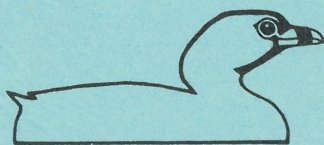


BRISTOL ORNITHOLOGY



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BRISTOL ORNITHOLOGY

THE JOURNAL OF THE BRISTOL ORNITHOLOGICAL CLUB

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PREFACE

It was in 1914 that Sir Julian Huxley published the first detailed study of the elaborate displays of the Great Crested Grebe. In 1948, and inspired by these descriptions, K.E.L. Simmons watched the same amazing behaviour. Thus stimulated and with a desire to discover more he continued his observations and in 1955 published his "Studies on Great Crested Grebes". Other papers and notes concerning the species have appeared, including one in the first issue of this journal (*Bristol Ornith.* 1(1968): 21-26). In his own words, the 1955 paper represented "..... not the final report, but a pause for stock-taking along the line." Dr Simmons has since accumulated a great quantity of extra data, much of it from the Bristol reservoirs. No doubt many members will recollect his regular appearances at Chew Valley or Blagdon lakes as he patiently observed and noted the behaviour of his subjects. Some of this data will be drawn upon for his new series of papers entitled "Further studies on Great Crested Grebes". It is most appropriate that the first part is published this year, a year which sadly saw the death of that great naturalist Sir Julian Huxley. Other parts will be published in the next issue of this journal.

Bernard King continues his discourse on albinism and melanism in grebes, begun two issues ago, and he also provides us with another interesting account from his field notebooks. All the notes are particularly relevant to our area and we hope to receive many more of this type of contribution from other members. In traditional fashion this issue is introduced by a concise, but lucid review of the past year expertly compiled, as always, by Brian Rabbitts.

Malcolm Sainsbury

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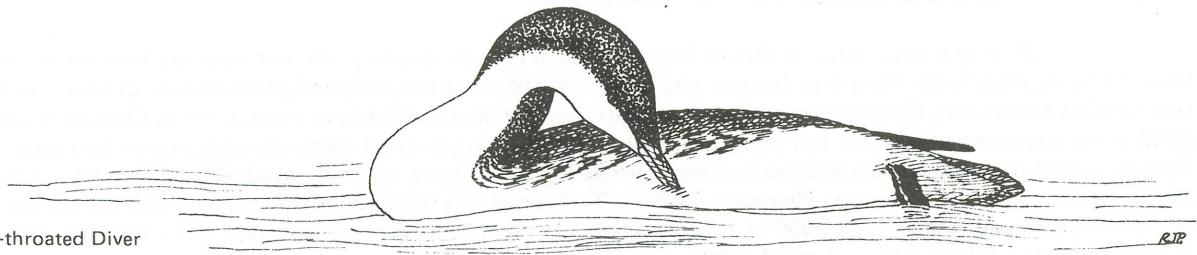
A REVIEW OF 1974

by Brian Rabbitts

My thanks are due to the 150 contributors to our monthly reports *Bird News* during 1974 without whose records this review could not have been compiled. The area from which we receive the majority of records and therefore the area covered by my review can be defined as the county of Avon, parts of Gloucestershire (to Frampton-on-Severn and bounded by the River Severn and Cotswold Hills) and Somerset to within some 30 miles from Bristol. We do not publish a systematic list (records should be sent to the appropriate county recorder) and it seems a great pity to me that the societies in our area that do, have not taken the opportunity, consequent upon the county boundary changes, to avoid unnecessary duplication by retaining their traditional boundaries. Reservoirs, often referred to collectively, signifies those at Barrow Gurney, Blagdon, Cheddar, Chew Valley Lake (CVL) and Durleigh; WT is the Wildfowl Trust at Slimbridge and the New Grounds refer to the adjacent river bank and estuary whilst the levels refer both to the peat-moors and heaths in Somerset and to the moors which lie to the south of the Polden Hills. Where the channel has been mentioned this term has been extended to include not only the Bristol Channel from the Bridgwater Bay area but also the River Severn to Frampton-on-Severn. Some 219 species occurred during the year and records of rare birds rejected or not submitted to the British Birds Rarities Committee have been excluded.

The first winter period

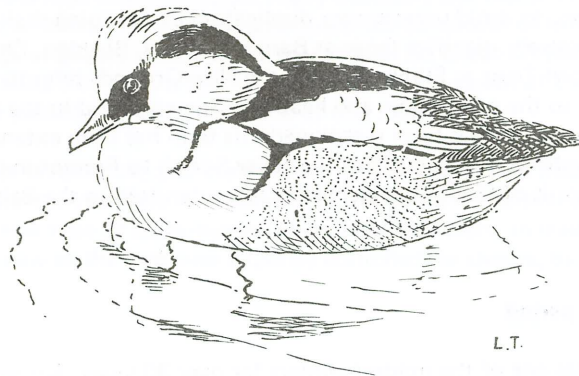
It was one of the mildest winters for over 30 years. January was dominated by an almost continuous series of depressions crossing the Atlantic and as a result, there were frequent gales from the south-west. The first two weeks of February followed a similar pattern with complex low pressure areas giving heavy rain at times and strong winds mainly from the south. It was generally anticyclonic from 17th but it remained fairly mild and this weather type continued for much of March. Although there were east winds during this month temperatures were near normal.



Black-throated Diver

A Black-throated Diver appeared at Cheddar on 9 January and it remained until 17 March while the only other diver recorded was one, not specifically identified, at Steart on 14 January. Counts of Great Crested Grebes at CVL numbered 114 during this month rising to 190 in March. The storms brought a Gannet inland to Wet Moor on 25 January, there were two in the channel off Sand Point on 9th of that month and a group of 10 off Steart on 2 February. Single Shags occurred at the reservoirs (Cheddar and CVL) and Sand Point. Cormorants at CVL appear to have a winter population of around 50 and a Bittern was recorded there in January. White-fronted Geese at the NG reached a peak of 4500 on 20 January (including a good number of first year birds) and other geese here included two Barnacle, Brent and Pink-foot with a single Lesser White-front until late February (one showing mixed characteristics of this species and White-front reported) and a Bean. A Barnacle Goose was at Cheddar and Wet Moor (perhaps the same individual) in January and three Brent were at Steart on 3 March. A count of 280 Bewick's Swans was made at the NG on 1 January (541 individuals — 24% immatures — passed through during the winter) and there was a large count of 358 on the levels during the same month.

National wildfowl counts organised by the Wildfowl Trust indicated a good season especially for Shelduck, Teal, Wigeon and Pochard. Counts in our area included 1106 Shelduck at Steart with several groups of 11–20 inland, 1467 Teal at Blagdon, over 1000 Wigeon at CVL and 2000 at Steart but Pochard numbers remained rather low. Other duck included up to 35 Gadwall at Cheddar and 72 at the WT, good counts of Pintail with 274 at the NG and 207 at Steart and unusual numbers of Shoveler here including 129 in January, but only low numbers (up to 195) on the reservoirs. Diving duck included a Red-crested Pochard at Cheddar to mid-January, several Scaup and a party of seven off Brean Down on 3 March, one or two Common Scoter in the channel and a Long-tailed Duck at CVL to the end of March. There was a count of 49 Goldeneye at CVL in February (last noted

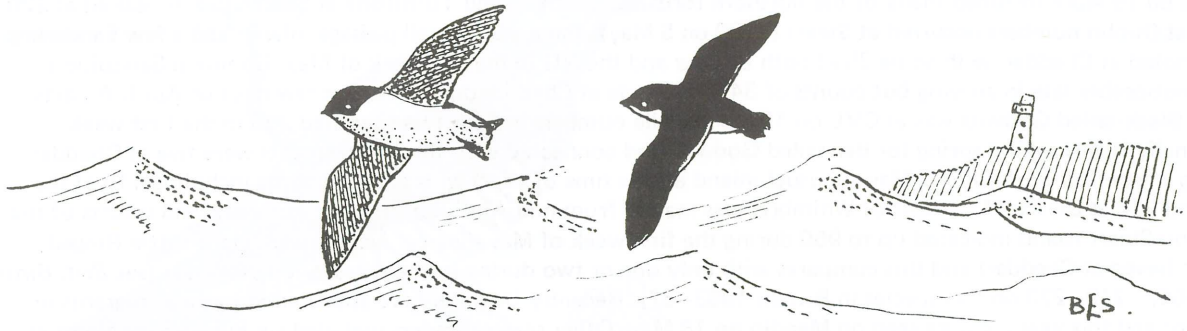


Smew

on 4 May) while three Smew were present to mid-March (mainly at Cheddar) with one to 16 April and also one at Orchardleigh on 8 January. A Red-breasted Merganser was seen at Cheddar on 10 January and there were good numbers of Goosander including a count of 56 at CVL in February (last noted here 18 April) while record numbers of Ruddy Duck occurred at Blagdon with over 100 in January.

Following a large influx of Rough-legged Buzzard into the country one was reported frequenting the levels (Aller or West Sedge Moors) in January and February. Other raptors included a Hen Harrier at Steart to the beginning of March with Peregrines being noted at five coastal areas and Merlins at eight. Coot at Cheddar numbered 3000 at the beginning of the year but the usual rapid dispersal took place and there was only one at the end of February. Dealing now with waders and starting at Ringed Plover — there was a count of 120 at Sand Bay in mid-March. Earlier, numbers of Golden Plover on Tealham/Tadham Moors reached 750 in February and the concentration of Lapwing here was estimated at 9000 in January. Dunlin numbers on the coast indicated up to 20700 during this month (including 10000 at Steart) and 14800 in February and there were some exceptional numbers inland including 700 at CVL and 1000 on Wet Moor. Only low numbers of Knot were recorded with most (120) at Sand Bay while counts of Bar-tailed Godwits at Steart reached 71 and 1200 Snipe on Wet Moor in January was the largest count reported. Over-wintering and other scarcer waders included four Little Stints at CVL and two at Sand Bay; one or two Purple Sandpipers at Sand Point and Severn Beach; about 25 Sanderling; Ruff were well represented with some 60 including up to 24 on the levels; one or two Spotted Redshanks; about 12 Green Sandpipers; single Common Sandpipers at the reservoirs and Sea Mills; 32 Black-tailed Godwits at Steart in January (one inland at CVL at the beginning of this month was unusual) but only some six in the following two months; Woodcock were present in four areas; some 40 Jack Snipe were recorded including up to 14 at Sand Bay (last on 16 April) and the usual Avocet was at Steart.

As a result of the storms a Great Skua was at Cheddar on 9 January, there was another at Steart on 14th and one found dead at Sand Bay in February. A Mediterranean Gull was identified at Steart on 16 February, there was one Little Gull in January and two in March and at least three Iceland Gulls during this month. Four single 'wrecked' Kittiwakes were at Cheddar while a group of 80 in the channel on 16 March should possibly be included



Little Auks

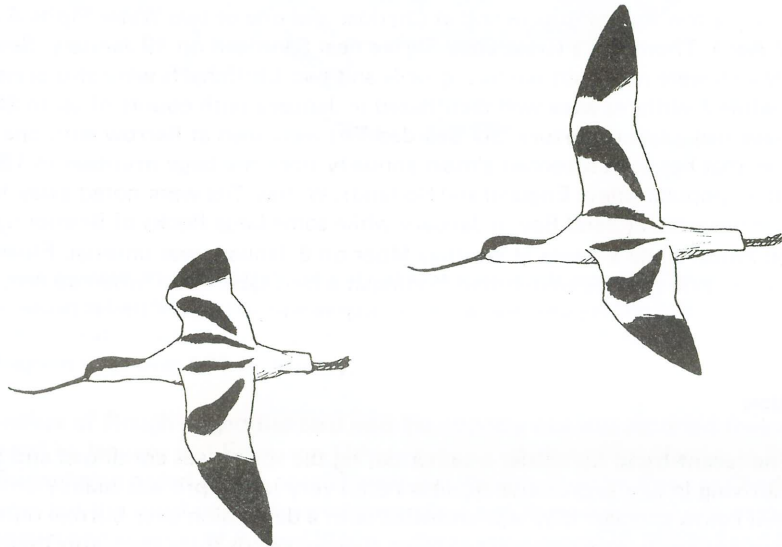
under spring migration (see below). An exhausted Little Auk was discovered near Brean Down on 9 February. Flocks of 200–300 Stock Doves occurred at CVL, on Mendip and at Steart. Barn Owls were noted in 15 localities and it was a good winter for Short-eared Owls with records from eight areas including a count of 13 on the levels. Passerines reported included a few Rock Pipits inland at Cheddar and one or two Water Pipits *A.s. spinoletta* here also with the last on 17 April. There was a Great Grey Shrike near Sandford on 19 January. Several Blackcaps noted at the beginning of March were no doubt wintering birds and two Chiffchaffs were also present. Only one Black Redstart was reported while Fieldfares were well distributed in January with counts of up to 800 on the levels and they appeared to have had a late departure. Six Bearded Tits were seen at Berrow with one or two at CVL and Steart. This is a species that has been recorded almost annually since the large irruption in 1965 (see *Bird Study* 21(1974) : 211–214 on their populations in England and Holland). Willow Tits were noted away from their usual breeding areas; two Snow Buntings were at Sand Bay in January while some large flocks of Brambling occurred with 500–600 at Chittening and Pilton while a Twite at Westhay Moor on 8 January was unusual. Flocks of 45–50 Siskins were seen in two localities and three birds were noted feeding at a bird table in an urban garden, but there were fewer Redpolls with no count exceeding 21. Hawfinches were as usual reported in the Clifton Down and Leigh Woods area.

Spring migration

The recent trend for colder weather during the spring was continued and this inhibited many of our summer visitors from arriving in any appreciable numbers until very late. April was mainly anticyclonic with north-east winds and rainfall well below average. May was unsettled with a depression over Europe during the first week with north-east winds and there was an abnormal passage of some species. Winds from the south then followed allowing migrants an easy though belated entry into the country. June continued unsettled with Atlantic fronts alternating with ridges of high pressure.

Grebes on passage included a pair of Black-necked at CVL on 6/7 April (display noted) and a Slavonian at Cheddar on 29 March. Fulmars were as usual regular in the channel; small parties of Manx Shearwaters appeared (most 88) and a few Gannets were also seen. 24 geese at the Parrett Estuary on 23 April were thought to have been Grey Lags. A group of 12 Garganey appeared on Curry Moor during the first week of March and these were followed by one or two at CVL and the NG. The spring influx of Tufted Duck at CVL numbered 510 on 20 April. Other diving duck included a small movement of Scaup of about 14 birds (12 in April and two at Steart 18 May); two Eider off Brean Down on 8 May; several Common Scoter in the channel with inland passage birds being recorded during the last week of March (three), 11–20 April (minimum of 14) and one on 25/26 May while finally two Red-breasted Mergansers were seen on the coast in April. Raptors included a Hen Harrier at Steart on 14/15 April (a harrier over Westbury-on-Trym, Bristol on 14th was probably a Montagu's) and a Marsh Harrier at Portbury Wharf on 22nd. The odd Peregrine was still around well into May but Hobbies were not recorded until the first week of this month and there was a late record of Merlin on 6th. A Corncrake was heard at Slimbridge on 19 May.

