dunlinologists! Switching to Knot, Peter Prokosch told us how to locate breeding birds in north-west Greenland, including a doubtfully relevant slide of a pram and stressing the importance of concave south-facing slopes, and Nick Davidson and Theunis Piersma provided their familiar double-act on migration. Ken Smith presented unusual insight into the night-time habits of Green Sandpipers; Rob Lambeck gave a compelling documented account of how an estuarine barrage can affect wintering Oystercatchers; and Cor Smit explained how eating mussels in winter contributes to breeding success in the same species. On the same day, notable double talks were given by Arnd Stiefel and Horst Scheufler on habitat management for breeding waders on Kirr Island, northern GDR, and by Peter Meininger and Tom van der Have on spring migration in Greece and Turkey respectively. The Greek winter had been the coldest on record, and a picture of flamingos in the snow was decidedly incongruous.

The conference was a marvellous and happy success, very largely because of the enormous trouble about things both large and small taken by our Polish hosts. To all concerned, dziekuje barbzo! Jadwiga Gromadzka, in particular, was a tireless mother-hen, endlessly organizing everything and much troubled by "problems with the bar". Ireneusz Chojnacki provided a display of brilliant black-and-white photographs of wader behaviour; his work deserves to become widely known outside Poland. Przemyslaw Chylarecki and Michal Skakuj contributed apt and amusing cartoons and provided everyone with personalised name badges, each with an appropriate avian emblem. A very chubby Ringed Plover captured the likeness of a well-known

worker on the species (and most senior WSG Officer) with particular acuity.

I had spent the summer of 1968 working and travelling in Poland, and promised myself then that I would return. Four brief days in 1987 were enough only to make me renew that promise. See you again soon!

Robert Prys-Jones, British Trust for Ornithology, Tring, Herts. HP23 5NR, U.K.

ABSTRACTS OF TALKS AND POSTERS AT THE WSG ANNUAL MEETING, GDANSK, POLAND, 24-28 SEPTEMBER 1987

Many of the talks and posters in the extensive programme at the meeting presented new and interesting material about waders in both eastern and western Europe. We feel that the reports of this research deserve a wider audience than just those who were lucky enough to attend the meeting. Hence we have asked authors to provide us, where appropriate, with a more expanded paper than the abstract published here, for publication in *WSG Bulletin*. Some of these papers are published elsewhere in this *Bulletin*; for these we print just the title and authors identity in this section. We hope to publish expanded papers from many of the other talks and posters, in the next few *Bulletins*.

Some peculiarities of wader migration at the Gulf of Gdansk, Poland

J.Gromadzka, Ornithological Station, 80-680 Gdansk 40, Poland

Autumn migration of waders is easy to observe on the Polish Baltic coast. Most favourable habitats for waders at that time are coastal meadows and sandy mudflats. There are few such places on the coast. One area is the Vistula mouth, where waders have been regularly trapped and ringed for over 20 years.

Birds are trapped every two hours during 2.5-3 months of permanent trapping each year. This work, carried out over many years and supported by visual observations, has resulted in much information about many wader species. This allows various comparisons between different years and species and within the same species.

The area holds only small numbers of waders (rarely some hundreds, usually tens) but it is visited by birds during the whole of the period of autumn migration, i.e. from July to November. Thus timing of migration of different species and age categories were easy to estimate. Sometimes it is also possible to say if it has been a good or bad breeding season for given wader species. Waders stop for only a short time in the area - most often for a few hours only. The duration of stopping is longer later in the season, and in juveniles. The number of birds present at the mouth of the Vistula depends much on weather conditions and on the size of the area of flats attracting the birds. Daily totals of trapped birds give good estimation of changes of wader numbers.

Geographic variation of Dunlins in eastern Siberia

Pavel S. Tomkovich, Zoological Museum of the Moscow Lomonosov State University, Herzen Street 6, 103009 Moscow K-9, USSR

Series of skins of the Dunlins (*Calidris alpina*) obtained recently from different areas of Soviet Far East have allowed a revision of our knowledge on the geographic variation of this species. Type locality of *C.a. sakhalina* is Southern Sakhalin, where different subspecies occur during migrations. So to escape nomenclature confusion the neotype *sakhalina* is distinguished as the population breeding on Chukotski peninsula and Anadyr lowland. Birds of *C.a. kistchinski* subsp. n. are larger, on average, than any East-Siberian Dunlins, they have less bright upper parts and rather small and parti-coloured black abdominal patch. The breeding area of *kistchinski* includes the SW Koryak highlands, the northern coast of the Okhotsk Sea, Kamchatka and the N Kuril Islands. The smallest body size is the main characteristic of *C.a. litoralis* subsp. n. from N Sakhalin. The Chaun Gulf vicinity is the area of intergradation between *centralis* and *sakhalina*. Intergradation among *sakhalina* and the Alaskan subspecies (*arcticola* and *pacifica*) takes places in the extreme eastern part of Chukotski peninsula. *C.a. arcticola* differ poorly from *sakhalina*. By the complex of characters *sakhalina* and *kistchinski* are closely related to each other and to the North-American subspecies. *C.a. centralis* and *litoralis* seem to have another origin.

The primary moult in Dunlins *Calidris alpina* during autumn migration at Ottenby, S.E. Sweden

Noel Holmgren, Storkstigen 2, 393 59 Kalmar, Sweden

The primary moult in adult Dunlins was investigated between 11 July and 14 August 1986 at Ottenby bird observatory. Up to 77% of one-year-old birds and 27% of the older birds were moulting. In birds kept for observation, growth rate of the feathers varied between 0.6 and 9.9 mm per day. As the moult progressed the gap created by missing primary feathers in the wing decreased. There was a significant negative correlation between gap size and the mean proportion of fat in the total body weight. No difference in moulting characteristics was found between the sexes. Thus, some Dunlins moult about 5-6 primaries during their first part of migration, and then suspend the moult. These might be non-breeders according to the difference between age groups.

Some results of wader ringing in GDR

Ulrich Brenning, Wilhelm-Pieck-Universitat, Sektion Biologie, Freiligrathstr. 7/8, DDR-2500 Rostock, GDR

From 1973 to 1979, 22 219 waders were caught and ringed in five places in GDR (Kragenow 1980). Since 1979, this work has continued only on the small island of Langenwerder, situated in the western part of the Baltic Sea, where 27 879 waders were trapped since 1976. These were mostly Dunlins (64.2%), Redshanks (14.7%), Knots (5.47%) and 26 other species were caught, some seldom (e.g. *Tringa stagnatilis, Calidris maritima,* and *Phalaropus lobatus*). Special attention was paid to *Calidris alpina*. First year birds and adults showed different migration routes. The main wintering grounds for juvenile Dunlins are the northern and western coasts of France, and for adults the southern part of Great Britain. First year Dunlins, ringed in Poland, pass the coastal region of GDR in the following years in very small numbers. The mean resting time for juvenile Dunlins at Langenwerder was 6.7 days. At Grosser Schwerin, an island resting place, it was 4.6 days. The increment of body weight at Grosser Schwerin is faster (2.12% per day) than at Langenwerder (0.97% per day).

