As a result, no fewer than 535 (82%) of the species featured in the book are accompanied by photographs, some for the first time – an amazing achievement. Most of the remaining species have been illustrated by the Polish artist Tomasz Cofa. These portraits are superb, indeed some can easily be passed off as photographs, and I understand that they will be sold to raise money for BirdLife International's Preventing Extinctions Programme.

A series of short introductory chapters covers

several topics including the BirdLife/IUCN definitions used in the book, and an overview of the pressures birds face in the modern world – grouped into 15 'threats'. It is no surprise that foremost among these are habitat loss to agriculture and demand for timber, closely followed by alien mammalian predators, hunting/trapping and development pressure.

Seven regional directories (Europe and the Middle East; Africa and Madagascar; Asia; Australasia; Oceanic Islands; North America, Central America, and the Caribbean; and South America) comprise the bulk of the book. These list each of the critically endangered and endangered species found in the region, accompanied by a colour photograph or illustration, a distribution map and a short account of their status, biology and the threats they face. An innovative feature sees a QR code alongside every species; scanning these with a smartphone enables quick access to the relevant page on BirdLife's website, where a factsheet relating to the species will be updated annually. Each directory also has a number of special short, very readable essays. These describe threatened bird hotspots such as Madagascar, Angola the Philippines and Indonesia, or outline conservation challenges such as those for vultures, hornbills or bustards.

At least 130 bird species have become extinct

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since 1500. Four species covered in this book now exist only in captivity and it is highly likely that some listed here as critically endangered are already extinct. Extinction is not declared until the evidence is overwhelming – it is difficult to secure funding to search for, or implement initiatives to conserve extinct species! It is hard to be optimistic about the future with an ever-burgeoning human population, the most powerful of which continue to measure their success in terms of GDP rather than quality of life for all their members and sustainable use of the planet's limited resources.

On the one hand this book is a veritable treasure chest – informative and educational; inspiring and uplifting even in its portrayal of avian diversity. Yet at the same time it is a disturbing and depressing catalogue of human degradation of biodiversity. It deserves to have a positive

impact – directly through proceeds from sales going to conservation but also indirectly through raising awareness of the plight faced by so many of the world's bird species.

This book demands a wider audience than most 'bird books' because of its importance. County Ornithological Services sponsored over 100 additional copies, which are to be sent to key decision-makers in those nations' governments concerned with threatened species, in the hope that they may contribute to some of the conservation targets set out in the book. They are to be congratulated, as are the authors. We too can contribute by buying it and more importantly bringing it to the attention of as many people as we can – especially those yet to be converted.

Paul Harvey

Atlas of Wintering Waterbirds of Libya 2005–2010

EGA (Environment General Authority) – RAC/SPA (Regional Activity Centre for Specially Protected Areas)

Imprimerie COTIM, Tunisia, 2012

Hbk, 312pp, colour illustrations; text in English and Arabic

ISBN 978-9938-9521-0-0

For purchasing information, contact: lobna.bennakhla@rac-spa.org

Libya occupies a major chunk of the coast of the Mediterranean, and yet remains relatively little known in birding terms. This well-produced book was a very welcome read, therefore, not only for filling some knowledge gaps, but also because it revealed the enthusiasm of a dedicated team of waterbird counters who, in their own words, have clearly 'caught the birding virus'.

The atlas describes a programme of co-ordinated winter waterbird counts between 2005 and 2010 at up to 84 sites per year. Unsurprisingly, most sites are coastal but there were some counted deep inland. Part of the initial impetus was to search for Slender-billed Curlews *Numenius tenuirostris* although, depressingly, none was found despite all of this focused effort. More positively, a great deal of new knowledge has been gained. Up to 50,000 birds were counted each winter, with mean counts over 1,000 of Shovelers *Anas clypeata*, Great Cormorants *Phalacrocorax carbo*, Greater Flamingos *Phoenicopterus roseus*, Kentish Plovers *Charadrius alexandrinus*, Dunlins *Calidris alpina*, Little Stints *C. minuta*, and Black-headed *Chroicocephalus ridibundus*, Slender-billed *C. genei*, Lesser

