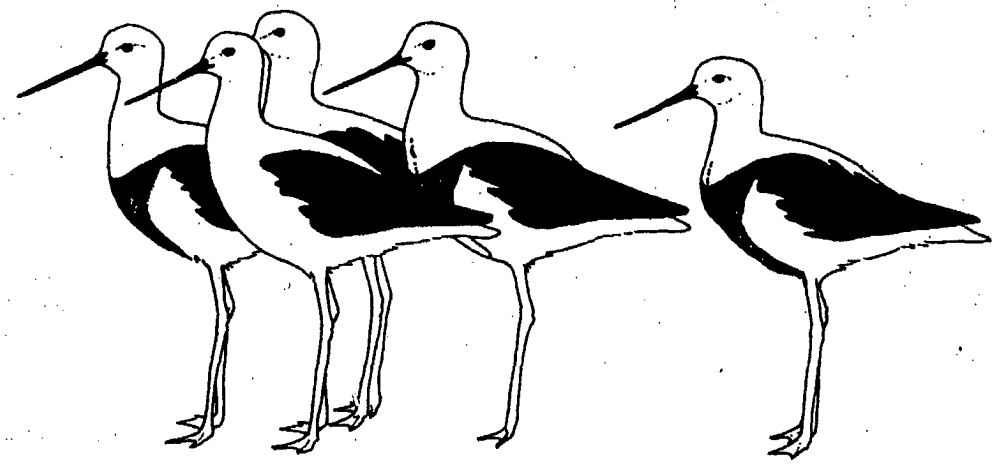
The Stilt



ISSN 0726-1888

BULLETIN OF THE AUSTRALASIAN WADER STUDIES GROUP
OF THE
ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

NO. 5 AUTUMN 1984

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CONTENTS

EDITORIAL

My first duty as the new editor is to congratulate my predecessor, Peter Curry, on his sterling effort as founding editor of The Stilt. He had the considerable task of producing the entire bulletin from scratch and the excellent results to date attest to the extent of his labours. I'm sure all members of the A.W.S.G. will join with me in thanking him.

The Stilt is primarily a vehicle for preliminary ideas, current thoughts, proposals and observations (both recent and ancient) and requests for information. As editor, I do not see my role as quibbling over grammatical niceties nor imposing a particular writing style as I believe it would interfere with the informality of the bulletin. It is hoped that this informality will induce more people to contribute relevant material. However, all authors are asked to consult a recent issue of The Stilt as a guide to the format (layout, headings, references, etc.).

Undoubtedly distance is one of the obstacles to communication among wader enthusiasts in Australia - an obstacle that The Stilt is intended to overcome. I am hoping to have regular contributions from State Representatives which will give a summary of interesting observations, counts and catches in their areas. This will serve as a means of keeping A.W.S.G. members informed on events in other areas.

All membership fees became due in June this year. Inserted in this issue is a renewal form which applies until the end of 1985. It was moved at a recent A.W.S.G. committee meeting that the membership fees be increased to $5.00 per year but that the membership year begin in January. So members subscribing $5.00 now will receive a membership subscription for 18 months.

The Stilt is dependent upon sufficient material forthcoming before production can proceed. At present there is very little for the next issue and all members are invited to contribute as soon as possible.

My sincere thanks to Hazel Dann and Margaret Considine for their assistance in producing this issue.

PETER DANN.

SOME ASPECTS OF THE FEEDING BEHAVIOUR AND DIET IN THE HOODED PLOVER, *Charadrius rubricollis* (CHARADRIIDAE), DURING THE NON-BREEDING SEASON.

Martin Schulz, Andrew Grant, and Lindy Lumsden,
37 Halifax Street, Middle Brighton, Vic. 3186.

INTRODUCTION.

This paper presents the findings from a preliminary investigation on the feeding behaviour and diet of the Hooded Plover, *Charadrius rubricollis*. The Hooded Plover is of interest in that it is the only Charadriidae species that is almost entirely restricted to ocean beaches in south-eastern Australia. The species appears to favour beaches backed by extensive sand dune systems and covered with large amounts of decaying seaweed originating from adjacent rocky shores (Lane, 1981). The study was conducted at two sites selected on this criterion at i) Darby Beach, Wilson's Promontory (38°49'S., 145°52'E.), and ii) Venus Bay (38°53'S., 146°12'E.), in July, 1982.

METHODS.

All observations were made during the rising tide at Venus Bay on the 10 July and Darby Beach on the 24-25 July, 1982.

Feeding Behaviour.

At both sites a group of six individuals, consisting of five adults and one juvenile, and at Darby Beach an additional pair of birds, were observed for two hours during high, mid, and low tide. The viewing period began one hour before the tide "peak" and concluded one hour after. Individuals in the group were selected at random and watched for a period of 4.5 minutes with a 0.5 minute gap between observations of two consecutive birds. During this observation period position on the beach, feeding rate (pecks/second), time spent feeding, and other behavioural details were recorded. Feeding movements were classed as pecks and not separated into different types of manoevres such as described by Holmes (1966).

Diet.

Goss-Custard (1973 and 1977) showed that reliable information on prey composition and feeding rates could be obtained by field observations on foraging birds. However, this method was not applicable in the present study as the identity of most food items could not be determined, and in many cases it was difficult to decide whether or not an item had actually been taken. Little faecal analyses were undertaken due to limited time and the difficulty in identifying animal fragments. Instead several techniques were applied to calculate relative abundances of the invertebrates present and from this to postulate the diet of *C. rubricollis*:

i) Transect Method: This technique was used to provide an indication of the abundance of invertebrates from the lower littoral zone to the base of the primary sand dunes backing the beaches. Two samples (Volume = 2640 cm, x depth = 14 cm) were taken at ten metre

intervals with a sand grab (Diameter = 15.5 cm) and were washed through a sieve mesh of 0.5 mm, which retained the majority of the invertebrates in the size range taken by *C. rubricollis* (P. Dann, pers comm.). Organisms in each sample were brought back to the laboratory for identification and counting. Biomass of each sample was measured as dry weight using a Mettler H35 balance by drying individuals in a vacuum oven to a constant weight over a twenty-four hour period. The weight of any worm broken during sieving was estimated from intact worms of similar size.

ii) Random Sample Method: Using the technique outlined above five samples at five metre intervals were taken at a site where *C. rubricollis* had been observed actively feeding. The composition and biomass was then compared to five samples taken under similar conditions where the birds had not been seen feeding during the same observation period.

RESULTS.

Charadrius rubricollis was observed to feed during all tide phases. However, the time spent foraging and the feeding rate varied between tide phases as shown in Table 1.

	Tide Phase	N	Feeding Rate (Pecks/second)		Time Spent Feeding (per 270 seconds)	
			x	SE	x	SE
Venus Bay Group	Low	24	0.48	0.02	178	14
	Mid	17	0.58	0.04	232	12
	High	15	0.37	0.03	152	21
Darby Beach Group	Low	24	0.38	0.08	216	16
	Mid	21	0.60	0.04	251	7
	High	22	0.29	0.03	211	18
Darby Beach Pair	Low	23	0.42	0.02	247	10
	Mid	24	0.69	0.02	246	14
	High	11	0.29	0.03	165	23

Table 1. Summary of feeding rates and time spent feeding.

At both sites the greatest amount of time spent feeding was in the zone of wave wash/recession (defined as the mobile zone where waves are breaking on the beach) during the low and mid-tide phases. The effect was most marked in the latter phase where the time spent foraging in this zone averaged 77% of all feeding time at the two beaches. During high tide both sites displayed an opposite effect where foraging in the wave wash/recession zone averaged only 37% of the total feeding time. Similarly, in both sites the highest mean feeding rate was recorded during mid tide and the lowest was at high tide. (Table 1).

Variations in the feeding rates of the pair and group of *C. rubricollis* during the three tide phases on Darby Beach (ANOVA, F1, 142 = 0.04, $P>0.05$), and between the Darby Beach and Venus Bay groups (ANOVA, F1, 141 = 0.32, $P>0.0$) were not significant. Feeding rates were similar within the same tidal phase for both sites but differed between phases (Figure 1). The Darby Beach birds displayed the greatest

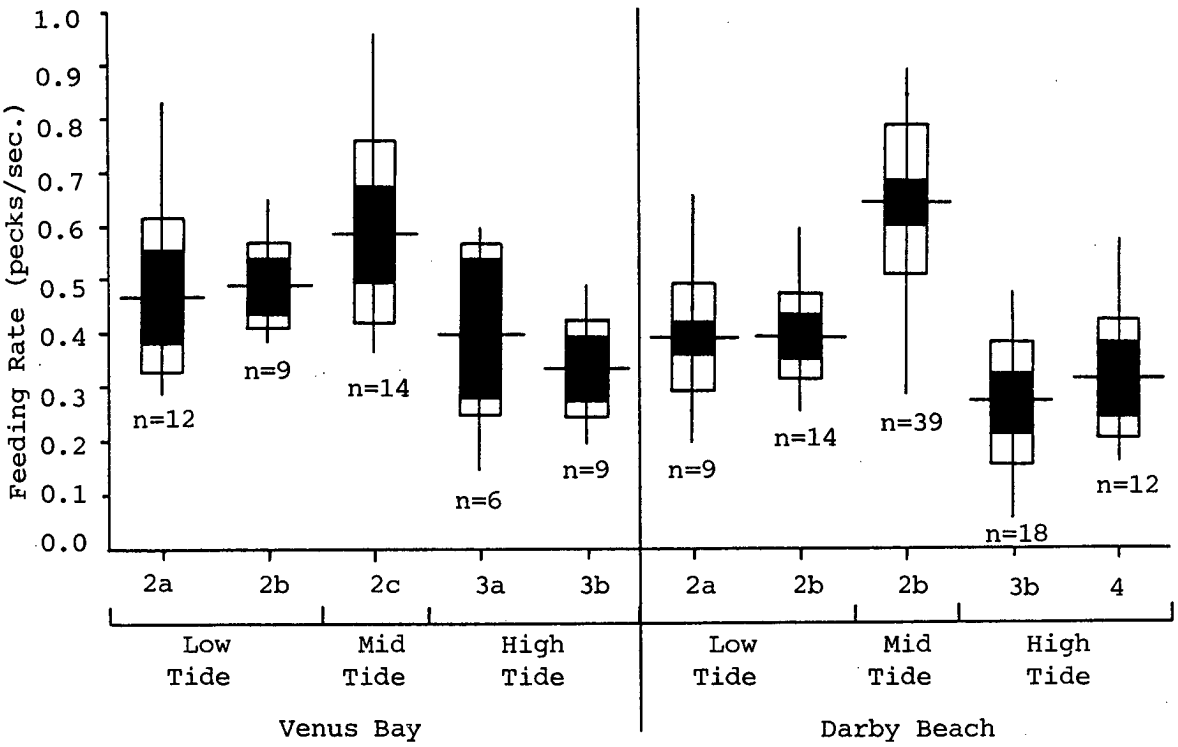


Figure 1. Mean feeding rate at different beach levels.
Shaded area = 95% confidence level, and lines represent one standard deviation and range on either side of the mean.
N.B. Where less than 3 feeding observations in a beach level for a particular Tidal Zone this was not plotted. these graphs account only for birds observed feeding, thus $\bar{x}$ and σ values do not take into account birds not observed feeding.

difference where little overlap occurred at the 95% confidence limits of the three tide phases.