New ideas about Dunlin migration

J. Gromadzka, Ornithological Station, 80-680 Gdansk 40, Poland

Two main questions have been considered: 1) the eastern limit of the range of Dunlin *Calidris alpina* populations migrating through the Baltic, and 2) the migration between the Baltic and the Mediterranean/Black Sea regions.

Many Dunlins migrating in autumn through the Baltic are in active moult. Some probably start their moult while breeding and have originated from the areas east of the Urals. These birds show some plumage patterns that are east to recognize: after the moult their new median coverts (usually a part of them) are of "adult buff" type. This is characteristic of the Central and Eastern Siberia populations which start the moult very early, whilst still on their breeding grounds. It is not clear yet where the wintering grounds of these birds are located. Also, the ringing data show that some Dunlins migrating to the Baltic originate from more eastern regions than it has been presumed.

Some Dunlins from the Baltic migrate in autumn in a SE direction. The origin of these birds is not known. The SE direction may be used also by Polish-breeding *schinzii*. Some Dunlins of *alpina* race, ringed in the Baltic in autumn, are recaptured in spring at the Black Sea. They seem to migrate in autumn along the Baltic to the Mediterranean, while in spring they pass through the Black Sea on a loop migration.

Breeding habitat of Knots in the Thule area or how to get a sunburn in Greenland

Peter Prokosch, Magnus-Voss-Str. 6, 2251 Ostenfeld, F.R.G.

With a team of 4 biologists (WWF) and 2 filming experts (NDR-television) a small expedition to the Thule area in Northwest-Greenland was carried out in summer 1987. Besides documentation purposes (part of an NDR-filming project on the function of the Waddensea as a spring staging area for arctic waders) the aim of the expedition was to collect data on weights, breeding biology and habitat of Knots *Calidris canutus islandica* (part of the WSG-spring migration project of these birds). During the period from 25 June to 9 July, three different sites (two with dominating dry vegetated mountain slopes, one coastal low tundra plain) were visited.

The rope method was used to search for nests. Extremely nice weather (except for one day, sunshine all the time) seemed not only to cause some sunburn-problems for us but also to favour a very successful and unexpectedly early breeding season for the Knots.

The only (and latest) nest with eggs was found on 26 June. From 30 June onwards only families with already hatched chicks were recorded,

indicating a generally early start of egg laying, in the very first days of June (cf. Meltofte 1985). The nest and families were only found on south-facing, convex-shaped mountain slopes between 200 m and 400 m above sea level. *Dryas, Cassiope* and *Salix* dominated the dry vegetation of that habitat. A rich insect food supply (in particular *Tipula*), on which we saw the birds feeding, seemed to make additional plant-food unneccesary, as Nettleship (1974) described for Ellesmere. Weight data of some birds indicated good conditions of adults and a rapid weight increase in chicks. 24 Knots (3 ad., 21 pulli) were ringed and measured.

Meltofte,H. 1985. Populations and breeding schedules of waders, *Charadrii*, in high arctic Greenland. *Medd. om Gronland, Bioscience* 16: 1-43.

Nettleship,D.N. 1974. The breeding of the Knot *Calidris canutus* at Hazen Camp, Ellesmere Island, N.W.T. *Polarforschung* 44: 8-26.

Bar-tailed Godwits *Limosa lapponica* in the eastern part of the Dutch Wadden Sea (Schiermonnikoog)

Dr. Ebel Nieboer, Biological Laboratory, Vrije Universiteit, P.O. Box 7161, 1007 MC Amsterdam, The Netherlands

Bar-tailed Godwits occur in large numbers during the post- and pre-nuptial period in the Dutch Wadden Sea area. The peak-numbers are higher in spring than in late summer and autumn. In the eastern part of the area the numbers are relatively low in the early spring (March, early April), but they increase considerably in the end of April and the first week of May. The numbers decrease rapidly after the first half of May.

The similarity in geographical origin between the birds in spring and autumn is investigated and it is probable that the majority of the birds present in May belong to the breeding-populations of Taimyr and Yamal.

The weight gain was spectacular, both in males and females and proved to be about equal in each year in the research period (1984, 1985 and 1986). Juveniles form a small part of the birds caught in the Waddensea, (not more than 5% in 1984 and 1985, on Schiermonnikoog), and their proportion was extremely low in 1986 (<1%).

There were also few juveniles present in the family-groups of Brent and Barnacle Geese in the Netherlands in 1986, and the proportion of juvenile Dunlins, was also low amongst birds caught in August, September and October. Perhaps there was a bad breeding-success in the Siberian arctic. If this is true, then it would have been due to unfavourable circumstances in the breeding-area and not in the Wadden Sea during the pre-nuptial period.

Movement patterns of Turnstone through Britain revealed by the West Coast Spring Passage Project

Robert Prys-Jones, British Trust for Ornithology, Beech Grove, Station Road, Tring, Herts. HP23 5NR, Great Britain

The British West Coast Passage Project, carried out in 1984 and 1985, coordinated the collection of information obtained by colour-marking and regular counting on the movement patterns and site usage of four species of migrant waders. Data for Turnstone are presented in conjunction with ringing recovery data for the species in order to throw light on the chronology of the migration along the west coast of Britain, similarities and differences in site usage between years, and patterns of turnover at individual sites.

The migration pattern of Eurasian Turnstones *Arenaria interpres*

Klaus Liedel, GDR-4020 Halle, Kleiststr. 1, GDR

From ringing results and field studies (literature) it is possible to identify some main migration routes. The breeding birds of the Scandinavian peninsula and from the Ice Sea coast of the European part of USSR (Kola Peninsula, White Sea) in autumn move southwest following the European Atlantic coast directly, or using at first the White Sea/Baltic Sea flyway. Few cross inland central and western European. The wintering grounds of this population are along the coast of western Africa, a little south of the Tropic of Cancer.

The birds breeding on north-east European and West-Siberian coasts (perhaps east from Kanin peninsula) probably cross the East European/West Siberian inland, via Caspi resp. Asov and Black Sea and reach the eastern Mediterranean, the Red Sea and the Persian/Arabian Gulf. There are links between the Mediterranean flyway and the East Atlantic flyway, but most of these birds winter in the western part of the Indian Ocean southward to the coasts of southern Africa. There are references that some birds of this origin cross the African inland (e.g. Rift Valley), so reaching the wintering grounds on the Atlantic coast of the southern third of Africa.

Birds from central Siberian breeding grounds (between Jenissei and Lena) probably cross the Asian inland in a south-westerly direction, in this way circumventing the barrier of the Tibetan Plateau and Himalayas, and reaching the Indian subcontinent and the eastern part of Indian Ocean southward to NW-Australia.