Black-backed *Larus fuscus* and Yellow-legged *L. michahellis*/Caspian Gulls *L. cachinnans*, the last two recorded in aggregate. Significant numbers of Audouin's Gulls *L. audouinii* were also recorded, whilst several species new to Libya were even discovered, including Pied Kingfisher *Ceryle rudis* found simultaneously at two sites in 2006. It is hoped that future counts might be extended into passage periods.

The authors note that publication was delayed owing to a year of civil unrest, and the end of the 40-year regime of Gaddafi. It is hoped that Libya can emerge from this turbulent period and make use of the evident energy of these dedicated bird-watchers. The counts should hopefully contribute to conservation debates in Libya, such as the loss of wetlands, and with efforts being made to improve waterbird monitoring across the Africa-Eurasian region, they can also be seen as part of a wider picture. A pan-Mediterranean census is in the process of being planned for early 2014, of which Libya should now form an integral part.

Andy Musgrove



Recent reports

Compiled by Barry Nightingale and Harry Hussey

This summary of unchecked reports of new arrivals covers the period from early April to early May 2013.

Headlines Despite the unseasonal cold weather and late arrival of most summer visitors, a belated migration season finally kicked off from mid April, boosted by several major rarities. Most appealing were Baikal Teal and Rock Thrush in Yorkshire, a total of four Black Storks and three Pallid Harriers (including two of the latter in Wales), a predated Baillon's Crake in Gloucestershire, Collared Flycatcher in Northumberland, Pallid Swift on Scilly and two Red-flanked Bluetails in Norfolk. While Scotland waited for winter to release its grip, an impressive gathering of White-billed Divers, particularly off North-east Scotland, looks set to enter the record books. Perhaps the most unexpected prize was belated news of a White's Thrush in a Highland glen in January, captured on 'film' by a camera trap set up to monitor Wild Cats.

American Wigeon *Anas americana* Loch of Stenness (Orkney), 21st April; Twechar Marsh (Clyde), 21st–30th April; Loch Magillie (Dumfries & Galloway), 3rd May; Bridgend (Clyde), 5th May. **Baikal Teal** *Anas formosa* Flamborough Head (Yorkshire), 15th April. **Blue-winged Teal** *Anas discors* Burton Mere (Cheshire & Wirral), 19th–20th April; Bridgend, 5th–9th May. **Ferruginous Duck** *Aythya nyroca* Minsmere (Suffolk), 17th April to 9th May; Barrow Gurney Resr (Somerset), 19th April. **Lesser Scaup** *Aythya affinis* Borwick Waters (Lancashire & N Merseyside), 14th April to 6th May; Netherfield Lagoons, 21st April then Holme Pierrepont (both Nottinghamshire), 22nd–27th April; Chew Valley Lake (Avon), 23rd April; Lough Neagh, 28th April, perhaps same Lough Shark (both Co. Armagh), 1st–4th May; Pugneys CP, 30th April, same Anglers CP (both Yorkshire), 2nd–9th May. **King Eider** *Somateria spectabilis* Ythan Estuary/Blackdog (North-east Scotland), 12th April and 24th April to 8th May. **Surf Scoter** *Melanitta perspicillata* Rerwick Head (Orkney), 13th April; Rossbeigh (Co. Kerry), 24th–27th April; Musselburgh area (Lothian), 25th April to 9th May; Embo (Highland), 8th–9th May.

