THE SPRING MIGRATION OF DUNLINS THROUGH BRITAIN IN 1979

(Results of the WSG Project on the Spring Passage of Dunlins, Sanderlings, Ringed Plovers and Turnstones through Britain - Part 4)

by P.N. Ferns

It is generally accepted that the majority of British wintering Dunlins belong to the race Calidris alpina alpina (Hardy & Minton 1980). A few C.a. schinzii may occur in the south-west, however, since colour-ringed breeding birds from Finland have been sighted in the Exe Estuary in November (Cabot 1963, Soikkeli 1967); and also four autumn migrants caught at Collister Pill in the Severn Estuary on 21 August 1978, and identified as schinzii on the basis of their breeding plumage, were retrapped in Britain in winter (Clevedon, Severn Estuary on 9 November 1978; Berrow, Severn Estuary on 25 November 1979; Berrow on 8 December 1979; and Bitterne, Southampton on 23 January 1980). During the spring and autumn passage much larger numbers of C.a. schinzii, and a few C.a. arctica pass through on both the east and west coasts of Britain. A useful map of the breeding ranges of these three subspecies is given in Ferns & Green (1979). Basically, alpina breeds in northern Scandinavia and the U.S.S.R.; schinzii breeds on the coasts of the Baltic and the eastern North Sea, as well as in the British Isles, Iceland and S.E.Greenland; and arctica breeds in N.E.Greenland. C.a. alpina from the western part of the breeding range winter in Europe and just into North Africa; schinzii winter somewhat further south on average, with large numbers in north west Africa (Pienkowski & Dick 1975); and although the wintering areas of the majority of arctica have yet to be identified, they are probably somewhere also in Africa.

In view of these extensive breeding ranges and wintering areas, the spring migration of Dunlins through Britain might be expected to be highly complex. Fortunately, the three races can be identified with a fair degree of accuracy on the basis of both breeding plumage and body measurements and this makes the interpretation of their movements much easier. Furthermore, although there is a rapid turnover of individuals during the migration period, most of this is concentrated into a well-defined timespan (Figs. 1-4), and so the trends in numbers are much easier to interpret than those, for example, of the Turnstone discussed in the previous report in this series.

It is already reasonably well-established, from ringing recoveries and Birds of Estuaries Enquiry counts, that adult alpina wintering in Britain begin to move eastwards in February, March and April. Some of those from sites in the west of the country apparently stop off at sites on the east coast before moving into Europe. Juveniles undergo a similar movement somewhat later than the adults (very few Dunlins breed in their first year). The majority of schinzii breeding on the mainland of Europe pass up the coasts of the southern North Sea in April. During April and May, large numbers of schinzii pass through Britain, the majority of them being recorded in the west. These birds include individuals ringed in France, Morocco and Mauritania and are thought to be heading for breeding areas in Iceland and Greenland. Most arctica are recorded as part of the same general movement in May. With these broad trends in mind it is now possible to examine the detailed information obtained in 1979.

The first thing to note is that at sites where counts were conducted frequently e.g. Collister Pill (Fig. 1) and Sandwich & Pegwell Bays (Fig. 4), birds were arriving and departing at frequent intervals throughout April and May. At the former site, significant influxes of birds occurred on 8, 13, 21 and 30 April, and on 5-9 and 11 May. Even when numbers remained roughly constant at 4,000 between 13 and 18 April, the fact that the proportion of birds in full winter plumage increased somewhat on 16 April suggests that some turnover of individuals was taking place. The proportion of birds in full winter plumage often increased on days when influxes were known to have occurred or when departures were observed, suggesting that it was the birds which had completed their moult into nuptial plumage which left first. Such departures were recorded on 28 April and 4, 9, 11 and 12 May. The fact that overall numbers increased on one of the days when birds were observed leaving (11 May), shows that arrivals and departures of different groups can occur simultaneously.

Most of the counts in the west and north of Britain (Figs. 1 and 2) show a main peak in early May. The timing of this peak is very similar at sites as far north as the Isle of Lewis, but in Shetland it occurs a little later. The Menai Straits are exceptional with the main passage of small numbers of birds in late May. Several sites, such as Collister Pill, Sunderland Point-Middleton Sands and the Isle of Lewis also show earlier peaks, mainly in April. The differences between the two sites in the Severn Estuary are also noteworthy, with Chittening Warth showing no evidence of the complex series of movements in April which were apparent at Collister Pill.