East Siberian birds (Yakutia) cross the continent in a south-eastern direction, flying to wintering grounds in S.E. Asia and Australia. The birds of the northeastern population use a special route (between 170°E and 170°W) following the coast and crossing the Bering Sea (with a stop to put on energy reserves - e.g. on Pribilov Islands). They then fly non-stop to Hawaian Islands and finally to wintering grounds in Micronesia. The northward migration of these birds follows another more western route via Japan, the Kuril Islands and Kamchatka to the breeding grounds.

Biometrics: a useful tool in migration studies?

Meinte Engelmoer, National Forestry Service, PB. 20020, 3502 La Utrecht, The Netherlands

Paper elsewhere in this Bulletin.

What do Green Sandpipers do at night?

K.W. Smith, 24 Mandeville Rise, Welwyn Garden City, Herts. AL8 7JU, UK

During the winters of 1985/86 and 1986/87 a number of wintering Green Sandpipers *Tringa erythropus* were radio tagged to discover their roosting behaviour at night. This paper

describes the roosting sites used and the activity patterns of the birds.

Winter mortality of Oystercatchers in relation to the construction of a storm-surge barrier

R.H.D. Lambeck, Delta Inst. voor Hydrobiol. Onderzoek, Vierstraat 28, 4401 EA Yerseke, The Netherlands

The intertidal area in the Oosterschelde-Krammer-Volkerak estuary in the Dutch Delta, which is one of the most important areas in Europe, has been reduced by 35-40% due to the completion in 1987 of a 8 km long storm-surge barrier and two secondary dams.

As part of studies of the consequences for the waders, a large ringing project was started in 1984, to provide information about composition and origin of the populations, residence times, site-fidelity, weight patterns etc., and possible changes after 1987. The final aim is to get more insight into the limiting factors for waders in such an estuarine ecosystem.

So far, all three winters in our study can be classified as severe and have resulted in a large mortality of waders, particularly Oystercatchers *Haematopus ostralegus*. In collaboration with colleagues of Rijkswaterstaat and volunteers, as many victims as possible were collected for dissection in the laboratory. The identity, size and condition of the birds that had died could be compared with that of the living population. Moerover, weight patterns of Oystercatchers from different sub-areas could be included in the comparison.

There are striking differences between the three winters, which will be discussed in relation to changes in the general food supply and changing environmental conditions (such as reduced tidal amplitude) in the last two years of the barrier construction.

Breeding Oystercatchers on Texel: what makes a good one?

Cor Smit, Schilderend 62, 1790 AB Den Burg, The Netherlands

The international Wadden Sea area is one of the world's most important wetlands for migrating and wintering waders. At the same time the area is used for a large number of human activities. Some of these result in disturbance of birds. In order to investigate the effects of disturbance, a study was started in 1982.

As a first step, some direct effects of human activities on food intake and changes in time expediture have been studied. Both potentially have an effect on the condition of the birds involved. A negative effect on the condition of birds may indirectly lead to a lowered reproductive output or a lower chick survival.

To investigate the second aspect, a study on the relation condition-clutch size/egg quality/number of chicks fledged, is under way using a colour-ringed population of Oystercatchers. From 1983 onwards we have studied a population of about 80 pairs, breeding on the southern part of the island Texel, The Netherlands. We tried to find all nests, to measure and weigh all eggs and chicks, and to determine the number of fledged chicks. Adult birds were caught on the nests and were weighed and measured. Nests starting early produced most chicks, not only because of a larger average clutch size, but also because of higher chick survival.

Breeding birds were also studied when feeding on the nearby mussel beds, and mudflats. Some breeding birds remain in the area during the winter, others leave to winter in nearby areas in the Wadden Sea or in the Delta. There are indications that female Oystercatchers that leave the study area during the winter, have a higher fledged chick production. This may imply that 'good quality' females, wintering on large areas of tidal flats, yield a higher chick production.

Recent developments in wader studies in Australia

Brett A. Lane, Australasian Studies Group, c/o RAOU, 21 Gladstone Street, Moonee Ponds, 3039, Victoria, Australia

Since the completion of the RAOU's Wader Studies Programme and the publication of the results in the book *"Shorebirds in Australia"*, the Australasian Wader Studies has commenced two projects designed to build on the results of the RAOU project. As well, individuals and groups are undertaking small-scale, detailed studies into aspects of the biology of waders. This paper examines the basis for and methods of the AWSG's projects, contrasting this with similar projects in Europe. It also presents information on the smaller scale projects, especially those researching wader migration in Australia.

Wader Studies in north-east Greece, spring 1987

Peter L. Meininger and Henk Spielmann, Belfort 7, 4336 JK Middelburg, The Netherlands

Between 1 March and 21 May 1987, an expedition organised by WIWO visited north-east Greece to study the significance of the local wetlands for waterbirds in spring. Frequent counts of waterbirds were carried out, and 767 waders of 18 species were captured, ringed, measured and weighed. Individuals of several wader species were colour-dyed to determine population turn-over. Some studies were made of the feeding ecology of waders, and benthos samples were taken from mudflats, marshes and lakes. Tens of thousands of waders use north-east Greek wetlands as a staging area in spring. The most numerous are Little Stint *Calidris minuta* and Curlew Sandpiper *C. ferruginea*. Mean weights of most wader species showed only slight increases during the period of study. This may be due to a rapid turn-over in the population, or to the possibility that after reaching Greece wadrs continue their migration to the breeding grounds in small steps. The presence of 200 pelicans *Pelecanus crispus* and *P. oncrotalus*, up to 20 000 ducks and 50 000 Coots *Fulica atra* emphasise the importance of the area to watyerbirds. Most wetlands are threatened by land-claim, intensification of fisheries, and a high hunting pressure. An extensive report on the expedition will be published in the WIWO series.

Preliminary data on geographic variation of Siberian Red Knots

Pavel S. Tomkovich, Zoological Museum, Moscow Lomonosov State University, Herzen Street 6, 103009 Moscow K-9, USSR

To check some of Roselaar's (1983. *Beaufortia* 33:97-109) conclusions, skins of adult Red Knots *Calidris canutus* from Siberian breeding grounds (see Figure 1) were compared using all the main museum collections in the USSR. Males in fresh breeding plumage are the most useful for colour comparisons of plumage. Four breeding populations can be distinguished morphologically. Morphometrics are summarised in Table 1. Taimyr and Wrangel Island are both inhabited by large-sized birds, but birds from the two areas differ slightly in the colour of the upperparts. Knots from Novisibirskie Islands have the same plumage colour as *C. c. canutus* from Taimyr but are on average smaller. Small-sized birds from Chukotski Peninsula differ from Knots of other Siberian populations by having a white belly and undertail coverts. Adult migrants from the southern Soviet Far East are small-sized, but have the same plumage colours as the populations on both the Chukotski Peninsula and the Novosibirskie Islands. The description of *C. c. rogersi* corresponds to that of birds from the Chukotski Peninsula. Studies of spring migrants from the American Pacific coast, and of a few birds from Alaska, show that these birds conform to the size and appearance of Knots breding on Wrangel Island.