White-billed Diver *Gavia adamsii* Gairloch (Highland), 9th–10th April; Lewis (Outer Hebrides), two 10th April, one to 11th, seven 12th, one 19th–20th April; Gruinard Bay (Highland), 11th April, two 13th; Loch Ewe (Highland), 15th April; South Ronaldsay (Orkney), 13th April to 7th May; Mull (Argyll), 19th–20th April; Portsoy to Sandend areas (North-east Scotland), up to

18, 21st April including 7+ from a boat c. 4 km offshore, at least five Portsoy 26th April to 4th May, one to 6th May, also three Sandend, 3rd May; Papa Westray (Orkney), 26th April; Buckie (Moray & Nairn), 13, 27th April, with seven between Buckie and Sandend, 6th May; North Ronaldsay (Orkney), 28th April; Evie (Orkney), 9th May.

Night Heron *Nycticorax nycticorax* Dartington (Devon), two 24th–26th April, one to 28th; Dunganvan (Co. Waterford), 6th May. **Squacco Heron** *Ardeola ralloides* Lanreath (Cornwall), 8th May. **Cattle Egret** *Bubulcus ibis* Hillsborough (Co. Down), 16th April; Margate, 18th April, then Grove Ferry/Oare Marshes (all Kent), 22nd April to 9th May. **Purple Heron** *Ardea purpurea* Winterton (Norfolk), 16th April; Pegwell Bay (Kent), 22nd April; Kenfig (East Glamorgan), 25th April to 6th May; Thetford (Norfolk), 26th April; Portsdown Hill (Hampshire), 26th April; Ormesby Little Broad (Norfolk), 26th April; Knock Lake (Co. Dublin), 28th April; Frampton (Gloucester-



223. Male Baikal Teal *Anas formosa* with Eurasian Wigeon *A. penelope*, Flamborough Head, Yorkshire, April 2013.

Graham Catley



224. Female Woodchat Shrike *Lanius senator*, Chew Valley Lake, Avon, April 2013.

shire), 28th April; Stockwood (Dorset), 28th April; East Chevington (Northumberland), 4th–5th May; Skipton (Yorkshire), 4th May; Costessey (Norfolk), 5th May; Dungeness (Kent), 6th May; Lakenheath Fen (Suffolk), 6th May; Minsmere, 7th–8th May. **Black Stork** *Ciconia nigra* Llanfairfechan (Caernarfonshire), 24th April; Corby's Crags (Northumberland), 1st May; Marshwood (Dorset), 6th May; Barnstable (Devon), 6th May.

Black Kite *Milvus migrans* Bramfield, 11th April; Stowmarket, 13th April; Westleton Heath (all Suffolk), 21st April; Bovey Tracey (Devon), 21st April; Sompting, 24th April, Littlehampton, 26th and Patching (all Sussex), 28th April; Romsey, 25th April and Stubbington (both Hampshire), 26th April; Brancaster (Norfolk), 29th April; Appledore, 30th April and Rochester (both Kent), 30th April; Sunbury (Surrey), 1st May; Crousa Downs (Cornwall), 2nd May; Ballymun (Co. Dublin), 5th May; Loch Duntelchaig (Highland), 6th May; Kirkwall (Orkney), 9th May. **Pallid Harrier** *Circus macrourus* Forfar Loch (Angus & Dundee), 19th April; Skomer (Pembrokeshire), 20th April to 1st May; Beddmanarch Bay (Anglesey), 1st May. **Red-footed Falcon** *Falco vespertinus* St Martin's (Scilly), 25th–26th April and 5th May; Spratton (Northamptonshire), 30th April; Ouse Washes (Cambridgeshire), three, 2nd May, one to 4th; Sedge Fen, 4th May, Lakenheath Fen (both Suffolk), 5th–7th May; March (Cambridgeshire), 6th May; Muckleburgh (Norfolk), 6th May; New Buckenham (Norfolk), 7th May. **Gyr Falcon** *Falco rusticolus* Orphir Bay, 20th April, then Birsay Moor (both Orkney), 25th April.

Baillon's Crake *Porzana pusilla* Slimbridge (Gloucestershire), freshly dead, 17th April. **Great Bustard** *Otis tarda* Long Melford (Suffolk), 17th April (appeared unringed and not wing-tagged), presumably same Onslow Green (Essex), 23rd April.

