THE SPRING MIGRATION OF TURNSTONES THROUGH BRITAIN IN 1979

(Results of the WSG Project on the Spring Passage of Dunlins, Sanderlings, Ringed Plovers and Turnstones through Britain - Part 3)

by P. N. Ferns

The interpretation of the complex pattern of Turnstone migration through Britain in spring 1979 is rendered a good deal easier as a result of the work of Morrison & Wilson (1972), Morrison (1975) and Branson et al. (1978, 1979). Two races are generally recognised - Arenaria i. interpres, which breeds in the Palaearctic, Greenland and N.E.Canada, and A.i.morinella, which breeds in the remainder of the Nearctic (Prater et al. 1977). Palaearctic breeders occur in Britain mainly during the autumn migration, when they stop off at sites such as the Wash to gain weight before moving on to wintering areas mostly on the west coast of Africa. Nearctic breeders of the race A.i.interpres winter in Britain and at sites as far south as N.W.Africa (Branson et al. 1978, 1979). In spring, Turnstones on the Wash do not put on sufficient weight to enable them to reach the Nearctic in a single journey and few birds of Palaearctic breeding origin pass through the Wash at this time of year. Many juveniles remain on the Wash during their first summer and undergo an early moult (Branson et al. 1979). Turnstones thus differ from Dunlins, Sanderlings and Ringed Plovers, in that winter residents and spring migrants breed almost exclusively in the nearctic.

The counts obtained in 1979 (Figs. 1-4) are remarkably different even at sites which are only a short distance apart. For example, the roosts at Collister Pill and Chittening Warth in the Severn Estuary are only 8km apart, yet the overall pattern of numbers is quite different at each site (Fig. 1). About 150 Turnstones winter just to the south of the Severn Bridge, where they feed on gravel banks and weed-covered rocks in the centre of the estuary and roost at Chittening Warth. Spring passage often begins as early as March, though it did not reach a peak in 1979 until 26 April. The majority of birds had departed from Chittening Warth by mid-May. At Collister Pill, where the wintering population is much smaller, a few birds appeared to pass quickly through during April, but there was then clear evidence of passage in mid-May which was lacking at Chittening Warth. During the latter period, many Turnstones were observed foraging on the open mud flats, a habit never observed in wintering individuals at this site. The availability of invertebrate prey, such as Nereis diversicolor, increases during May as the larger worms come to the mud surface to spawn. It may thus be that migrating Turnstones were taking advantage of improved food availability at Collister Pill. Many of the larger gull species certainly do so at this time of year. These migrating Turnstones were in full summer plumage, whereas those that remained at Chittening Warth were less well advanced.

There is a similarly contrasting pattern of numbers at the sites in South Devon. At Wembury (on the river Yealm near Plymouth), peak numbers occurred on 12 May, whereas at Dawlish Warren (near Exeter), there was a very late peak on 28 May. Dawlish Warren was also notable for its late passage of Ringed Plovers and Sanderlings, though the reasons for this are completely unknown. The situation at the Menai Straits in north Wales was very similar to that at Chittening Warth, the peak count being only three days later. At both these sites, wintering population levels appear to have been increased by a wave of migrants in late April; most of the birds then departed slowly throughout May and there are signs of small numbers passing through in June. The proportion of birds in full winter plumage at the Menai Straits was very high, just as it was in the late passage at Dawlish Warren. Some of the late migrants could conceivably have been non-breeders.

At the Ribble and Morecambe Bay (Fig. 2), the situation was again conflicting, with an early passage at the former site, and a late one (peaking on 23 May) at the latter. Although the counts were not so frequent, the Morecambe Bay passage appears similar to that at Collister Pill. On the Solway Firth, numbers were high when counts started on 25 April, and then simply declined to zero at a time when peak numbers were present in Morecambe Bay. A much earlier declining pattern was observed on the Isle of Lewis. Passage was evident on Shetland at various times during May, just when many birds had departed from sites further south (such as Chittening Warth and the Solway Firth), though Shetland does not, of course, lie on the most direct route of birds heading for the Nearctic.

Counts at several sites clustered around the Solent (Fig. 3) illustrate very well the lack of any consistent pattern in the spring migration of Turnstones. The Hamble Estuary shows no clear signs of passage in April, whereas Oxley Creek - Pennington Marsh, Dibden Bay and Meon - Titchfield Haven all do. Dibden Bay, Meon - Titchfield Haven and Langstone Harbour show peaks in early May, whereas Oxley Creek - Pennington Marsh and the Hamble Estuary show peaks about a week later.