Due to the high proportion of time spent feeding in the lower beach levels the dominant behaviour observed was foraging and associated behaviour (>89%), whilst in the upper beach levels foraging behaviour became less important (<60%) and other behaviour particularly resting (>25%) increased in frequency.

DIET.

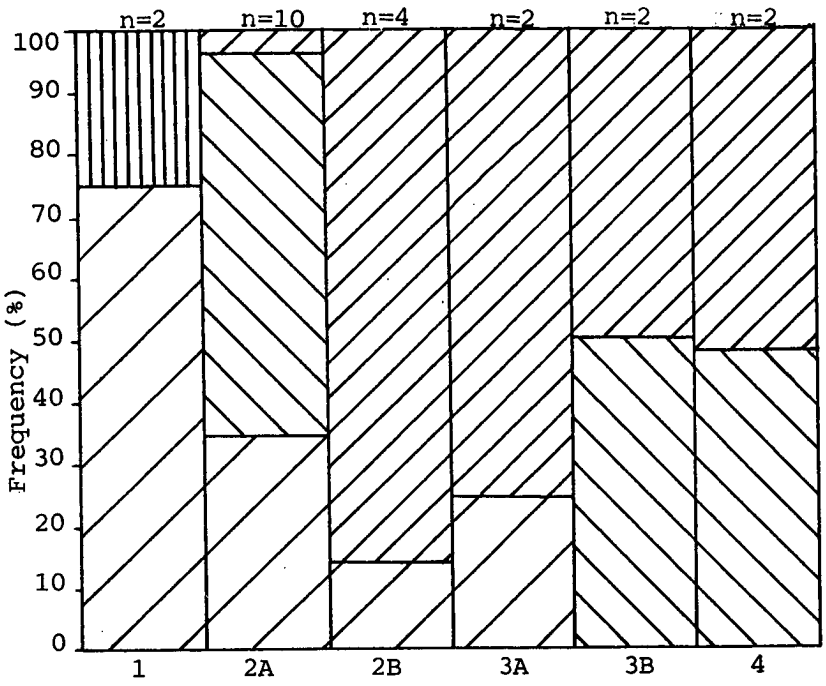
i) Transect Method. Six main groups of invertebrates were found to occur in the substrate - *Polychaeta, Amphipoda, Isopoda, Decapoda, Mollusca,* and *Diptera* (Figure 2). The two dominant groups represented in the upper levels of both beaches were the *Amphipoda* and *Isopoda*, while a greater diversity was displayed in the lower beach levels where polychaete worms and *Amphipoda* were the commonest organisms. The results suggest a vertical zonation such as found by Watkins (1942) and Jones (1970), and were probably caused by factors such as drainage, dessication, and compaction of the substrate (Eltringham, 1971). A similar zonation was found within groups, where for example in the amphipods the Genus *Orchestria* occurred at the upper beach level but was replaced at lower levels by other *Talitridae* and the Family *Gammaridae*.

The biomass values along the transect at Darby Beach were highest in the upper littoral zone and storm tide level. While at Venus Bay the biomass values were similar at all beach levels, the difference between the two beaches probably was due to the regular penetration of waves to the primary sand dune base at Venus Bay thereby inhibiting the presence of invertebrates abundant in the seldom-flooded storm tide zone at Darby Beach.

ii) Random Sample Method: Marked differences were found in the relative abundance, diversity, and biomass of invertebrates present in the sample when comparing an active feeding site to an area where the birds had not been observed feeding (Table 2).

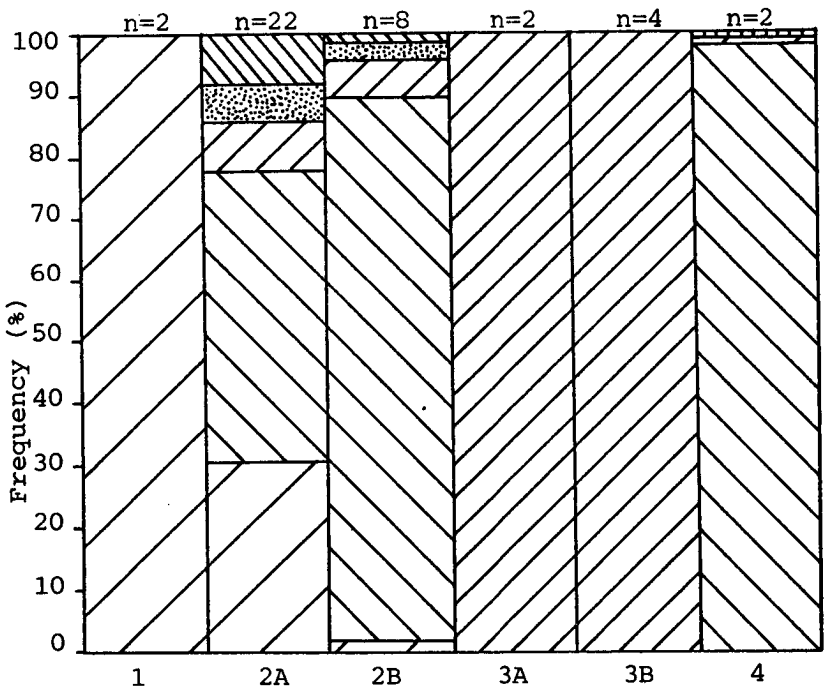
	Active Feeding Site	Non-Active Feeding Site
Total Invertebrates caught	48	3
% *Polychaeta*	10	33
% *Isopoda*	24	-
% *Amphipoda*	14	66
% *Decapoda*	5	-
% *Pelecypoda*	47	-
Biomass (dry wt) (grams)	0.3	0.06

Table 2. Comparison of invertebrate samples from an active and non-active feed site at Venus Bay.

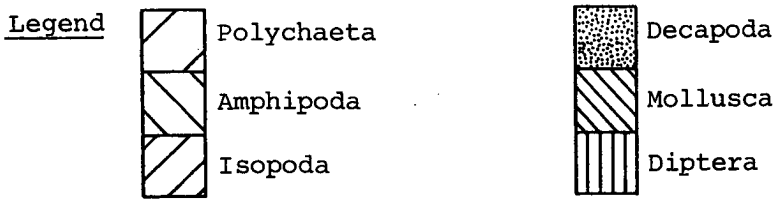


A. Venus Bay

N.B. n=Number of samples analyzed per beach level.



B. Darby Beach



Beach Levels

1. Only uncovered at 'peak' of low tide.
2a. Uncovered at low to early mid-tide - area never completely dry having a film of water lying over the substrate.
2b. Uncovered at low to mid-tide -area of damp sand but no film of water lying over substrate,
3a. Only covered at high tide - area below high tide mark with little beach debris.
3b. High tide 'peak' area covered with moderate amounts of fresh decaying debris.
4. Above high tide mark - zone only splashed by spray or invading storm waves. Moderate to large amounts of debris in various states of decay.

Figure 2. Proportion of major invertebrate groups from a no. of individual samples at different beach levels (along the transect).

DISCUSSION.

The results and conclusions drawn in this paper are only tentative due to the limited scope of the study, but are presented here to give some clues on the feeding ecology of *C. rubricollis*.

In this study the feeding rate and time spent feeding at various beach levels were demonstrated to be significantly different and were probably due to the activity and abundance of potential prey items. Studies have shown that juvenile amphipods and the isopod, *Eurydice*, burrow just below the beach surface and on rising tides become exposed by wave action (Bowers 1964, Watkin 1942, and Jones 1970). Such a response to the rising tide in amphipods and isopods, which occurred in the littoral zone could account for the feeding pattern observed in *C. rubricollis*, where the greatest proportion of the time was spent foraging in the wave wash/recession zone. In this zone birds would wait for the wave to recede and then quickly move down the beach following the receding wave, pecking as they went. The three main groups of invertebrates observed on the surface of the sand after the recession of a wave were *Talitridae* amphipods, isopods, and the bivalve, *Donacilla*. The exposure of these organisms would appear to be of paramount importance to a *Charadriid* wader that feeds by visual searching and could account for the large proportion of the time spent feeding in the wave wash/recession zone during different tide phases.

Jones (1970) found that the isopod, *Eurydice*, relied upon wave action to wash it out of the sand on each tide. The depth to which the isopods were buried was correlated with the range of depth penetration by average wave action. Maximum depth penetration would be expected in the high tide zone as this is proportional to wave height and beach slope. Thus isopods and probably other invertebrates such as amphipods burrow to a greater depth in the upper than lower littoral zone. This could explain why little feeding was observed in the upper littoral zone when the wave wash/recession zone was at a much lower beach level. For in this case prey species would be buried relatively deep in the substrate, and be inactive until wave action washed them out on the rising tide. *C. rubricollis* relying on visual cues would be unable to detect these animals in the resting state.

A zone at the mid beach level was found to have a low amount of feeding activity. This could be attributed to it being an intermediate zone, where the lower level invertebrates were less abundant and required larger wave action to activate them, and higher level animals were less abundant due to the regular frequency of flooding in this level. P.Dann (pers comm.) has similarly noted low feeding activity in the mid beach levels.

The time spent feeding in the storm tide zone was comparatively low compared to that in the littoral zone. This zone contained a lower diversity of potential prey, however, *Orchestria* and *Scyphacidae* isopods were present in high densities and at Darby Beach had the highest biomass values along the transect. The anomaly between the low amount of time spent feeding in this zone and the high potential prey biomass may be due to the fact that *Orchestria* and *Scyphacidae* are largely nocturnal (pers obs.). Bowers (1964) suggested that this habit in the amphipod, *Orchestroidea*, provided better moisture and temperature conditions while the animals fed, and that only juveniles were active during the day. Thus although the stormtide zone had the second highest biomass on Darby Beach and third highest on Venus Bay the

majority of potential prey was made up of *Orchestria* and *Scyphacidae* which lived in burrows or under kelp during the day, thereby making them difficult to catch. *C. rubricollis* was also observed to have difficulty in catching *Orchestria* by the latter managing to elude capture due to its jumping ability. As a result energy gain from consuming an amphipod may not exceed the cost of energy used in capturing it. This further could account for the small amount of time spent searching and feeding on *Orchestria* and *Scyphacidae* in the upper beach levels, where they were found to be abundant.

It can be inferred that *C. rubricollis* is an opportunistic feeder based on field observations (recorded feeding on polychaete worms, flies, and *Orchestria*), limited faecal analyses (showed traces of small bivalve molluscs), and the position and abundance of major potential prey items.

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AUSTRALIAN BIRD-BANDING SCHEME: COLOUR BANDING OF WADERS.

In early 1984 about two hundred waders will be colour-banded at two sites in the vicinity of Perth, Western Australia. These birds will be banded with the following combinations:

	Left Tarsus	Right Tarsus
Site 1	one metal band	one mauve band
Site 2	one metal band	one white band

This banding will be undertaken by the Western Australian Wader Study Group on behalf of a student at the Murdoch University.

D. Purchase, CSIRO Division of Wildlife and Rangelands Research,
21 December 1983.

DIAGRAMS OF MONTHLY WADER NUMBERS AT STOCKYARD POINT, WESTERNPORT BAY, VICTORIA, 1973-1983.

E. L. Jones, School of Economics, La Trobe University, Bundoora, 3083.

The bar diagrams which follow display the mean monthly maxima of the twelve species of waders most frequently seen at Stockyard Point from 1973 to 1983. Two additional diagrams show separately the totals for the eight palearctic migrants and the four southern hemisphere breeders. Fourteen other species were seen, but much less often, and are not reported here. All the count data, including those for non-wader species, have been entered in the La Trobe University computer.