The main peak in May presumably consisted of birds heading for breeding areas in Iceland and Greenland (see later), and there are several ringing recoveries from previous years which support this view. For example, a bird ringed on the Dee on 22 May 1970 was recovered at Danmarkshavn in N.E. Greenland 16 days later, and a bird captured on the nest by myself and Greg Mudge on 9 July 1974 in Jameson, N.E. Greenland, was controlled in Morecambe Bay on 19 May 1975. There are also several movements between Britain and Iceland. Recoveries from both these areas are reviewed by Hardy & Minton (1980). Unlike the Turnstone, there are not many movements of spring migrant Dunlin within Britain in the same season, but they do occur e.g. a bird captured at the Severn on 5 May 1974 was retrapped in Morecambe Bay on 11 May in the same year. The latter bird had moved northwards by about 175 miles, yet had still managed to gain 6g in weight in six days. In 1979, conditions in the Solway Firth appeared not to be to the liking of BX46399 which was ringed there on 14 April, yet was recaptured further south in Morecambe Bay on 7 May. This individual weighed 43g on initial capture and 56g on recapture, and presumably constitutes an example of the curious reversed movements which do occur from time to time in the migration of birds. Most of the above Dunlin movements involved subspecifically identified birds and all of them except those from Greenland, were schinzii. The overall proportion of ringed birds amongst this spring passage population was very low. For example, there were no ringed birds amongst the 104 schinzii caught in Morecambe Bay on 20 May 1979, yet 22% of the 239 birds captured at the same site on 1 April 1979 (most of which were presumably wintering alpina) carried rings.

A similar May peak dominates the counts on the south coast (Fig. 3), though there were also April peaks at Oxley Creek-Pennington Marsh and Meon-Titchfield Haven. The timing of the May peaks is very similar to that at sites in the west of Britain suggesting that they consisted of birds heading for the same breeding areas. This view is substantiated by observations of the direction of departure of spring migrants from the Hampshire/Sussex Harbours collected over several years by Steventon (1977). The dominant directions of movement were towards the north and north-west. On the east coast (Fig. 4), passage at Sandwich & Pegwell Bays and the S.W. marshes of Teesmouth, followed a very similar pattern. On 12 May, the proportion of the different races present at Sandwich & Pegwell Bays, was estimated as being - alpina 36%, schinzii 58% and arctica 6%. Estimates from the same site on 20 May gave - alpina 39%, schinzii 17% and arctica 44%. The presence of arctica clearly shows that birds of westerly breeding origin

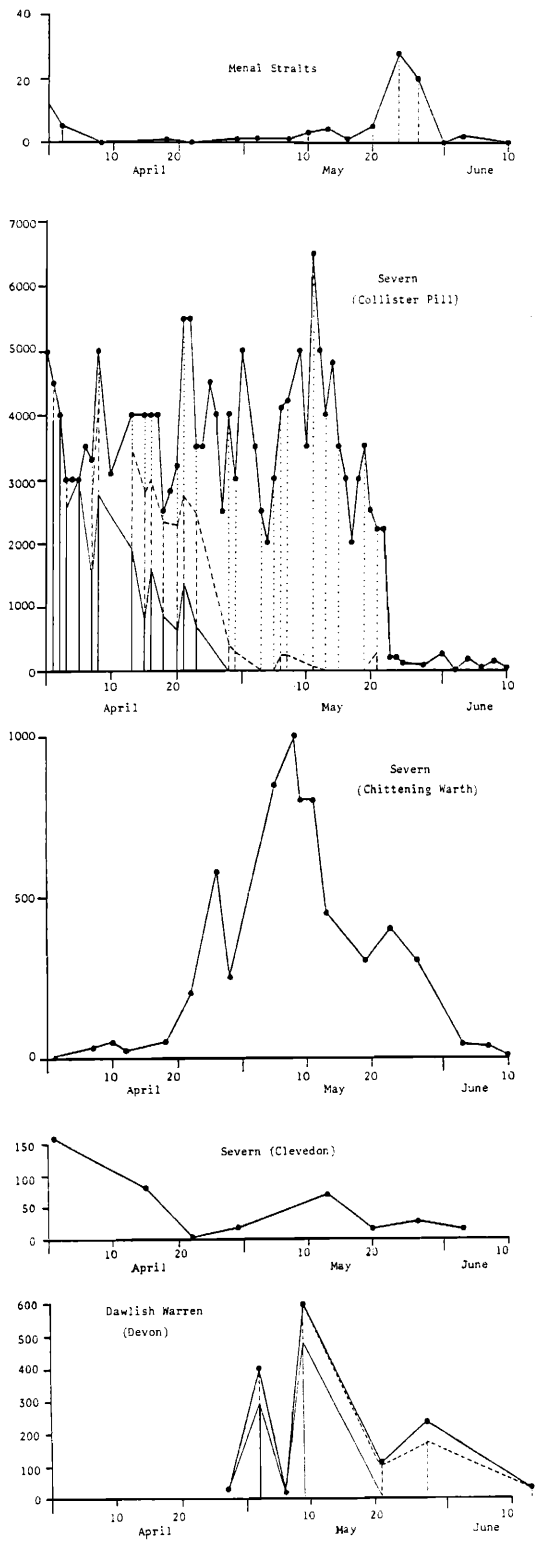


Figure 1. Counts of Dunlins at sites in south-west England and Wales in spring 1979. The most northerly sites are at the top. The closed circles are the actual counts; the dotted lines represent the proportion of birds in full nuptial plumage; the dashed lines represent those in partial nuptial plumage;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