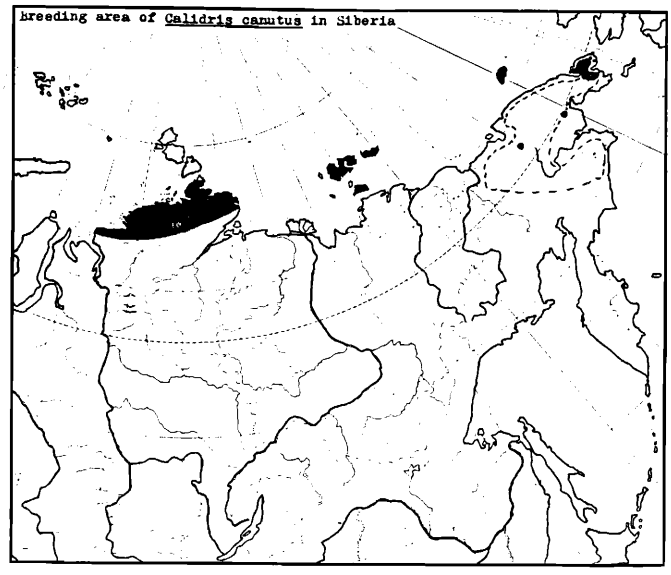

Figure 1. Breeding areas of Red Knots in Siberia.

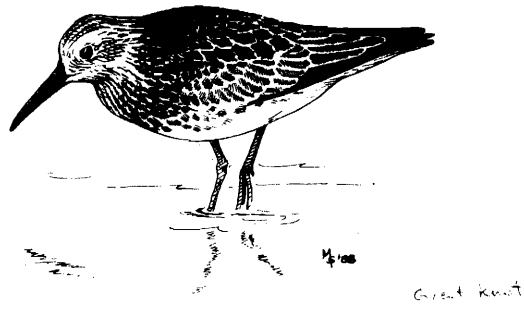

Table 1. Bill-lengths and wing-lengths (mm) of adult Knots, measured as museum skins.

	bill-length				wing-length			
	n	mean	s.d.	range	n	mean	s.d.	range
1. males								
Taimyr Peninsula	15	32.5	1.8	29.0-35.2	18	162.3	2.2	158.5-166.0
Novosibirskiye Is.	7	30.0	0.9	29.0-31.0	5	155.1	3.5	150.0-160.0
Chukotski Penin.	5	31.6	1.8	28.9-33.5	5	160.1	6.2	150.5-167.0
Wrangel Is.	18	36.1	1.8	33.3-38.9	17	166.8	3.6	159.5-172.5
Soviet Far East	6	31.1	0.4	30.8-32.5	6	165.6	3.0	161.5-169.5
Washington State	6	35.6	1.8	33.4-38.0	6	165.8	3.6	159.5-169.0
Eastern Canada	13	35.6	1.2	33.8-37.5	13	162.8	5.9	153.5-176.0
2. females								
Taimyr Peninsula	7	34.9	1.8	33.2-37.3	6	168.6	4.2	163.5-173.0
Novosibiriskiye Is.	6	33.4	0.6	32.8-34.4	4	160.1	2.7	158.0-164.0
Chukotski Penin.	8	33.2	1.0	31.4-34.2	8	165.8	3.5	162.0-170.5
Wrangel Is.	11	36.6	1.4	34.7-38.3	12	170.4	3.5	166.0-175.5
Soviet Far East	3	32.2	0.8	31.4-33.0	3	168.5	2.3	166.5-171.0
Washington State	3	38.4	1.4	36.9-39.6	3	170.3	8.5	162.0-179.0
Eastern Canada	10	36.9	1.6	34.2-39.0	12	167.8	4.1	161.5-173.0

Geographic breeding distribution of Calidris Sandpipers in the Palearctic

Pavel S. Tomkovich, Zoological Museum of the Moscow Lomonosov State University, Herzen Street 6, 103009 Moscow K-9, USSR

The number of breeding *Calidris* species increases eastward from Europe to the Bering Strait area. Beringia was the region with the lowest ice covering in Ice Ages, so preservation of some species with restricted breeding areas could be expected there, and this occurs (*C.ptilocnemis, C.mauri, C.pygmeus*). More interesting results come from a comparison ofthe zonal distribution of *Calidris* species and subspecies. Russian division of tundra into four nature subzones (southern tundra, typical tundra, arctic tundra and polar desert) was used. The coastal Beringian species mentioned above as well as some American species with main breeding areas out of Siberia (*C.pusilla, C.bairdii*) were not taken into account. *Calidris* sandpipers inhabit a wide latitudinal gradient from the steppe zone (*C.subminuta*) to polar desert (*C.maritima, C.alba*), with the highest diversity in typical tundra (9 species). If only optimum breeding areas are examined, another picture stands out. (The zone or tundra subzone where species or at least one of subspecies is most numerous is implied here as optimum.) The largest number of optimums occur in southern and arctic tundras. This means that high species diversity in typical tundra arises due to the overlap of breeding areas of more southern and more northern species. It is supposed that species' (and subspecies') particular habitat needs were formed mainly in tundra refuges in Ice Ages.

Breeding waders in Poland - past and present status

Ludwik Tomialojc, Museum of Natural History, Wroclaw University, Sienkiewicza 21, 50-335 Wroclaw, Poland

Paper elsewhere in this *Bulletin*.

Number, distribution and interspecific relations of breeding waders in Biebrza Marshes

A. Dyrcz, J. Wikowski, Zaklad Ekologii Ptakow U. Wr., ul. Sienkiewcza 21, 50-335 Wroclaw, Poland

Paper elsewhere in this *Bulletin*.

The situation of breeding waders on the Lower Havel River

J.-J. Seeger, Buckower Str. 4, Nennhausen 1831, GDR

The Lower Havel river valley is of post glacial origin and its habitats have been created by human activity. Meadows adjoining the river are flooded every year in spring. The breeding waders on the meadows are Lapwing, Common Snipe, Black-tailed Godwit, Curlew, Redshank, Ruff and Oystercatcher. All these species breed in interspecific communities, together with some species of ducks. The breeding of waders is connected with food availability on meadows. Two kinds of breeding sites may be distinguished: those sporadically and permanently (every year) occupied by waders. The management for waders of some parts of meadows had been based upon the characters of the permanently occupied sites. It includes digging small pools and creating shallow slopes. An existing dam system will be extended to optimalise water levels in the area, and mineral fertilising will be limited or abolished. As a result, the regeneration of more natural vegetation is expected.