There was a total of 483 Ringed Plover at five localities in May; 90 Golden Plover at Tealham/Tadham Moors on 15 April included many of the northern form *P.a. altifrons* and Turnstone at Severn Beach peaked at 220. Highest Dunlin numbers occurred at Steart (2700 on 5 May), there was a small passage inland, and a few Sanderling were noted at Cheddar, with some 35 at both Berrow and the NG in the last week of May. Common Sandpipers were noticeably late in arriving but counts of 34 were made at Cheddar during the last few days of April. A party of 40 Black-tailed Godwits was at CVL on 19 April while numbers at Steart had reached 250 in the first week. Nationally it was a good spring for Bar-tailed Godwits and connected with these movements were five at Cheddar during the period 28 April – 3 May (unusual inland at this time of year) with coastal counts including 116 at the NG and 176 at Steart. Movement of Whimbrel was mainly from mid-April, but in small numbers, and counts of the roost on Steart Island indicated up to 950 during the first week of May. Scarcer waders were eight Little Ringed Plover (seven at Cheddar) and this compares with only one or two during spring passage ten years ago (see *Brit. Birds* 62(1969) : 219–223 on this species in Britain 1963–67). Recently Dotterel have appeared as passage migrants on Exmoor and this year six were seen on Mendip on 18 May. Other scarcer waders included six Purple Sandpipers at Brean Down on 4 May and one on 9th (these being late dates); only one Ruff – in April; some 14 Spotted Redshanks and all on the coast; 10 Greenshanks; three Green Sandpipers; a Wood Sandpiper at Steart on 27 April with two at Berrow on 26 May and a number of Avocets with one at CVL and two or three at the NG and Steart.

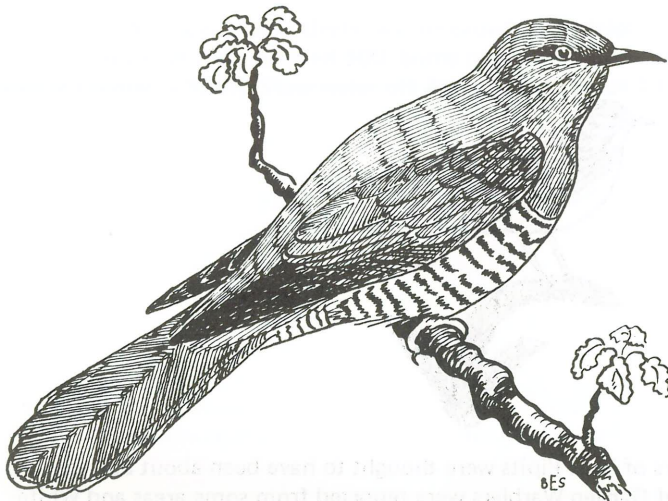


Avocets

RJP

Some 11 Arctic Skuas were noted in the channel from the end of April. Mediterranean Gulls were identified at Steart on 6 April and 5 May and there was an Iceland Gull here at the end of April. There was an exceptional passage of Little Gulls with some 142 – the majority in the first week of May including a count of 86 at Cheddar (previous highest count being 14). A total of 260 Kittiwakes were noted in the channel from April to the beginning of June with the vast majority (249) in May. Only one Black Tern was recorded in April but some 50 in the following month (most in the first week) and it was an exceptional spring for Common/Arctic Terns. Early migrants were present from 7 April and then at least 2000 passed through with a heavy movement in the channel on 27 April, including 600 off Brean Down, and another large wave to 5 May with counts of over 100 at the reservoirs and 250 at the Parrett Estuary. On the evidence received it is not possible to determine accurately which species predominated in these movements but a paper which has recently been published on the upperwing pattern of adult Common and Arctic Terns should make specific identification easier (see *Brit. Birds* 67(1974) : 133–136). Other terns concerned about nine Sandwich and three Little. One or two Razorbills and Guillemots were seen in the channel.

Three Short-eared Owls were present during the latter half of April. Many of our summer visitors, especially warblers, did not arrive in any appreciable numbers until early or mid-May but early migrants included a



Cuckoo

Cuckoo at Congresbury on 4 April; a Tree Pipit at Brean Down on 3rd; a Yellow Wagtail at Steart on 30 March and a Wheatear at Sand Point on 5th. Scarcer species reported were two Hoopoes near Weston-super-Mare on 18 April; a Woodlark at Sand Bay on 5 May; up to four Blue-headed Wagtails, *M.f. flava*, at CVL; a minimum of 40 White Wagtails, *M.a. alba*; a Savi's Warbler in the Bridgwater Bay area on 14 May; only one Pied Flycatcher; a Wheatear at Sand Point on 4 June which was probably of the Greenland form *O.o. leucorrhoa*; two Black Redstarts (with one at the end of May being in a possible breeding area) and some ten Ring Ouzels, with six of these on 4/5 May, which is unusually late. A few Sand Martins came in at their usual time and this was another species which underlined the lateness of spring migration with notable influxes at the end of April and beginning of May. A few Redpolls moved north-east at the NG in April and other visible migration included small numbers of Goldfinch and Linnet.

Breeding species (selected)

It was a successful breeding season for Great Crested Grebes at CVL (water level high) with a count of 70 young (56 broods) at the end of July. A count of 88 Cormorants on Steep Holm was made in the same month. Herons have in recent years shown an increase (see *Bird Study* 21(1974) : 129–134) and of the heronries counted there were some 49 nests at Cleeve and 18 at Newton Park. Observations of breeding duck included two pairs of Shelduck at CVL and a count of 52 young (six broods) at Steart, some five broods of Gadwall at CVL and one at Blagdon and of some six pairs of Ruddy Duck at CVL it was thought that only one bred successfully. Teal, Garganey and Pochard were also present but there were no breeding records. A Honey Buzzard was noted in a suitable breeding area and Buzzards were present at several sites on Mendip. It is encouraging to record that following the decline of the Peregrine this trend appears to have been reversed locally with several observations during the summer. Hobbies were recorded in five potential breeding areas. The only record of Red-legged Partridge came from Steart, there were three definite breeding records for Partridge, and Quail were present only at Marshfield. Of the waders no assessment is possible regarding breeding numbers of Redshank, Curlew and Snipe. Two or three pairs of Oystercatcher and Ringed Plover nested and there was one pair of Black-tailed Godwits. Lesser Black-backed Gulls bred at a roof top site in Bath and no doubt Herring Gulls did also in similar places – this behaviour pattern being almost unknown 30 years ago (see *Brit. Birds* 64(1971) : 476–487). A count of the Herring Gull colony on Steart Island revealed 2214 occupied nests and this compares with 3121 in 1969 (see *Bristol Ornithology* 3 (1970) : 100–117). The reason for this decline was thought to have been predation by Foxes.

Turtle Doves were locally distributed including up to 12 at Copley Wood. It is interesting to record that the Barn Owl is a species that is very beneficial to mankind with 90% of its diet comprising of rodents and shrews (see *Bird Study* 21(1974) : 200–210) and they were present at eight sites. Long-eared Owls bred successfully (the first definite record since 1928) and observations revealed that they continually hunted in daylight, this probably not being unusual (see *Brit. Birds* 67(1974) : 361–369) but the similarity with some plumage characteristics of Short-eared Owls was very noticeable. Nightjars were located at Shapwick and at one site on Mendip, Lesser Spotted

Tree Pipit



Woodpeckers at eight places, May–July, while numbers of Tree Pipits were thought to have been about average. Grasshopper Warblers were scarce but good numbers of Garden Warblers were reported from some areas and White-throats were still not plentiful. Another theory put forward to account for their decline, which has still to be fully investigated, is infection with arboviruses (arthropod or tick-borne viruses) which occurred in an abnormally high percentage of birds examined in Egypt (see *Brit. Birds* 67 (1974) : 248–249). Lesser Whitethroats were located at 21 sites in May, there were some 15 pairs of Whinchat on Somerton Moor and numbers of Redstarts were thought to have been similar to last year. Nightingales were present at eight localities in May, Willow Tits bred at their usual sites on the levels and at one Mendip one while Corn Buntings were located here (four places), on Somerton Moor and were as usual well represented in the Marshfield area. Cirl Buntings were present at three sites on the south slopes of Mendip. Lastly, Hawfinches bred successfully near North Wootton.

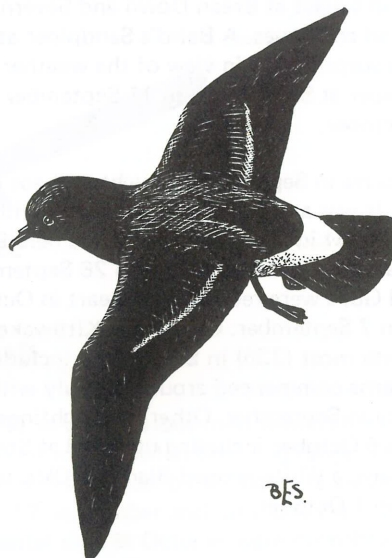
Other summer observations

The usual sea-birds in the channel included a small number of Fulmar and counts of Manx Shearwaters included 111 on 6 June; 300 on 15th; 182 on 23rd; 350 on 3 July; 270 on 4th and 54 on 4 August. A Storm Petrel was off Breaun Down on 3 July with two at Steart on 6th and Gannets included 11 on 22 June and 12 on 3 July with one found dead at CVL at the end of this month. Counts of duck at Steart in June included 1200 Shelduck and high numbers of Mallard with 328 at the beginning of the month rising to 550 by the 22nd. There was a Wigeon here on 15th and a Pintail on 21st. A Merlin at Sand Point 5–9 July was unusual. Apart from a Little Stint at Severn Beach on 9 June, most other reports of waders during this month came from Steart where there was a Golden Plover on 1st, 65 Grey Plover on 22nd (one at CVL on 25th was well outside the usual dates for inland passage birds), Curlew Sandpiper on 20th, up to 24 Knot while there were 50 Black-tailed Godwits mid-month and four Avocets on 22nd. Another Mediterranean Gull was identified here on 19 June while single Little Gulls were at Cheddar on 18th and Steart on 1 July. About 10 Kittiwakes were noted in the channel and it is interesting to record that the recently formed colony on the north coast of Devon has now increased to 100 pairs (W.E. Jones *in litt.*). Sandwich Terns were very well represented with some 24 in June, a few Common/Arctic Terns lingered on and there was a Little Tern on 22nd. The odd Razorbill and Guillemot was in the channel. The only passerine of note was an Aquatic Warbler at Berrow on 7 July, this being an exceptionally early date as most occurrences of this scarce, but increasing, migrant to this country are not usually until well into August.

Autumn migration

Both July and August were generally cool and unsettled being dominated by weather from the Atlantic. September followed the same pattern with a series of deep depressions and it was very wet and cold. During the first week the cyclonic south-west airstream resulted in a number of sea-bird records and the only calm period came around mid-month. October continued the unsettled weather of the autumn and this month was again rather cold with north-west winds during the first two weeks and again in the last ten days.

A Black-necked Grebe was recorded at Durleigh on 8 September and in the same month Great Crested Grebe numbers at CVL reached 500. Some of the sea-birds observed during the severe gales in September included several Fulmar, a Sooty Shearwater off Aust on 7th, about 13 Manx Shearwaters including one at CVL on 29th,



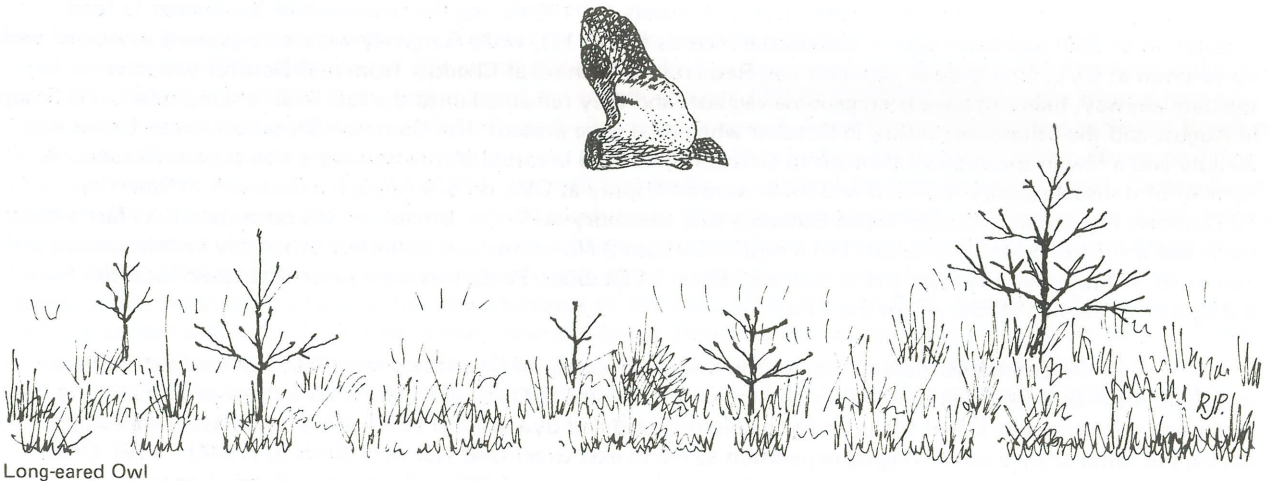
Storm Petrel

eight Storm Petrels and 18 Gannets with one found dead at Cheddar on 6th. There was a small 'wreck' of Shags with some 18 being recorded including five at Cheddar and the exceptional number of nine together at Sand Point. Post breeding counts of Mallard included 1000 at CVL and Steart in August and movement of Teal was noticed from the end of July. Counts of Gadwall at Blagdon and CVL numbered 150 during the first week of September (a total population of 230) and there were a few coastal records (up to 11), while Garganey were only present in August with up to seven at CVL. Diving duck included two Red-crested Pochard at Cheddar from mid-October which were, on the date anyway, likely to have been genuine vagrants and they remained until the last week of December; one Scaup in August and the usual small influx in October when nine were present; five Common Scoter off Brean Down on 29 July and a few in the channel through to October. Two Red-breasted Mergansers were also seen in October. A number of unusual raptors appeared and these were an Osprey at CVL on 5/6 August; a Goshawk at Steart on 13 October; two possible Rough-legged Buzzards over Westbury-on-Trym, Bristol, on the same date (like last autumn there was an influx on the east coast) but a bird at CVL on 9 November was definitely assignable to this species; a harrier sp. at Steart on 3 August and a Hen Harrier on 14 October. Peregrines were present at seven localities from 8 August and Merlins at four, from the 17th.

Of the commoner passage waders the maximum count of Oystercatchers (326) was made at Berrow in mid-September and there were small numbers inland (up to nine at CVL). Ringed Plover peaked at 2500 during the first week of this month (75 at CVL) and two colour-ringed and dye-marked birds on the coast had been caught during the summer by a wader ringing expedition to north-east Greenland (see *Brit. Birds* 67(1974) : 219). Once again only small numbers of Knot occurred with a maximum count of 265 in September, Sanderling present included 131 at Berrow at the end of July (a marked bird was at Sand Bay on 2 September — see above) and there were some good flocks of Redshank including 500 at Chittingen and 800 at Steart. Common Sandpipers were plentiful with up to 46 at CVL and 20 at the other reservoirs, mainly during August. Black-tailed Godwits had reached 1131 at Steart by the end of July (a peak of 1300 mid-August) and small numbers (up to 70) of Bar-tailed Godwits occurred at this locality. Scarcer passage waders (all minimum numbers) were 60 Little Stints from 7 August to mid-October; a poor autumn for Curlew Sandpipers with only 19 including one on the early date of 13 July; excellent numbers of Ruff (170) with most (92) in August, including the exceptional count of 71 at CVL; 157 Spotted Redshanks with 65 of

these being in September; 31 Greenshanks at CVL at the beginning of this month and some 90 passed through; Green Sandpipers (96) were mostly in August (47) including up to 29 at CVL; up to seven Wood Sandpipers here but only some 14 were recorded and there was a small return passage of Whimbrel with counts at Steart including 107 at the end of July. Rarer waders concerned 14 Little Ringed Plover with the first at Berrow on 7 July and most in the period 22 July – 9 August. Following the spring record, Dotterel were again recorded with three on Mendip and singles at Brean Down and Severn Beach, all around mid-September, and it is to be hoped that this recent trend continues. A Baird's Sandpiper at Steart on 15 September and a Pectoral Sandpiper here on the same date were surprisingly, in view of the weather conditions, the only Nearctic waders present. There was an early Purple Sandpiper at Sand Point on 11 September and single Avocets at the NG in July and September and at Steart from mid-October.