Black-winged Stilt *Himantopus himantopus* Newport Wetlands (Gwent), two, 26th April, same Ham Wall (Somerset), 27th April; Limbourne Creek (Essex), 6th May; Frampton Marsh (Lincolnshire), 7th May. **American Golden Plover** *Pluvialis dominica* Kilcoole (Co. Wicklow), 28th April

to 3rd May. **Kentish Plover** *Charadrius alexandrinus* Ferrybridge (Dorset), 2nd–3rd May. **Lesser Yellowlegs** *Tringa flavipes* Tacumshin (Co. Wexford), 27th April to 2nd May; Dundalk (Co. Louth), 29th April to 5th May; Marazion (Cornwall), 2nd–3rd May; Inishkeas (Co. Mayo), 7th May. **Long-billed Dowitcher** *Limnodromus scolopaceus* Lewis, 29th April; Islay (Argyll), 1st May.

Brünnich's Guillemot *Uria lomvia* Lough Hyne (Co. Cork), 15th April; Iona (Argyll), 6th May.

Caspian Tern *Hydroprogne caspia* Kilnsea (Yorkshire), 25th April. **Whiskered Tern** *Chlidonias hybrida* Garretstown (Co. Cork), 19th April; in Somerset, Shapwick Heath, two, 21st–22nd April, perhaps one of same at Ham Wall, 22nd, and Durleigh Resr, 22nd and 27th; Whitcombe Resr, 22nd–23rd and Frampton (both Gloucestershire), 26th; Chew Valley Lake, 23rd April, with another 25th April; Carsington Water (Derbyshire), 24th April, probably same Blithfield Resr (Staffordshire), 24th April. **Forster's Tern** *Sterna forsteri* Tacumshin, 3rd May.

Bonaparte's Gull *Chroicocephalus philadelphia* Theale GP (Berkshire), 26th April; Chew Valley Lake, 27th April; Elmley Marshes (Kent), 28th April to 6th May; Tacumshin, 2nd–9th May; Topsham, 3rd–8th May.

Alpine Swift *Apus melba* Skinningrove (Cleveland), 14th April; Pagham Harbour (Sussex), 14th April; Marton Mere (Lancashire & N Merseyside), 14th April; in Yorkshire, Flamborough Head, 16th and

18th April, Scarborough, 16th–17th April, Filey Brigg, 17th April; Castlerock (Co. Derry), 17th April; Glasnevin (Co. Dublin), 17th April; Lopham Fen (Norfolk), 17th April; in Kent, Dungeness and Cliftonville, 17th April, Lade GP, 18th April. **Pallid Swift** *Apus pallidus* St Mary's, 16th April to 1st May, also St Martin's (both Scilly), 30th April. **European Bee-eater** *Merops apiaster* Niton (Isle of Wight), 27th April; Wheathall (Shropshire), 29th–30th April; Walney Island (Cumbria), 1st May; Briningham (Norfolk), eight, 8th May.

Woodchat Shrike *Lanius senator* Kenidjack (Cornwall), 15th April; Averton Gifford (Devon), 18th April; Cot Valley (Cornwall), 20th–29th April; St Mary's, 20th April, two 23rd–28th April, one to 8th May; Aberdaron (Caernarfonshire), 20th–26th April; Wembury (Devon), 20th April; Chew Valley Lake, 21st–30th April; St David's Head (Pembrokeshire), 21st–30th April; Barton Bendish (Norfolk), 25th–30th April; Courtmacsherry (Co. Cork), 27th April; Land's End (Cornwall), 28th–30th April; Lizard (Cornwall), 30th April; Carnsore Point (Co. Wexford), 2nd–6th May; Brandon Marshes (Warwickshire), 2nd May; Cromer (Norfolk), 6th May; Penlee Quarry (Cornwall), 6th–9th May; Gwenter (Cornwall), 7th May.