On the east coast (Fig. 4), Sandwich & Pegwell Bays and Scarborough show signs of some passage in mid-April, followed by a more prolonged passage in late April and May.

The only clear similarities between all these sites involve Southampton (Meon - Titchfield Haven), Sandwich & Pegwell Bays, Scarborough and Shetland (The Houb). It would clearly be a mistake to read too much into these similarities in view of the marked discrepancies which also occurred. Hartlepool and Wembury are also quite similar, but the small secondary peak which they both show on 12/13 May is suspiciously close to the time of high spring tides, when birds may have been concentrated into a smaller number of roosts.

The most reasonable explanation for the disparate pattern of Turnstone migration through Britain is that birds gradually move northwards in an irregular series of steps, depending on the availability of food for premigratory fattening which they encounter at each site. There is some evidence for this interpretation from the catches obtained in 1979, from ringing recoveries, and from work carried out by the Cambridge Iceland Expeditions.

Johnson & Morton (1976) found that the average fat-free weight of six Turnstones from Enewetak Atoll in the Pacific Ocean was 93 g. This probably overestimates the amount of fat normally available for migration in live birds. The assumed fat-free weight of Sanderlings in the previous report on the Spring Passage Project was 12% less than the weight of birds captured on nests in N.E. Greenland. A similar percentage deducted from Turnstone weights in the same area (Green 1978) gives an estimated fat-free weight of 95 g. Using the method of McNeil & Cadieux (1972), the approximate flight range of Turnstones caught on the Moray and Solway Firths on 14 April 1979 (Table 1) was 400-450 miles. This is not sufficient for these birds to have reached Iceland (unless they stopped off at the Faeroes on the way) and presumably they were not yet ready to commence migration towards the Nearctic. The birds captured on the Solway Firth a month later had a potential flight range of about 1200 miles and could, theoretically, have reached the coast of East Greenland. However, feeding conditions in this area at this time of year are very unfavourable, since much of the ground is still covered with snow, and it is much more likely that these birds would have stopped off in Iceland before moving on directly to breeding areas further up the coast of Greenland and in Canada. Considerable numbers of Turnstones are known to utilise the coasts of Iceland as a spring staging post (Morrsion & Wilson 1972, Morrison 1975), where they reach weights in excess of those recorded in Britain. For example, the 1971 Cambridge Iceland Expedition obtained a series of catches of 298 adult Turnstones on the south-west coast of Iceland (Morrison & Wilson 1972) between 11 May and 25 May. The first catch had the lowest mean weight (133.9 g, n = 40), whilst the last had the highest (181.3 g, n = 55). These birds were netted on accumulations of wrack at the top of the