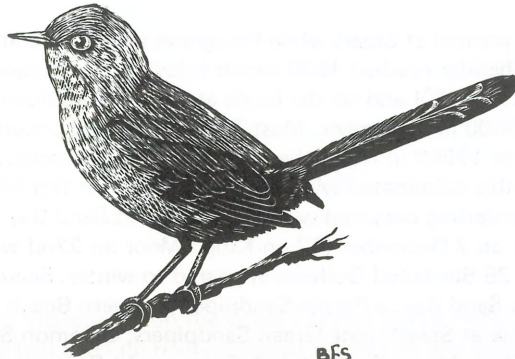
The storms in September brought perhaps as many as seven Grey Phalaropes to Steart and singles to Cheddar and CVL. It was a good autumn for skuas with three Great in September (one at Cheddar on 7th) and one found dead at Steart in October; a Pomarine here 9–15 September; some five Arctic on the coast and three at CVL and a Long-tailed on Tealham Moor on 28 September. About 23 Little Gulls passed through mainly in August, one or two Iceland Gulls were recorded at Steart in October and to complement the Nearctic waders a Sabine's Gull was present here on 7 September. Only eight Kittiwakes were noted and all on the coast. There was a minimum of 360 Black Terns with most (336) in September, including a large influx of 200 at CVL on 11th, and movement of Common/Arctic Terns commenced around 20 July with some 196 to the first week of October and again the majority (121) were in September. Other tern sightings concerned Sandwich which continued to be well recorded with 42 through to 6 October including up to 23 at Steart in September, some 28 Little with 12 here in August and an annual vagrant, a White-winged Black, at CVL on 11 September with another at Steart on 17th. A Guillemot was off Clevedon on 1 October.



Long-eared Owl

Long-eared Owls were recorded away from their breeding site in two localities and there was an early Short-eared Owl at Steart from 8 August. A Nightjar at Priddy on 8 September was unusual, Wrynecks were seen at Brean Down and CVL 8–16th and return movement of Sand Martins was noted from mid-July (last on 5 October) including 100 at Sand Point on 11 September. Rare pipits at Steart were a Richard's on 19 October and a Tawny on 15th (one present here last year on 4 October). A few migrant Tree Pipits were noted at coastal areas with the last at Brean Down on the late date of 14 October. Other late passage birds in November were a Swift on 15th

(very late for this species), House Martin on 20th and Redstart on 3rd. A Great Grey Shrike on Mendip in October was probably passing through the area as there were no subsequent winter observations. An unusual record concerned a Dartford Warbler at Steart on 11 August which remained until mid-November. This is a species that is subject to



Dartford Warbler

BFS

periodic population 'crashes' (see *Brit. Birds* 60(1967) : 87–89) so the previous mild winters have obviously helped the build up of its population to the current high level (560 pairs) in its limited breeding range. There was a Pied Flycatcher at CVL on 8 September, Black Redstarts were recorded at Filton on 8 August (a very early date so possibly a local breeding bird) and another at Middle Hope on 12 September and only one Ring Ouzel was reported. A few small parties of tits (mainly Long-tailed and Blue) at coastal sites in October were probably migrants and other visible migration during this month included small numbers of Chaffinches (maximum 750 in any one watch), Brambling (70), Siskin (26) and Redpoll (24), (see *Bristol Ornithology* 5(1972) : 195–200 on visible migration along the south-east shores of the Severn Estuary). Six Twites were seen at Sand Bay on 22 October and finally in the same month a similar number of Ravens flew over Brean Down.

The second winter period

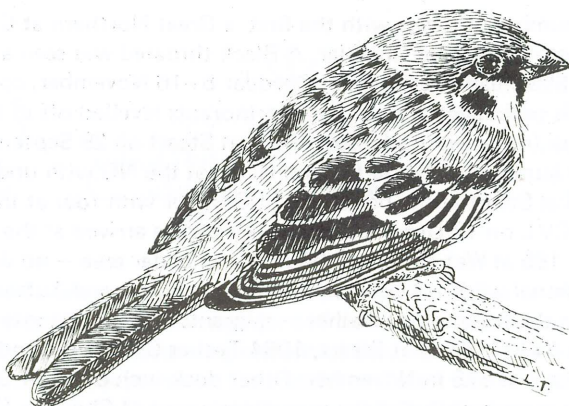
The weather during November was unsettled with a number of depressions crossing the country and strong winds in the second week. Rainfall was above average as also was the total precipitation for the year. Although flooding occurred on the levels on several occasions during 1974, with more efficient drainage and the consequent lowering of the water-table, these soon drained away. December was very mild with a predominant westerly airflow. Winds were strong throughout the month with gales at times. As a result of the extreme mild weather plant growth was abnormally advanced and some birds were showing breeding activity.

There was an interesting number of divers with the first, a Great Northern at CVL, on 24 October, and this one was followed by up to four here and two at Cheddar. A Black-throated was seen at Berrow on 3 November and at CVL 30th–17th December. A Slavonian Grebe was at Cheddar 5–16 November; counts of Great Crested Grebes at CVL reached 456 during this period and numbers of Cormorants levelled off at their usual winter population of around 50. A gaggle of 23 grey geese (not specifically identified) at Steart on 28 September was early but due to the mild weather there were only low numbers of White-fronted Geese at the NG with under 1000 at the end of the year. Other geese included three Bean at Steart at the beginning of October with four at the NG from 26th to the end of the year and two Pink-foot at CVL on 17 December. Bewick's Swans arrived at the end of October and counts in December included 206 at the NG, 165 at Wet Moor and 50 in the Cheddar area – no doubt roosting at times on the reservoir. According to the national wildfowl counts numbers of Wigeon and Tufted Duck were low and this was again thought to have been due to the favourable weather – migrants not coming into this country. Counts of other commoner duck included up to 1430 Mallard at Steart, 1064 Teal at CVL at the end of the year and the maximum count of Pochard at Cheddar was 825 in November. Other duck included 124 Gadwall at the WT in December, 120 Pintail here during the same month and the maximum count of Shoveler (220) was made at CVL in mid-November. At least six Scaup were present (unusually scarce on the reservoirs however), there were two Common

Scoter in November, the first Goldeneye appeared on 27 September and then up to 30 were present at CVL and one or two Smew on the reservoirs from 8 November (last year noted from 10th). A Red-breasted Merganser was at Steart on 17 November, Goosanders occurred from early in this month and a count of 31 was made at CVL towards the end of the year. Up to 92 Ruddy Ducks were at Blagdon and there was an unusual observation of one at Chitting.

Two Hen Harriers were present at Steart while Peregrines were noted at three localities and Merlins at five. The large number of Coot at Cheddar reached 1500 which is lower than in recent winters. Of the waders, most Golden Plover were at the Axe Estuary (500) and on the levels at Tealham/Tadham Moors (600) and the large concentration of Lapwing here numbered 6000 in November. Most Turnstone (120) occurred as usual at Severn Beach while Dunlin numbers indicated up to 17200 in November and 20500 in December. A recent trend has been for large numbers to appear inland and this culminated with a count of 1600 on Wet Moor in November. Up to 325 Knot were reported at Steart; some 56 Sanderling occurred with 42 of these at Sand Bay in mid-November; there was a count of 42 Black-tailed Godwits at Steart on 7 December (12 on King's Moor on 22nd was an unusual number inland in relation to the date) and only some 25 Bar-tailed Godwits appeared to winter. Scarcer wintering waders were some eight Little Stints with up to four at Sand Bay; a Purple Sandpiper at Severn Beach in December; 18 Ruff with most on the levels; a few Spotted Redshank at Steart; nine Green Sandpipers; Common Sandpipers at the reservoirs (Barrow Gurney and CVL) and Tealham Moor; the first Jack Snipe on 14 September and then a minimum of 34 including 15 on Wet Moor and Woodcock were present at three localities in December but were no doubt under-recorded.

A storm driven Great Skua was at Cheddar on 27 December. Little Gulls were identified here and also at CVL and Clevedon (two) and an Iceland Gull was reported at CVL at the end of the year. Small weather motivated movements of Kittiwakes occurred in the channel with some 70 off Steart on 3 November and 55 off Brean Down on 28 December. Another sea-bird present was a Guillemot at Sand Bay on 29 December. Short-eared Owls, noted from the first week of October, were present in five localities including up to six at Steart. A few Rock Pipits were as usual at this time of year inland at Cheddar, the first Water Pipit was here on 24 October, then later up to 12 at CVL, and there was a coastal record of one at Steart. Blackcaps were much in evidence (at least seven) and as many as four Chiffchaffs were seen at CVL in December with two Firecrests here also and another at Abbots Leigh. More Black Redstarts (at least eight) were reported than has been the recent trend and Fieldfares were widespread from mid-October with several flocks of 1000. Redwings were also present in large numbers during the early part of the winter but the majority probably migrates through the area as numbers in December were generally small. Four Bearded Tits occurred at CVL and some 15 Snow Buntings included up to five at Sand Bay and two on Steep Holm. No large flocks of Brambling were present but there were one or two flocks of some 30 Siskins and Redpolls — although both species did not appear to be widespread — and Hawfinches were noted in one area.



Tree Sparrow

FURTHER STUDIES ON GREAT CRESTED GREBES

1. COURTSHIP

By K.E.L. Simmons

Plates 13–16

INTRODUCTION

General

When my preliminary monograph on the Great Crested Grebe *Podiceps cristatus* appeared 20 years ago (Simmons 1955), there had been no really detailed studies on any other grebe apart from a number of papers on the Little Grebe *Tachybaptus ruficollis* – by Selous (1915), Huxley (1919), and Hartley (1933, 1937) for example. More recently, however, such work has proliferated, with contributions on the behaviour of several species, including the Little Grebe (Bandorf 1968, 1970), Rolland's Grebe *Rollandia rolland* (Storer 1967), New Zealand Hoary-headed Grebe *Poliiocephalus rufopectus* (Storer 1971), Great Grebe *Podiceps major* (Storer 1963), Black-necked Grebe *P. nigricollis* (McAllister 1958, Wittgen 1962, Franke 1969, Prinzing 1974), Slavonian Grebe *P. auritus* (Storer 1969, Fjeldsø 1973), and Red-necked Grebe *P. grisegena* (Wobus, 1960, 1964; Schmidt 1970). In the New World, Robert W Storer is continuing his comparative studies on grebes – with papers on the Least Grebe *Limnodytes dominicus*, Black-necked Grebe, and Western Grebe *Aechmophorus occidentalis* in preparation – while Virginia L. Scammell and Gary Neuchterlein are also working on the latter species. In the Old World, major projects on the Red-necked Grebe (Th. Schmidt) and all the European species (J. Fjeldsø) are still in progress.*

As the Great Crested Grebe has long been used as a basis for all grebe studies, it is now necessary to bring up to date the information on the behaviour of this species, the earlier accounts of Selous (1901, 1920-1, 1933), Huxley (1914, 1924), and Simmons (1954, 1955, 1959, etc.) being incomplete in many details. The monograph by Melde (1973) is also deficient in many respects, while the recent work of P.P.A.M. Kop, J.J. Vlug, and others in the Netherlands has yet to be published in full, though our knowledge of certain aspects of the breeding biology has been increased by the papers of N.H. Leys and his colleagues (Leys and De Wilde 1967, 1968, 1969, 1971; Leys et al. 1969a, b). In Germany, M. Wiechmann is photographing the whole life-history as completely as possible in colour; this follows a similar attempt, initiated many years ago by my friend W.N. Charles, some of whose black-and-white photographs are used in the present series of papers.

Though lack of space prevents the inclusion of many subsidiary details and full comparisons with other grebes, these papers will give greatly improved descriptions of a number of behaviour patterns in the Great Crested Grebe. Based mainly on my own observations at Chew Valley Lake, Somerset, during 1966-70, and also at gravel-pits in the Reading area of Berkshire during 1948-62, the papers derive partly from accounts prepared originally in 1970 for my doctoral thesis (Simmons 1970b) and for the forthcoming first volume of the new handbook *The Birds of the Western Palearctic*, edited by Stanley Cramp, myself, and others. The line-drawings have been prepared specially and with great care by Robin Prytherch; based for accuracy on cine-film and still photographs, they replace earlier illustrations (e.g. in Huxley 1914 and Simmons 1955) which, though most attractive and serviceable, were based mainly on field-sketches or verbal descriptions and are thus now largely of historic interest. The figures in Simmons (1970a), however, were mostly derived from cine-film and still give a good idea of the displays depicted.

*Generic nomenclature of the grebes (Podicipedidae) follows an unpublished revision by R.W. Storer with the exception of *Limnodytes* for the Least Grebe (see H.C. Oberholser, 1974, *The Bird Life of Texas*, Austin, Texas).

This paper

It seemed highly appropriate to start the series with the topic of courtship as a tribute to Sir Julian Huxley who died earlier this year. The working definition of courtship followed here is: heterosexual communication used in the establishment and maintenance of the pair-bond. In grebes, the behaviour as thus defined falls mostly into two main contrasting types: (1) water-courtship and (2) platform-courtship, these terms being used for the first time here. The broad details of much of this behaviour in the Great Crested Grebe are well known from the earlier work (see also Boase 1925) but much new information is now available, mostly unpublished (but see Simmons 1968, 1970a).

In this and other papers, I have attempted to standardise the terms which have been evolving in the growing international and comparative study of grebe displays. In some cases, this has meant the modification or changing of certain well-known names. Sadly, because the Great Crested Grebe is in some ways atypical in its water-courtship, Huxley's famous term 'Penguin-dance' has had to be replaced by the more appropriate 'Weed-dance' in the repertoire of the species, 'Penguin-dance' now being reserved for similar displays in other grebes in which no weed is carried (see Storer 1969). As is usual in ethological studies, movements and postures thought to have been evolved as displays ('social signals') are given capital initial letters, the same applying to all calls. The latter, though mentioned by name in context in other papers, will be the subject on their own of a later paper in the series.

WATER-COURTSHIP

The complex displays which make up the water-courtship of the Great Crested Grebe are among the most spectacular of all bird rituals. Correspondingly and deservedly, they have attracted much attention in the general ornithological and ethological literature; many accounts, however, are surprisingly ill-informed and inaccurate. The behaviour consists largely of four highly ritualised and distinctive, mutual display-chains: (1) the *Head-shaking Ceremony*, the standard meeting ceremony; (2) the *Discovery Ceremony*, the special meeting ceremony; (3) the *Retreat Ceremony*; and (4) the *Weed Ceremony*. All, particularly Head-shaking, occur at a variety of intensities and degrees of completeness, especially early and late in the prolonged process of pair-formation, and only typical, high-intensity versions can be described here in any detail. The term 'mutual', as introduced into biology by Edmund Selous and Julian Huxley, broadly indicates that male and female participate more or less equally in the courtship; they may play similar roles simultaneously or reciprocally (as throughout the Head-shaking and Weed Ceremonies), or their roles may be different (as in the main phases of the Discovery and Retreat Ceremonies). The roles involve the performance of displays in a set sequence, though some of these displays also appear at times outside the context of the ceremonies. Either the male or female may take the initiative, both during early pairing and subsequently, often drawing attention to itself by vocal Advertising.

Because of numerous statements to the contrary in the literature, it must be stressed that the water-courtship of the Great Crested Grebe occurs both during and after pair-formation; it is, however, more or less confined to the pre-egg stage of the breeding cycle, and, with the partial exception of Head-shaking, has ceased by the time the birds start incubating. It does not last throughout the cycle, though there may be some recrudescence during the later phases of chick rearing or subsequently linked with the re-establishment of pair-bonds after hostile incompatibility has arisen after the parents have divided the care of the brood between them (Simmons 1970b, 1974).