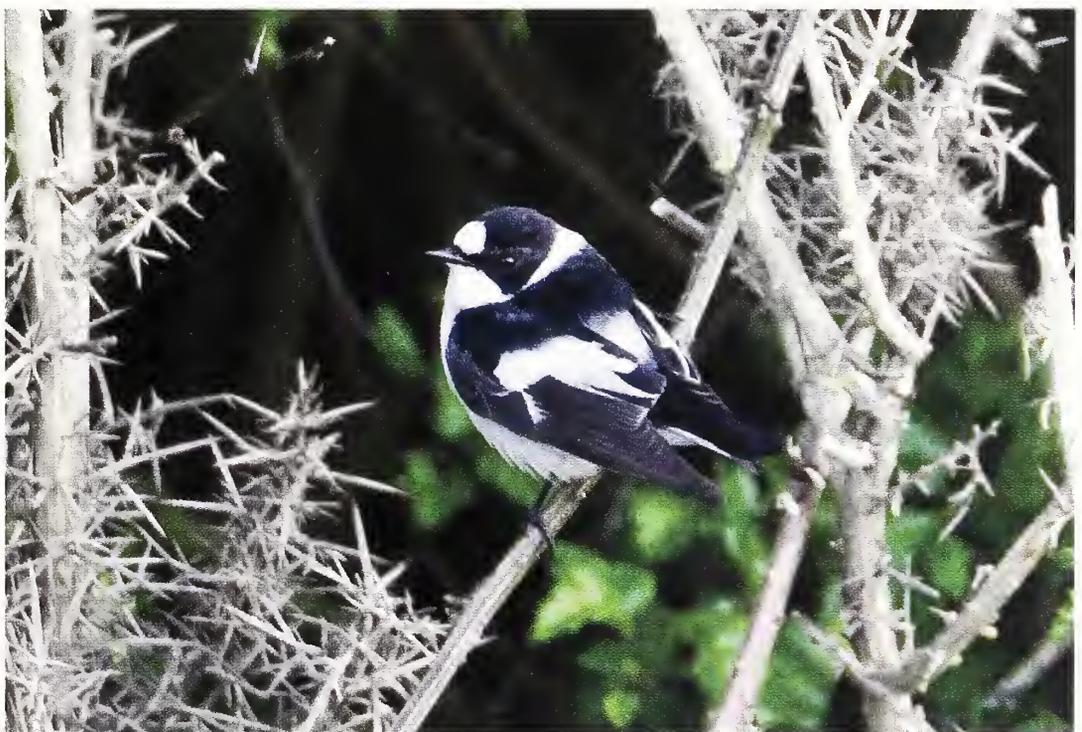
Short-toed Lark *Calandrella brachydactyla* Bryher (Scilly), 20th April; St Mary's, 9th May. **Red-rumped Swallow** *Cecropis daurica* Crediton (Devon), 16th April; Coldwaltham (Sussex), 18th April; Kessingland (Suffolk), 18th–19th April; Porthgwarra (Cornwall), 20th April; Port-



Mark Rayment

225. Male Eastern Subalpine Warbler *Sylvia cantillans albistriata*, Landguard, Suffolk, April 2013.

land (Dorset), 21st April; Kenidjack, 21st April; Cot Valley, 21st April; Dungeness, 24th, and 27th April, and 2nd–3rd May; Attenborough (Nottinghamshire), 26th April; Lodmoor (Dorset), 27th April; Spurn (Yorkshire), 28th April; Dun Laoighre (Co. Dublin), 30th April; Great Saltee (Co. Wexford), 6th May; Gibraltar Point (Lincolnshire), 9th May.