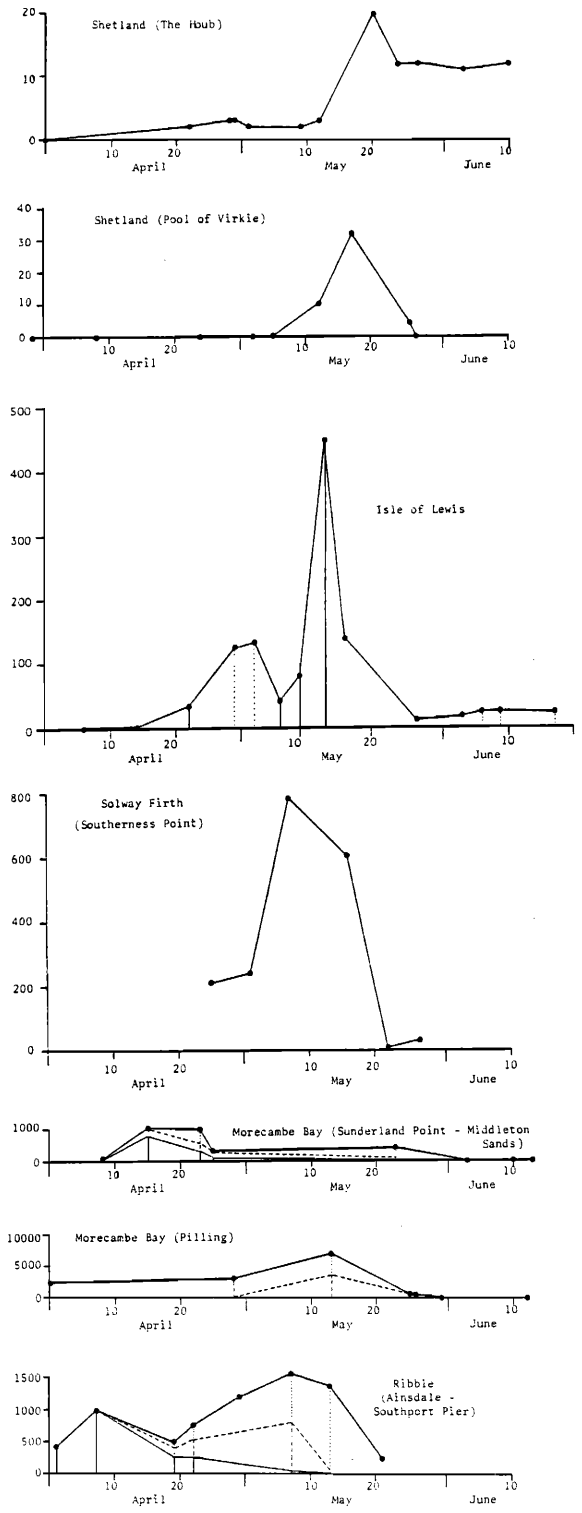
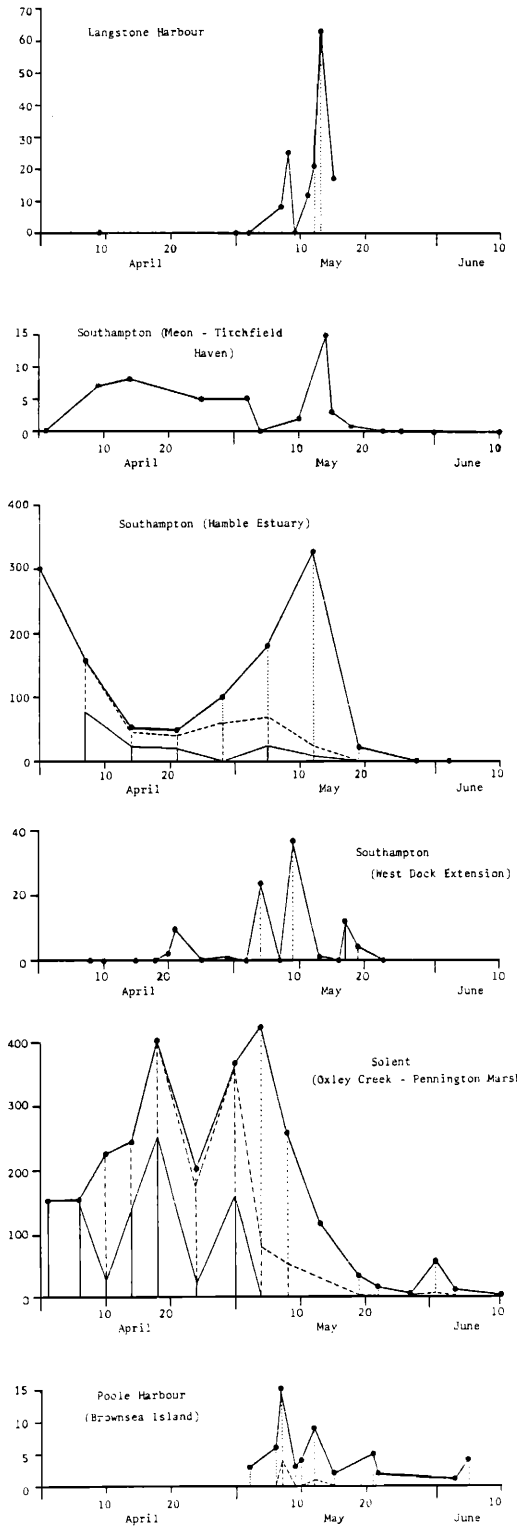