The Head-shaking Ceremony is the most common form of courtship, probably more so than in any other grebe whose behaviour is known. It occurs independently of the other ceremonies, in one form or another, about five times more frequently than in combination with them — when it then forms the initial or terminal phases, or both. Occasionally, a Discovery Ceremony leads immediately into a Retreat Ceremony or into a Weed Ceremony, that is there can be joint Discovery-Retreat Ceremonies or joint Discovery-Weed Ceremonies, in both cases via Head-shaking. Also, a Retreat Ceremony can develop into a Weed Ceremony, producing a joint Retreat-Weed Ceremony, again with a linking bout of Head-shaking. I can find no record in my field-notes of a combined Discovery-Retreat-Weed Ceremony, though I have a memory of seeing one and would predict that this represents the full sequence of courtship, however rarely performed. None of the many Weed Ceremonies observed ever developed into a Retreat Ceremony (and never, of course, into a Discovery Ceremony) so that

the Weed Ceremony itself, with its integral Head-shaking, is clearly the terminal and highest intensity activity in any combined sequences of water-courtship.

Independent Head-shaking is performed throughout the pre-egg phases of the breeding cycle, and at times later, though at decreasing mean intensity. The Discovery and Retreat Ceremonies, however, are most characteristic of the early phases of pairing-up before the grebe couple has firmly selected any mating sites and embarked on platform-courtship; but it is in this latter phase that the Weed Ceremony becomes more frequent, in fact often occurring off potential mating and nesting sites.

The water-courtship of the Great Crested Grebe is not directly pre-copulatory, mating having its own distinctive rituals. Many sequences just peter out, the birds going on to preen, for example. For this reason, Huxley termed such display 'self-exhausting'. However, we now know that some sequences do lead to the pair moving off to explore likely sites and to build and perform platform-courtship there, including copulation — thus probably completing the full functional chain of complex interactions. As they move to the platform site from the spot where they engaged in water-courtship, male and female often travel more or less closely side by side with heads low, calling (usually the *Clucking-call*); see the figure, taken from a photograph, on p. 188 of Simmons (1955) where this *Parallel-swimming* was called 'swimming together'.

Advertising

This typical display of solitary birds — of either sex and not just females as I originally suggested — is performed in the first place by unpaired birds seeking a mate, then by paired birds separated visually from the mate. Later still in the cycle, parents will Advertise when they have lost contact with their chicks. When Advertising, the grebe floats on the spot or swims slowly along, periodically uttering the characteristic, far-carrying *Croaking-call* with its head held moderately erect. In this *Advertising-upright* posture, the crest and tippets seem usually to assume no special positions except they appear to be somewhat depressed, but the throat is noticeably distended each time a call is given. Although fully species-characteristic, the main component of the Croaking-call shows considerable variation in tone and phrasing, clearly facilitating individual recognition among the birds. Sometimes, a few 'anxiety' *Growling-calls* may be given as well and these occasionally replace the Croaking entirely. In all cases, Advertising display ceases when a potential partner is encountered, or the mate (or chick) located and identified. I have myself never seen any other forms of Advertising in the Great Crested Grebe, such as those described in the Slavonian Grebe by Fjeldså (1973). Both Jon Fjeldså and Paul Kop inform me, however, that the Great Crested Grebe may at times display its head plumes while Advertising much as in certain forms of Head-shaking, while the neck may be extended forward (1) horizontally as a different call is uttered (P.P.A.M. Kop), or, after pair-formation only, (2) diagonally (J. Fjeldså), in both cases much as when threatening. More observations are obviously needed, but I remain to be convinced that the calling with neck forward—which may in part correspond to the 'search behaviour' of Huxley (1914) — is directly comparable to what I have called Advertising in this species, especially if a different sound is produced or the bird not separated from its mate.

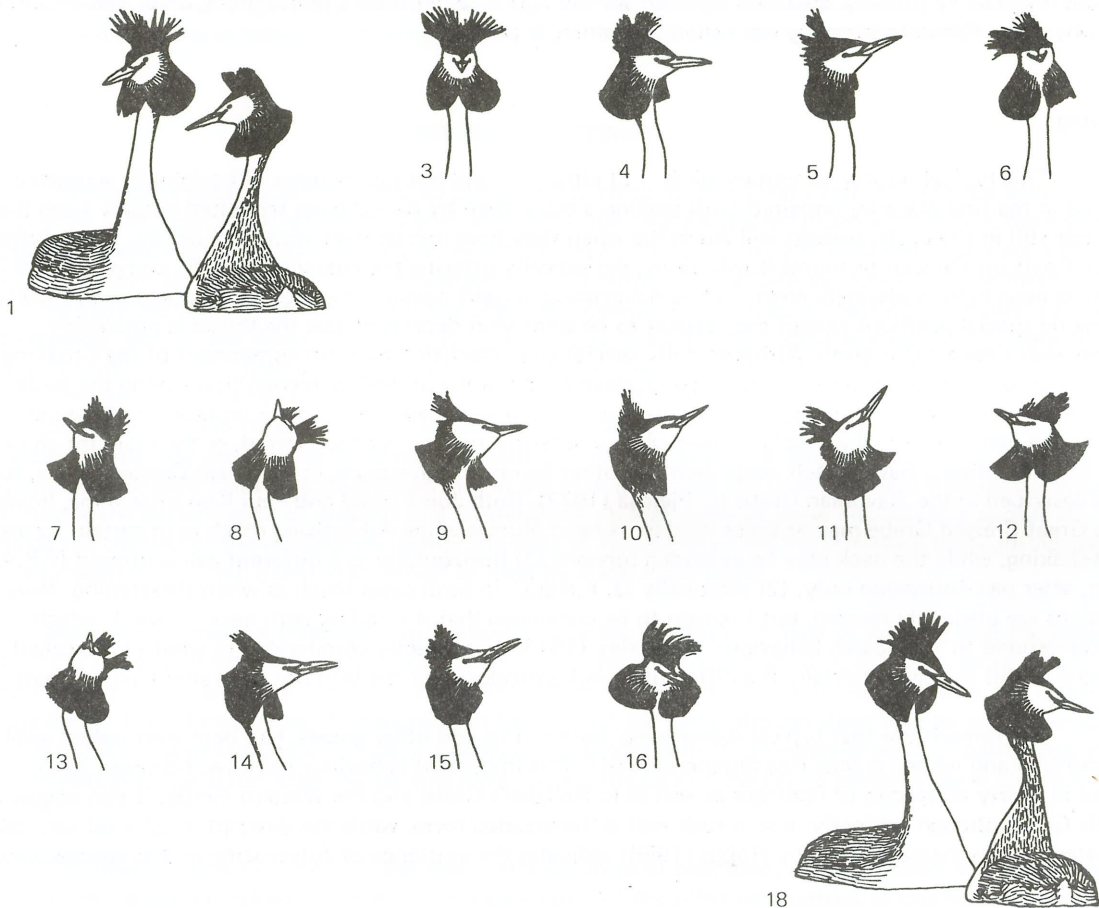
It is remarkable that typical Advertising, both in this and other grebes, had been overlooked until I first recognised and named it thus (see Simmons 1954). This important behaviour has now, however, been described in nearly all species of *Podiceps* as well as in Rolland's Grebe and the Western Grebe. It also occurs in the Little Grebe, though evidently not in such well-differentiated form, while the description of a solitary calling New Zealand Hoary-headed Grebe by Hobbs (1958) indicates the existence of Advertising in that species also.

Head-shaking Ceremony

The term 'Head-shaking' is used as a generic name for all the components of the ceremony in which ritualised movements are made with the head. It also usually denotes mutual performances of these movements; when one grebe displays unilaterally, then it is best to refer to the actual movement it uses. These are of three types. (1) *Low Head-wagging*: repeated shaking and rotating of the head rapidly from side to side with the bill lowered; the movements are of small amplitude so that the bill tip inscribes quite a small arc. (2) *High Head-*

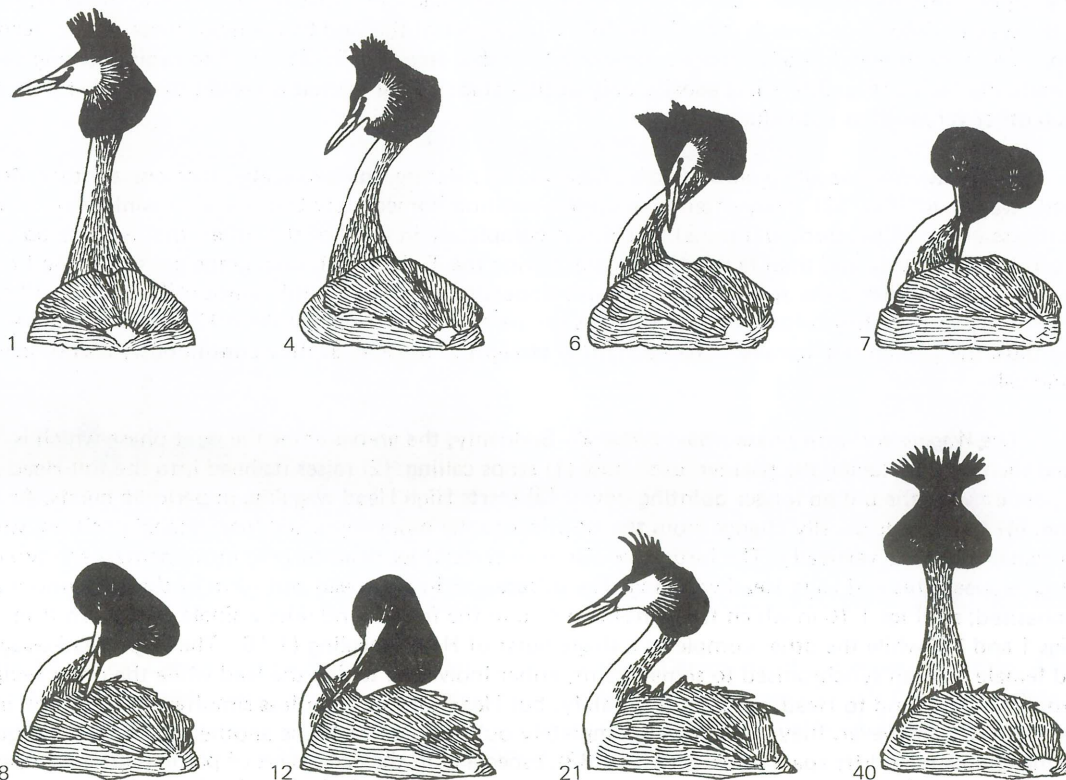
wagging: a much more free movement, occurring in bursts and with much wider amplitude; the bill moves sideways and upwards to one side, then the other, with a circular motion as the head is rotated, cocked sideways, and tilted back repeatedly, sometimes to such a degree that the bill is raised vertically. There are usually 4-6 turns per waggle but at times up to nine. The exact details of this movement, however, can only be detected through frame-by-frame analysis of cine-film (see Figs 2-15). (3) *Slow Head-turning*: pointing of the bill from side to side, entirely in the horizontal plane, in a deliberate, measured manner (Figs 1 and 16, right-hand bird), often 3-4 times in succession (normal range 2-6). While performing these movements, the grebe typically adopts the *Head-shaking Upright* posture with neck stretched up, often looking incredibly thin, upper breast raised out of the water, and tail-tuft incongruously cocked (see Plate 13).

Another movement characteristically associated with Head-shaking in the Great Crested Grebe is *Habit-preening*. The bird first turns its head round so that the bill points sideways and backwards, then immediately dips its neck to lower the head to back level. Here, the bill is next tucked behind the base of one of the long scapular feathers and drawn down it towards the tip, head and neck then being returned to the upright starting



Figs 1—16. Head-shaking Ceremony: while the right-hand bird completes a single Slow Head-turn, the other carries out a burst of High Head-wagging (head only shown, Figs 2—15).

N.B. The small numbers on these and subsequent figures, if given, indicate frames of cine-film at 24 frames per second. Here it can be seen that both movements lasted about three-quarters of a second.



Figs 17–24. Head-shaking Ceremony: Habit-preening (only one bird shown).

position. In the process, the feather is flicked up with the open or closed bill — the whole sequence (see Figs 17-24) being performed fairly quickly but with deliberation, poise, and grace. As recognised by Huxley (1914), this behaviour is clearly a highly ritualised form of preening. The two wagging types of Head-shaking, on the other hand, seem certainly to have been derived from the 'head-shake' comfort-movement used, for example, to remove water from the head (see a later paper in this series). At full intensity, neither resembles the precursor closely; indeed, High Head-wagging is more like an exaggerated form of the 'head-flick' comfort-movement found in the Anatidae (McKinney 1965) but not very differentiated as such in the grebes. The origin of Slow Head-turning is more problematical. I originally suggested (Simmons 1955) that it represented the intention-movement of turning to Habit-preen but this has been disputed (Wobus 1964, Schmidt 1970). All that can be said at the moment is that it is closely similar to the head-turning pre-flight movements made at certain other times as a Great Crested Grebe faces into the wind with neck erect prior to pattering away across the water and taking wing.

In its most complete form, the Head-shaking Ceremony consists of an approach phase and then three main phases. Of the latter, the first is usually quite brief, well under a minute, but the other two phases can continue for a further 2-3 minutes. During a bout of Head-shaking, the two grebes often remain in almost the same position on the water throughout the ceremony, or one may bear forward while the other drifts backward from it. The male's head is held characteristically higher than the female's when they eventually face each other in the full Head-shaking Upright posture (see, for example, Fig. 1).

The approach phase. The two grebes swim towards one another with heads low; indeed, especially during the early part of pair-formation, they can show distinct hostility in their approach behaviour, including *Forward-threat* display with *Barking-calls* (see Simmons 1955 and later papers in this series). As they draw nearer,

often at first giving Clucking-calls, each raises its neck into the Head-shaking Upright posture and, with bill pointing sharply down and mandibles open, starts to Low Head-waggle in a spasmodic and jerky manner, now uttering the special *Ticking-call* which is confined to the later part of this and to the next phase of the Head-shaking Ceremony. One or both may initially manoeuvre round the other (see Figs 25-31), as if to avoid meeting head-on, before eventually facing (Fig. 32) — but usually only at that stage in pair-formation when the birds still do not know each other very well as individuals.

The Low Head-wagging phase (main phase-1). On meeting, the two grebes face one another, usually only a little way apart (Fig. 32). They often take up this position immediately but — again mainly early in the pairing process — one of the birds will sometimes rotate completely in front of the other, that is circle on the spot by turning right away and then facing back again. Giving the Ticking-call, each grebe continues the Low Head-wagging started during the approach phase, with tippets spread into the full 'elliptical' position and crests erected vertically so that they bristle forward towards the partner like horns (see Plate 13, upper and lower left). Posturing thus, the two grebes literally 'look each other straight in the eye' as they continuously and synchronously waggle and call.

The Waggle-and-turn phase (main phase-2). Suddenly, the grebes enter the next phase which is performed silently. Still facing the partner, each now (1) stops calling; (2) raises its head into the full Head-shaking Upright posture with the bill no longer pointing down; (3) starts High Head-wagging in periodic bursts. At the same time, (4) the tippets usually change from the elliptical to the more depressed 'pear-shape' position, while the crest remains erected vertically. The birds now also introduce Slow Head-turning movements, each typically alternating between this and High Head-wagging. The differences in the speed and form of the two movements is thus emphasised; see Figs 1-16 in which the right-hand bird in the foreground does a single Head-turn from left to right (Figs 1 and 16) while the other completes a single burst of Head-wagging (1-16). The High Head-wagging of male and female is often synchronised to some extent, either individual taking the lead while the other reciprocates. Thus, typically, they tend to Head-wagging alternately, but Head-turn more or less simultaneously, often in opposite directions; however, they can also get completely out of phase with one another at times. Subsequent to meeting, the couple may drift apart somewhat (Fig. 33), especially in the early days of pairing-up; their tippets may then be more or less depressed and sometimes they merely face thus inactively ('static' display).