Ian Fisher

226. Male Collared Flycatcher *Ficedula albicollis*, Low Newton-by-the-Sea, Northumberland, May 2013.



Gary Thoburn

227. Red-flanked Bluetail *Tarsiger cyanurus*, Horsey Gap, Norfolk, April 2013.

Western Bonelli's Warbler *Phylloscopus bonelli* Pagham Harbour, 22nd–23rd April. Iberian Chiffchaff *Phylloscopus ibericus* Soap Rock (Cornwall), 20th April; St Mary's, 24th–27th April; Boldon Flats (Co. Durham), 24th–25th April; Flamborough Head, 25th–30th April; Llanelli (Carmarthenshire), 6th May. Subalpine Warbler *Sylvia cantillans* Aberdaron, 19th–30th April; Poole Harbour (Dorset), 19th April; Gibraltar Point (Lincolnshire), 20th–23rd April; Portland, 21st April; St David's Head, 23rd–27th April; St Mary's, 25th–26th April and 8th–9th May; Landguard (Suffolk), 26th–27th April; Bardsey (Caernarfon-

shire), 7th May; Power Head (Co. Cork), 7th–8th May. Savi's Warbler *Locustella luscinioides* Lytchett Bay (Dorset), 30th April.

Rose-coloured Starling *Pastor roseus* Orford (Suffolk), 23rd–29th April. Black-bellied Dipper *Cinclus c. cinclus* Long Melford, 27th April. White's Thrush *Zoothera dauma* Bonar Bridge (Highland), photographed on 31st January. Thrush Nightingale *Luscinia luscinia* Fair Isle, 8th May. Red-flanked Bluetail *Tarsiger cyanurus* In Norfolk, Burnham Overy Staithe, 10th April, Horsey Gap, 14th April. Collared Flycatcher *Ficedula albicollis* Low Newton-by-the-Sea (Northumberland), 8th–9th May. Rock Thrush *Monticola*

saxatilis Spurn/Kilnsea, 25th–26th April.

Citrine Wagtail *Motacilla citreola* Swillington Ings (Yorkshire), 19th April; Kelling/Cley (Norfolk), 25th April; Spurn, 30th April. Tawny Pipit *Anthus campestris* Paull Holme Strays (Yorkshire), 5th May.

Arctic Redpoll *Carduelis hornemanni* Islay, 19th April; North Ronaldsay, 4th–7th May. Little Bunting *Emberiza pusilla* Hengistbury Head (Dorset), 17th April; Rawcliffe (Lancashire & N Merseyside), 30th April.



Steven Lawton

228. Female Rock Thrush *Monticola saxatilis*, Spurn, Yorkshire, April 2013.

Talking point

The amateur ornithologist is dead: long live the citizen scientist!

The last Talking point (*Brit. Birds* 106: 237–238) raised the issue that the amateur ornithologist was an endangered species, shut out from presenting their ornithological observations to the wider world because any significant publication outlet requires unobtainable statistical knowledge. Consequently, amateur ornithology is in danger of dying, or becoming irrelevant, because any valuable information produced by amateurs is now consigned to a grey literature ghetto of local bird reports. Only professionals have the skills to carry out ornithology now. I disagree.

Like most opinions, Peter Bircham's has some truth in it but is slanted by a particular point of view. I would like to put forward a different view and show that its truths are actually a call for 'amateur' ornithologists to raise their game. You will have noticed that I am now referring to 'amateurs' in quotes. This is because in my point of view there is no difference between someone paid to do ornithological work and someone who is not, in terms of what they can achieve scientifically; there is only good and bad science, and people with different skill sets. And this is the core of my counter to the 'death of the amateur' argument: ornithology can be carried out by anyone, at a variety of levels, as long as they have the skills. Furthermore, the opportunities for acquiring these skills, or working with people who do, are greater than ever. Amateur ornithology has shifted into citizen science and anyone with enough wit to be able to identify birds properly (and never underestimate this skill as an indication of a sharp and trainable mind) has enough wit to learn the skills necessary to collect data properly and analyse them.