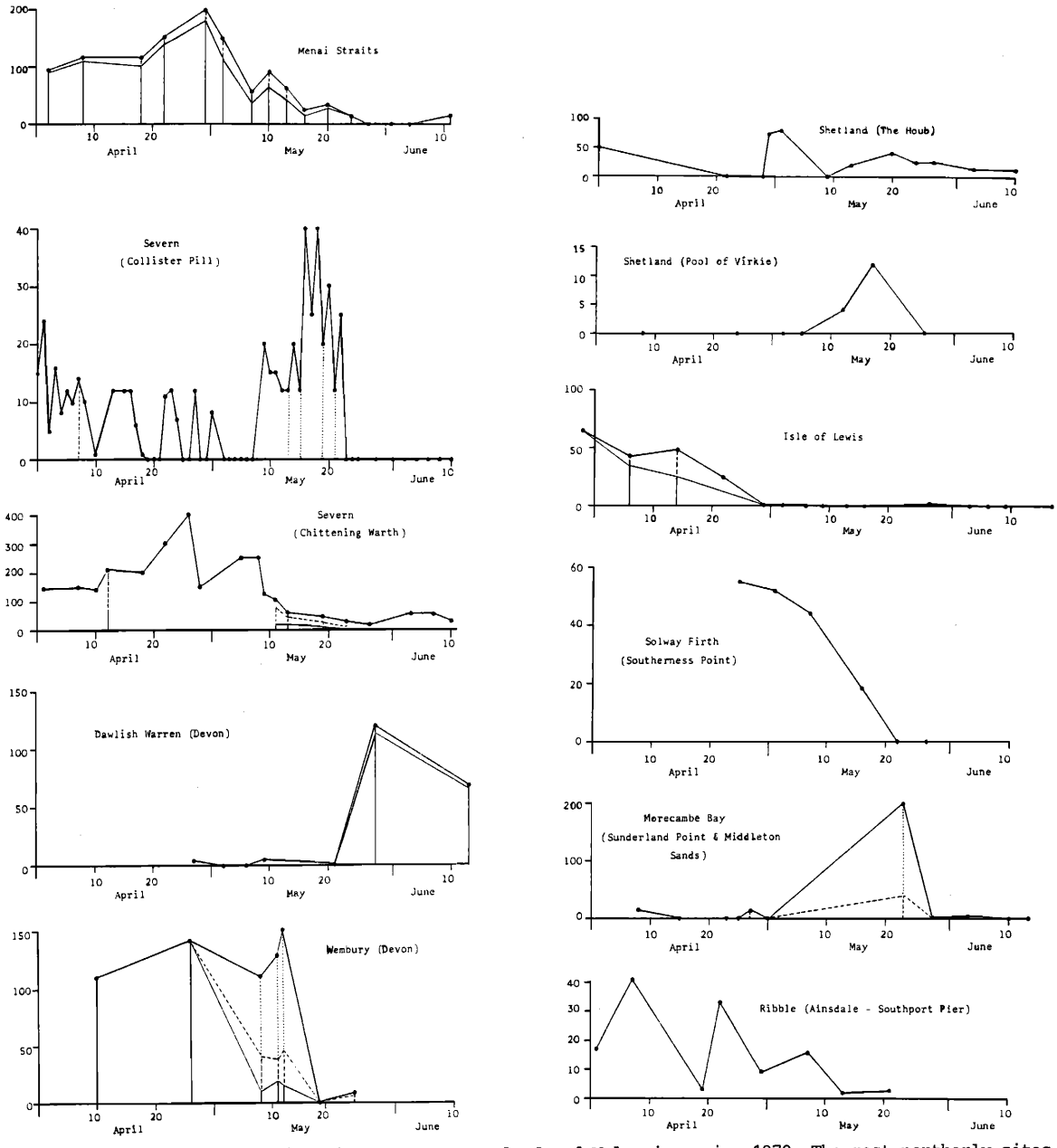

Figure 1. Counts of Turnstones at sites in south-west England and Wales in spring 1979. The most northerly sites are at the top. The closed circles are the actual counts; the dotted lines represent the proportion of birds in full nuptial plumage; the dashed lines represent those in partial nuptial plumage; and the lower unbroken line represents those in full winter plumage.

Figure 2. Counts of Turnstones at sites in the west and north of Britain in spring 1979. The most northerly sites are at the top. Other conventions as in Fig. 1.

shore, where they are presumably able to feed for much longer than on the intertidal feeding areas which they mainly utilise at sites in Britain. The rate of weight gain of six retrapped birds in 1971 was 2.5 g/day (Morrison & Wilson 1972). The rate of weight gain calculated from two 1972 catches given in Morrison (1975) was 2.0 g/day (though this is probably an underestimate because heavy birds may have been leaving and light ones arriving). On the other hand, the average rate of weight gain of seven adults retrapped on the Solway Firth between 14/15 April and 12/13 May 1979 was only 0.9 g/day. Thus, the rates of weight gain at an important staging post in Britain are less than half those achieved in Iceland, and the maximum weights which birds attain are also lower.

The flight range of the birds in Iceland towards the end of May was about 2,100-2,600 miles, which would be sufficient to take them well into the Canadian arctic. In fact, it seems likely that they might arrive in some parts of the breeding range with considerable reserves of fat still available. Turnstones captured at Alert in northern Ellesmere Island at the beginning of the breeding season in 1974 still had about 18 g of fat unutilised (Morrison 1975). Such reserves may be of the greatest importance if birds are to survive the unfavourable conditions which sometimes occur in the early part of the breeding season at such high latitudes. This is well illustrated by the fate of a large number of Turnstones and Knots which were found dead in mid-June 1974 on the east coast of Ellesmere Island following a period of bad weather. A sample of 12 of these dead Turnstones weighed only 59 g on average and had clearly metabolised some protein as well as all of their fat reserves in the attempt to survive (Morrison 1975).