The Habit-preening phase (main phase-3). In turn, the second main phase merges sooner or later into the third. The grebes continue to High Head-waggle and Slow Head-turn but also now intersperse Habit-preening. Usually, just one formal 'preen' is carried out at a time, though sometimes two may be made in succession on the same side without the bird's returning to the fully upright position between. At least at first, each Habit-preen is preceded by a Slow Head-turn to the same side and followed by further High Head-wagging. Not infrequently, however, the Habit-preening movements come to dominate; one or both birds do little else but Habit-preen repeatedly, remaining more or less immobile in the upright position between each downward bob. Often, though certainly not invariably, successive 'preens' are made to alternate sides. Male and female may Habit-preen quite out of phase with one another, though they often alternate or perform more or less synchronously, one tending to lead the other.

As well as varying greatly in duration (especially main phases-2 and 3), Head-shaking sequences often differ from one another in intensity and completeness — from the full ceremony described above to a few desultory, mutual High Head-waggles with necks barely raised. Each phase can be performed on its own. A bout of display may consist of Low Head-wagging and Ticking only, or these can be omitted as the birds start immediately with High Head-wagging and then Slow Head-turning. Habit-preening can also be omitted, or come earlier in the sequence. Though mutual Head-shaking is the typical 'meeting' or 'greeting' ceremony of the Great Crested Grebe, occurring when male and female join each other after separation, paired birds will also frequently Head-shake when already near one another — for example, during loafing spells. The approach phase can then be more or less omitted. As well as being performed spontaneously, Head-shaking may also be induced by the activities of other Great Crested Grebes apart from the mate. Thus, the sight and sound of conspecifics displaying is particularly stimulating, and the simultaneous Head-shaking of two or more pairs is not an uncommon sight. Head-shaking also frequently takes place during antagonistic encounters, the pair tending to display together thus while approaching an intruder or neighbour. A variant of the normal orientation in such cases results in



Plate 13. Great Crested Grebe *Podiceps cristatus*: Head-shaking Ceremony of the water-courtship. Above and below left: first main phase. Below right: second main phase. See text (pages 89-107) for further details of all displays. These and, unless otherwise stated, the following photographs of Plates 14-16 were taken at Lough Neagh, Northern Ireland, in May-June 1962. (Photos: W.N. Charles)

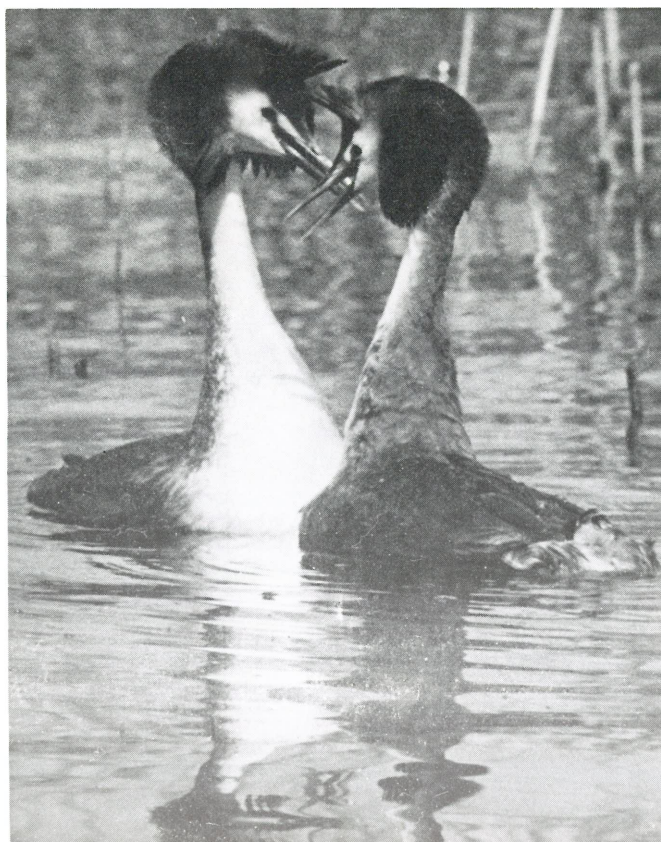




Plate 14. Great Crested Grebe *Podiceps cristatus*: Mating Ceremony of the platform-courtship. Above left: Rearing-display. Above right: Inviting-display (foreground bird) and pre-mounting posture (other bird). Below left: stage in copulation (rear view). Below right: stage in copulation (front view). (Photos: W.N. Charles)





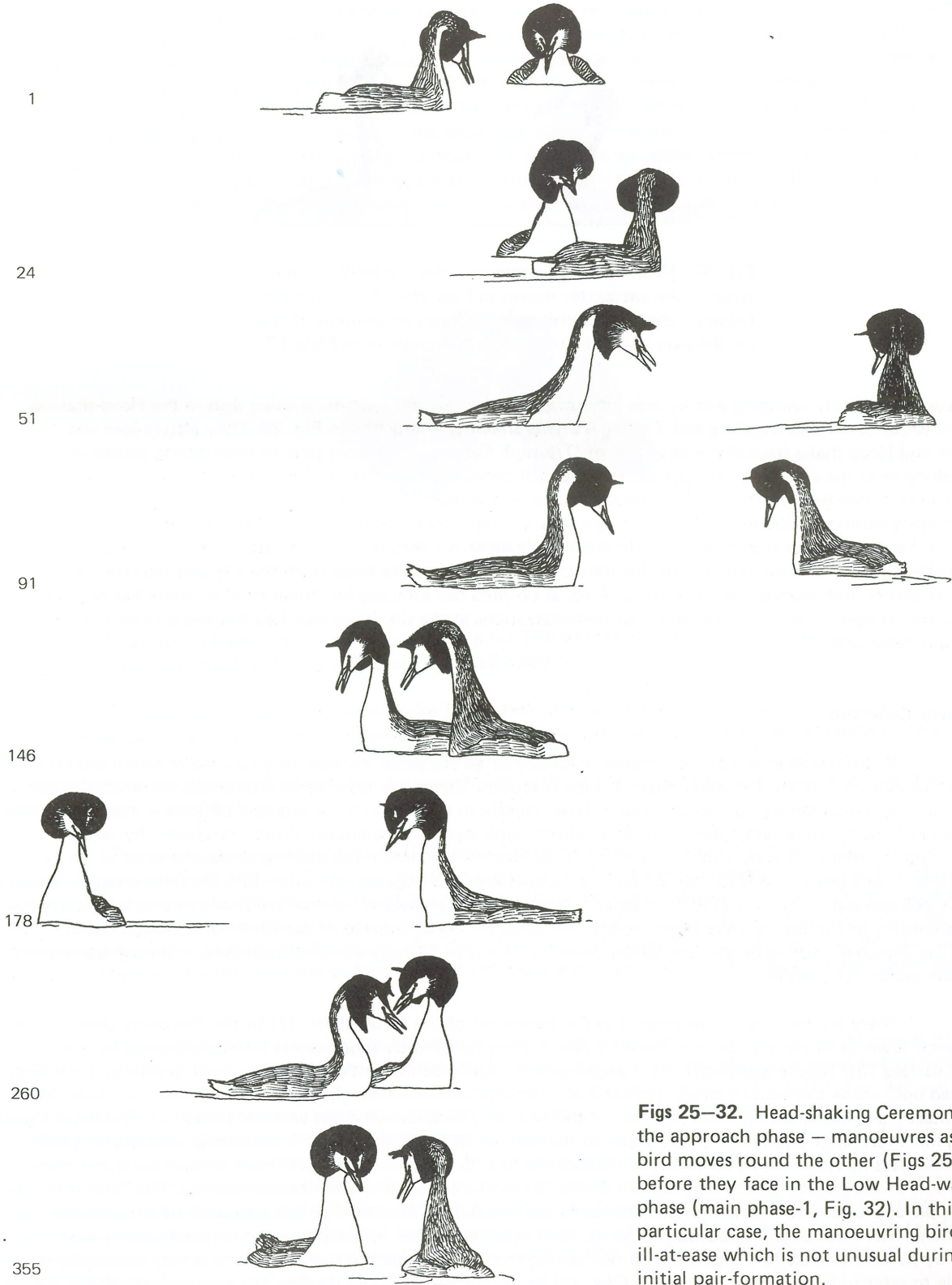
Plate 15. Great Crested Grebe *Podiceps cristatus*: Mating Ceremony of the platform-courtship (continued). Above left: stage in copulation (side view). Above right: Post-copulatory Water-treading by active bird. Below: Post-copulatory Head-shaking by both birds (Burghfield Gravel-pit, Berkshire, April 1956). (Photos: W.N. Charles)





Plate 16. Great Crested Grebe *Podiceps cristatus*: Weed Ceremony of the water-courtship. Above left: Weed-dance, immediately after the Ceremonial Rise-and-clash. Above right: Weed-dance, later stage (when the birds may drift apart somewhat). Below left and right: Weed-dance, final stage (when one bird often subsides before the other and starts to High Head-waggle on its own). (Photos: W.N. Charles)





Figs 25–32. Head-shaking Ceremony: the approach phase — manoeuvres as one bird moves round the other (Figs 25–31) before they face in the Low Head-wagging phase (main phase-1, Fig. 32). In this particular case, the manoeuvring bird seems ill-at-ease which is not unusual during initial pair-formation.

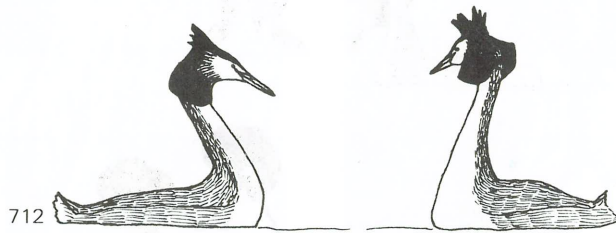


Fig. 33. Head-shaking Ceremony: main phase-2 – later stage in the encounter shown in Figs 25–32. The distance between the birds in this case indicates an element of fear on the part of one or both birds. Compare with Plate 13.

the birds immediately swinging side by side after meeting head-on and swimming along thus in the Head-shaking Upright while Low Head-wagging and Ticking (*Parallel-shaking*) – much as in Fig. 29. They also re-join one another and Head-shake frontally – as a kind of 'Triumph Ceremony' – from time to time during pauses in skirmishing or at the end of the encounter. It is on such occasions that Retreat Ceremonies are particularly likely to occur (see below). It is induced Head-shaking, in the main, that is performed occasionally and mostly at low intensity during incubation and the rearing of the young. Grebes, however – unlike, for example, most herons (Ardeidae) and many seabirds in which male and female meet as mates only at the nest – do not have special nest-greeting or change-over ceremonies, for they consort freely in pairs away from the site and thus have no need to identify and appease the mate there. Also, as pointed out long ago by Julian Huxley, there has probably been selection against noisy and conspicuous demonstrations at the site in species, like the Great Crested Grebe, with vulnerable nests.

Discovery Ceremony

Mutual Head-shaking is sometimes preceded by an elaborate introductory ceremony which replaces the normal approach phase and main phase-1. This Discovery Ceremony is performed by unpaired Great Crested Grebes during initial pairing-up encounters and later, chiefly in the territory, by engaged couples – especially when one bird re-joins the other after they have been wholly separated. The ceremony is often preceded by vocal Advertising or other calling by either or both birds. Before the terminal Head-shaking phase, the roles of the sexes are different: one grebe (the *Ghost-diver*) takes a mobile, approaching role, the other (the *Cat-bird*) a static, waiting one. As pointed out by Huxley (1914), they also often play the respective roles of the *Searcher* and the *Discovered-bird*; according to Huxley, it is the latter which then takes on the active role of the Ghost-diver, but, in fact, I found the Searcher itself to be also the Ghost-diver (in 24 out of 31 fully documented cases) – though sometimes both will search for a while.

There are two main components in the behaviour of the Ghost-diver. (1) In the *Discovery-dive*, it submerges and swims towards its partner. So shallow is its dive that its underwater trajectory is clearly indicated by a wake on the surface (the *Ripple-approach*). As it progresses, it usually carries out one or more brief 'sightings' (exposing the head only above the water), checking that it is on course before submerging again; it may also 'porpoise' (surfacing momentarily and incompletely with just part of the head and back showing but without stopping). The Great Crested Grebe, however, never leaps clear of the water in the manner of the Silver Grebe *P. occipitalis* (see Storer 1969) nor punctuates its approach by surfacing in the bathing-like 'Bouncy-posture' (with head thrown back and chest thrust out) in the manner of the Red-necked Grebe, Slavonian Grebe, and other related species. The Discovery-dive and Ripple-approach bear a striking resemblance to the threatening *Sinister-dive* and approach of antagonistic encounters. The form of the actual submergence itself requires further investigation but, at least once, I was struck by its resemblance to the dive performed during the Weed Ceremony (see below), so it may eventually be possible to refer to both as the *Ceremonial Dive*. (2) In the Ghostly-penguin display, the approaching bird

finally emerges with a surge vertically out of the water so that only its lower belly and tail-end remain below the surface; its tippets are expanded but the crest is depressed and bill sharply lowered (Fig. 39). Frame-by-frame analysis of film shows that the grebe appears head first, breaking the surface with its forecrown or, sometimes (as in Figs 35-38), with up-pointing bill; however, the bill is immediately lowered as the neck is arched down while the emergence is completed. The bizarre *Cat-display* (Fig. 34) is the main behaviour shown by the other bird. It *Hunches* by lowering its head just in front of the shoulders, expands the tippets into the full elliptical position, divides and spreads the crest laterally (so that each half forms an upper border to the tippets on each side of the crown), and adopts the striking Wing-spread posture (partly opening the wing and rotating them forward in a V on each side of the body so that the white pattern of their upper surfaces are displayed frontally).

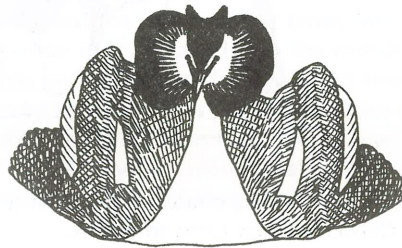


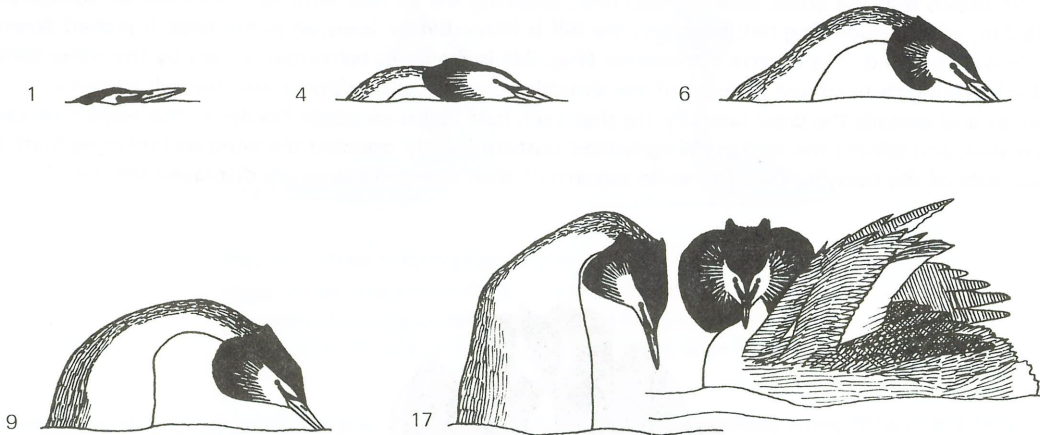
Fig. 34 Discovery Ceremony:
Cat-display

Four main phases may be distinguished in a full Discovery Ceremony, the first two occurring simultaneously as each bird performs a different role well away from the other.

The approach phase. While looking for its partner, the Searcher may swim along silently in a normal posture or periodically Advertise in the typical manner; or it may travel in the Forward-threat posture, Barking or Growling. On discovering the second bird, it occasionally stops and adopts the Cat-display; more usually, however, it takes on the role of Ghost-diver by submerging in the Discovery-dive and initiating the Ripple-approach while still many metres away.