Kirr Island: The most important breeding place of waders in the GDR and its development in the last 25 years

A. Stiefel and H. Scheufler, Department of Stomatology and Institute of Biology, Martin Luther University, Halle-Wittenburg, DDR 4020 Halle, GDR

Kirr Island is part of the nature reserve "Inseln Oie und Kirr" in the inshore waters of the Darss-Zingst peninsula. Together the two islands have an area of 470 ha. The larger one is Kirr, at 370 ha. For more than 500 years the islanders were engaged in agriculture and especially grazing domestic animals were kept on these "grass islands". In 1957 the farmers abandoned the pasture grounds. In 1963 the wet islands were turned into a sanctuary for waders. Recently about 750 nesting pairs were counted. On Kirr 600 pairs of 10 wader species were breeding, as well as ducks, gulls and terns. Between 1962 and 1987 the number of nesting birds has been increasing, with changes from year to year in the various groups. Dunlin reached their smallest population in 1982 with 16 pairs. In 1987 32 pairs settled in our territory. These are 50% of the total breeding population in the GDR. We also have 100 Black-tailed Godwits, 150 Redshanks, 60 Ruffs and 110 Avocets. These are 90%, 50%, 50% and 80% respectively of the GDR populations. Seen from a European standpoint these numbers are certainly very small. For this reason our institutions have been trying in recent years to enlarge the area of extensive pasturage at the sea coast and on the inshore waters.

Agriculture, biotope management and the protection of waders: the example of Isle Kirr (Barther Boddenketts)

H. Schuefler and A. Stiefel, Institute of Biology and Department of Stomatology, Martin Luther University, Halle-Wittenburg, Halle, DDR 4020, GDR

The preservation of bird sanctuaries and an intensive observation of factors which are of great importance to the life of birds are basic for the survival of species. On the isle of Kirr (370 ha of salt pastures) breeding birds include Dunlins, Black-tailed Godwits, Redshanks, Avocets, Ruffs, and 12 species of Anseriformes. The preservation of pastures of this island is only possible in cooperation with state-owned farm (VEG) Darss/Zingst. Many years of research show that cows and meadow birds prefer very similar halophilous plant communities. In cooperation with VEG Darss/Zingst we developed a beneficial grazing regime: pasturing begins at the end of May at a rate of 2 cows/ha. Grazing later in the season would cause damage to the grassland. The herd of cattle grazes for 10-14 days on an area of about 50 ha. After this time the pasture is changed. Under this condition the loss of eggs and young birds averages only about 5%. In recent years we have cleaned natural and man-made drainage ditches using a mud-drag, in cooperation with the VEG Darss/Zingst. This resulted in a better water supply on the island. Through this management the number of breeding meadow birds has increased significantly.

Are the southern breeding areas of the Dotterel *Eudromis morinellus* relicts of the Ice Age?

Hartmut E.J. Muller, DDR-2081 Serrahn, Post Thurow, GDR

The fragmented southern breeding areas of the Dotterel almost all seem to be relicts of the Ice Age. The similarity of the breeding habitats in the northern tundra and the sparsely vegetated mountains in the south clearly lead to this conclusion. This suggests that the Dotterel is a species with a highly developed site tenacity.

However, evidence from the history of climate and vegetation, from systematics, behaviour, ringing and the quite irregular breeding on some southern sites show a very different picture of the dispersion behaviour of the Dotterel.

It is suggested that the Dotterel is a species with an unusually well developed ability to settle in foreign areas also at distances a few thousand km away from their birth place.

Breeding population and distribution changes of Avocets and Red-winged Pratincoles in the Evros Delta, Greece, 1980-1987

Vassilis Goutner, Department of Zoology, University of Thessaloniki, GR-540 06 Thessaloniki, Greece

In the Evros Delta, two kinds of habitats have been available for breeding Avocets and Red-winged Pratincoles: saltmarsh habitat, available in a fishpond (called "Drana") and coastal habitat - including sandy islets - used only by Red-winged Pratincoles.

Populations of both species (and especially Avocets) dramatically declined after 1982. Important changes were also observed in the use of available sites within habitats through years. The main reasons for these changes were:

Herd grazing over a part of the breeding habitat (the islet in the fishpond). This rather negatively affected the presence of birds on the grazed site in the following year(s).

Species interaction. The presence of breeding larids in both habitats and a rapid increase in the saltmarsh habitat (primarily Mediterranean Gulls) rather displaced Avocets and attracted Red-winged Pratincoles (although their population decreased). There is also an indication that, despite the timing of laying being different between the two species, the presence of Avocets acted positively on the presence of Red-winged Pratincoles (on the islets where both species bred).

Habitat destruction. In May 1987 the available saltmarsh habitat (fishpond "Drana") was arbitrarily drained by local people. Only 3 pairs of Avocets nested exceptionally on a coastal islet, on which also most of the remaining Red-winged Pratincoles population bred.

Waders and waterfowl in Southern Turkey: the Cukurova Delta

T.M. van der Have, V.M. van den Berk and J.P. Cronau, Dept. of Popul. Evolut. Biology, Padulaan B, Utrecht, The Netherlands

The Cukurova area, formed by the deltas of the Seyhan and Ceyhan rivers, is the largest coastal wetland in Turkey. Migrating waders and waterfowl were counted, trapped and marked during spring 1987. The importance of this major wetland for waders using the Mid Eurasian Flyway is discussed.

POSTERS

An historical overview of wader ringing in Italy

Nicola Baccetti, Lionello Bendini and Lorenzo Serra, INBS, Via Stradelli Guelfi 23/A, 40064 Ozzano Emilia (BO), Italy

Paper elsewhere in this *Bulletin*.

Breeding waders in Yugoslavia

V. Bartovsky, E. Kletecki, D. Radovic, M. Stipcevic and G. Susic, Institute of Ornithology, Ilirski trg 9/2, Yu-41000 Zagreb, Yugoslavia

Paper elsewhere in this *Bulletin*.

The distribution and habitat selection of breeding *Charadrii* in the Notec Valley, western Poland

Jan Bednorz and Michal Kupczyk, Department of Avian Biology and Ecology, Adam Mickiewicz University, Fredry 10, 61 - 701 Poznan, Poland

The Notec is one of the greatest rivers in the Odra drainage basin. Its valley has an area of 865 km² and can be divided into two distinct parts: the upper Notec valley (105 km²) where meadows on mineral soils predominate; and the wide ice-marginal valley (760 km²) with peaty meadows predominating. In 1981-85 ten species of birds, including all Charadrii, were censused and their locations were marked on 1 : 25 000 maps. Censuses were conducted in stages and each section was inspected three times from April to June. Breeding of 10 species of Charadrii was recorded. The most numerous were: *Vanellus vanellus* (1506 pairs), *Gallinago gallinago* (517 pairs), *Limosa limosa* (332 pairs), and *Numenius arquata* (174 pairs).

The density of *Tringa totanus, Charadrius dubius, L.limosa, G.gallinago and V.vanellus* was higher in the upper Notec valley, whereas almost all pairs of *N.arquata* bred in the peaty wide ice-marginal valley. The density of breeding *Tringa hypoleucos and Tringa ochropus* was similar in both parts of the valley. *Charadrius hiaticula and Scolopax rusticola* were scarce, and bred exclusively in the ice-marginal valley.

Waders of carbonate marshes near Chelm (Eastern Poland)

A. Buczek and T. Buczek, ul. Pulawska 27/25, 20-041 Lublin, Poland

The study area was 1340 ha carbonate marshes near Chelm (51°08'N, 23°37'E). About 75% of the marshes is covered with Twig rush *Cladium mariscus*. Only 25% are wet meadows and hummock sedge fen. The data were collected by transect between early April and mid of June 1986 and 1987. Observations were recorded on 1:10 000 maps. During the investigation 6 species were noted, of which 5 definately breed, and 1 possibly breeds.