All the diagrams start with July, which seems the most appropriate month for the beginning of the seasonal cycle of northern hemisphere migrants in Australia, and all of them present absolute figures. The diagrams are of the same size, the labelling of the y axis however differing, so that visual comparisons of the round-the-year fluctuations of all species may instantly be made. The x axis repeats the months of the year in order to bring out the peaks of the seasonal cycle with as much clarity as possible. Dr. G. C. O'Brien of La Trobe University was kind enough to write the computer program by which the data were plotted.

This body of data is the result of 450 high tide wader counts at the Stockyard roost from March, 1973 through August, 1983. It includes a six months' update of the ten years' observations described in a previous article. (Jones, 1983) The additional six months' counts amend most totals (given as tables in the previous article) in only the most minor ways, an exception being the effect on the seasonality of the Red Knot produced by the unprecedented occurrence of a flock of up to one hundred during winter 1983. The mean of maximum counts for each month over the ten-and-a-half years is presented since average counts may be low through chance disturbance. The diagrams are based on eleven years' observations for the months March through August and ten years for September through February and should give a solid basis for month-to-month fluctuations through the year in the numbers of the commoner waders on the central Victorian coast. There appear to be no comparable data in print apart from figures for a single year at Westernport reported by Loyn (1978). In the present series for a single

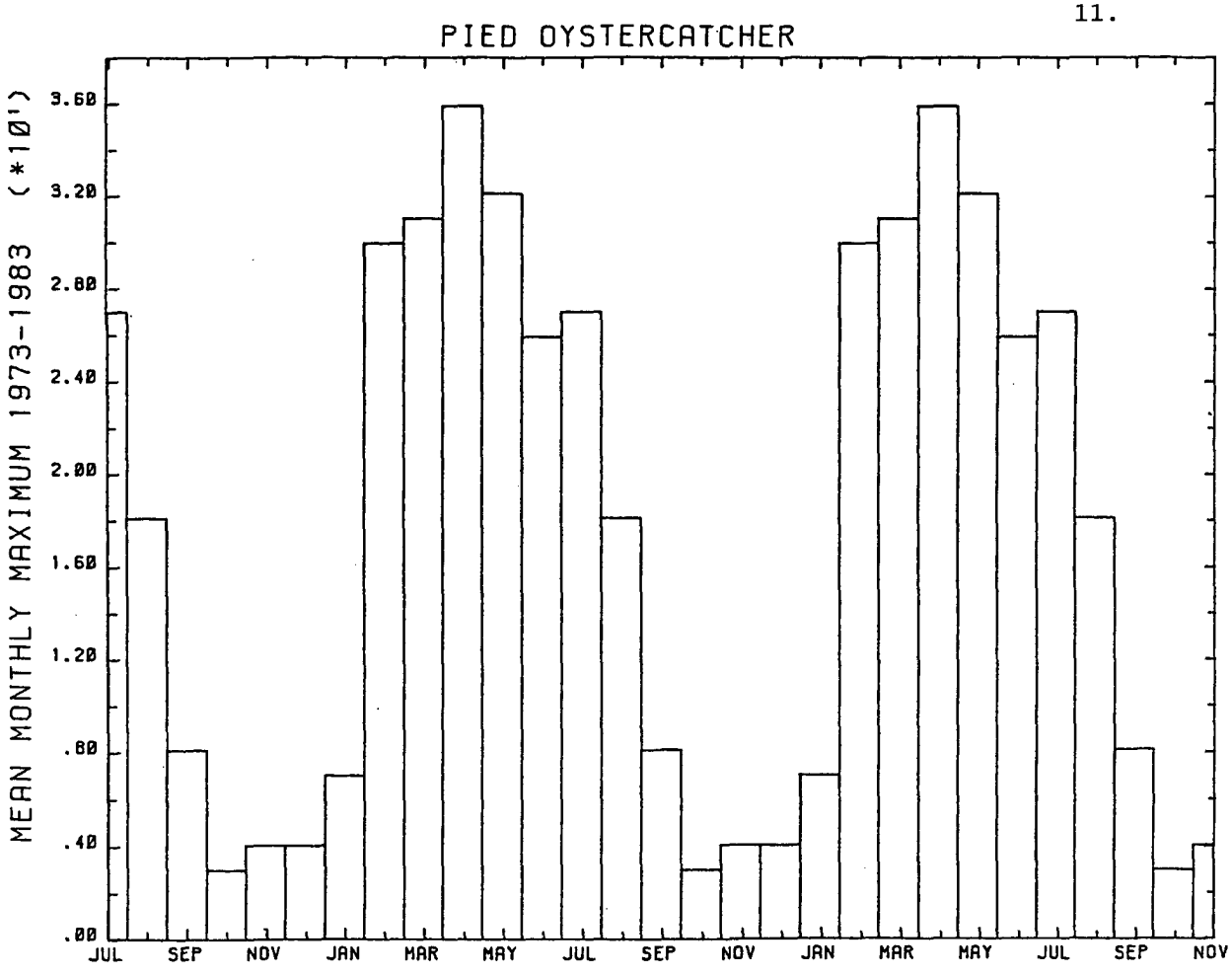
roost it is hoped that the use of ten-and-a-half years' observations will wash out any irregular effects of movements between Stockyard Point and neighboring roosts and supply reliable monthly indices.

E. L. Jones (1983), 'A Preliminary Note on Wader Counts at Stockyard Point, Westernport Bay, Victoria, 1973-1983', Bulletin of the Victorian Wader Study Group, 7, pp. 21-33.

R. Loyn (1978), 'A Survey of Birds in Westernport Bay, Victoria, 1973-74',The Emu, 78, pp. 11-19.

DIAGRAMS.