Figure 2. Counts of Dunlins at sites in the north-west and north of Britain in spring 1979. The most northerly sites are at the top. Other conventions as in Fig. 1.

were involved in the passage, and the fact that a greater proportion of arctica were present on 20 May shows that most of the birds which departed between 12 and 20 May were alpina and schinzii.

Observations of departures made during the course of the project, show that the dominant direction of onward movement from Collister Pill was towards the north-west, viz 28 April - 250 birds NW, 4 May - 100 birds NW, 11 May - 17 birds NW, 12 May - 801 birds 329° (see Wader Study Group Bulletin 26: 7). The only exception was 9 May, when nine birds departed towards the NE. In previous years, departures towards the NE, which were commoner in April than May, were identified as involving alpina on the basis of their slightly deeper call-notes. The only departures recorded from other sites in 1979 involved nine birds heading NNW from the West Dock Extension (Southampton) on 21 April, and 23 heading due N from Oxley Creek (Solent) on 13 May.



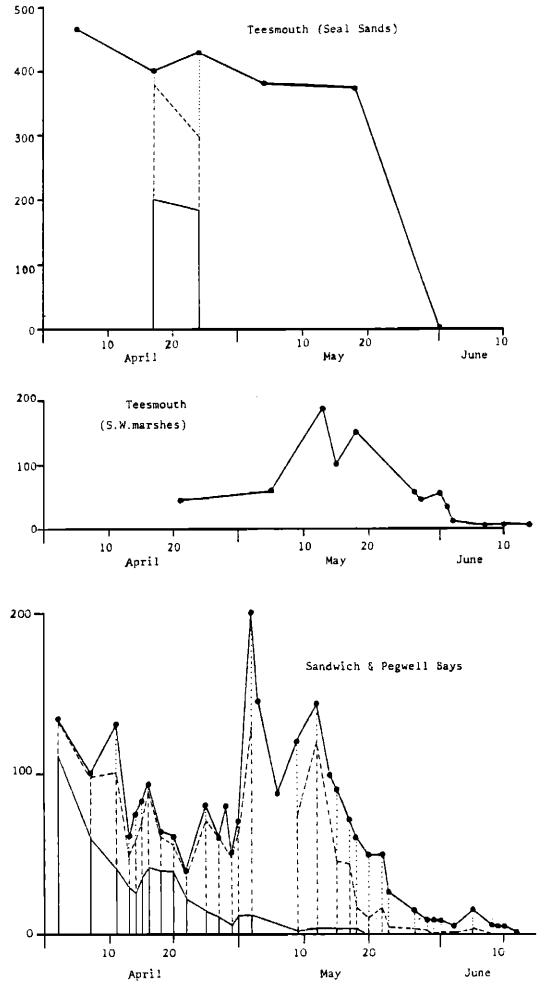


Figure 4. Counts of Dunlins at sites in eastern Britain in spring 1979. The most northerly sites are at the top. Other conventions as in Fig. 1.

← Figure 3. Counts of Dunlins at sites on the south coast of Britain in spring 1979. The most easterly sites are at the top. Other conventions as in Fig. 1.