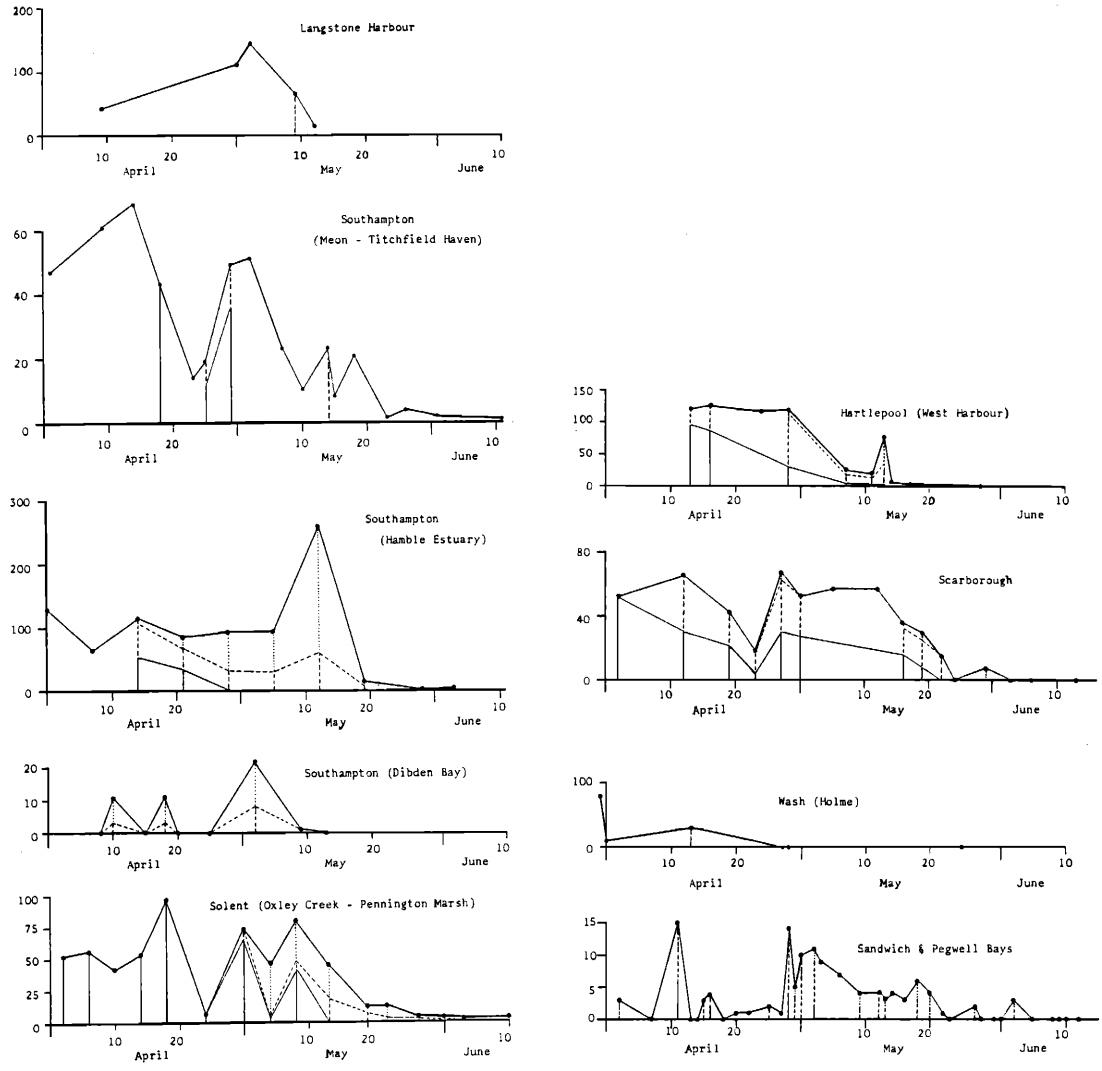

Figure 3. Counts of Turnstones at sites near the Solent in spring 1979. The most easterly sites are at the top. Other conventions as in Fig. 1.

Figure 4. Counts of Turnstones at sites in eastern Britain in spring 1979. The most northerly sites are at the top. Other conventions as in Fig. 1.