1. Pied Oystercatcher
2. Masked Lapwing
3. Double-banded Plover
4. Red-capped Plover
5. Eastern Curlew
6. Whimbrel
7. Terek Sandpiper
8. Bar-tailed Godwit
9. Knot
10. Sharp-tailed Sandpiper
11. Red-necked Stint
12. Curlew Sandpiper
13. Palearctic Migrants
14. Southern Hemisphere Breeders.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MEAN MONTHLY MAXIMUM 1973-1983 (*10')
3.60
3.20
2.80
2.40
2.00
1.60
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.80
.40
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JUL
SEP
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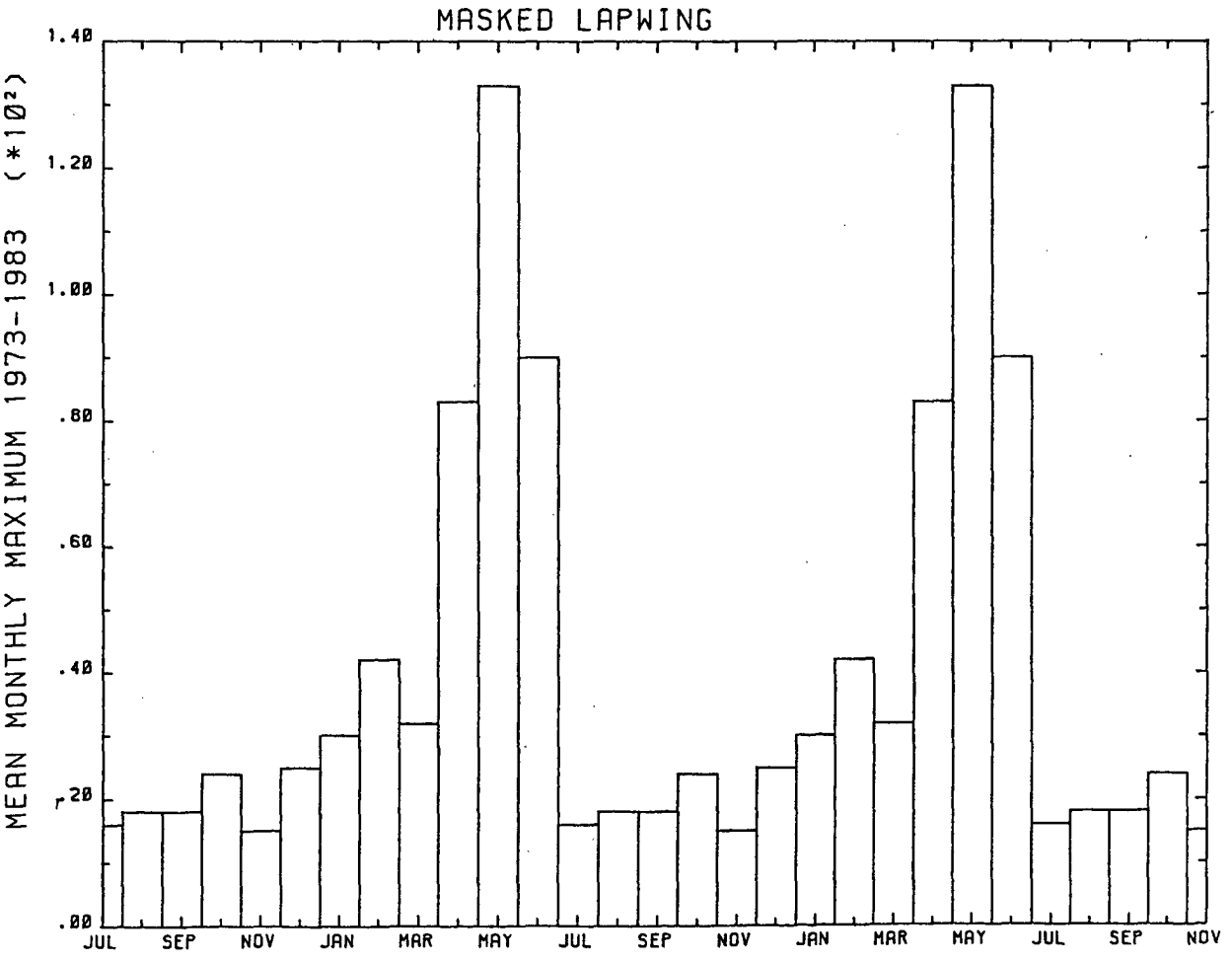
MASKED LAPWING
MEAN MONTHLY MAXIMUM 1973-1983 (*10²)
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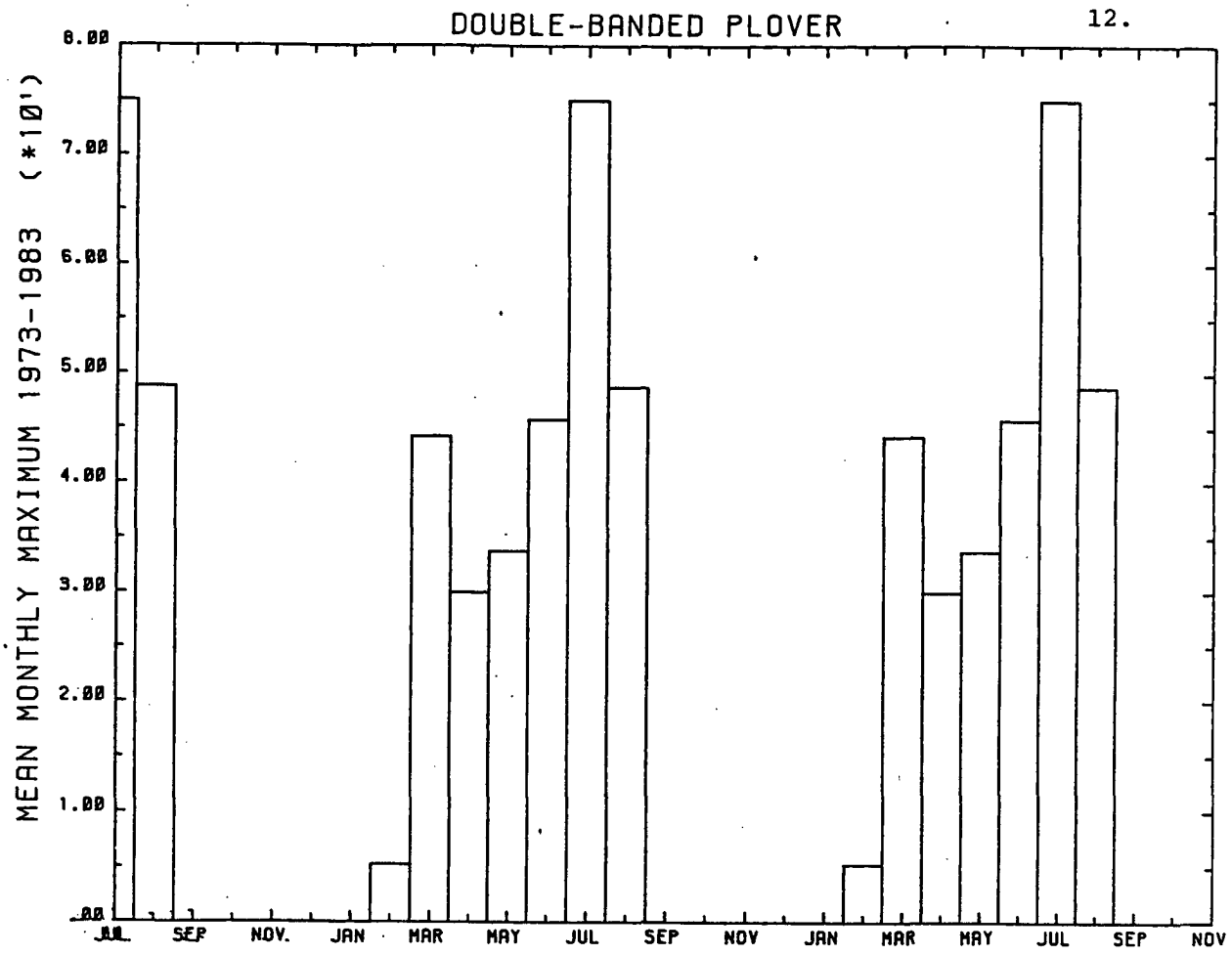
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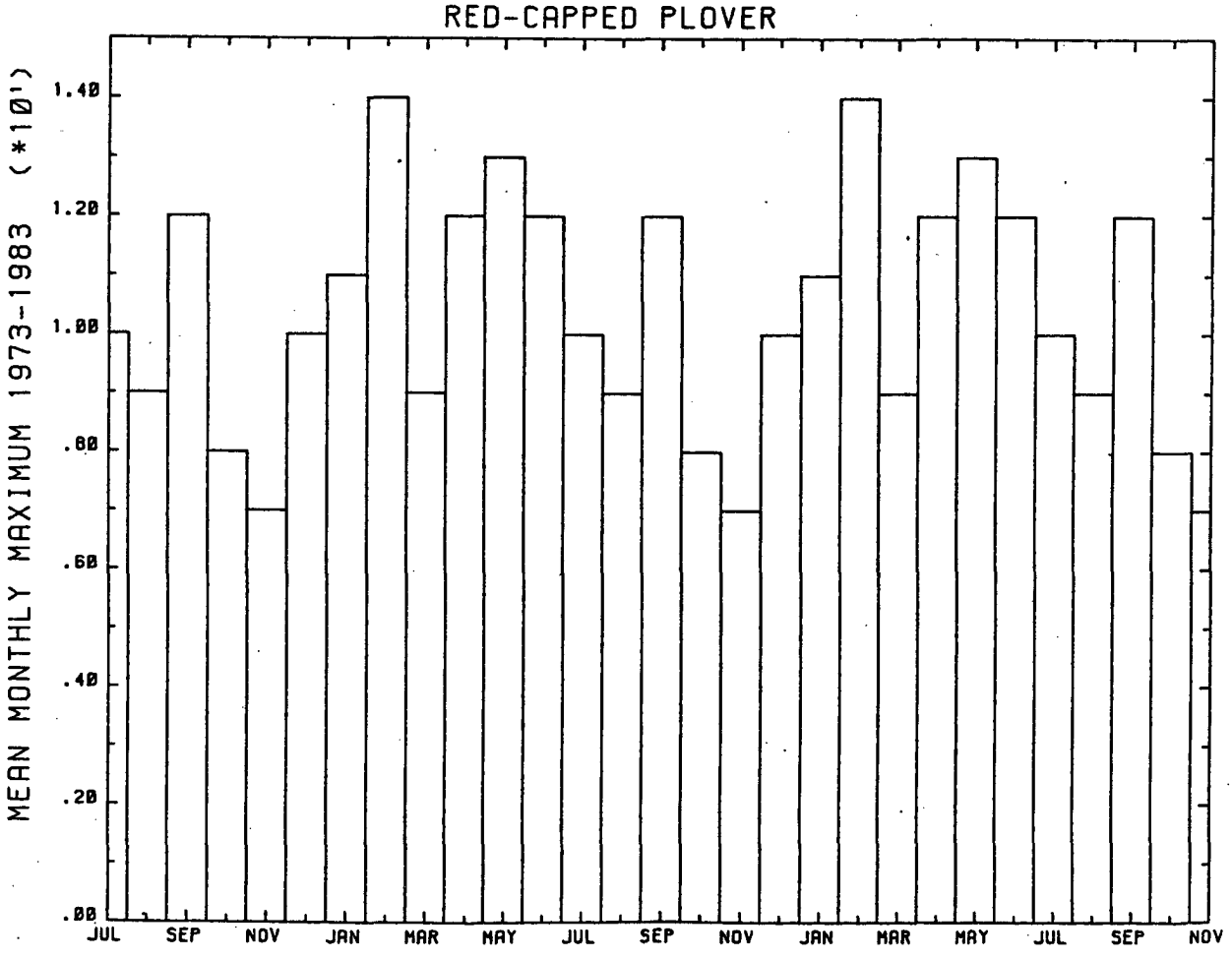
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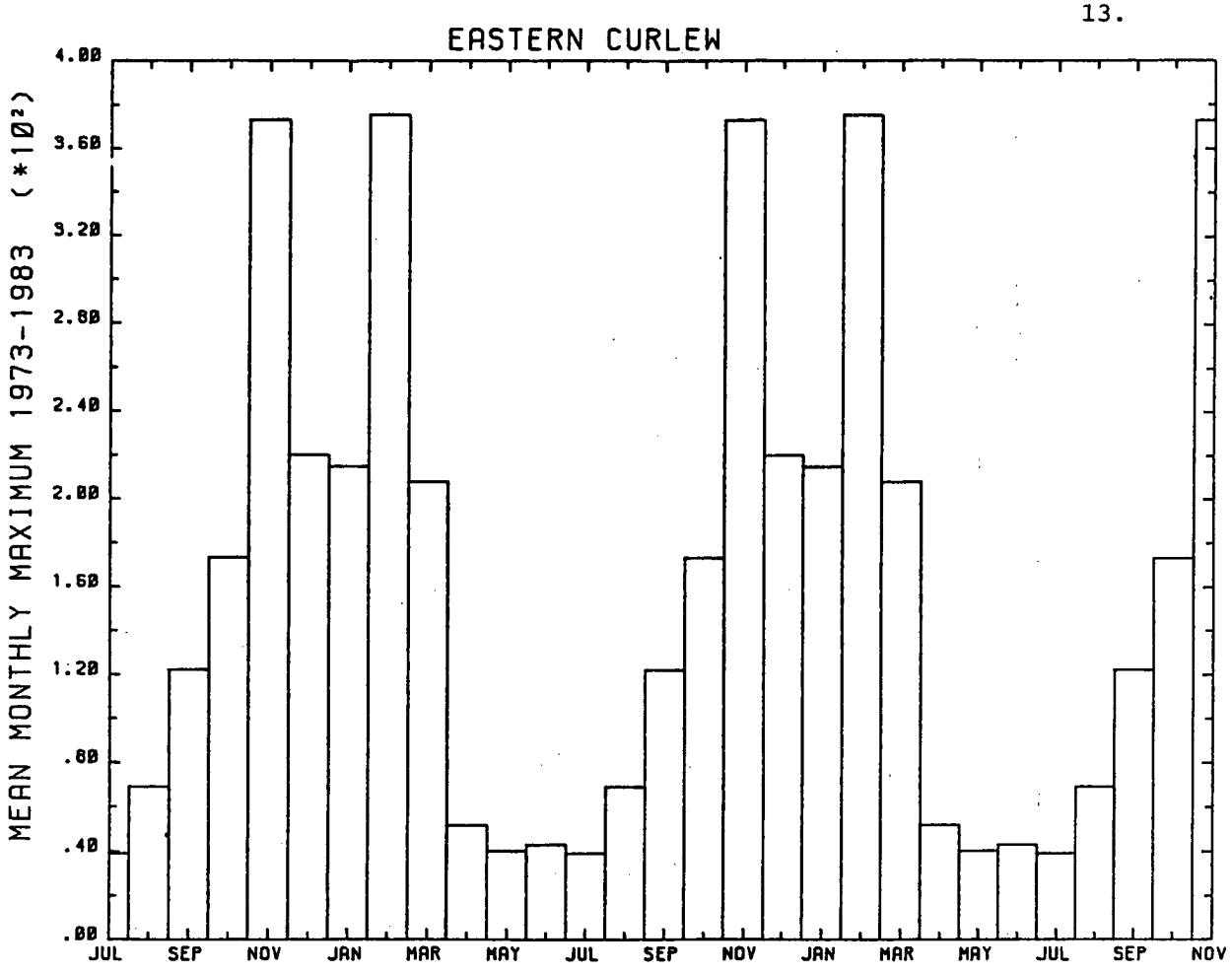
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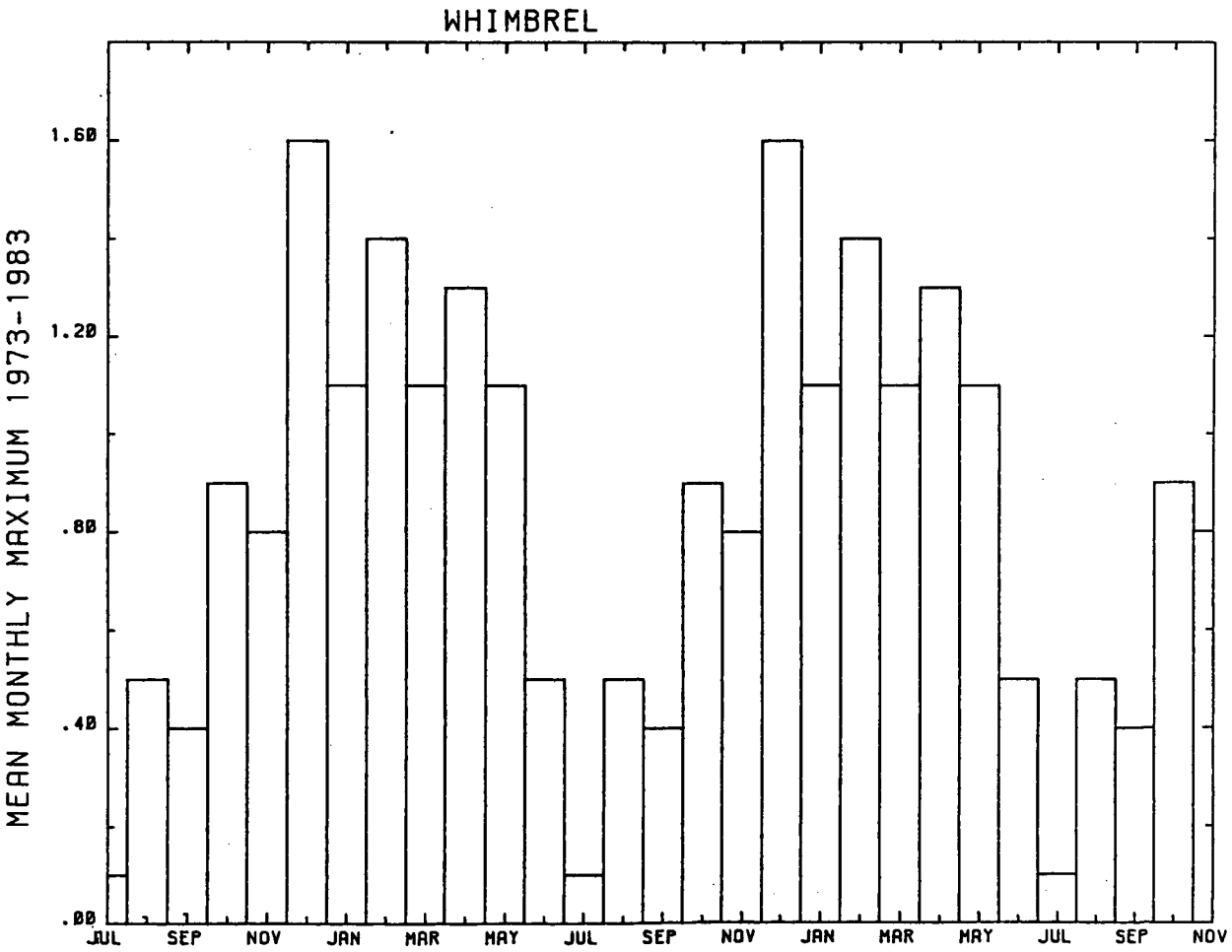