The number of birds captured in spring 1979 was considerable (Table 1), and they provide a great deal of valuable information. The catches from the Solway Firth consisted almost exclusively of schinzii, which is in marked contrast to Morecambe Bay where 47% of the catch on 15 April and 53% on 7 May consisted of alpina. Catches in previous years at the Severn show a similar pattern to Morecambe Bay with quite a high proportion of alpina in April and early May, followed by a dominance of schinzii in mid and late May. The alpina which occur at these sites (but apparently not on the Solway) may include adults heading for breeding areas in the more northerly parts of the Soviet Union (and which therefore have a later passage than the bulk of alpina), but since they also include quite a high proportion of juvenile birds some of them may simply be part of a late westward movement of non-breeders. Since the bulk of the alpina probably follow a more southerly route, it would not be unreasonable to expect that some of these birds were from wintering sites in Ireland. For example, a juvenile alpina ringed in County Cork on 12 March 1977, was controlled at Collister Pill on 21 May in the same year. The catches of schinzii at all sites (794 aged birds) contained only 1.1% juveniles which is just what might be expected of breeding birds on passage. The numbers of arctica captured were quite small and it is not clear whether this is because the breeding population of N.E. Greenland is small relative to that of Iceland and S.E. Greenland, or because more individuals of this race tend to overfly the country. The highest proportion of arctica was in the latest catch from Morecambe Bay (23 May), and it is not surprising that this, the most northerly breeding race, has a late passage.