The approximate flight ranges of birds captured at Morecambe Bay on 1 and 15 April were only 600 and 800 miles respectively, but judging from the counts in Fig. 2, they probably did not leave until late May. The birds from Severn Beach in April had very similar weights to those in Morecambe Bay. The Wembury birds, captured at the time of peak numbers just before a mass exodus occurred, had the highest weights recorded anywhere in Britain. Their approximate flight range of 1,600 miles was just sufficient for them to have reached the east coast of Greenland, but as with the Solway birds, it is much more likely that they were heading for Iceland.

There are several ringing recoveries which demonstrate the northward drift of Turnstones through Britain in spring. The most impressive are those which have occurred in the same season. An adult ringed on the Mersey on 25 March, 1978 was retrapped in Morecambe Bay on 8 April 1978, and another ringed at the same site on 31 March 1979 was retrapped on the Solway during the Spring Passage Project on 14 April 1979 (W.S.G. Bulletin 23: 10, and 27: 23). There are many other retraps in different years which are strongly suggestive of the same kind of movement, including several exchanges between Conway (North Wales) and Morecambe Bay. Several birds, later during the passage, appear likely to have come from even further south, e.g. Solway Firth 20 May 1973 to Wembury 27 January 1979; Morecambe Bay 26 May 1978 to Calvados, France 15 August 1979 (W.S.G. Bulletin 26: 8, and 27: 23).

The other measurements of Turnstones captured in 1979 are also rather interesting (Table 1). The catches in the Solway Firth in May had, on average, slightly shorter bills than those caught in the Solway and Moray Firths in April. The available information on birds from various parts of the Nearctic breeding range is shown in Table 2. Turnstones from the north and west of the range have slightly shorter bills (and wings) than those from the south-east. The wing measurements made from skins have been increased by 2.4% to allow for shrinkage (Greenwood 1979, Green 1980) and a further 2.3% to allow for the fact that wing chord, rather than maximum length was measured (Dwight 1925). This is only a very approximate correction, but does bring the wing lengths of skins from Ellesmere Island broadly into line with those of live birds. Manniche (1910) does not actually state his measuring technique, but the same correction has been applied. Both sexes have been combined in these measurements, even though females are slightly larger than males. Though this evidence is unsatisfactory in several respects, it does suggest that the birds captured in Britain in April, and at Wembury on 12 May, were from the south-eastern part of the breeding range, whereas those from the Solway Firth in May were from further north and west. Since birds from further north breed later, this is perhaps to be expected. In 1972 in Iceland, birds caught later in the passage period also had shorter bills.

TABLE 1. SUMMARY OF TURNSTONE CATCHES OBTAINED DURING THE SPRING PASSAGE PROJECT

Site	Date	Number, age & sex	Wing length (mean ± S.D. in mm)	Bill length (mean ± S.D. in mm)	Weight (mean ± S.D. in gm)
Moray Firth (Alturlie)	140479	82 adults	156.4 ± 4.1	22.6 ± 1.0	104.8 ± 6.1
		26 Juveniles	151.1 ± 4.2	22.5 ± 0.8	101.6 ± 7.1
		(75.9% adults, 24.1% juveniles)			
		3 age unknown	156.7	22.7	107.7
Solway Firth (Waterfoot Annan)	140479	19 adults	156.7 ± 4.0	22.2 ± 1.0	103.6 ± 5.5
		1 juvenile	152	22	102
		(95% adults, 5% juveniles)			
	150479	40 adults	159.2 ± 3.2	22.8 ± 1.3	108.2 ± 6.8
		4 juveniles	154.5	21.8	105.5
		(91% adults, 9% juveniles)			
	120579	18 adult males	158.0 ± 2.9	22.1 ± 0.7	127.6 ± 8.0
		23 adult females	159.4 ± 3.6	22.1 ± 1.2	123.9 ± 16.6
		(44% males, 56% females)			
		11 unsexed adults	157.2 ± 3.6	22.0 ± 1.1	123.0 ± 10.0
		2 juveniles	152.5	22.0	95.5
		(96.3% adults, 3.7% juveniles)			
	130579	9 adult males	152.9 ± 3.9	21.6 ± 0.7	125.7 ± 7.2
		10 adult females	154.7 ± 4.5	22.0 ± 0.7	126.2 ± 13.0
		(47% males, 53% females)			
		2 unsexed adults	155.0	21.5	123.5
		1 juvenile	145	22	96
		(95% adults, 5% juveniles)			
Morecambe Bay (Newbiggin)	010479	72 adults	160.6 ± 3.6	-	110.1 ± 5.1
		4 juveniles	153.0	-	113.0
		(94.7% adults, 5.3% juveniles)			
(Biggar)	150479	15 adults	158.9 ± 2.5	-	113.7 ± 4.2
		2 juveniles	150.5	-	102.5
		(88% adults, 12% juveniles)			
Wash (Heacham)	260579	7 juveniles	150.3 ± 3.1	23.0 ± 0.8	105.6 ± 6.5
Severn (Clevedon)	030379	24 adults	158.2 ± 3.3	22.5 ± 0.9	110.9 ± 4.9
		2 juveniles	153.5	23.1	110.0
		(92% adults, 8% juveniles)			
(Severn Beach)	130479	11 adults	158.4 ± 3.8	22.9 ± 1.0	112.6 ± 4.2
		2 juveniles	157.5	25.0	112.5
		(85% adults, 15% juveniles)			
Devon (Wembury)	120579	40 adults	155.0 ± 4.2	22.9 ± 1.0	139.6 ± 15.3
		10 juveniles	149.4 ± 2.3	23.1 ± 0.9	107.6 ± 15.7
		(80% adults, 20% juveniles)			

