disused nests of various waterbirds. None of them showed evidence of being built or of having material added by the ducks.

Ticehurst Swamp is over four kilometres in diameter and like most canegrass swamps has only a few scattered trees and bushes on its perimeter. Such swamps are probably the most favoured habitat of the Pink-eared Duck and, should it restrict its nesting to the few sites available on the perimeter, the species would seriously reduce its breeding potential, which it must exploit to the full when seasonal conditions allow. I imagine that few persons wade through the monotony and discomfort of a large canegrass swamp and consequently nests reported in such a locality are probably, incorrectly, few. I suggest that the ducks may build their own nests in canegrass quite often. Occasional lining of nest-hollows suggests that nest-building is an inherent activity of the Pink-eared Duck.

J. N. Hobbs, *Columbus Street, Ivanhoe, NSW 2878.* 27 January 1975.

MOULT OF RED-NECKED STINTS AT WESTERNPORT BAY, VICTORIA

On 29 November and 12 December 1974 seventy-eight Red-necked Stints *Calidris ruficollis* were caught with a clap-net at Stockyard Point, a wader roost holding about 500 stints on the eastern shore of Westernport Bay. Each bird was examined for its state of moult, before being dyed on the underparts and released. (This colour-marking formed part of a study of movement of waders between feeding and roosting areas on Westernport Bay.)

Moult of the primary feathers was recorded by the system in general use in Britain; its validity for passerines was discussed by Evans (1966) and for waders by Pienkowski *et al.* (in press). In this system, a feather missing or in pin is allocated a score of one and various stages of growth of the vane are allocated scores of from two to five, the last referring to a fully formed new feather. Waders have ten conspicuous primaries; thus complete replacement of feathers in one wing would score 50.

Of the seventy-eight Stints examined, all but fifteen were moulting some primary feathers and so were probably at least one-year old. All were in grey non-breeding plumage, with tips of the primary feathers abraded, sometimes markedly so. Probably, therefore, the fifteen non-moulting birds were also 'adults', and indeed three of them had retained a few feathers of the reddish brown breeding plumage among their scapulars, so were definitely more than one-year old. The distribution of moult scores of all birds is shown in Table I.

TABLE I

Moult scores of Red-necked Stints at Westernport Bay

Moult score of right wing	0	1 / 5	6 / 10	11 / 15	16 / 20	21 / 25	26 / 30	31 / 35	36 / 40
Number of birds	15	18	5	3	15	6	4	10	2

Even with this quite small sample, the presence of three types of moulting birds may be inferred: (1) a group that had just begun to moult in late November, (2) another that had reached almost half-way through the moult and (3) sixteen individuals with moult scores greater than 26. All birds in this last group had undergone 'arrested moult'. This refers to replacement of only some primaries at any one moulting period or place and may be recognized by the presence of a block of fully grown, new feathers adjacent to a block of old feathers or separated from the old feathers by a single feather in the early stages of growth. Of the sixteen that showed arrested moult, four had replaced five feathers, ten, six feathers and two, seven feathers before moult stopped. All had just begun their moults again and had the next primary missing or in pin.

These results may be compared with those of Thomas and Dartnall (1971) who examined nearly 100 Red-necked Stints between September 1967 and April 1968 near Hobart, Tasmania. Unfortunately their data included only small samples of birds from any one day; so they presented them as a scatter diagram of moult score against date. From this they concluded that from start to finish the moult took just over three months on average. They also calculated, by subtracting an average rate of growth from the score on a given date, that moult of the primaries in different individuals began between 21 August and 8 December. Although they noted the possibility of arrested moult of the body feathers of a few individuals caught in September (because these birds were in transition between breeding and non-breeding plumage but not in active moult), they made no mention of arrested moult of the primary feathers. Such a phenomenon would invalidate the method they used to estimate the dates on which birds had started moult. In 1974, it occurred in about twenty per cent of the birds I examined.

From the scatter diagram that Thomas and Dartnall presented of moult score against date, the best straight line fit suggests that the average score of Tasmanian birds in late November and early December 1967 was about 25 (recorded as 50 on their diagram, which summed scores from both wings). This value is comparable to those of Group (2), which were in mid-moult on Westernport Bay in 1974. The Tasmanian data also included a few birds that were just beginning moult in late November, but these were not recognized as a distinct population, as my data in 1974 suggest.

It may be speculated that Group (1), which had just begun moult, had reached Westernport Bay considerably later than Group (2), which were almost half-way through moult. Possible reasons for the variation in date of arrival could relate to the sex, place of origin or breeding success of the migrants. Separation of statistical 'populations' of Red-necked Stints is difficult, because the traditional measures of size are not very helpful. Length of wing is not a reliable measure in moulting birds, because the old primaries have been subject to different amounts of wear in different individuals. Length of bill unfortunately is small and the range of variation is much less than, say, in Curlew Sandpipers *Calidris ferruginea*. Indeed, no statistical differences could be established between the average lengths of bills of the three groups (17.9 mm for those with moult scores up to five, 18.1 mm for those with moult scores between 16 and 25 and 17.7 mm for those in arrested moult). Weights were similarly unhelpful.