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

Site	Date	Number, age, sex & race	Wing length (mean ± SD in mm)	Bill length (mean ± SD in mm)	Weight (mean ± SD in g)	Nuptial plumage (mean ± SD in %)
Solway Firth (Waterfoot Annan)	140479	62 unsexed adult *schinzii*	111.1 ± 2.6	29.6 ± 2.4	45.8 ± 4.5	-
		7 unraced adults	113.7 ± 2.0	33.3 ± 1.0	50.1 ± 3.3	-
		6 unraced juveniles	115.0 ± 2.8	33.2 ± 1.8	51.2 ± 3.6	-
		(92.0% adults, 8.0% juveniles)				
	150479	1 unsexed adult *schinzii*	114	30.0	43	-
	120579	6 adult female *alpina*	121.3 ± 2.6	33.6 ± 1.3	60.0 ± 2.0	77.5 ± 29.3
		4 unsexed adult *alpina*	121.8	33.1	59.0	65.0
		1 juvenile male *alpina*	120	29.4	58.5	100
		1 juvenile female *alpina*	124	36.5	60.5	100
		1 unsexed juvenile *alpina*	124	36.3	63.0	70
		38 adult male *schinzii*	116.5 ± 2.5	29.1 ± 2.2	55.7 ± 5.2	98.5 ± 2.3
		61 adult female *schinzii*	118.8 ± 2.9	32.0 ± 2.2	58.6 ± 5.2	99.6 ± 1.8
		(38.4% adult male *schinzii*, 61.6 adult female *schinzii*)				
		20 unsexed adult *schinzii*	117.5 ± 3.4	30.6 ± 2.4	57.5 ± 5.4	96.4 ± 8.7
		2 unsexed juv. *schinzii*	118.5	32.1	57.5	99.0
		(98.4% adult *schinzii*, 1.7% juvenile *schinzii*)				
		1 unsexed adult *arctica*	118	29.0	57.0	100
		(7.7% adult *alpina*, 91.5% adult *schinzii*, 0.8% adult *arctica*)				
	130579	4 adult male *alpina*	118.0	31.0	58.9	100.0
		5 adult female *alpina*	124.4	33.8	64.1	92.0
		4 juvenile female *alpina*	124.3	34.5	61.5	95.0
		2 unsexed juvenile *alpina*	118.5	30.3	52.8	65.0
		58 adult male *schinzii*	115.3 ± 2.2	29.0 ± 1.9	55.8 ± 4.5	99.1 ± 1.8
		109 adult female *schinzii*	119.1 ± 2.8	32.3 ± 2.0	59.9 ± 5.4	99.0 ± 3.7
		(34.7% adult male *schinzii*, 65.2% adult female *schinzii*)				
		13 unsexed adult *schinzii*	118.3 ± 2.9	31.2 ± 2.7	58.8 ± 5.5	96.9 ± 8.3
		3 juvenile male *schinzii*	114.3	27.5	56.7	98.3
		2 juvenile female *schinzii*	116.5	31.6	55.0	100.0
		(97.3% adult *schinzii*, 2.7% juvenile *schinzii*)				
		1 adult male *arctica*	113	26.6	42	100
		3 unsexed adult *arctica*	113.7	27.5	48.3	96.7
		(4.7% adult *alpina*, 93.3% adult *schinzii*, 2.1% adult *arctica*)				
Teesmouth	080579	1 adult *alpina*	-	-	58	-
		1 juvenile *alpina*	125	35	61	50
		3 unaged *alpina*	-	31.3	54.5	50.0
		3 unaged *schinzii*	-	31.0	48.8	33.3
	160579	6 adult *alpina*	121.3 ± 3.3	35.8 ± 2.3	67.8 ± 5.7	70.8 ± 19.2
		2 juvenile *alpina*	122.0	35.0	52.8	62.5
		5 adult *schinzii*	118.6	32.4	58.1	70.0
		2 juvenile *schinzii*	118.0	32.5	68.0	75.0
	230579	8 adult *alpina*	-	34.5 ± 2.0	69.8 ± 5.4	71.9 ± 9.8
		8 juvenile *alpina*	-	33.8 ± 1.8	65.7 ± 4.6	62.5 ± 18.9
		15 unaged *alpina*	-	33.3 ± 2.4	68.4 ± 9.2	66.7 ± 20.4
		12 adult *schinzii*	-	31.3 ± 2.3	56.5 ± 4.7	52.1 ± 16.7
		6 unaged *schinzii*	-	31.3 ± 1.6	57.7 ± 6.7	45.8 ± 18.8
Morecambe Bay (Newbiggin)	010479	52 adults	118.5 ± 3.6	-	56.9 ± 4.8	-
		5 juveniles	117.6	-	54.0	-
		(ringed birds only above, remainder not processed: total catch = 205 adults, 34 juveniles, i.e. 85.8% adults, 14.2% juveniles)				
(Biggar)	150479	41 adult *alpina*	117.5 ± 3.9	32.0 ± 2.7	51.4 ± 4.2	-
		16 juvenile *alpina*	118.8 ± 3.2	31.8 ± 2.2	51.0 ± 4.2	-
		(79.2% adult *alpina*, 20.8% juvenile *alpina*)				
		70 adult *schinzii*	113.7 ± 3.2	29.5 ± 2.2	48.9 ± 5.2	-
		(46.6% adult *alpina*, 53.4% adult *schinzii*)				
(Hest Bank)	070579	16 adult male *alpina*	121.1 ± 3.0	33.9 ± 2.4	58.6 ± 4.6	66.3 ± 18.9
		7 adult female *alpina*	121.7 ± 1.5	34.9 ± 2.1	59.1 ± 2.2	68.6 ± 6.9
		42 unsexed adult *alpina*	121.5 ± 2.8	33.8 ± 2.7	57.8 ± 3.1	57.5 ± 23.0
		2 juvenile male *alpina*	119.0	30.5	56.5	50.0
		5 juvenile female *alpina*	119.4	33.4	56.0	90.0
		7 unsexed juv. *alpina*	121.7 ± 3.5	32.9 ± 3.0	57.6 ± 2.1	75.7 ± 9.8
		(82.3% adult *alpina*, 17.7% juvenile *alpina*)				
		15 adult male *schinzii*	115.8 ± 1.6	29.5 ± 1.7	55.4 ± 7.4	88.0 ± 9.4
		12 adult female *schinzii*	117.7 ± 3.9	31.4 ± 2.8	56.7 ± 7.4	88.3 ± 8.3
		28 unsexed adult *schinzii*	116.6 ± 2.7	30.1 ± 2.6	58.4 ± 7.4	77.1 ± 14.4
		2 unsexed adult *arctica*	113.0	28.0	57.5	80.0
		(53.3% adult *alpina*, 45.1% adult *schinzii*, 1.6% adult *arctica*)				
	200579	1 adult male *alpina*	111	32	57	-
		10 unaged *alpina*	-	-	-	72.0 ± 24.9
		104 unsexed adult *schinzii*	-	-	-	89.8 ± 10.8
		9 unsexed adult *arctica*	-	-	-	92.2 ± 6.7
		(0.9% adult *alpina*, 91.2% adult *schinzii*, 7.9% adult *arctica*)				
(Conishead)	230579	1 juvenile *alpina*	122	33	75	-
		37 unsexed adult *schinzii*	116.7 ± 2.7	30.1 ± 2.7	54.1 ± 5.0	-
		11 unsexed adult *arctica*	116.2 ± 3.5	28.5 ± 1.9	55.8 ± 5.0	-
		(77% adult *schinzii*, 23% adult *arctica*)				
Southport (Marshside)	150479	1 adult male *schinzii*	114	31.0	45.5	100
		2 adult female *schinzii*	120	32.3	51.8	100
	270579	1 unaged female *alpina*	116	31	64	100
		7 unaged male *schinzii*	115.9 ± 2.7	26.6 ± 1.2	59.0 ± 6.4	100.0
		1 unaged female *schinzii*	115	29	60.5	100
Dee (Point of Air)	120579	1 unsexed adult *alpina*	122	28	60	50
		134 unsexed adult *schinzii*	117.7 ± 2.9	30.2 ± 2.3	53.0 ± 5.6	98.9 ± 7.5
		3 unsexed adult *arctica*	116.0	27.0	45.7	100.0
		(0.7% adult *alpina*, 97.1% adult *schinzii*, 2.2% adult *arctica*)				
Devon (Wembury)	120579	3 unsexed adult *schinzii*	116.0	30.0	39.7	-