	1986		1987	
	pairs	Density pairs/10ha	pairs	Density pairs/10ha
Lapwing *Vanellus vanellus*	77	0,8-5,6 x=3,3	139	0,8-8,8 x=3,7
Redshank *Tringa totanus*	8	0,2-1,6 x=0,4	23	0,2-1,5 x=0,5
Black-tailed Godwit *Limosa limosa*	52	0,3-6,4 x=2,7	67	0,3-6,4 x=2,8
Curlew *Numenius arquata*	6 breeding pairs (1p. per 223 ha).			

The number of pairs of Snipe *Gallinago gallinago* and Great Snipe *G. media* was estimated at 150-200 and a minimum of 10 respectively. The increase of the numbers of breeding waders in 1987 (with little increase of density) was due to the large patches of burnt Twig rushes and meadows in autumn 1986. Three species prefered wet meadows mown for hay and pastures, and burned sedge fen. Curlews used burned and non-burned Twig rushes and sedge fen.

Breeding waders in lower Bug valley

Slawomir Chmielewski, Andrzej Dombrowski, Tomasz Smolenski and Jaroslaw Zawadzki, ul. Rynek 12, 05-640 Mogielnica, Poland

260 km of the Lower Bug river and 500 km² of the surrounding area, between Cupel and Neple, were investigated in 1984-86. Three counts were carried out in the mid April to end of June period, at 3-5 weeks intervals. A special census of Common Sandpipers *Actitis hypoleucos*, Little Ringed Plover *Charadrius dubius* and Ringed Plover *C.hiaticula* was made down the river in the end of May - first days of June. The Lower Bug is a medium lowland river with wide dry pastures as a predominant habitat in the valley. The fens are situated around old river beds and the lower parts of small inflowing rivers. The fens have been mostly drained. The river is regulated only in some parts (20 km), so there are numerous sandy or bushy islets and flat sandy beaches. The following numbers of pairs of breeding waders were estimated: Lapwing (1198-1348), Black-tailed Godwit (488-563), Snipe (216-248), Redshank (195-228), Little Ringed Plover (128-145), Ringed Plover (86-106), Common Sandpiper (67-84), Great Snipe (13 sites - 56 birds: max. concentration - 24 displaying males), Green Sandpiper (15), Curlew (14), Stone Curlew (4-5), Ruff (probably bred - 1 female), Dunlin (1 pair probably bred). The Lower Bug valley plays an important role for breeding populations of Stone Curlew (50% of the Polish population), Ringed Plover (20%), Redshank (17%), Great Snipe (10%), and Black-tailed Godwit (7%).

Factors influencing egg size in the Ringed Plover - do larger females lay larger eggs?

Przemyslaw Chylarecki, Sredzka 22 m.4, 62-035 Kornik, Poland

Egg dimension variability in the Ringed Plover *Charadrius hiaticula* was studied in a small inland population breeding at the Warta river, central Poland. Mean egg length has increased significantly over the last decade. At the same time egg breadth only slightly decreased and egg volume remained unchanged. In order to determine factors responsible for this rapid (2.3%/10 yrs) increase in egg length, variables likely to influence egg size were studied in 1986 and 1987. The effect of 4 variables was tested: time of season, female wing-length, female tarsus-length, and female weight. Only full clutches (4 or 5 eggs) were analysed using means for the clutch. Results based on small sample sizes (n ranges from 9 to 30) are of preliminary nature. Nevertheless, they indicate that neither egg length nor egg shape index is correlated with any of the above factors. However, both egg breadth and egg volume are significantly correlated with female tarsus-length and female weight. Additionally, egg breadth slightly but significantly decreases as the breeding season progresses. Female wing-length does not correlate with any egg measurement. Joint variation of female tarsus-length and weight explains 79% of variability of mean egg volume. Thus, recent increase in egg length could not be explained in terms of increasing body size of females (*contra* Vaisanen 1969). Other factors, most probably age- or food-related, would seem to be more important.

Early-autumn wader passage at Warta Mouth, Poland

Przemyslaw Chylarecki and Andrzej Czapulak, Sredzka 22 m.4, 62-035 Kornik, Poland

Wader passage was studied in Warta Mouth, western Poland, in early autumn (mid July - early September) 1984-1986. A flooded area *c.*42 km² at a junction of two rivers here forms a kind of semi-natural retention reservoir. Water level is highly variable, but muddy flats, ranging from some hundreds ha to several km² in total, are usually exposed in late summer/early autumn. Warta Mouth (known also as Slonsk Reserve) appears to be one of the most important inland resting sites for waders in Poland. 27 species were found here on the early-autumn passage. Most numerous were Snipe, Lapwing, Ruff, Spotted Redshank, Greenshank, and Wood Sandpiper. Maximum numbers of some waders are as follows: *c.*400 Spotted Redshanks, mainly juveniles in August, but also 200 adults in early August; over 400 Ruffs in early August; *c.*220 Wood Sandpipers in early August; and *c.*150 Greenshanks in first half of July. Abundance of Snipe could not be estimated, but flocks of 200 birds were seen during early August. Almost all adult Spotted Redshanks, male Ruffs and Snipes were moulting their primaries when observed or caught in Slonsk Reserve. During three years of trapping over 2200 waders were ringed, and Snipe predominate (over 1300). According to results obtained from Snipe caught twice, over half of individuals do not stay longer than *c.*10 days in Slonsk. In addition over 450 Wood Sandpipers, 130 Ruffs and 100 Common Sandpipers have been ringed as well during the study period.

Waders breeding in the Warta River Valley, Poland, in 1983-86

Przemyslaw Chylarecki and Aleksander Winiecki, Sredzka 22 m.4, 62-035 Kornik, Poland

Populations of waders breeding in the middle course of the Warta river, central Poland, were estimated in 1983-86. An extensive survey was carried out in the 80 km long section of the valley near Konin and covered the area *c.*265 km². Flooded meadows, extensively utilized agriculturally as hayfields, are the main breeding habitat for waders. Flooded pastures, grazed either by cattle or cattle and geese, are the secondary habitat of major importance for meadowbirds.

Most numerous species are Lapwing (over 1000 pairs), Black-tailed Godwit (*c.*520 pairs) and Redshank (*c.*250 pairs). Snipe is locally abundant, and 150 pairs is a very rough estimate. Other breeding waders are: Ringed Plover (45 pairs), Ruff (*c.*15 breeding females, leks of several hundred birds, exceptionally up to 1200 individuals), Common Sandpiper and Little Ringed Plover (several pairs each), and Great Snipe (at least two breeding sites). The area is thus one of the most important breeding sites for waders in Poland. About 19% of Polish population of Redshanks, 12% of Ringed Plovers and 7% of Black-tailed Godwits breed here. Unfortunately, a large reclamation project is now in progress in the Warta valley, and the majority of the best breeding sites have recently been destroyed, and others are endangered in the immediate future. Locally, a decrease in grazing intensity is a second serious problem for the conservation of this area.