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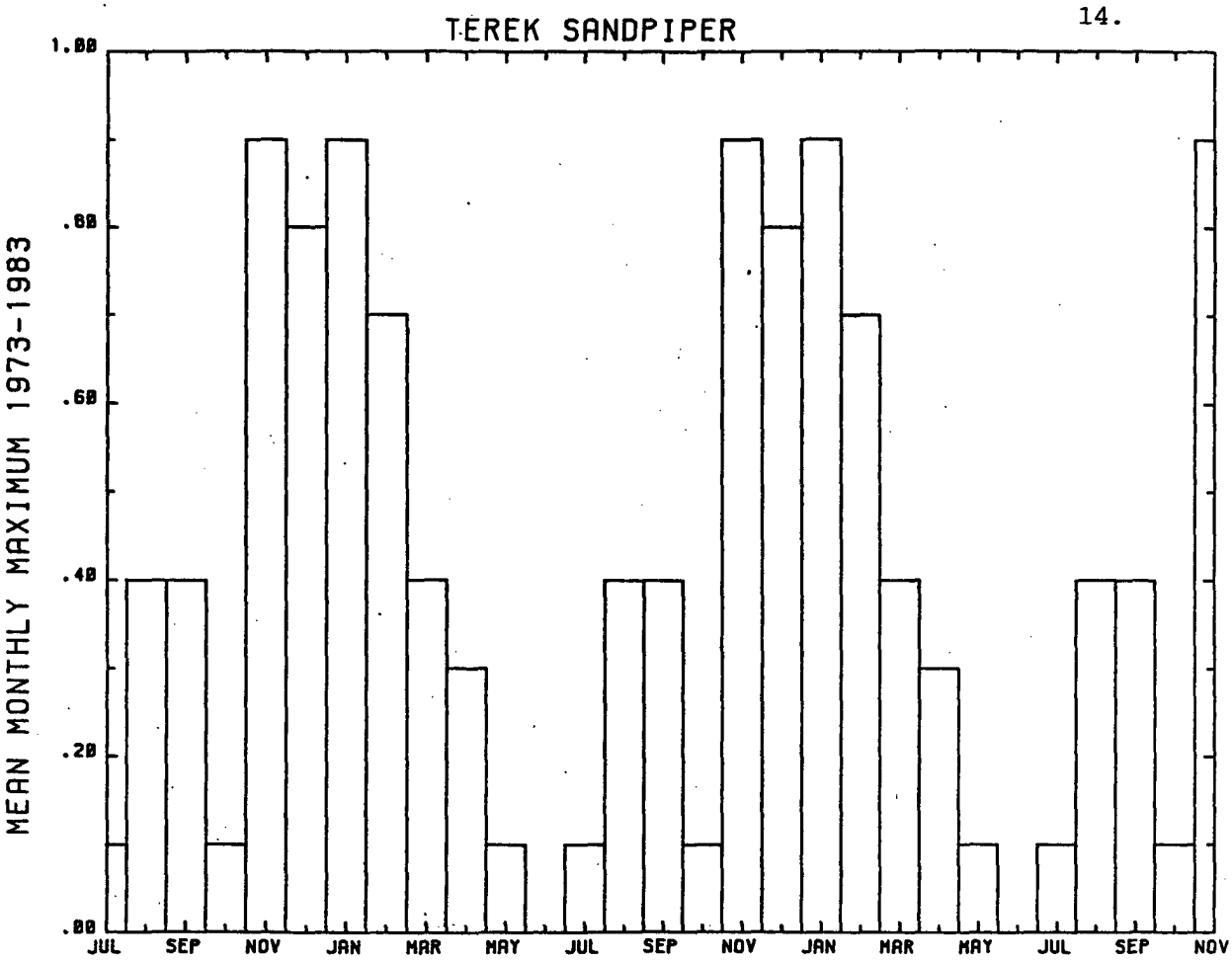
TEREK SANDPIPER
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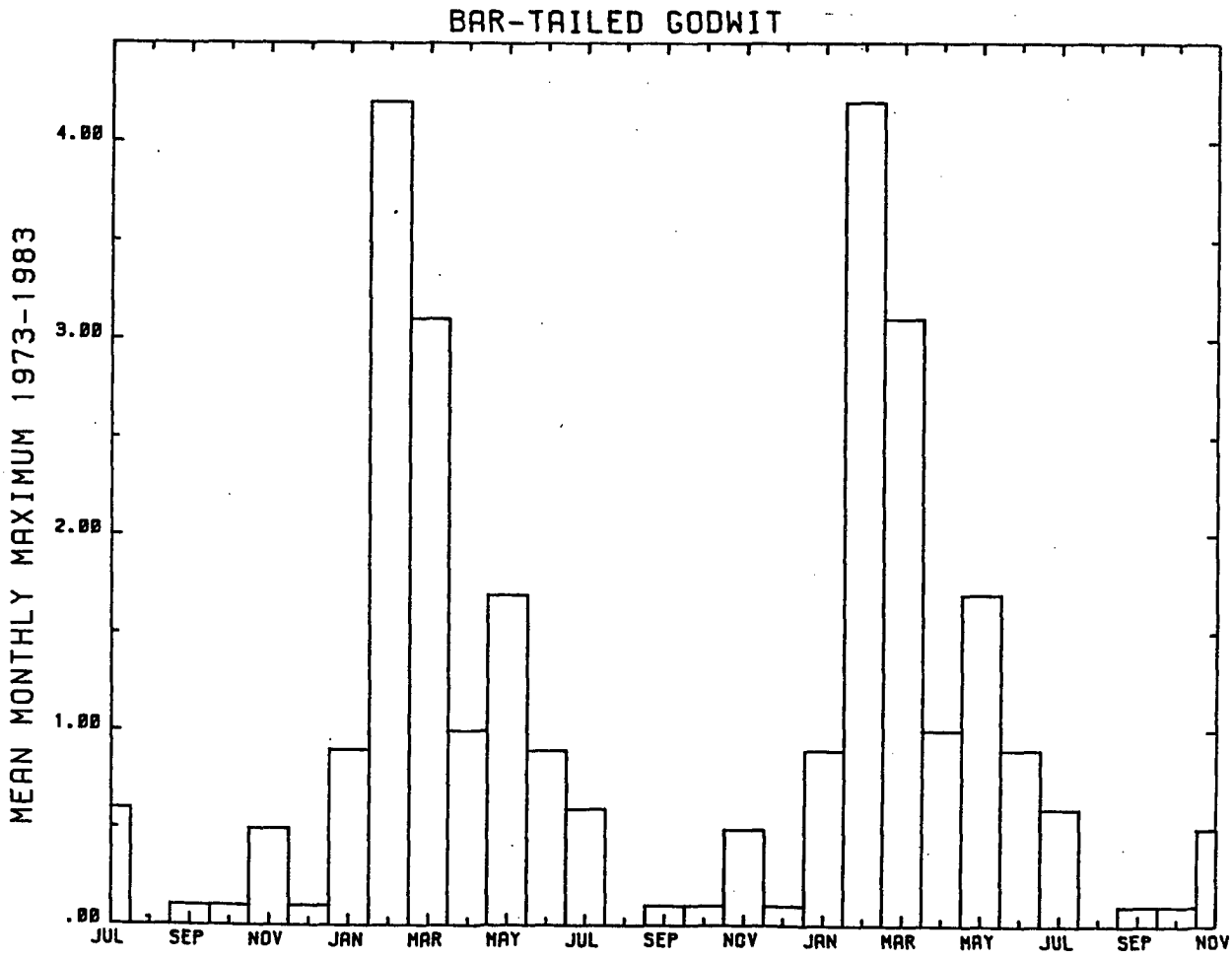
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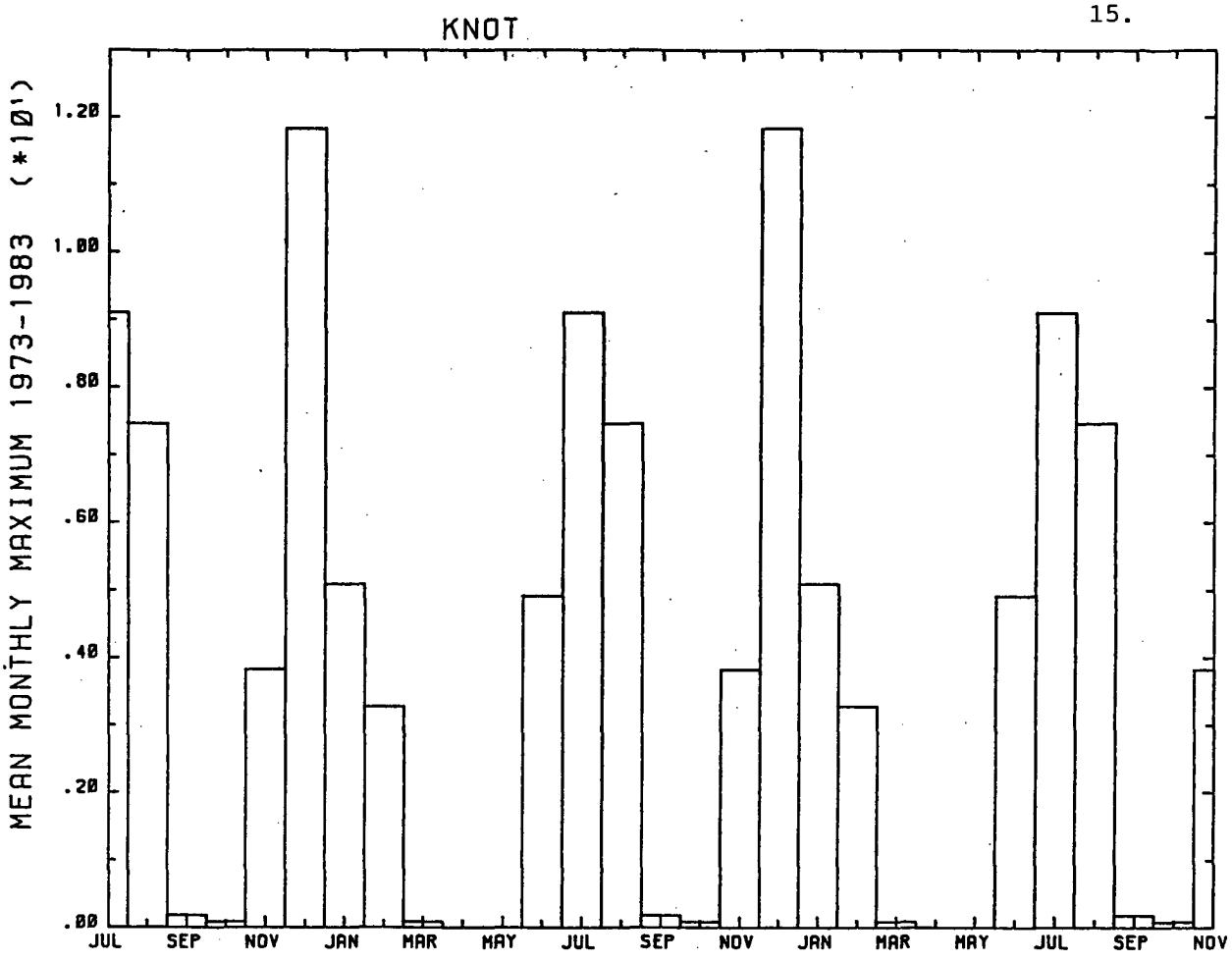
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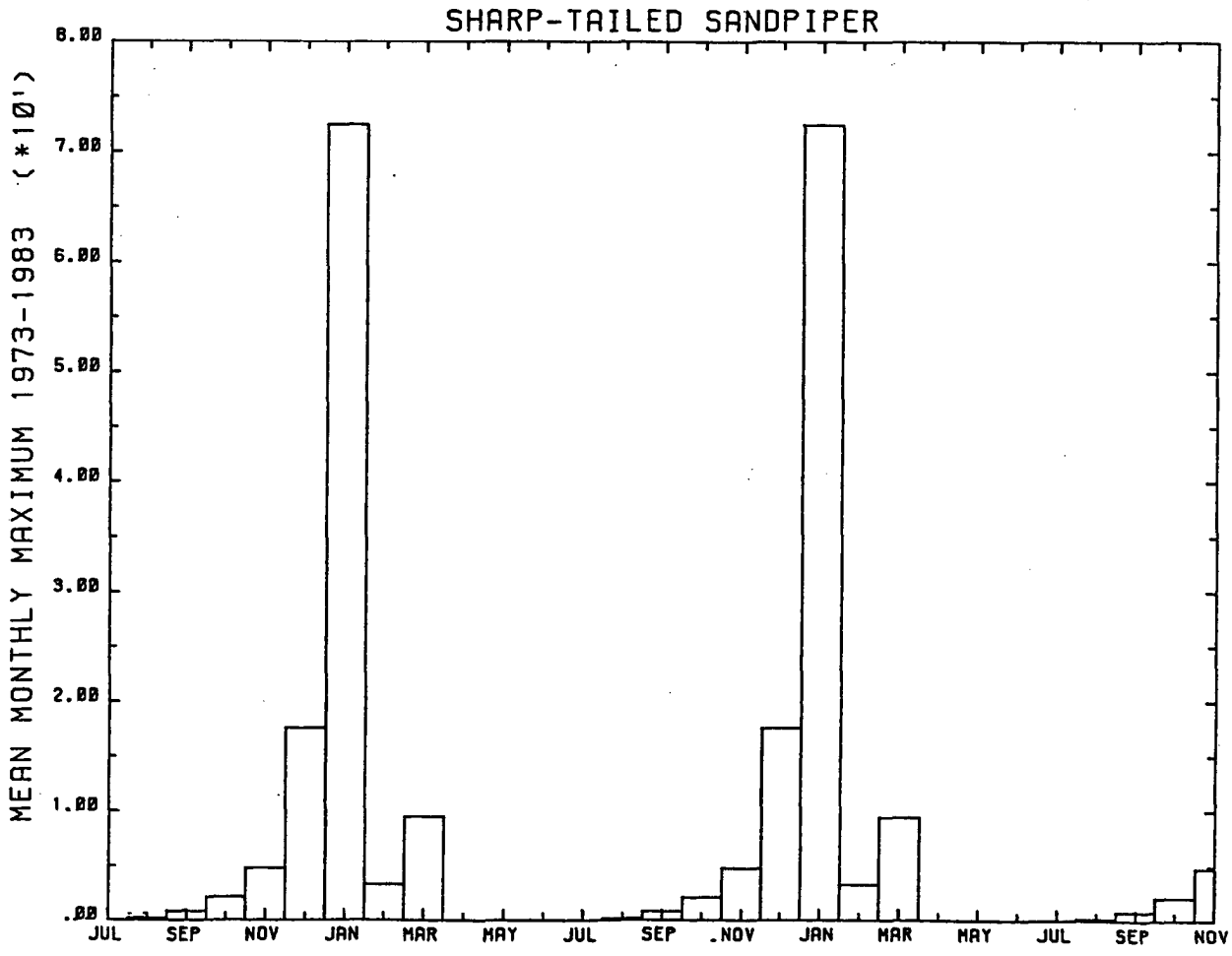
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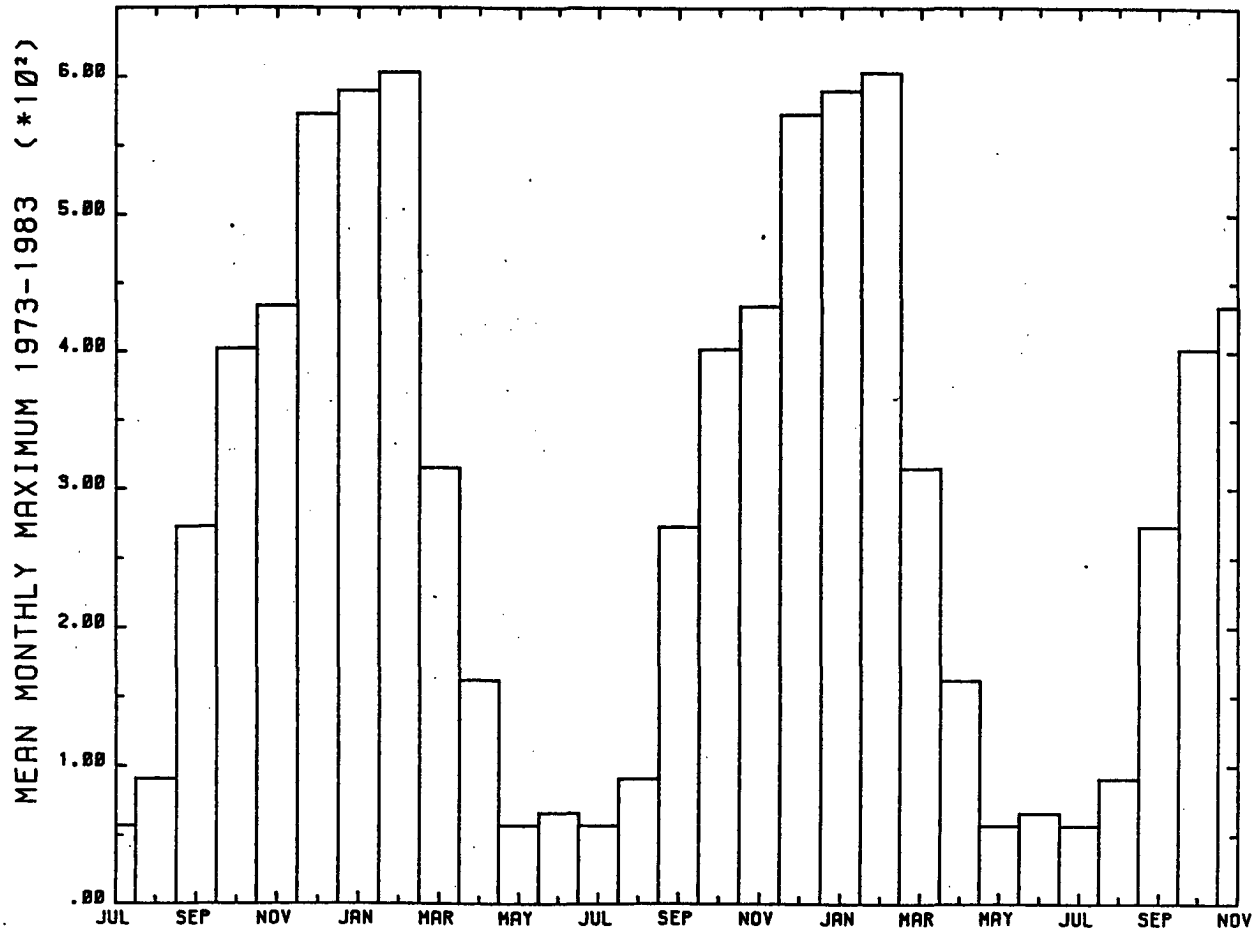
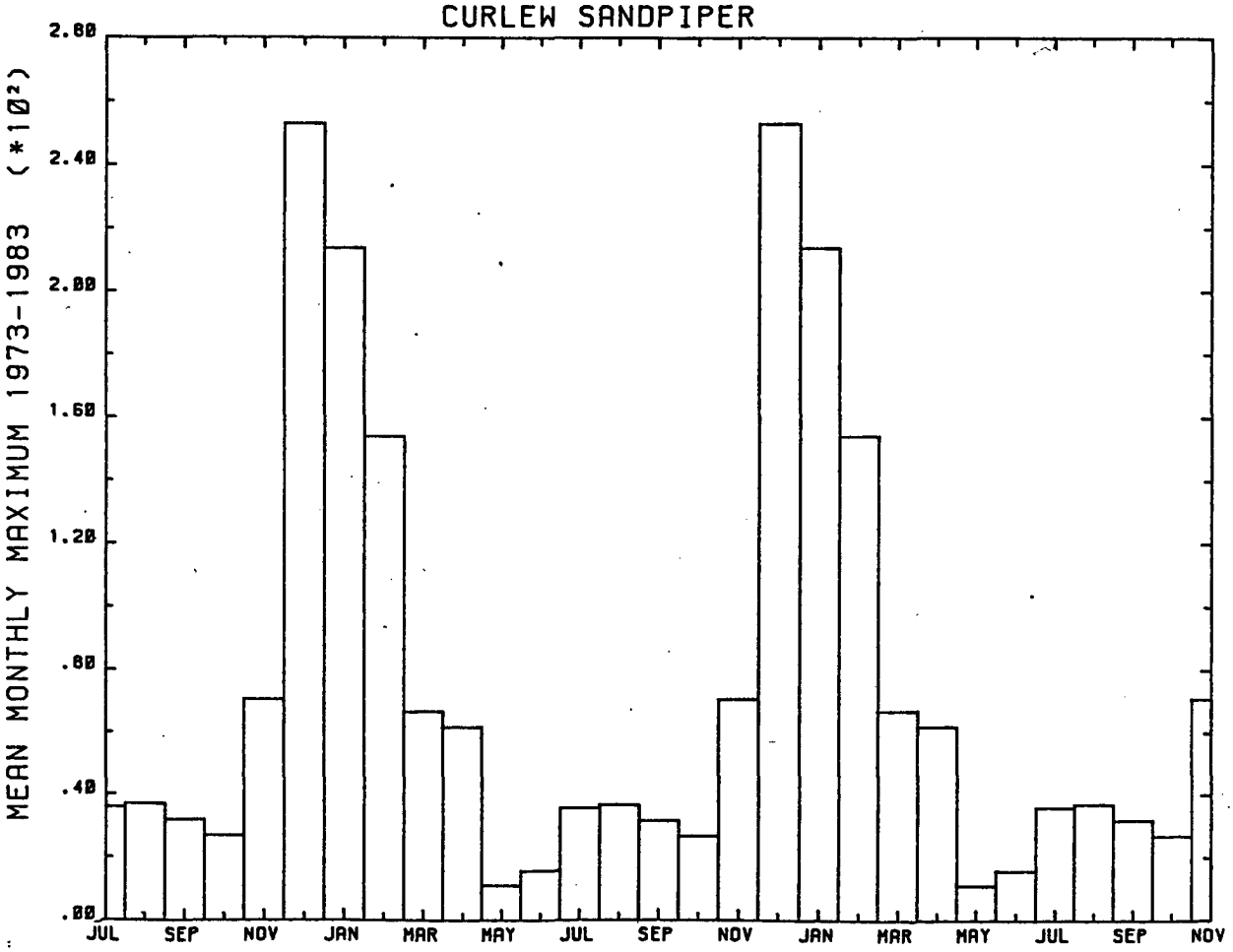
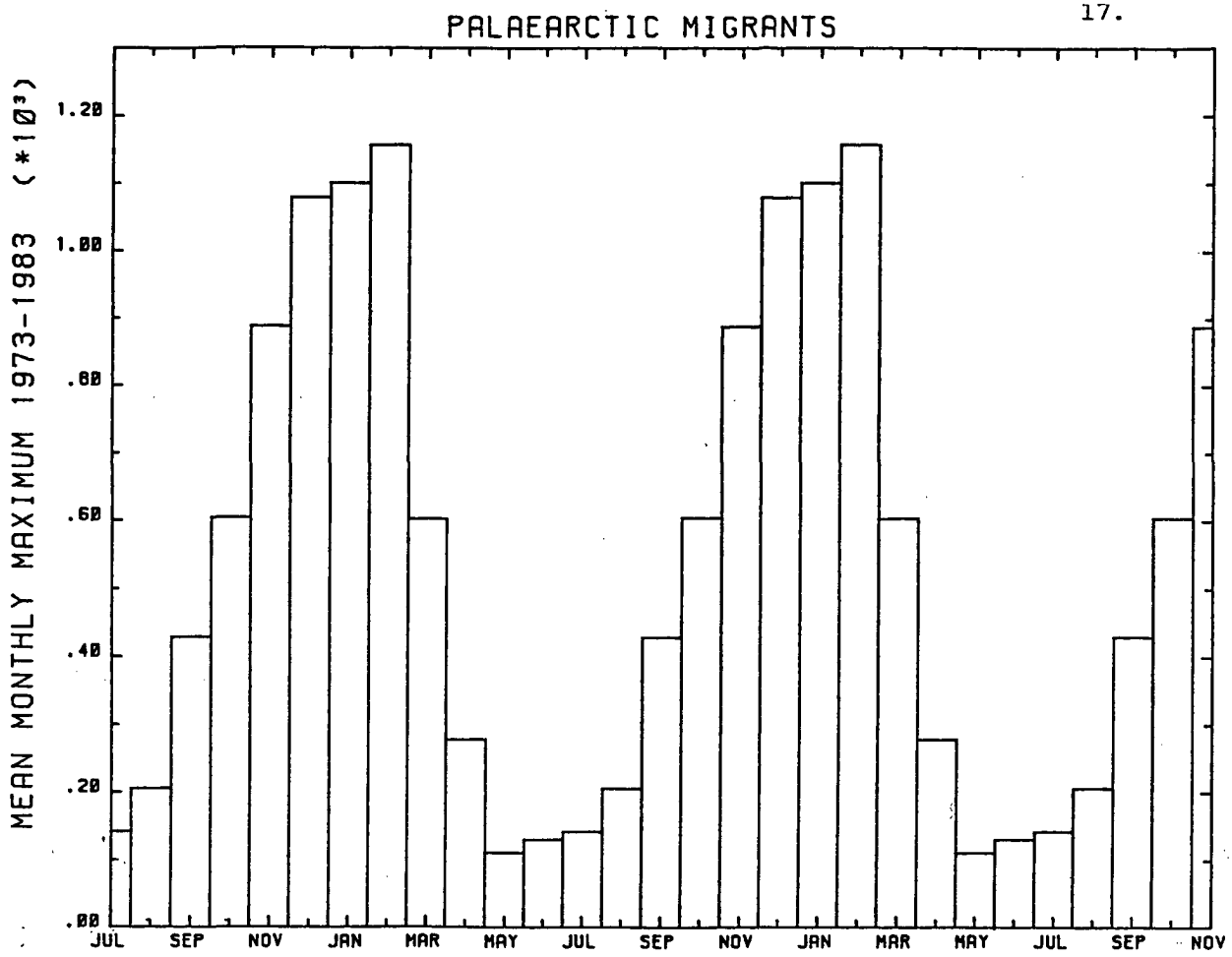
RED-NECKED STINT