TABLE 2. AVERAGE WING AND BILL LENGTHS OF REASONABLY LARGE SAMPLES OF DUNLIN IN SPRING 1979

Subspecies	Site	Date	Sex	Sample size	Wing (mm)	Bill (mm)
Probably *alpina* (winter plumage)	Morecambe Bay	010479	males and females	52	118.5	-
alpina	Morecambe Bay	150479	males and females	41	117.5	32.0
alpina	Morecambe Bay	070579	males and females	65	121.4	33.9
schinzii	Solway Firth	120579	males	38	116.5	29.1
schinzii	Solway Firth	120579	females	61	118.8	32.0
schinzii	Solway Firth	130579	males	58	115.3	29.0
schinzii	Solway Firth	130579	females	109	119.1	32.3
schinzii	Solway Firth	140479	males and females	62	111.1	29.6
schinzii	Morecambe Bay	150479	males and females	70	113.7	29.5
schinzii	Morecambe Bay	070579	males and females	55	116.6	30.2
schinzii	Dee	120579	males and females	134	117.7	30.2
schinzii	Solway Firth	120579	males and females	119	117.9	30.8
schinzii	Solway Firth	130579	males and females	180	117.8	31.1
schinzii	Morecambe Bay	230579	males and females	37	116.7	30.1
arctica	All sites		males and females	21	115.4	28.0

In order to make the measurements of the Dunlins captured during the project easier to interpret, all the reasonably large samples have been extracted and are shown in Table 2. Only adults are included and the catches are listed in date order. None of the differences in average size between the catches is a result of combining the sexes in samples with disparate sex ratios, as a detailed examination of Table 1 will reveal. Adult alpina captured in May tended to be larger than those in April. The same trend is apparent in catches obtained in several previous years at the Severn. This suggests that the later birds originated from breeding areas further east in the U.S.S.R. than the earlier ones (Greenwood 1979). The sexed samples of schinzii from the Solway Firth in May fit very closely with the measurements of birds breeding in Iceland (Hørring 1939). Although the bill lengths of Finnish breeding birds are also very similar, their wing lengths are about 2 mm shorter than those from the Solway (Soikkeli 1974). The overall average dimensions of schinzii tended to increase throughout April and early May, and then decreased in the final catch from Morecambe Bay on 23 May. There is, moreover, a reasonably good agreement between different sites on similar dates. The most reasonable interpretation of this trend is that the early passage of schinzii included some birds of more southerly origin (e.g. northern Britain and perhaps the Faeroes) which are smaller in size (Greenwood 1979). The main passage in early to mid-May then consisted of Icelandic breeders, followed by a movement of slightly smaller birds from S.W. Greenland. The wing and bill lengths of the arctica samples combined were a good deal shorter than most of the schinzii, but they were a little longer than breeding adults from the southern part of the range in N.E. Greenland (Green 1978). The fact that the wings of the April samples of schinzii from the Solway Firth and Morecambe Bay were shorter than those of arctica, while their bills were longer is consistent with them being British breeders (Greenwood 1979).

The weights of the April samples of schinzii were relatively low (Table 1). This could either be because these birds still had a good deal of inter-migratory fattening to undertake, or because they did not have much further to migrate. The average weight gain of spring migrant Dunlin at the Dee in 1973 and 1974 was 0.6g/day (Eades & Okill 1977), and this is very similar to the rate in most years for schinzii at the Severn (unpublished data). If a similar rate of weight gain is assumed for the Solway Firth, schinzii at this site ought to have increased in weight by about 17g between 14 April and 12/13 May (taking them to a mean weight of about 63g). The mean weight on the latter dates was actually less than this, and the fact that these catches contained no retraps of schinzii caught in April indicates that the population had turned over completely. The Hest Bank (Morecambe Bay) catch on 20 May similarly contained no schinzii retraps from 5 May.

Breeding adults arrive in the Peak District in mid-April (Yalden 1974). Average first egg dates in the Hebrides are about 15 May (Wilson 1978), and if it is assumed that the delay between 50% of the birds arriving and the average first egg date is the same as in Finland, i.e. seven days (Soikkeli 1967), then half the local population should arrive in the Hebrides by about 7 May. It therefore seems reasonable to suppose that the first peak observed on the Hebrides in 1979 represented the arrival of local breeding birds along the shore prior to moving onto the machair, and that the second peak consisted of more northerly breeders, as at other sites. The April peaks observed elsewhere also quite probably consisted of British breeding birds. The only reasonably large samples of schinzii which contained birds which had yet to complete their moult into nuptial plumage (bearing in mind that a few winter plumage feathers often remain unmoulted) were those from Morecambe Bay.