Trust me, I'm a doctor – anyone with undergraduate-level experience of science (and many who are far removed from this but who still enjoy thinking and learning) can learn the basic quantitative methods necessary to carry out high-level ornithology. I know this from experience by specialising in teaching students from developing countries

how to do quantitative analysis: many of these students have only a passion to learn the methods rather than previous statistical experience, and many learn them quickly and thoroughly. And that is the key – how prepared are you to take the challenge? It's no worse than learning to identify shearwaters at distance, or learning the 300 or so species you might expect to hear in any one year in the UK (or the 600 to be safe), or learning to mist-net and extract birds safely and then age them in the hand, or learning to count Oystercatchers accurately on a windy estuary, and so on. Birders do amazingly skilful things every day, and all have different skill sets. I know birders who I would trust my life to their raptor identification yet who can't identify bird calls for toffee. But that is just application or specialisation. My raptor friends could learn their passerine calls if they bothered to. We all acknowledge that birding is a difficult craft that has many dimensions of skill involved, all requiring experience and dedication. That's part of its appeal. Why then shy away from learning about quantitative analysis of data and the scientific method so that your observations then become more valuable and understandable? And the opportunity to learn these skills is now more accessible than ever.

Citizen science has emerged recently and this is where the amateur ornithologist is alive and well. For example, the BTO is a world leader in facilitating amateur ornithologists to carry out rigorous 'citizen' science. For those who don't want to do the stats, the BTO has many projects where you can just make the observations that they then analyse for you. I look at the last national breeding atlas with great pride for the tiny part I played in it, and look forward to the new one later this year, again with pride because my tetrads are in there. I haven't done the stats for these incredibly important books, but my 'amateur' ornithological contribution exists there, alive and well and is essential for monitoring and conserving birds in Britain and Ireland. And for those who do want to do the



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analyses themselves, there are courses to improve scientific skills, or you can teach yourself (most of us who use stats in ornithology are to a large degree self-taught).

I don't believe that the problem for 'amateur' ornithologists is having no outlet; it's a problem of some ornithologists failing to engage with learning some quantitative methods and basic hypothesis testing, or failing to engage with citizen science. It's like a birder complaining that no-one takes him seriously just because he is using a pair of milk bottles for observation and the Ladybird Book of Birds for identification. Ornithology has developed and to engage fully you should just learn a bit of basic science methodology and analysis: it's not rocket science, just a proper science now rather than anecdote, and all the better for it. But, like being a good birder, you need to put the hours in and learn the skills. And if ultimately the statistical methods and scientific methods you need still prove elusive, then you can always just plug into a ready-made citizen science program.

So where are the 'amateur' ornithologists? They are out doing Breeding Bird Surveys, running Constant Effort sites, recording nesting Peregrines in Wales, making Wetland Bird (WeBS) counts – any number of projects with variable degrees of involvement,

autonomy and even quantitative analysis. Anybody who is not involved in doing valuable ornithology who truly wants to can join the party, at any time and at any level. I think any 'amateur' ornithologist can master enough stats, or get involved with others who have, to do good science, and I think more should take the challenge.

Answering basic ornithological questions properly such as whether my colour-ringed population of sparrows is declining, my Blue

Tits are nesting earlier or my Robins have larger territories in winter has nothing to do with being an 'amateur', just whether you have put the time in to learn some quantitative methods. Or joined a network of people like the BTO already tackling such questions. David Lack, quoted in the last Talking point as being proud that he had achieved academic credibility for work done as an amateur, was being disingenuous – whether you are being paid to study birds is irrelevant and 'professionalism' does not necessarily equal value or quality of science. What makes good ornithology is people who have learnt their craft (like David Lack), and this craft now includes statistics. Learning stats is no harder than learning to pick out a Ring-billed Gull amongst 1,000 Common Gulls, it just takes time. Many 'amateur' ornithologists have raised their game over the last 20 years in terms of good identification and field recording, and many have also engaged properly with quantitative methods and become citizen scientists. Those who haven't are just left repeating that old chestnut that 'things were not like this in my day': indeed and thank goodness.