CURLEW SANDPIPER

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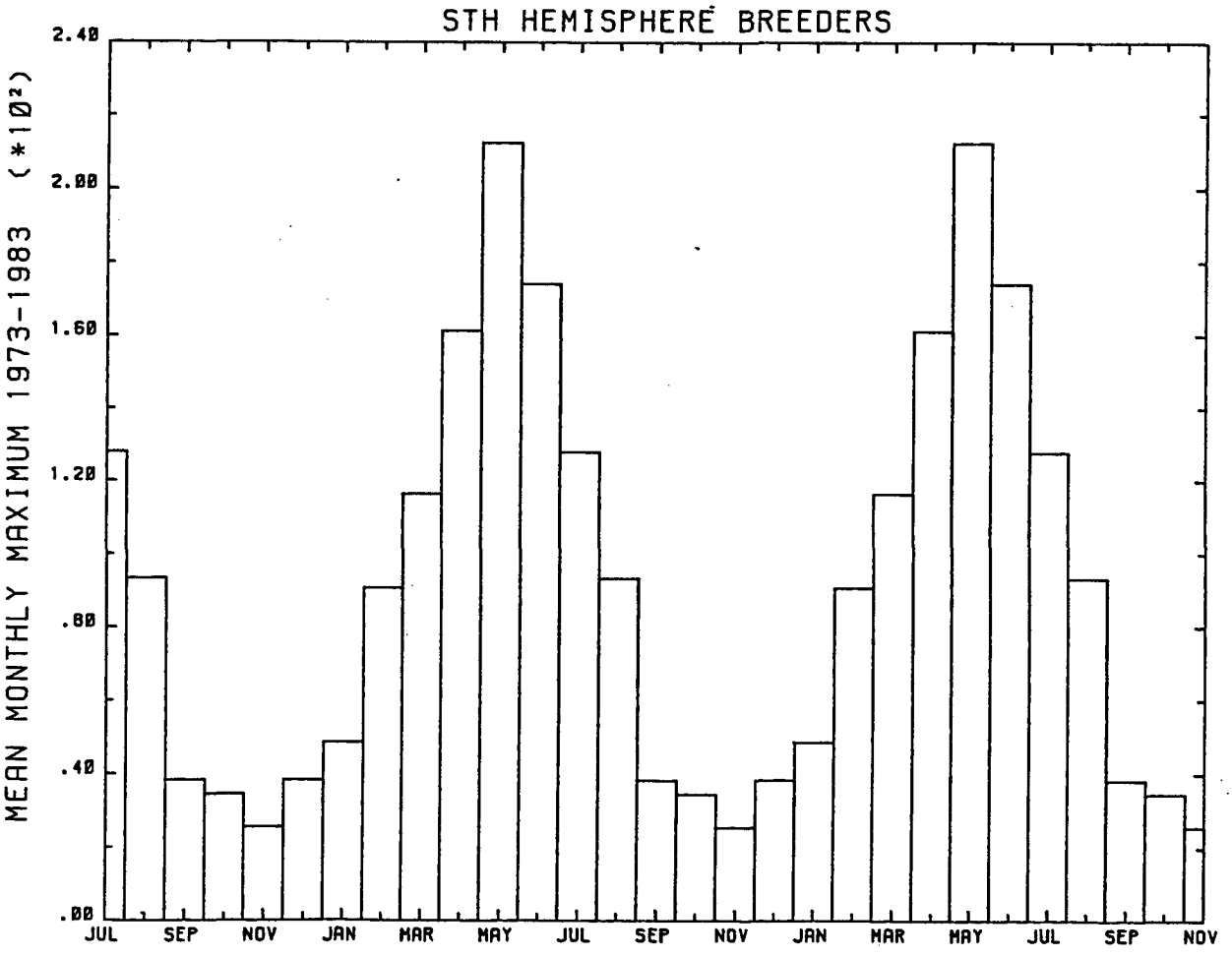
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SO WE THOUGHT IT WAS DIFFICULT?

Brett Lane, RAOU, 21 Gladstone Street, Moonee Ponds, Vic., 3039.

While searching publications on birds in north-western Australia for background information to the AWSG North-west Australia wader studies expeditions, one paper written by a Mr. T. Carter in 1920 and published in The Ibis stands out. He describes his trips to Shark Bay and North West Cape in 1911, 1913, 1915, and 1918. Some extracts of his account of his journeys are presented here. Those who have been on the North-west Expeditions will surely sympathise with him.

1911

"Left my station at Broome Hill in South-west Australia 30 July, 1911, hoping to visit my original sheep station at Point Cloates and the North-West Cape peninsula, where I had lived for thirteen years ... I travelled two hundred and fifty miles by railway to Perth, then sailing by steamer six hundred miles to Carnarvon, arriving on 5 August. Eleven days were spent there searching through the mangroves and coastal scrubs, and also the timber and scrub on the banks and islands of the large Gascoyne River, which as usual, was not running at the time; but there were some pools in its wide sandy bed, and considerable bird life around them. Left Carnarvon 16 August by five-horse mail coach, and arrived at the Minilya River station (eighty miles north) on the 18th. The late owner, Mr. Donald McLeod, most kindly lent me a pair of horses and buggy, and I proceeded sixty miles north, reaching Mauds Landing on the 23rd. Owing to a severe drought then prevailing, the whole country was almost denuded of grass, and travelling along the coast was extremely hard on the horses, owing to the loose dry sand and constant steep hills, also of sand. It was impossible to obtain any fresh animals, as I hoped to do, or any chaff or horse feed, and as the forty odd miles between there and Point Cloates was by far the worse and heaviest piece of road anywhere, I reluctantly gave up the idea of proceeding any further north. So after resting the horses for ten days, I proceeded inland for about fifty miles, camping one night at an artesian bore, where the overflow formed a considerable swamp, and from there worked back to the Minilya ...; then after a few days at the Minilya waiting for the mail coach, I left by it for Carnarvon, and took a steamer for Fremantle and the south on 30 September."