The average fat-free weight of a sample of adult alpina from the Wash was 50g (Pienkowski et al. 1979), while the March minimum weight of live birds from the same area was about 48g. The average fat free weight of 11 schinzii from the Severn during the spring migration was 42g, and that of 6 arctica was 38g (unpublished data). Much larger samples of all three races from the Severn are currently being analysed, but reasonable interim estimates of fat-free weight are 48g for alpina, 42g for schinzii and 38g for arctica. The value for arctica may appear to be low but it is well in line with the 42g average live weight of breeding birds from N.E. Greenland (Green 1978). Similarly, it is worth noting that the three adult schinzii captured at Wembury on 12 May 1979 weighed only 39.7g on average. Using the above fat-free weights and the method of McNeil & Cadieux (1972), the potential flight ranges (PFR) of the 1979 birds can be estimated. Of course it is worth remembering that the mean weight of any random sample of birds is likely to underestimate their true departure weight. The same flight speed of 50 m.p.h. (80 km/h) was assumed for all three sub-species in the absence of more detailed information. The birds in winter plumage in Morecambe Bay on 1 April (assumed to be mostly alpina) had a PFR of 920 miles (1470 km). The sample of alpina from the same site on 7 May had a similar PFR, and this is enough for them to have reached the Baltic. The alpina from the Solway Firth in mid-May had sufficient reserves to take them well up the north coast of Norway, or beyond the Baltic and into Finland. The heaviest sample of alpina was that captured at Teesmouth on 23 May. These birds had a PFR of nearly 2,000 miles (3200 km) - enough to reach the White Sea quite comfortably. This does not of course imply that these birds were necessarily heading in such a direction, it merely gives some idea of their potential range. These were rather long-billed birds and could quite possibly have been heading even further east by way of other intermediary feeding areas. Many of the alpina samples had not completed their moult into breeding plumage.

The schinzii captured in the Solway Firth on 14 April and in Morecambe Bay on 15 April had PFR's which were insufficient for them to have reached Iceland. This tends to confirm the view that they were heading for breeding areas in the southerly part of the range. Those captured at the same sites in May had PFR's of between 1300 and 1700 miles (2000 and 2700 km) which is enough for them just to have reached Greenland or, in the case of the heaviest samples, to have penetrated well down the south-west or well up the north-east coasts. The schinzii from the Dee on 12 May had sufficient reserves to reach Iceland but not Greenland. As discussed previously, it is quite likely that all these birds, except possibly those from Morecambe Bay on 23 May, were in fact heading for breeding areas in Iceland, and if this was the case, many of them were carrying sufficient fat reserves to cope with adverse weather conditions during migration or upon arrival. The average weight of all 21 adult arctica captured in 1979 was 53g, giving them a PFR of about 1800 miles (2900 km), which is enough to reach the northern limit of their breeding range in N.E. Greenland. Although some arctica and schinzii on onward migration do occur in Iceland (Morrison & Wilson 1972), the numbers are not large and it seems that many Greenland breeders carry sufficient reserves to undertake the journey from Britain in a single step.

One final problem remains to be resolved, and that is whether any of the schinzii recorded in Britain in April and May might have originated from breeding areas on the mainland of Europe. The birds from near the most northerly part of this range (i.e. Finland) arrive on the breeding grounds between 12 and 30 April (Soikkeli 1967). Assuming that their breeding season is later than that of birds further south, which seems reasonable, then only the schinzii passing through Britain earlier than late April can conceivably have been heading towards breeding areas in the east. Since only 1.3% of the Dunlins leaving the Hampshire/Sussex Harbours headed in an easterly or north-easterly direction (Steventon 1977), the proportion of such birds must be very low even in the south. The spring passage of schinzii through the Wash is negligible, according to Minton (1975). However, it is possible that a few of the birds passing through Sandwich & Pegwell Bays in April may have been schinzii heading towards the east.

The approach adopted in the WSG Spring Passage Project i.e. a combination of counting and catching, has proved to be particularly successful in this species, aided by the fact that different subspecies are readily identifiable in breeding plumage and that there are quite well-marked morphometric differences between populations breeding in different parts of the range. At sites in England (but apparently not to the same extent in Scotland) the passage begins with an easterly movement of alpina. This can be viewed as a continuation of the departure of overwintering birds, most of which leave before April. These late birds include quite a few juveniles as well as adults which are probably heading for the most northerly and easterly parts of the breeding range of this subspecies. The passage of schinzii begins in April with a northerly movement of British breeding birds. This is followed in early May by larger numbers of Icelandic breeders. Later in May, birds from S.E. Greenland apparently pass through, to be followed by small numbers of arctica from N.E. Greenland. Very few schinzii from continental Europe appear to pass through Britain in April and May. As far as I am aware this project represents the first occasion on which the passage of British breeding Dunlin has been even tentatively identified. It would be well worth obtaining more catches of schinzii in April to confirm the presence of British breeders, especially now that a comprehensive review of the biometrics of this species has been undertaken (Greenwood 1979), enabling different populations to be identified with much more confidence.

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