Will Cresswell (birder first, amateur ornithologist second and professional ornithologist last of all, Crail & University of St Andrews)

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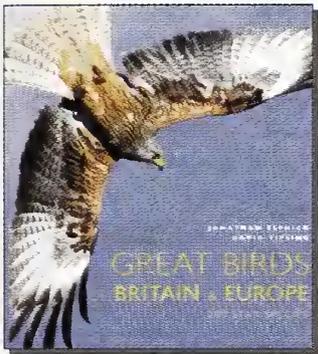
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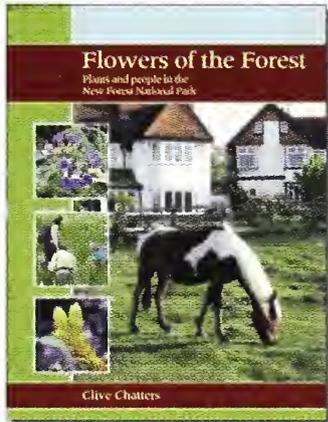
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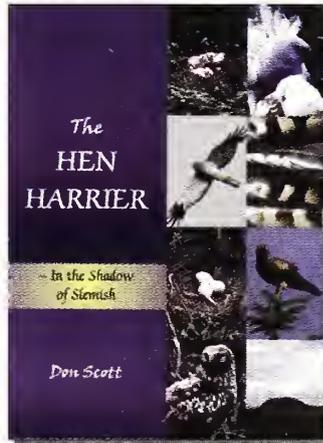
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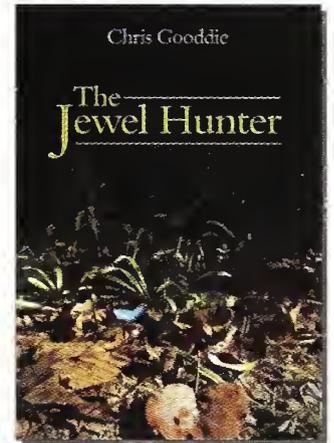
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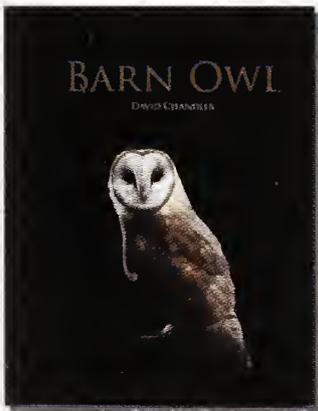
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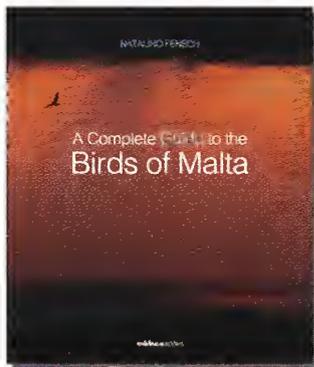
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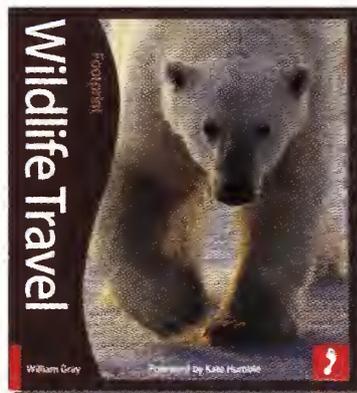
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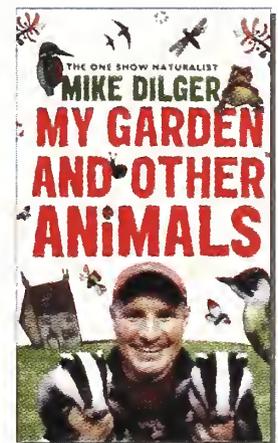
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