The difference between the average dates of start of moult of Groups (1) and (2) must have been at least six weeks, if the average rate of moult determined by Thomas and Dartnall in 1967 is typical of other years. Such a large difference in the timing of moult is unlikely to occur between the sexes of a single breeding population but could arise if a considerable proportion of the population lost their eggs early in the breeding season and then left to moult on their 'winter' quarters. (In western Europe, the southward return migration of waders, often in full breeding plumage, begins each year while the last few birds, travelling north to breed, are still on passage.) Hence Groups (1) and (2) at Westernport may have been successful and failed breeders respectively, from the same breeding population. Alternatively, they may be from two distinct geographical areas. This would accord with Dementiev and Gladkov's (1954) information, which indicates two centres of breeding distribution: one in extreme eastern Siberia and north-western Alaska and the other farther west in Siberia near the mouth of the river Lena.

The identity of the stints showing arrested moult, Group (3), is even less certain. Because they began moult again at about the same date as birds of Group (1), it might be argued that they reached Westernport Bay at the same time. If so, the question arises as to where they began their moult, before arresting it.

One possibility is that they accompanied Group (1) to their breeding area, but did not attempt to breed through immaturity (or failed, early in a breeding attempt) and then began moult immediately, arresting it at a date appropriate for travel southwards again with Group (1). There is no hard evidence from shorebirds breeding in the Arctic that failed breeders stay to moult instead of departing early. However, recent studies of Dunlin *Calidris alpina* caught during migration in north-western Europe leave little doubt that some individuals showing arrested moult had replaced the one to three primaries concerned on the breeding grounds. The Red-necked Stints caught on Westernport, however, had arrested moult at a much more advanced state, after an average of six primaries had been replaced. This might have taken two months to achieve, if the rates of growth of feathers were similar in breeding and 'wintering' areas. Thus the birds would have had to start moult very soon after arrival on the breeding grounds, which does not seem likely. Alternatively, they might have left early and stopped to moult somewhere *en route* to Westernport. Further data on moult from shorebirds resting at different places in eastern Australia may help to resolve the question.

A final possibility is that Group (3), those in arrested moult, were immature (1½-years old) and had not returned to the breeding grounds, but had spent the southern winter on Westernport Bay or elsewhere in south-eastern Australia. The suggestion would be that these birds were juveniles when they reached Westernport in the southern summer of 1973–74, had begun moult early in 1974 but later arrested it with the approach of the southern winter and then began again in late November 1974. (I am indebted to M. W. Pienkowski for this suggestion, based on similar data from Africa.) Examination of the state of moult of Stints remaining on Westernport during their nominal breeding season should clarify the validity of this hypothesis.

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REFERENCES

DEMENTIEV, G. P., and N. A. GLADKOV. 1954. Birds of the Soviet Union. Jerusalem: Israel Program Scient. Transl.

EVANS, P. R. 1966. Autumn movements, moult and measurements of the Lesser Redpoll. Ibis 108: 183-216.
PIENKOWSKI, M. W., P. J. KNIGHT, D. J. STANYARD and F. B. ARGYLE. In press. Primary moult of waders on the Atlantic coast of Morocco. Ibis.
THOMAS, D. J., and A. J. DARTNALL. 1971. Moult of the Red-necked Stint. Emu 71: 20-26.

DR P. R. EVANS, *Department of Zoology, Durham University, South Road, Durham DH1 3LE, England.*
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COMMUNAL DISPLAY OF HOUSE SPARROW

The House Sparrow *Passer domesticus* has a communal display in which several cocks chase a hen. I recorded this behaviour with Alma Secker from 1957 to 1974 round a house in upper Hutt Valley in the south of North Island, New Zealand. Observations were made from July 1957 to September 1958 at weekends and daily from October 1958 to December 1974; records from March 1960 to February 1961 were lost. The chief aim was to find when displays were most numerous but I have used records to February 1972 only for this purpose.

Summers-Smith (1963) says that in Europe communal display stimulates breeding but this statement may be only partly true in New Zealand. I observed that about five per cent of displays began after Sparrows scolded domestic cats but not after they scolded other potential predators such as White-backed Magpies *Gymnorhina hypoleuca*, Dominican Gulls *Larus dominicanus* (perching beside nesting boxes occupied by sparrows), Spotted Owl *Ninox novaeseelandiae* and Stoat *Mustela erminea*. Also, Sparrows displayed communally to Blackbirds *Turdus merula* posturing in a tree, to Eastern Silvereyes *Zosterops lateralis* fighting at a feeder, twice to a helicopter overhead and to a Sparrow caught in a trap, approached by a man.

In Western Europe displays are most numerous in spring about two weeks after the equinox (Summers-Smith 1963), but they tend to peak earlier in New Zealand. As shown in Table I, displays started in March but most occurred in September, after which they decreased and they were noted rarely after the end of January.

TABLE I
Totals of communal displays 1957–72

	Mar.	Apr.	May	Jn.	Jly	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
1957–62	8	51	38	53	119	221	309	187	73	49	19	4
1962–67	5	56	85	87	193	404	568	297	158	37	50	0
1967–72	27	143	157	115	208	521	672	424	169	138	68	0
Totals	40	250	280	255	520	1,146	1,549	908	400	224	137	4

TABLE II
Total communal displays in intervals of seven days from August to October 1962–71

	August				September				October		
	4-10	11-17	18-24	25-31	1-7	8-14	15-21	22-28	29-5	6-12	13-19
1962–66											
Total	76	80	115	95	112	144	135	133	107	107	45
Average	15	16	23	19	22	29	27	27	21	21	9
1967–71											
Total	105	111	91	168	139	134	170	176	146	116	100
Average	21	22	18	34	28	27	34	35	29	23	20
Total	181	191	206	263	251	278	305	309	253	223	145
Average	18	19	21	26	25	28	30	31	25	22	14