Results of wader ringing at the mouth of Vistula (Gulf of Gdansk, Poland)

J. Gromadzka and B. Przystupa, Ornithological Station, 80-680 Gdansk 40, Poland

Wader ringing at the mouth of Vistula started in 1960 and it has been continued almost every year up to now. Since 1976 wader studies in this place have been organized by the Ornithological Station in Gdansk.

Waders have been caught mainly in traps (Ottenby type and own type). In the period 1960-1980 waders were trapped on the east side of the mouth; in this time 29 361 waders, belonging to 30 species, were ringed and 628 long-distance recoveries about these birds were received. In the period 1983-1986 wader catching was undertaken done on the west side of the mouth; 13 774 waders from 31 species were ringed and 184 long-distance recoveries have been completed to the end of June 1987. 280 waders with foreign rings were controlled. The most numerous species are *Calidris alpina, C. ferruginea, C. minuta, C. canutus, Tringa hypoleucos, T. totanus, T. glareola* and *Philomachus pugnax.*

Studies of Common Sandpipers *Actitis hypoleucos* breeding in the Peak District, England 1977-1987

P.K. Holland and D.W. Yalden, 54 Mersey Road, Stockport, U.K.

The Peak District has about 200 pairs of Common Sandpipers breeding on streams and reservoirs at altitudes of 100-250 m. A study area containing usually 20 pairs is studied intensively with colour-ringing. The remaining area is covered as well as time allows.

From 1977-1980 and from 1981-87, mortality has averaged 24% of breeding adults. For 1980-81 it was 46% and this was attributed to freak snow and cold in late April 1981. The total number of pairs dropped from 21 to 14. It has taken until 1987 for the number to increase back to 19. The number of fledged young produced has varied between 24 and 8. Interestingly, 1981 had a good production of young at 1.2 per pair. The average is 0.9 per pair.

Two birds from 1977 still bred in 1987; both were males. One of them has raised 2 or 3 to fledging nearly every year, the other raises 1 occasionally. The variability of success between territories and individuals appears to be mainly due to the existence of high quality birds rather than differences in quality of territory.

Studies of food and time-budgets show that the shingle habitat defended as a territory is mainly used by chicks from 5-20 days old. Typically when the chicks are 10 days old the female leaves and the male stays until the chicks are 25-30 days old.

The study is continuing.

Autumn migration of waders at Hel Peninsula, Poland

KULING, c/o Bogdan Brewka, Conrada 4, 81-847 Sopot, Poland

The Waterfowl Research Group "KULING" (part of the Ornithological Association of Gdansk University) studied the autumn migration of waders near Jastarnia (57°17'N, 18°58'E) at Hel Peninsula. This area is one of a few places on Polish Baltic coast where waders concentrate in large numbers (up to 900 birds).

The studied area is 24 ha and consists of four different habitats: sewage dump, sandy sea shore, coastal dry meadow and wet meadow. The main study method was the censusing of all birds observed along the same transects during July to September in every year (there is also some material from spring), giving special attention on habitat selection.

37 species of waders were recorded. Most common were: Dunlin, Knot, Curlew Sandpipers, Little Stint, Ruff and Common Snipe. Daily changes in the numbers of different species are shown during autumn migration as well as some data about habitat selection.

On the defensive behaviour of the Snipe *Gallinago gallinago*

Hartmut E.J. Muller, DDR-2081 Serrahn, Post Thurow, GDR

The defensive behaviour of the Snipe is shown in a lot of figures (photographs and line drawings) and discussed in connection with different functions in Snipe (from crouching to the spectacular ground display with flapped wings and raised tail) and compared with defensive behaviour of more and less related species.

Contemplations on the lek behaviour of the Great Snipe *Gallinago media*

Hartmut E.J. Muller, DDR-2081 Serrahn, Post Thurow, GDR

The following points are mentioned: The evolution of lek behaviour in the Great Snipe, especially in view of the absence of sexual dimorphism. The voice of lekking Great Snipe in comparison to instrumental and vocal sounds of their allies in aerial display. The decrease in the European population as a result of the mating system, under a changed environment and the outlook for their conservation.

Waders in the Dutch Waddensea, possible breeding origin and function of the area in spring

Ebel Nieboer, Biological Laboratory, Vrije Universiteit, P.O. Box 7161, 1007 MC Amsterdam, The Netherlands; Meinte Engelmoer and Gerard Boere, National Forest Service, Department of Nature Conservation, P.O. Box 20020, 3505 LA Utrecht, The Netherlands

The poster shows the probable breeding areas of Grey Plover (*Pluvialis squatarola*), Dublin (*Calidris alpina*), Knot (*Calidris canutus*), Bar-tailed Godwit (*Limosa lapponica*), Redshank (*Tringa totanus*) and Turnstone (*Arenaria interpres*).

Regarding Dunlin and Bar-tailed Godwit, considerable weight-increase occurs after the first week of May. The rate of increase remains equal during this month, while the numbers decrease rapidly in the second half of May.

Fat reserves in the Dunlin during autumn migration at Vistula Mouth, preliminary results

Bogdan Przystupa, Ornithological Station, 80-680 Gdansk 40, Poland

Dunlins were trapped and processed each day during 2.5 months, from the middle of July to the end of September 1986.

Fat reserves have been calculated according to the formulae proposed by Pienkowski (1979), from the total weight of birds and their wing length (lean weight = 0.69 x wing length - 38.8). Results are expressed as a *lipid index*, which is the weight of fat as a percentage of the total body weight. Lipid index is shown separately for birds which were trapped only once (=stopped in the area for some hours/one day only), for birds which were trapped on two successive days and for birds which stayed on the area longer than two days.

The average lipid index in Dunlins trapped during studies was 9%-18% (for different groups of birds). Lipid index in birds trapped only once was similar during the whole period of studies (on average 13.3%). In birds, when they were trapped first time but next stopped at the area longer time, it was lower than in birds trapped only once. In Dunlins departing after more than two days of their presence at the mouth, their lipid index before leaving was 18%-20%.

Fat reserves found in Dunlins at Vistula mouth in autumn are similar to that at other places in Europe at that time.

Invertebrate food available for waders at Vistula Mouth during autumn migration

Bogdan Przystupa, Ornithological Station, 80-680 Gdansk 40, Poland

Studies concern potential food taken by waders at the sea shore in the river mouth area. Samples of invertebrates were taken from different depths of the water with the sampler covering an area of 0.037m², down to the depths of 15 cm. The samples were sieved through a 1 mm sieve. Invertebrates were collected in the same places twice: in second half of July and in second half of September 1986. The content of invertebrate community in the study area is of mixed character: there are fresh water organisms - *Chironomidae (Diptera)* larvae and crustaceans *Gammerus sp.*, as well as salt water crustaceans *Corophium sp.* and polychaetes *Nereis sp.* Generally the salt water invertebrate fauna is very poor in species number comparing with other, more west European, sea shore habitats (*e.g.* in Vistula mouth there are no bivalve molluscs).