The waiting phase. Meanwhile, the Discovered-bird may also have Advertised, or Barked or Growled, from the Forward-threat posture. On seeing the other grebe, it may itself then occasionally become the Ghost-diver; more usually, however, it stops moving, floats inactively on the spot, and sooner or later goes into the Cat-display — often after the Ghost-diver has performed its Discovery-dive, though sometimes it seems that it is the adoption of the Cat-display that initiates the Discovery-dive. In either case, the Cat-bird eventually watches the approach of the Ghost-diver intently using the surface ripple it produces and its periodic brief re-appearances above water as guides.

The meeting phase. Usually, the Ghost-diver carries out a last sighting only a couple of metres or so from the Cat-bird; then it dives for the last time, moving past or actually under the other grebe before finally and suddenly emerging to one side of or, more often, beyond it in the Ghostly-penguin display (Fig. 39) and with its back to it. Then, removing water from the bill with some unritualised head-shakes, it rotates to face its partner while subsiding into a normal swimming position. Meanwhile, the Cat-bird has already turned to face the Ghost-diver as it emerges (Fig. 39), often starting to High Head-waggle unilaterally before finally putting away its wings after the other has completed its display and faced it. Occasionally, the Ghost-diver may also assume the Cat-display after surfacing, either before or after it rotates. The Great Crested Grebe differs from other related species in that the climax of its Discovery Ceremony lacks an integral Penguin-dance (using this term in the new, stricter sense) in which the two participants, on meeting after the Ghostly-penguin emergence, rise up breast to breast.



Figs 35–39. Discovery Ceremony: the meeting phase – the Ghost-diver emerges in the Ghostly-penguin display watched by the Cat-bird which turns to face it.

The terminal Head-shaking phase. Male and female now start normal, silent, main phase-2 Head-shaking – to which they may later add Habit-preening.

About one in every 40 bouts of Head-shaking is initiated by a Discovery Ceremony. The roles are fully interchangeable between male and female, each acting as Ghost-diver or Cat-bird in exactly 50% of cases in which I was certain of the sex of the participants. Discovery Ceremonies are usually complete, but sometimes the Ghostly-penguin display or the Cat-display may be omitted.

Retreat Ceremony

Originally called the 'Display Ceremony' by Huxley (1914) but later re-named by Simmons (1959) following Huxley's own criticism of the term in 1957, the Retreat Ceremony is one of the two ritual sequels to Head-shaking. Contrary to the statement by Fjeldså (1973), the name 'Escape Ceremony' has not been used for this behaviour. Male and female play different roles during the main part of the ritual – one active (the *Retreater*), the other more or less passive and stationary (the *Static-bird*). Unlike in the Discovery Ceremony, however, there appears to be no equal sharing of the roles (see below). The chief feature of the Retreat Ceremony is the *Ceremonial Flight* of the Retreater which suddenly, without any obvious warning, rises on the water and 'flees' from the other bird, pattering away for a few or many metres across the surface with neck stretched forward, tippets spread, and wings waving, before subsiding and assuming a form of the Cat-display (see Fig. 40).

There are three or four phases in a full Retreat Ceremony.

The initial Head-shaking phase. Retreat Ceremonies always start with a bout of Head-shaking, usually of high intensity, after the two grebes have joined one another. In already paired birds especially, this introductory Head-shaking is often induced (see above) by an antagonistic encounter with one or more other grebes; in such cases, the pair start Low Head-wagging and Ticking, then switch to High Head-wagging and Slow Head-turning. In some cases, as we have seen, the Head-shaking is that which has already terminated a Discovery Ceremony.

The retreat phase. It is while male and female are engaged in High Head-wagging and Slow Head-turning that the actual 'retreat' typically occurs when one of them abruptly performs its Ceremonial Flight. It all happens so quickly that the exact details are hard to establish, no film being available to study frame by frame,

but I suspect that it is usually immediately preceded by Slow Head-turning for, in other situations as we have seen, similar movements occur as pre-flight behaviour. The Retreater often dashes straight past and beyond the Static-bird, but at other times it appears to turn before making its Ceremonial Flight away from and in front of the partner. Though further observations are needed, I further suspect that the direction and strength of the wind may play at least some part in determining the direction of the Retreat: if there is little or no wind, or if the wind is blowing into the Retreater's face (i.e. from behind the Static-bird), it will tend to move directly past the latter, if however, the wind is coming at any appreciable force from behind (i.e. into the Static-bird's face), the Retreater may be more likely to turn and move away into the air current. In either case, the active grebe ends up with its back to the now distant Static-bird and assumes the Cat-display. Then, sooner or later, it rotates to look back the way it has come — so the two grebes face one another again, but now far apart — at the same time often intensifying the Wing-spread posture. In the Retreat Ceremony, at least eventually, the form of the Cat-display (Fig. 40) differs from that assumed in the Discovery Ceremony (see Fig. 39): instead of Hunching with neck withdrawn and head low, the Cat-bird now tends, while still Wing-spreading, to adopt an erect posture which seems somewhat similar to that used during the withdrawal phase of the Weed Ceremony (see below). Meanwhile, the Static-bird may at first remain 'frozen' in the Head-shaking Upright posture, apparently (like the observer) often taken by surprise by its partner's sudden departure. Or it may *Ruffle* its back feathers or *Swan* its wings defensively, even sometimes lowering its head and lurking in the Forward-threat display. It may also itself go into the full Cat-display but, more usually, it assumes the same upright posture as its partner, though mostly without Wing-spreading, and then relaxes, rotating to face in the direction of the Retreater if necessary.

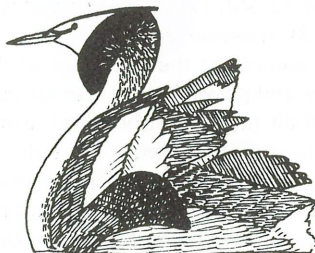


Fig. 40. Retreat Ceremony:
Cat-display.

The terminal phase. This is sometimes omitted, the two birds not re-uniting but swimming or drifting even further apart. More often, however, after a brief pause, they meet each other and start to Head-shake again. The Head-shaking may be perfunctory; more usually, it consists either of moderate to high-intensity High Head-wagging and Slow Head-turning, or largely of Habit-preening. In rare cases, as we have seen, the latter may lead to a Weed Ceremony. Unlike in the Slavonian and Black-necked Grebes, the Retreater does not typically initiate a Discovery Ceremony on re-joining the Static-bird; in one case, however, a Discovery Ceremony did follow an incipient Retreat Ceremony (see below).

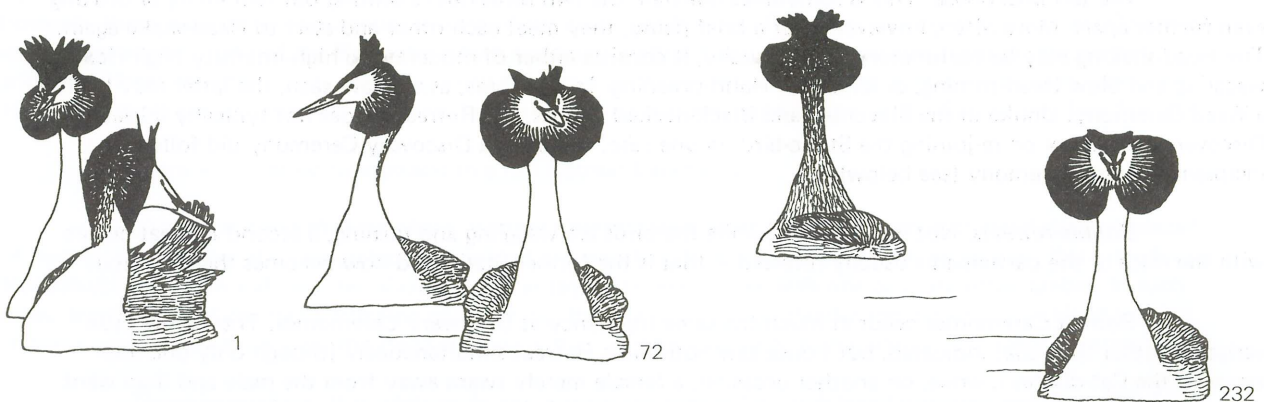
Double-retreats. Not infrequently, while the birds are wagging and turning, a second Retreat occurs with the roles of the participants usually reversed — that is the former Static-bird now becomes the Retreater.

Retreat Ceremonies occur at much the same frequency as Discovery Ceremonies. They show little variation, other than that indicated, but I once saw both birds Retreat simultaneously (though only one then assumed the Cat-display), while, on another occasion, a female merely swam away from the male and then went into the Cat-display which her mate briefly reciprocated. It was this female that went on to initiate a Discovery Ceremony by taking on the role of Ghost-diver (see Simmons 1955). Once, too, a female actually took wing from her Ceremonial Flight (recalling the 'Ceremonial Flying-away' of the Great Grebe), travelled many metres, and

then alighted to assume the Cat-display. There seems to be a marked tendency for the female to take on the role of the Retreatter much more frequently than the male, this being so in 19 out of 26 cases in which the sex of the performers was known to me. Males actually initiated only four of these 26 Retreats, in the remaining three instances making the second Ceremonial Flight in Double-retreats.

Weed Ceremony

This other ritual sequel to Head-shaking is much more complex than the Retreat Ceremony. Formally called the 'Ceremony of the Penguin Dance' (Huxley 1914) and 'Penguin-dance Ceremony' (Simmons 1955), the Weed Ceremony was re-named in Simmons (1968) where several all-important details were described for the first time. The roles of male and female are identical throughout, unlike in the Discovery and Retreat Ceremonies. The main features of the Weed Ceremony may be listed as follows. (1) *Ceremonial Turning-away*: a slow and deliberate formal rotation on the water with neck stiffly erect (see Fig. 42). (2) *Ceremonial Sailing-away*: a slow, effortless and majestic glide through the water as if the grebe were being gently blown along by the wind (Fig. 43). (3) *Sailing-upright* or, to adapt a term suggested to me by P.P.A.M. Kop, *Statue-upright*: a most distinctive posture with neck fully erect, tippets spread into the full elliptical position but often with a marked forward rake so that their lower edges are advanced on each side of the chin, and crest lowered from the vertical of Head-shaking to the lateral (Figs 42-44). (4) *Weed-dive*: a slow and deliberate submergence head-first; the Sailing-upright posture is maintained to the last moment (Fig. 44), the bird disappearing below the water with crest and tippets still in the special posture — unlike in normal diving when all the head feathers are tightly depressed. (5) *Weed-trick*: submerging, underwater searching for soft, lank weed of the sort used in nest-building, and surfacing with as large a bill-full as possible. (6) *Weed-forward*: a rather hostile-looking posture in which the bird holds its cargo of weed with head low, neck arched, and back feathers raised (Figs 45-46). (7) *Weed-lurking*: waiting in a stationary position while adopting the Weed-forward posture (Fig. 45). (8) *Weed-approach*: swimming towards the partner in the Weed-forward posture (Fig. 46). (9) *Ceremonial Rise-and-clash*: the first stage of the mutual Weed-dance in which the two grebes — each paddling with its feet rapidly and powerfully — rise abruptly out of the water into the erect *Penguin-posture* with bodies vertical and only their tail-ends submerged, usually colliding breast to breast as they do so (Figs 47-49), at times so energetically that they almost leave the water for a moment. (10) *Weed-dance*: while still holding the weed and maintaining the Penguin-posture by continually treading water, male characteristically higher than the female (see Fig. 50), both birds *Weed-swing* by rapidly and rhythmically pointing the bill from side to side, this *Fast Head-turning* movement having a marked amplitude and being quite distinct from the other forms of Head-shaking already described; the two grebes often co-ordinate their Fast Head-turns closely, moving in absolute unison, each pointing the bill to the same side so that they act as mirror images of one another. Though the tippets are still spread, the crest is typically closed and depressed during the Weed-dance (see Plate 16).



Figs 41–43. Weed Ceremony: the withdrawal phase — three stages during Ceremonial Turning-and-Sailing-away.

There are four main phases in a full Weed Ceremony between the introductory and concluding bouts of Head-shaking.

The initial Head-shaking phase. The Weed Ceremony proper is always preceded by high-intensity Head-shaking, consisting usually of Low Head-wagging and Ticking followed by High Head-wagging and Slow Head-turning and then by Habit-preening. This introductory Head-shaking often arises more or less spontaneously but, as we have seen, it may occasionally be the terminal Head-shaking of a Discovery or Retreat Ceremony.

The withdrawal phase. Contrary to the statement in Simmons (1957), prolonged Habit-preening is a highly characteristic component of the initial Head-shaking phase of the Weed Ceremony and is a good indication that the first main phase of that ceremony is impending. As they Habit-preen, first one and then the other grebe starts its Ceremonial Turn-away (Fig. 41) so that its back is eventually presented to the partner (Fig. 42). Each then Ceremonially Sails-away (Figs 42-43), sooner or later changing over from the ordinary Head-shaking Upright to the full Sailing-upright posture (Fig. 43, foreground bird; Fig. 44). One or both birds may at first continue to Habit-preen while Sailing-away, but soon all activity is confined to the trance-like swimming and (at least occasionally) to quiet, repeated utterance of the *Twanging-call*. After progressing thus, usually for many metres in more or less opposite directions (Fig. 43), so that they become widely separated, first one and then the other stops (Fig. 44) and performs the Weed-dive. The first bird not infrequently submerges well before the other which may sometimes then turn on its tracks and Sail back the way it came before diving.

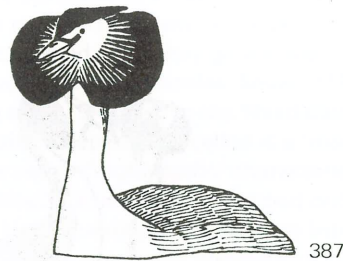


Fig. 44. Weed Ceremony: the withdrawal phase — bird about to perform the Weed-dive.

The Weed-trick phase. The Weed-dive initiates the second main phase of the ceremony — the Weed-trick. In favourable conditions, the gathered cargo of weed can be surprisingly big, hiding the bill and trailing below it like a dark, shaggy beard. In the local absence of weed, however, the birds will collect other items, such as sunken twigs or reeds, if only the smallest fragment.