TABLE 2. MEASUREMENTS OF ADULT *A.i.interpres* FROM VARIOUS PARTS OF THE NEARCTIC BREEDING RANGE AND FROM ICELAND (SAMPLE SIZE IN BRACKETS)

Region	Mean wing length (mm)	Mean bill length (mm)	Source
Ellesmere Island (Alert)	156.0 (53)	21.5 (53)	Morrison (1975) Manning et al. (1956)*
Ellesmere Island (Fosheim Peninsula)	156.0 (37)	21.0 (35)	Morrison (1975) Parmalee & MacDonald (1960)*
East Greenland (Germania Land)	158.1 (5)	22.4 (5)	Manniche (1910)*
East Greenland (Kong Oscars Fjord)	157.8 (13)	22.4 (13)	Green (1978)
South West Iceland			
11 - 25 May 1971	158.9 (298)	23.1 (298)	Morrison & Wilson (1972)
3 May 1972	157.2 (33)	22.9 (33)	Morrison (1975)
23 May 1972	158.3 (44)	21.5 (44)	Morrison (1975)

*Wing lengths from these sources have been corrected (see text)

Overall, the number of juveniles captured during spring 1979 was quite small (14.0%). The bills of these birds were scarcely any different from those of adults, but their wings were about 4% shorter. This is in accordance with the longer period of wear to which they would have been subjected, and the fact that juvenile primaries tend to abrade more rapidly than those of adults (Branson et al. 1979). Their weights remained low, supporting the idea that first year birds do not return to the breeding grounds (no juveniles were captured on spring migration through Iceland in 1971 or 1972). The percentage summer plumage of adults was measured in only one reasonably large catch - the birds at Wembury on 12 May - which had gained on average 73% of their nuptial feathers. Rather curiously, two of the adults in this catch were in active wing moult (including one with 33% summer plumage), having renewed nine and seven primaries respectively. May is very early for non-breeding birds to have almost completed their moult, and since their weights were high (142 and 144 g), the situation is even more anomalous. They might have been birds which failed to moult in the normal way the previous autumn.

Few departures on migration were noted, but in the two cases where a single heading was recorded for a specific flock (Oxley Creek - Saltern's Marsh on 13 May, and Langstone Harbour on 1 June), the direction was between N and NW.

To summarise the results of the Spring Passage Project on Turnstone, movements through Britain appear to be complex, even though the vast majority of birds are heading for the same breeding area. Weight gain in Britain is less than half as fast as that in Iceland, where large numbers of birds stop off to put on fat. Turnstones probably move northward through Britain in a series of steps, the length and timing of which may depend upon the feeding conditions which they encounter at each site. The birds which pass through later in spring are probably heading for the most northerly and westerly parts of the breeding range and have probably come from the most southerly parts of the wintering range. It is not surprising that the two species of Palaearctic wintering waders which penetrate furthest into New World breeding areas (Turnstone and Knot) make considerable use of Iceland as a staging post, whereas those that do not penetrate as far (Ringed Plover, Sanderling and Dunlin) use it to a much more limited extent.

Acknowledgements

I am grateful to all those who participated in the Wader Study Group Spring Passage Project.

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