Invertebrate food available for waders has occurred at a density of several hundred individuals per m² in July, while these densities were about ten times higher in September.

The food was present in an area of shallow water around the sea and river shore line, maximally up to 1 ha in the whole area of the mouth (this area was varying, depending on water level). Not more than 1/3 of waders, which had stopped in the mouth area, were feeding there. The other places of the feeding were beds of organic detritus brought by the river and thrown out on the shore. These were very rich in *Chironomidae* and *Trichoptera* larvae. The availability of this food differs depending on water movements (*e.g.* storms).

Breeding waders in Liwiec Valley

Miroslaw Rzepala, 08-110 Siedlce, ul. Prusa 12, Department of Ecology and Nature Protection, Agricultural and Teacher's University, Poland

The breeding populations of waders were investigated in Liwiec valley in 1982, 1984 and 1985. The different parts of the area were visited in particular years. The less disturbed fens (12.2 km²) in the upper part of the river were viewed in 1982. Other drained parts of the valley were visited in 1984-1985. The whole investigated area was about 118 km², along 130 km of river. The river is regulated in only some parts (23 km). Particular parts were visited 3 times in the end of April - end of June period, at 4 weeks intervals. Five counts on 2 plots (36.6 ha and 58.8 ha) in semi-natural fen habitat were done. The following densities of pairs of breeding waders per 10 ha were estimated: Lapwing 2.9 and 2.4, Snipe 1.9 and 0.6 and Black-tailed Godwit 1.4 and 1.0. The abundance of pairs of waders was estimated as Lapwing 471-525, Black-tailed Godwit 195-225, Snipe 107-122, Common Sandpiper 23-24, Little Ringed Plover 13-17, Curlew 6-7, Redshank 5-8, Ringed Plover 2, Great Snipe 1. Differences of distribution of some species were noted in the whole valley: Black-tailed Godwit, Snipe and Curlew occurred in the upper part of river; Common Sandpiper and Little Ringed Plover in the lower part.

Time budgets, growth, and energetics in chicks of Lapwing and Black-tailed Godwit: two alternative strategies

G.H. Visser and A.J. Beintema, Laboratory of Veterinary Physiology, Utrecht and Research Institute for Nature Management, Arnhem, The Netherlands

Energetic costs of chicks can be divided into costs for maintenance, and costs for growth. Maintenance costs include costs for sustaining the body temperature. Chicks can take in all energy required themselves (most waders), or they can leave the job to the parents (most songbirds). Within waders, there is some variation in the amount of self-maintenance. Small chicks always need a parent to brood them at intervals. The better the chick maintains its body temperature, the less time (and energy) it demands from the parent, but the more expensive it is in terms of running costs. It will need more food intake than the chick that receives much of its heat from the parent, but on the other hand it has more free time to search for the food needed. Lapwing and Godwit chicks differ considerably in their strategies. The former has a weak thermoregulation, and a slow development. Therefore it has to spend much time being brooded, but its running costs are low. The latter has a strong thermoregulation, a very fast development. Therefore it has much time available for feeding, but its running costs are high. Differences in running costs are reflected in the amount of insect food needed.

Foraging activity of territorial and non-territorial Lapwings during migration

Tadeusz Stawarczyk, Museum of Natural History, Wroclaw University, Sienkiewcza 21, 50-335 Wroclaw, Poland, and Luis Javier Alberto, Departmento de Zoologia, Facultad de Biologia, Univeridad de Sevilla, Avda. Reina Mercedes 6, E-41012 Sevilla, Spain

Age-related foraging activity of territorial and non-territorial Lapwings was studied at Turawa Reservoir in south-western Poland. It was shown that feeding efficiency of territorial birds was higher than non-territorial birds, independent of the age. Territorial birds needed less time to find prey than non-territorial birds (as measured by the number of steps per successful peck). So the general order of feeding efficiency of Lapwings was as follows: adult territorial>juvenile territorial> adult non-territorial>juvenile non-territorial. In respect of three microhabitats, feeding efficiency was the same in wet and dry mud, but higher than in shallow water, in adults as well as in juveniles. Adults feeding in the dry and wet mud had higher feeding efficiency than juveniles in the same places.

The Ringed Plover *Charadrius hiaticula* in Poland - its distribution, numbers, and habitat selection

Aleksander Winiecki and Zenon Lewartowski, Department of Avian Biology and Ecology, Adam Mickiewicz University, Fredry 10, 61-701 Poznan, Poland

A combined total of 52 observers counted Ringed Plovers during the breeding seasons 1973-74 and in 1981-83. The size of Ringed Plover breeding population remains at the same level of about 400 pairs in Poland. About 50% of all pairs nest along the Baltic coast, and the rest occupy valleys of bigger flood-plain rivers (Vistula *c.*60 pairs, Bug 25 pairs, Narew *c.*35 pairs, Pilica 14-25 pairs, and Warta 40-50 pairs). The coastal population is associated with sandy beaches, and only small number of pairs (5-10%) nest in pastures. Along the Vistula (Wisla) River the Ringed Plover nest exclusively on sandy banks next to the channel. Along other rivers some pairs nest also out of the river-bed on pastures and fallow grounds (Pilica 20%, Narew 55%, Bug 67% and Warta 71%). The frequent nesting at a distance from the river are an adaptation of inland populations to the changed environmental conditions. In the major nesting sites of the Baltic sea-coast and the Vistula river, the breeding pairs are distributed evenly but in other localities concentrations of up to 20 pairs are characteristic.

The results of capturing and ringing of waders in Czechoslovakia

Pavel Zdarek, Baarova 1375, 500 02 Hradec Kralove, Czechoslovakia

During the period from 1934 to 1986, 2 755 732 birds were ringed in Czechoslovakia. Among these there were 50 146 waders of 39 species, representing 1.8% of all birds ringed. During the early years mostly juveniles of nesting species were ringed; most commonly young Lapwings, which represent 63.2% of all waders ringed during 1934-1955. The increasing use of mist nets for mass capture of birds at the beginning of the 1960s is reflected by the increase in captured full grown birds. In 1970 a national wader study group was established, which has issued 29 circulars to their members since then. The membership fluctuated from 12 to 24 people, who have ringed 28 506 waders in the 17 years of existence of the study group. Waders are ringed mostly at ponds (70%), settling ponds (10%), flooded meadows and fields (10%), dam reservoirs (9%) and river banks (1%). The annual numbers of captured birds of the genus *Calidris* shows fluctuations in the intensity of migration through continental Europe during 1970-1986. We have recorded some 10% of recoveries in ringed waders. As examples, the most distant recaptures of birds of the local populations are indicated in the maps. The species in question include Redshank and Black-tailed Godwit. As for the migrating waders, results concerning the genus *Calidris* (71 recoveries) and the Ruff (53 recoveries, incl. 16 from equatorial Africa) are also presented.