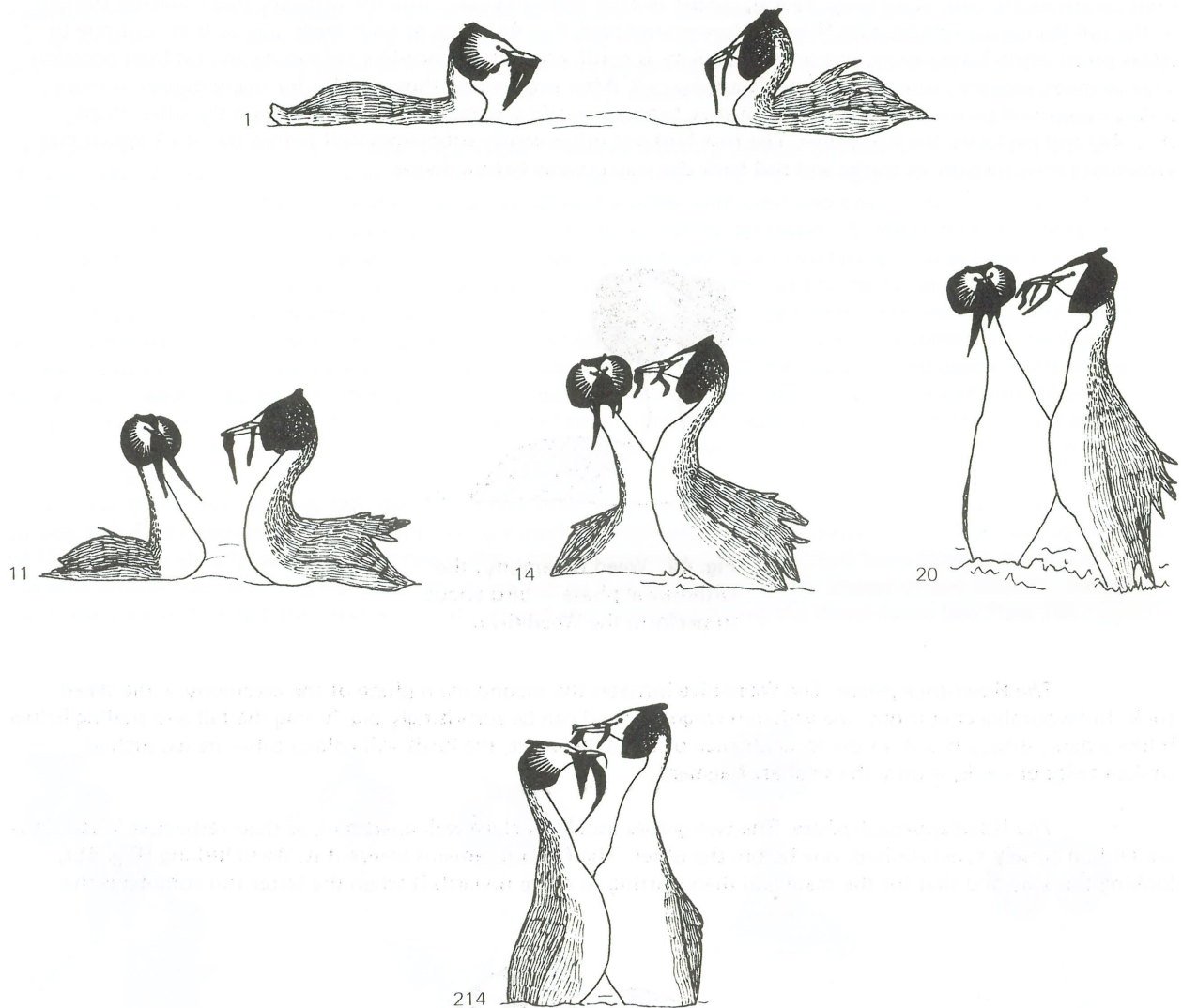
The Weed-approach phase. The two grebes usually surface well apart and, as their respective Weed-dives are seldom closely synchronised, one before the other. The first up remains where it is, Weed-lurking (Fig. 45), looking this way and that for the mate and then starting to move towards it when the latter too completes the



Fig. 45. Weed Ceremony: Weed-lurking.

Weed-trick. The second bird also tends to Weed-lurk, but usually only briefly, and both eventually swim quickly towards the other in the Weed-forward posture (Fig. 46).

The Weed-dance phase. Travelling thus, the two grebes soon meet head-on, upon which they immediately perform the Ceremonial Rise-and-clash and initiate the spectacular Weed-dance, the climax of the ritual. As they tread water and Weed-swing with their heads, they often remain in breast-to-breast contact; but they will at times 'stand' somewhat apart, thus showing that the support of the partner is not essential (see Plate 16, upper right). After a few or many (occasionally over 40) joint Weed-swings, first one and then the other subsides, shaking away the weed at the precise moment that normal High Head-wagging begins.



Figs 46–50. Weed Ceremony: the approach and meeting phases — Weed-approach (Fig. 46) followed by the Ceremonial Rise-and-clash (Figs 47–49) and Weed-dance proper (Fig. 50).

The terminal Head-shaking phase. As they subside, the birds engage in a bout of usually fairly brief, phase-2 Head-shaking — that is they High Head-waggle and Slow Head-turn together. The transition between Weed-swinging and mutual Head-shaking is, however, by no means always closely co-ordinated; one grebe often subsides well in advance of the other, High Head-wagging in the Head-shaking Upright posture while its partner continues to Weed-swing on its own in the Penguin-posture (see Plate 16, lower).

It was still not fully known until quite recently how the main phases of the Weed Ceremony were initiated and co-ordinated in the Great Crested Grebe. Now, however, it is clear that the Weed-trick phase is preceded by highly specific behaviour: firstly the intense Head-shaking with much Habit-preening, then the Ceremonial Turning-and-Sailing-away in a most distinctive manner and posture, and finally the special Weed-dive. Male and female can perform each stage of the ceremony more or less synchronously, but usually one or other gives the lead. Not infrequently, however, initiated Weed Ceremonies are not completed, only about half proceeding to the climax of a full Weed-dance. Out of 105 Weed Ceremonies observed (84 at Chew), 59 (45 at Chew) advanced to the Weed-dance phase; a further eight were nearly complete, but one of the birds failed to rise into the Penguin-posture. In all but one of the remaining cases (mostly at Chew), both grebes dived but neither subsequently took part in a Weed-dance: in seven, both completed the Weed-trick only, then usually just Head-shook together (so-called *Weed-trick Ceremony*); in a further 23, only one completed its Weed-trick, the second bird evidently often having difficulty in finding weed or any other material and finally giving up; in seven more, neither completed the Weed-trick. Finally, in just one case, only one of the grebes dived after both had Ceremonially Sailed-away. There were also a number of instances in which one or both birds Ceremonially Turned-and-Sailed-away after Head-shaking but then neither dived; these have not been classed as Weed Ceremonies of any sort. Thus, the full Weed Ceremony is revealed as a complex of sequences which its participants often find difficult to co-ordinate, and it remains highly probable that really complete performances are achieved only by birds that are firmly and harmoniously paired. Possibly, also, pairs do not become fully established until they go through even more complicated sequences of courtship, that is combined Discovery-Retreat-Weed Ceremonies. Selous (1901) — whose one observed Weed Ceremony was followed by copulation at the platform site — referred to the Weed-dance as a 'marriage ceremony', and I have myself (Simmons 1968) similarly though quite independently called it a 'marriage-confirming rite'; future observation will establish the exact implications of these rather 'unscientific' characterisations. The Weed-dance itself was once thought to be rare, but we now know that Weed Ceremonies are second only to independent Head-shaking Ceremonies in frequency. About one in every ten of all Head-shaking bouts develop into at least the Weed-trick phase of a Weed Ceremony, and about one in every 20 culminate in the Weed-dance itself.

Food-presentation

This, the least frequently seen of the Great Crested Grebe's courtship activities, has been overlooked by most observers, including myself until 1968 at Chew — though Miss L. McCartan (now Mrs Slay) had drawn my attention to it several years earlier. During the engagement phase of the cycle (see Simmons 1974), before nesting has taken place, the male, after catching a small fish while engaged in a normal spell of self-feeding, occasionally takes it and offers it to the female. In one case, it was a length of tapeworm that was presented (Simmons 1975). Such *Food-presentation*, though at least at times associated with Head-shaking, seems otherwise to be quite unritualised and totally irregular in its occurrence. It is best, therefore, to avoid using the term 'Courtship-feeding' for such behaviour; while simple Food-presentation probably occurs in all or most *Podiceps* grebes, regular Courtship-feeding seems to be confined to the Western Grebe.

More observations are urgently needed on incidents of Food-presentation by Great Crested Grebes in the period well before the eggs are laid. This behaviour should not be confused, as by some observers (such as Rankin 1947, Jones 1955), with the parental bringing of food to the nest before or during the hatching of the young. However, deliberate Food-presentation by either sex to the mate does occur not infrequently when older young are being fed; also, in some pairs, during the re-establishment of the pair-bond late in the cycle. Strangely, neither the Great Crested Grebe nor any other grebe, so far as we know, has developed the heterosexual presentation of feathers to the mate, though these are frequently given to the young (Simmons 1956, 1970b).

PLATFORM-COURTSHIP

In my 1955 paper, I coined the term *platform-behaviour* for the activities and calls associated with (1) the collection of material, (2) the building of structures to be used for mating and, later, for holding the eggs, (3) soliciting, and (4) copulation. Later (1959), I also used the term *Mating Ceremony* for sequences of soliciting, copulation, and post-copulatory display. In all grebes, so far as known, not only will both sexes solicit but either can take the active role in copulation, reversed mating having been first demonstrated for the Great Crested Grebe by Selous (1901). As platform-behaviour often precedes nesting by many weeks or months, first occurring as early as December or January, it became clear that these activities must play an important part in courtship — for copulation, even when performed by the male, cannot then lead to the insemination of the female. It is useful, therefore, to refer to early soliciting and copulation as *platform-courtship*. True, functional copulations, almost entirely by the male, take place only immediately before and during egg-laying, when the female ovulates. It has yet to be demonstrated that fertilisation can be achieved during the occasional reversed copulation at this time. The true nest is also built at this time; it may derive from one of the preliminary structures used for platform-courtship but, as these are often too exposed or otherwise unsuitable for nesting, a new and safer site is often chosen.

The adaptive aspects of early pair-formation, water-courtship, and platform-courtship are discussed in Simmons (1974).

Inviting-on-the-water

Once they have settled in a territory, usually from mid-winter onwards, the Great Crested Grebe pair seek out sites, typically together. A highly characteristic form of behaviour in these early days before any effective mating platforms have been assembled is what I call *Inviting-on-the-water*. Either male or female, or sometimes both simultaneously, floats immobile with back turned to the mate and head held forward and low, neck kinked, while uttering intermittent Twanging-calls. This behaviour is similar to one form of soliciting shown later upon the platform (see below), but occurs typically on open water off stands of covers or in the edge of, or among sparse, flooded vegetation. It can follow bouts of water-courtship but is best considered a form of incipient platform-behaviour that is often associated with site-selection early in the cycle. It is not, however, at this stage preceded or followed by the gathering of material or by building; nor does it lead to copulation.

Soliciting

The grebe pair, during their site-seeking, sooner or later start to build one or more rudimentary mating platforms. When one of these is firm enough to support a grebe's weight, male and female take turns in soliciting upon it. This is of two forms: *Inviting* and *Rearing* (Simmons 1955). One of the pair (the *On-bird*) first jumps up out of the water on to the platform, then usually sits down to Invite or Rear when its mate (the *Water-bird*) comes near. While Inviting, the On-bird extends its kinked neck forward over the edge of the platform and remains immobile (see Plate 14, upper right) while Twanging periodically. It contrives to keep an eye on the Water-bird and, when the latter swims up close behind or to the side, often Rears by rising suddenly into a standing position with its back to the other while arching its neck grotesquely downwards with the bill initially pointing back towards its feet. In this pose, and while inclining the head sideways to squint back at the Water-bird, it *Wing-quivers* by rapidly shaking the closed wings in a burst of three shakes at a time, thus 'flashing' their white dorsal markings (Plate 14, upper left). It may then retain the Rearing position, with or without further bursts of Wing-quivering, occasionally toying with nest material or preening the underparts; more usually, however, it just stands still, watching the Water-bird, and soon subsides back into the Inviting position. The activities of the Water-bird, meanwhile, are less stereotyped. It may drift or swim aimlessly about in the vicinity of the platform; or preen; or collect, bring, and incorporate material; or High Head-waggle spasmodically at the On-bird. At times also, it may show intentions of mounting the other, approaching close from directly behind and making aiming movements

of the head as if about to jump up. In the early phases of the cycle, however, the Mating Ceremony does not usually proceed beyond this point, male and female just alternating in the roles of On-bird and Water-bird.

Copulation (mating)

Later in the cycle – but still well before egg-laying – full Mating Ceremonies take place, with the Water-bird frequently mounting and copulating with the On-bird, reversed mounting by the female at this time appearing identical in all its movements and calls to the equivalent behaviour of the male. Prior to mounting, the Water-bird starts giving the loud, highly distinctive *Mooing-call* (I suspect, too, that the same call is uttered simultaneously by the On-bird). This call reaches its peak as the Water-bird prepares to mount (see Plate 14, upper right), expanding its tippets to the full elliptical position and raising the crest before leaping suddenly out of the water on to the On-bird's back (Plate 14, lower right). Once mounted, the active bird changes from the *Mooing* to the *Rattling-call*, continuing to call thus as it stands, more or less erect and supported on the flat of the tarsi, with the neck and head arched forward, bill open, for some six seconds while copulating (Plate 15, upper left). Calling then stops as it suddenly waddles forward and dismounts over the On-bird's head, forcing it momentarily under water. On re-entering the water, the active bird still maintains its upright position while vigorously stamping and noisily splashing with its feet (*Post-copulatory Water-treading*: see Plate 15, upper right). Then it starts High Head-wagging with its back still turned away from the On-bird. The latter, meanwhile, after remaining in the Inviting posture throughout, now raises its head and also starts High Head-wagging – thus joining in a brief or fairly prolonged spell of *Post-copulatory Head-shaking*. During this, the Water-bird either rotates to face its mate (Plate 15, lower) or slowly moves away, spasmodically Head-wagging as it goes.

Ceremonial-building

Though the pair often build the platform, and later the nest, together, their behaviour is usually strictly functional; see Simmons (1955) for descriptions. Jan Fjeldså has, however, drawn my attention to the fact that Great Crested Grebes will sometimes engage in ritualised building, much as in the Little Grebe, male and female repeatedly and formally picking up and dropping the same piece of material alternately while more or less facing each other across the platform. It would appear, however, that such mutual *Ceremonial-building* cannot be really common in the present species. The behaviour is not familiar to me, although I have watched building many times over the years, and, in a quick search of my notes, I have located only one record – on 29 April 1968 at Chew. On the other hand, Ceremonial-building by one member of the pair, while the other is also in the vicinity of the platform, may possibly be much more common. Further study of the whole problem is clearly needed.

SUMMARY AND COMMENT

The main purpose of this paper has been to provide definitions and detailed, up-to-date descriptions of the courtship of the Great Crested Grebe *Podiceps cristatus*, largely for comparative purposes and to stimulate further work on this and other species of grebes (Podicipedidae). The chief features of the water-courtship of the Great Crested Grebe are (1) vocal Advertising, (2) the Head-shaking Ceremony, (3) the Discovery Ceremony, (4) the Retreat Ceremony, and (5) the Weed Ceremony; those of the platform-courtship (1) Inviting-on-the-water (2) soliciting, and (3) copulation – the last two items constituting the Mating Ceremony. Less frequent activities are (1) Food-presentation, and (2) Ceremonial-building.

I have stressed the link between both types of courtship and the process of pair-bond establishment and maintenance. For those interested in pursuing the topic further, I would refer them for very preliminary discussions of other problems to my papers of 1955 (motivation and derivation), 1965 (possible functions of the different water-courtship ceremonies), and 1974 (ecological aspects). Useful discussions will also be found in

the papers by Storer (1969) and Fjeldså (1973) on the Slavonian Grebe, while the concluding remarks of Huxley's great papers of 1914 and 1923 are of considerable historic interest.

In my earlier *Studies on Great Crested Grebes*, I was particularly fascinated by the question of the evolutionary history of water-courtship ceremonies, suggesting that some of them had their origin in antagonistic encounters that later became increasingly ritualised. Thus, I saw the Discovery Ceremony as deriving from underwater attack by the Ghost-diver which was appeased by the Cat-display of the other bird; the Retreat Ceremony from fleeing and appeasement by the active bird; and the Weed-dance from mutual, breast-to-breast combat. This old interpretation of mine seems now to be generally accepted, if with some reservations, and is amply supported by data from more recent observations on other grebes. Thus, for example, Rolland's Grebe has a strange Bumping Ceremony in which one bird, after the two have faced with erect necks, dives and then surfaces forcibly under the other, knocking it out of the water; the Penguin-dance of the Red-necked Grebe is accompanied by hostile-looking biting and fencing movements of the bills as the two birds paddle breast to breast; the Weed-dance of the Slavonian Grebe consists of only a brief Rise-and-clash and is followed immediately by both birds turning side by side and rushing off together over the water, as if attack turned instantly into escape; the spectacular, mutual Rush of the Western Grebe may be preceded by repeated threat-like movements with lowered heads and ends in a ceremonial dive. How much of the original motivation, of attack and escape, now remains as a causal factor in present performances of these activities is not fully clear, but I suspect that at least some does, especially at the start of the pairing process. This and many other problems have still to be adequately investigated, so we still have much to look forward to in the growing comparative study of the grebes.

Acknowledgements

Special thanks are due to Robin Prytherch and W.N. Charles for their illustrations. All the drawings are taken from cine-film by Ron Eastmann and used in the B.B.C. television film 'The Private Life of the Great Crested Grebe' (produced by Jeffery Boswall and Suzanne Gibbs), first transmitted in 1970. They were initially projected on to drawing paper, using a frame-by-frame film analyser belonging to the Department of Psychology, University of Leicester, then traced and later reduced and redrawn in the semi-stylised form employed here. My work at the Somerset lakes in 1966-70 was financed by a special research grant from the Natural Environment Research Council. For further acknowledgements, see Simmons (1970b, 1974).

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ADDITIONAL RECORDS OF ALBINISM AND MELANISM IN GREBES

by Bernard King

In my earlier paper on this subject (King, 1973) I endeavoured to list all the known incidences of albinism and melanism in the eighteen or so species of grebe in the world. Stimulated by this information not only has an additional record been published (Simmons, 1974) but I have also received details of another six unusually plumaged grebes. Two new species have been added to the list — Least Grebe *Limnodytes dominicus* and New Zealand Hoary-headed Grebe *Poliiocephalus rufopectus*. The summarized World distribution for Least Grebe was extracted from Meyer de Schauensee (1971) and that for New Zealand Hoary-headed Grebe from Falla *et al.* (1960). I have not repeated the distributions for the other species mentioned.

The doubt that was cast over the identity of record (4) under Red-necked Grebe *Podiceps grisegena* was justified for it now seems that the bird in question is almost certainly a Great Crested Grebe *P. cristatus*. Full details of this correction are given under the Great Crested Grebe entry in the list below.

With these additional records (and allowing for the correction) the number of known grebes throughout the World with albinistic or melanistic features is 33 (31 albinistic — including two young seen together — one melanistic and one showing both features). They are: Pied-billed Grebe *Podilymbus podiceps* (one), Little Grebe *Tachybaptus ruficollis* (four), Least Grebe (one), New Zealand Hoary-headed Grebe (two), Black-necked Grebe *Podiceps nigricollis* (five), Slavonian Grebe *P. auritus* (four), Red-necked Grebe (six including the two young), Great Crested Grebe (nine) and Western Grebe *Aechmophorus occidentalis* (one). The Least Grebe and one of the Great Crested are the two that show melanistic features. The additions are listed below (the numbers follow on in sequence from my previous paper) and I have maintained a similar format to facilitate easier reference and continuity.

LITTLE GREBE

Albinism: one additional record (total four).

(4) An all white bird with reddish legs and orange-red bill, Westhouses, Derbyshire, 17 September, 1962. (Letter from R.A. Frost dated 2 December, 1974).

LEAST GREBE. Breeds in parts of Mexico, whole of Central America, most of South America to Argentina and south-east Patagonia, Cuba and West Indies. Casual in California. Winters within the range.

Melanism: one record.

(1) A female collected at La Laguna, Darien, Panama, 19 March, 1964, with very dark underparts. Now No 484262 in the United States National Museum. (Letters from M. Ralph Browning dated 26 February, 1975 and Robert W. Storer, 29 October, 1974). This is only the second known occurrence of melanism in grebes.

NEW ZEALAND HOARY-HEADED GREBE (or DABCHICK). An endemic species to New Zealand where it is well distributed on North Island but now very scarce South Island.

Albinism: two records.

(1) A partially albino female with the wings and sides of the head dark and much of the rest of the bird white with scattered dark feathers collected at Glenmark (Buller, 1888). Now No 526361 in the American Museum of Natural History. (Letters from Robert Falla dated 6 December, 1974, and Robert W. Storer dated 29 October, 1974). Buller also mentions another variant being buff where it should have been silvery white but it could have been merely stained and not true melanism. (Letter from Robert Falla).

(2) An albino seen at Canterbury many years ago but unfortunately details have now been mislaid. (Letter from Robert Falla).

BLACK-NECKED (or EARED) GREBE

Albinism: one additional record (total five).

(5) A completely white bird mounted in the office of the Bear River Wildlife Refuge, Utah, U.S.A. No other details available. (Letter from Robert W. Storer dated 29 October, 1974).

RED-NECKED GREBE

Albinism: one additional record (total still six as bird (4) in my earlier paper has now been placed under Great Crested Grebe — see below).

(7) A female found dead at Fort Qu'Appelle, Saskatchewan, Canada, 24 May, 1959. It was normally plumaged, except for a scattering of white among the black feathers from the crown to the lower back, with a concentration of white at the lower part of the back of the neck where they constitute half or more of the feathers. (Letter from Robert W. Storer dated 29 October, 1974).

GREAT CRESTED GREBE

Albinism: two additional records (total eight).

(7) A pure white bird with creamy tinge on mantle. This is the record first listed as no. (4) under Red-necked Grebe in my earlier paper (King, 1973). Witherby (1928) reported that the bird was sent to him soon after it had been shot. He passed it to Lord Rothschild who identified it as a Red-necked Grebe. A few weeks later Lord Rothschild confirmed in the *Bull. Brit. Orn. Club* 48(1928):73–74 that both he and Dr E. Hartert thought that it was a Red-necked Grebe but that H.F. Witherby was of the opinion that it was a Great Crested Grebe. Since this is the bird that is in the skin collection of the British Museum (Natural History), Tring, I wrote to Derek Goodwin there and asked him if he would kindly investigate the matter. Thus, in April earlier this year, both he and Dr Jan Wattell (of the Amsterdam Museum) examined the skin and compared it with many specimens of both species. As a result of this, they both think that it is a Great Crested Grebe (letter from Derek Goodwin dated 22 April, 1975). Mr Goodwin adds..... "That two such eminent ornithologists as Witherby and Hartert disagreed will, I think, indicate that the problem is not perhaps one capable of an easy and absolutely certain solution."

(8) "A pure white" bird was seen at close quarters on Fleet Pond, Hampshire, on 8 October, 1938, by J.C.M. Nichols. In a letter to *The Field* for 22 October that year, the observer mentions that the bird, which was "white from beak to tail" apart from "the faintest tinge of blue-grey along the back", was definitely not just an adult in winter plumage but one still in breeding dress showing "a considerable crest" (Simmons, 1974).

Acknowledgements

I am greatly indebted to the following for supplying records and spending a considerable time looking through large collections of grebe skins: G.W. Benson, Dr R. Browning, R. Falla, Dr J. Farrand, R.A. Frost, D. Goodwin, R.D. Penhallurick, Dr K.E.L. Simmons, Dr R.W. Storer, Mrs T. Putnam and J.G. Williams.

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NOTES

Red-throated Pipit at Blagdon Lake, Somerset

During the late afternoon of 24 September, 1973, I was at Blagdon Lake, Somerset, (now in Avon) in company with R.M. Curber when we decided to walk down to the area of wet, and, in some places parched mud, at the Ubley end of the reservoir. The exposed bed was in places, fairly thickly covered with weeds, mainly Goosefoot, *Chenopodium rubrum*. As we walked through this area we flushed a pipit which gave a most distinctive call and reminded me of the call of a migrant Red-throated Pipit *Anthus cervinus* that I had observed on 6/7 May, 1973, near Minsk, Russia.

The bird was flushed again and the same single drawn out call was heard. As views of this bird were frustratingly brief, it is the call which one would like to emphasize as the distinguishing factor. It is, of course, notoriously difficult to render a bird's call with human sounds. However, the note uttered by the pipit can be described as a long drawn-out, not too harsh (certainly not as harsh as the "teeez" flight call of a Tree Pipit *A. trivialis*) "seeeeee/eeeeee", i.e slightly disyllabic, but not pronouncedly so. It had a rather 'thin' and somewhat melancholy quality to it. The call was not at all like the "tseep" of a Meadow Pipit *A. pratensis* of which at least 30 were present and calling continuously.

In flight it reminded us of a Meadow Pipit but the general colouring was rather dark brown, in some ways reminiscent of a Reed Bunting *Emberiza schoeniclus* and contrasted with the yellowy-green appearance of the Meadow Pipits. As I have mentioned before, only brief views were obtained of this bird on the ground and the following description was taken :

Upper-parts: Mantle brown with dark striations. Two buffish wing-bars showed clearly.

Under-parts: Heavy streaking was seen on the flanks, sides of breast and throat. One glimpse of the bird front on showed a pale buffish chin this contrasting strongly with the dark streaks at the sides.

An exhaustive search of the same area on the following day failed to re-locate the bird. I have since observed several parties of Red-throated Pipits in the Voronezh Region, Russia, and my observations there confirm that the Blagdon bird could only have been of that species.

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Additional notes on Mute Swans breeding at Blagdon and Chew Valley Lakes

I was interested to read the note on Mute Swans *Cygnus olor* breeding at Blagdon and Chew Valley Lakes in 1972 (*Bristol Ornithology* 7(1974):73-75) and can add further information on the fate of the young from June onwards, after the period covered by Tibbles.

The brood of two at Blagdon apparently survived. They were still with their parents on 21 September, but that was my last visit until the following January. Two immature birds present on 13 April 1973 could well have been these.

My observations at Chew Valley Lake show that in fact three broods survived the summer, not two as suggested by Tibbles. On 23 June, together with K.G. Harris, the entire lake was covered and three broods located. For easier reference these are referred to by the same letters as used in the original note with the additional one as E. There was a brood of six at Denny Island (D), a brood of six on the East Shore (A), one of the original seven from this brood having obviously died, and three at Herriott's Bridge (E). This brood was smaller in size than the others so they had hatched later and were from a well-hidden traditional nest site close to Herriott's Bridge.

This situation remained unchanged during July but on 1 August two young from brood A had become separated from the rest. By the 4th the cygnets were back together but they had been deserted by their parents. The young now were only 11 weeks and 2 days old; the normal fledging period being about 18 weeks. On the 15th only four could be located (the remains of one were found in Spring Bay) while six days later only three remained. By the 24th one of the adults of pair D had deserted its brood, but one of these generally leaves early every year. The remaining adult was seen with seven cygnets which meant that one of brood A had tagged on. This seems unusual as adult swans are usually rather intolerant of outsiders; indeed on the 21st the D adult had been seen to chase away some of the A cygnets.

There was a gap in my observations until 5 September when only five young birds remained, these being divided into broods of two and three. No additional corpses were found so it could be presumed that at least some of the other seven had left. The five juveniles remained until at least 28 October. By 18 December only two remained (these from brood E) and they were still present on 9 January 1973. None of the previous year's cygnets were located in the following March.

The pair on Herriott's Pool is the only one which is permanently resident at Chew. Herriott's Bridge is a locality always favoured by swans, this probably being due to the good feeding conditions of the Pool which presumably has a higher density of aquatic vegetation due to the constant water level and also the added advantage of supplementary food supplied by visitors. The young of this pair usually remain as a family group through the winter until they are driven away when nesting activities start again during the following spring. Most of the other breeding swans leave the lake in the autumn, usually returning during the second half of March or early April.

The luckier cygnets either stay with their parents through the winter (like those on Herriott's Pool) or, more usually, they leave as family parties in the autumn to join the comparative safety of a wintering herd. The unlucky ones are abandoned rather too early (like brood D) before they are mature enough to fend for themselves. A large proportion of these birds are then found dead during September and October. Although there is no direct evidence it seems probable that these are killed by Foxes *Vulpes vulpes* whilst roosting on the mud at night. Corpses are always found partially eaten and dragged well away from the water's edge. Cygnets on their own would be very vulnerable and roosting birds very conspicuous on the exposed mud. Earlier in the summer, before the water level falls, they could be concealed more easily in the vegetation. The seriousness of these attacks was well illustrated in 1969 when 14 young were reared in three broods but no less than seven were found dead on 19 October. A similar situation occurred in 1974 with seven out of the 14 young which survived the summer having disappeared by late September with four Fox-killed cygnets actually being located. In this year the pair at Herriott's Bridge produced seven young. Three of these remained with their parents on the Pool while the others spent most of their time on the main lake. However, when the water level fell these four were unable to rejoin their parents as they could not climb up the overflow. They eventually took to wandering across the whole expanse of the lake and in a short time all had disappeared or were found dead.

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Gull behaviour during sea-mist in the Bristol Channel

On 13 July, 1969, whilst on board m.v. *Balmoral* and engaged in a sea-bird survey (see *Bristol Ornithology* 4(1971) : 159–171) a heavy sea-mist was encountered for much of the journey. A fair census of the sea-birds was impossible, nevertheless the trip surprisingly had its interesting compensations to learn a little of how gulls behave in these weather conditions. As the vessel approached Steep Holm on the return journey, it was seen that as far as visibility allowed the calm sea was 'carpeted' with many hundreds of Great Black-backed Gulls, *Larus marinus*, Lesser Black-backed Gulls *L. fuscus* and Herring Gulls *L. argentatus*, all of which appeared to be adult. Their only purposeful movements were those compelled by the approach of the *Balmoral*. The number of gulls on the water increased the nearer we steamed towards Steep Holm. However, a sudden off-shore breeze started and it was not long before sunny weather took over and cleared the channel of sea-mist for as far as we could see. The full realisation of the 'grounded' gull numbers could then be appreciated and these were in thousands. Although the time was 17.40 hours when normally the gulls would be expected to be making their way back to Steep Holm to roost,

on this occasion their long straggling flights were mainly making down channel and out of sight. It was presumed that the birds were belatedly making for their feeding grounds before ultimately returning to roost. The experience was entirely new to me although there can be little doubt that it is normal behaviour during the summer in similar weather conditions.

Bernard King
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CLUB ACTIVITIES, 1974

1974 saw the start of the Gull Photographic Competition in October, which caused several cameras to be "aired". The Club's Kestrel Nestbox Scheme scored its first success — a pair brought off young in member Dilys Breese's garden near Chepstow.

The annual subscription was raised to £2.00 in October, and senior citizens among our members became eligible for a reduced subscription rate. A charge of 25p for guests at meetings was introduced. The Club made donations to the Ken Smith Memorial Fund, and to the Kenneth Allsop Memorial Fund.

We held a joint Film Show with the RSPB in October, and another with the Wildfowl Trust in November. A very successful Wine and Cheese Party took place at Bristol Grammar School in September, in conjunction with the Somerset Trust for Nature Conservation.

Field Meetings

Two successful weekend trips were organised — to the Solway Firth and the Gower Peninsula. A couple of Beginners' Meetings were also held. The 24-hour Tally Hunt and Barbecue converged on Bristol Grammar School's playing fields at Failand in July, while the Christmas Tally Hunt again took place on foot. Several members continued to travel on White Funnel Steamer Trips, thus contributing to the Bristol Channel Seabird Survey.

Indoor Meetings

As before, these took place at St Mary Redcliffe and Temple School, and were generally well attended with about 170 members at the March meeting.

- 1. 1.74 — Members' Meeting
- 21. 2.74 — Canada Geese and Eskimos — Don Baldwin
- 21. 3.74 — Gravel Pit Reserve — Dr & Mrs J. Harrison
- 10.10.74 — Birds of East Africa — Tony Deane
- 14.11.74 — Sound Recording Trip to Southern France —
John Burton and David Tombs
- 12.12.74 — A.G.M. and Christmas Social

Publications

Bird News continued to be published monthly thanks to the hard work of a few members, particularly Derek Lucas. Several members collected their copies at indoor meetings, and a number were hand-delivered, thus saving considerable postal charges. *Bristol Ornithology* 6 was distributed in the early part of 1974 and although attempts were made to get no. 7 out within the year, it did not appear until the beginning of 1975.

Wendy Dickson *Honorary Secretary*