1915

After many weeks travelling by steamer to Shark Bay, thence to Carnarvon where the Gascoyne was in flood, he sailed by schooner for Maud's Landing on 17 June. "... arriving on the 19th, expecting to be able to travel to Point Cloates with the fortnightly mailman; but he arrived several days late with only a pack horse, as the three rivers between there and Carnarvon - viz., Lyndon, Minilya and Gascoyne - were all running bankers and impassable for vehicles. It seemed as if I should again be disappointed in reaching the North-West Cape, but after a few days, by great good fortune, a carpenter turned up to effect some repairs on the jetty, and I was able to hire his strong and "roomy" buckboard buggy, with pair of horses and full camping outfit, for a term of two months; so I lost no time in proceeding to Point Cloates, ... ". On 5 August I reached my "farthest north" point at a sheep station not far from Vlaming Head and the North-West Cape, where I was most hospitably received by Mr. A. Campbell, and stayed a few days." ...

"As my time-limit for the hired buggy would not allow me to round the North-West Cape and revisit the Exmouth Gulf country, as I had hoped to do, I reluctantly turned south on 10 August." ... "I drove alone back to Maud's Landing, where I was fortunate in meeting an old squatter friend, Mr. Guy McLeod, who was driving a mob of three thousand sheep to his Minilya Station, and gave me permission to travel with him, the large wagon drawn by fourteen camels, with calico yard for sheep, and water tank, food, etc., for the drovers, easily finding room for my outfit. The sheep started away early every morning and the wagon followed them, sometimes on a bush "road", but mostly across open country. Mr. McLeod had his motor car with him, but most of the time it was fastened by ropes to the hind axle of the wagon, and I travelled in it trying to keep it straight behind the wagon. There was often much Spinifex in large tussocks, occasional rocks, and sometimes thick scrub up to twelve feet in height, but wherever the wagon went, the motor car had to follow. Sometimes we would suddenly come to the edge of a steep declivity, and the camels had a cheerful way of going down it at a clumsy gallop, with the motor bounding after it in a most exhilarating way, over all and sundry obstacles, none of which I could see ahead of me on account of the wagon. However, I never quite capsized the motor, and we reached the Minilya on 30 August. I did twelve days field-work there, and left on 12 September by mail coach drawn by five camels for Carnarvon.".

1918

"The trip from which I have recently returned was made in order to effect the sale of my station at Broome Hill. I left Liverpool 30 October, 1918, travelling by SS. 'Carmania' to New York; thence by railway to Montreal, Banff, and Vancouver, "stopping off" for a few days at Banff, and being "hung up" at Vancouver for seventeen days; thence I sailed 9 December via Honolulu, Fiji, and Auckland to Sydney, where the steamer and passengers were quarantined for a week on account of the influenza epidemic, then raging generally at all ports on the route. As the shipping strike had stopped all coastal traffic, I went across Australia on the Trans-Continental Railway to Perth, Western Australia, arriving 21 January, 1919. After completing my business, I made a collecting tour of eight hundred miles through the south west area mostly by motor car, with Mr. J. Higham, the owner of the car and a keen field naturalist. Unfortunately, it was then the driest and hottest summer on record there; birds were in full moult, and we were much inconvenienced by disastrous bushfires, that had swept about half the country traversed. I returned to Perth early in April with the intention of doing more field work in Shark Bay and Dirk Hartog Island; but as the shipping strike still prevented coastal steamers running, and then influenza spread to Western Australia, making local travel very difficult and unpleasant on account of the stringent health regulations, I reluctantly gave up my proposed trip and returned to England via the Suez Canal, being very fortunate in obtaining a berth that an intending passenger had thrown up at almost the last moment."

So we thought we had it hard!!

RED-NECKED AVOCETS AND LEAD SHOT.

Chris Sonter, 72 San Mateo Avenue, Mildura, Vic. 3500.

The Red-necked Avocet *Recurvirostra novaehollandiae* is a common species of wader in the Sunraysia District of North-Western Victoria and adjacent New South Wales. Its status in the district is resident and breeding takes place when conditions are suitable. At times numbers build up to several thousands when birds congregate on waters of high salinity such as Fletcher's Lake (N.S.W.) and Lake Ranfurley (Vic.). Several other smaller bodies of water, also contained more than usual numbers of Red-necked Avocet. Such instances of population build-up, i.e. at Fletcher's Lake, related to a rapid drying-up of the water in November-December, 1979, when an estimated 5,000 birds were present.

Opportunities to observe the feeding habits of Red-necked Avocet are readily available at Fletcher's Lake but little study on its feeding behaviour and food requirements have been undertaken. From personal observations I have always believed that avocets obtained food from near the surface of the water or at mid-level even in shallow water.

Waterfowl species also utilise the same waters as Red-necked Avocet and subsequently non-game species run the gauntlet of the shooters during the open season on waterfowl. Red-necked Avocet were numerous during the opening of the 1982 season on the swamps and saline drainage basins in the South Merbein area (Vic.). The six birds found had been shot and were lying in a cluster on the side of an embankment. The legs were in a position suggesting that they had been held tightly in a clenched hand. Wounds from shotgun pellets were distributed over the bodies but no pellets had been found to enter the walls of the stomachs.

Four of the six birds had lead-shot in their stomach contents. Two specimens had two pellets each, one had three pellets and the fourth specimen had four pellets. All six birds had varying quantities of grit in the stomach. Some of the grit was large in comparison to size of stomach, i.e. stomach analysis of a Red-necked Avocet found shot on a swamp at Yelta (Vic.) on 6 February, 1982, revealed several stones of 3mm diameter.

It would appear from the analysis of the stomach contents of six Red-necked Avocets that a certain portion of their food intake is procured from off the bottom or mud zone in shallow water depressions. Contamination of such shallow swamps from leadshot, through intensive shooting of waterfowl, must pose some threat to species such as Red-necked Avocet. Other species sharing comparable ecological niches as Red-necked Avocets such as Black-winged Stilt *Himantopus himantopus* and Banded Stilt *Cladorhynchus leucocephalus*, would be in less danger of taking lead-shot because of their 'probing' technique, though stomach contents of a Red-necked Stint *Calidris ruficollis* and a Sharp-tailed Sandpiper *C. acuminata* (both 'probers') also revealed grit had been taken.

However, Red-necked Avocets would be particularly vulnerable in gathering excessive amounts of lead-shot when frequenting potentially good waterfowl habitats where shooting is encouraged because of their method of "sweeping" when feeding.

A SURVEY OF THE WADERS OF SOUTH-WEST TASMANIA.

M. Schulz, 37 Halifax Street, Middle Brighton, Vic. 3186, and
K. A. Menkhorst, Port Davey, C/- Tasair, P.O. Box 451E, Hobart, Tas.7001.

The wader populations of south-west Tasmania are generally poorly known and little detailed quantified information has been collected. Green and Mollison (1961) and Luckman and Luckman (1972) both presented isolated records of waders from scattered localities in the region.

In this survey all the beaches (with the exception of a short section at New Year Bay - 43°32', 146°23') on the south coast of Tasmania from South-east Cape west to South-west Cape, on the west coast (with the exception of the short pebble beach at McKays Gulch - 43°32', 146°02') north to Port Davey entrance, and two bays (Spain Bay and Hannant Inlet) on the south side of Port Davey were censused. The survey was conducted from late November to late December 1983.

Results.

In all a total of six species and two hundred and thirty-nine individuals were recorded. The most common species observed was the Pied Oystercatcher, representing 34.7% of the total waders present (Table 1). The Sooty Oystercatcher and Hooded Plover were equally common and respectively represented 27.6% of the total waders present. The other waders recorded were in far lower numbers: Masked Lapwing (5.9%), Latham's Snipe (3.8%), and Red-necked Stint (0.004%).

The totals given in Table 1 are considered to closely approximate the total population of the Pied Oystercatcher and Hooded Plover in the region. This is because these species favor sandy beaches (none were recorded along the rocky shoreline or on pebble beaches), and all beaches of this type were visited with the exception of New Year Bay. However, the Sooty Oystercatcher total is likely to be an underestimate due to its occurrence along rocky shorelines. Little rocky coastline was covered due to the difficult terrain and the large amount of time this would have taken.

The Latham's Snipe total is not a true indication of numbers present in the region as little time was spent examining habitat favoured by this species. Individuals recorded were either in sedgeland at creek mouths or on the edge of lagoons adjacent to the coast.

Notes on Each Species.

Pied Oystercatcher - recorded from most sandy beaches but absent from pebble beaches and rocky coastline. The highest density observed was on the tidal mudflats at Hannant Inlet (representing 20.5% of the total of this species).

Sooty Oystercatcher - found on the majority of sandy beaches but generally less common than the Pied Oystercatcher. This species was also recorded on a number of pebble beaches and rocky shores on which the previous species was not found. The highest number recorded was a loose flock of fifteen birds (representing 22.7% of the total of this species) on an exposed reef and pebble beach to the north of Noyhener Beach. This species was not observed on the tidal mudflats at Hannant Inlet.

Table 1. Summary of waders censused at each locality visited.

Locality +	Geographical Co-ordinates	Date Visited	Substrate Type	Pied Oyster Catcher	Sooty Oyster Catcher	Masked Lapwing	Hooded Plover	Red-necked Stint	Latham's Snipe
South Cape Bay	43°37'146°47'	22.11.83	A	6	4	-	4	-	-
Granite Beach	43°36'146°41'	23.11.83	B	2	-	-	-	-	-
Surprise Bay	43°35'146°39'	23.11.83	C	2	4*	-	2*	-	-
Osmiridium Beach	43°34'146°37'	24.11.83	C	2	-	-	4**	-	-
Rocky Boat Inlet	43°34'146°36'	24.11.83	D	-	1	2	-	-	-
Prion Beach	43°32'146°34'	25.11.83	C	10	2	-	7	1	-
Deadmans Bay	43°32'146°31'	25.11.83	C	6*	2	-	-	-	-
Lousy Bay	43°32'146°29'	25.11.83	E	-	-	-	-	-	-
Louisa Bay	43°31'146°22'	27.11.83	C	6	1	-	6	-	-
Louisa Island	43°32'146°22'	27.11.83	E	-	6***	-	-	-	-
Louisa Ck. Mouth	43°31'146°21'	28.11.83	C	1	2	-	2	-	-
Unnamed Ck. Mouth	43°31'146°20'	28.11.83	C	-	2	-	-	-	-
West Louisa Beach	43°31'146°19'	28.11.83	C	2*	2	-	-	-	-
Cox Bight	43°30'146°14'	28.11.83	C	11*	4	-	7	-	4
New Harbour	43°31'146°09'	30.12.83	C	4**	2	2	4*	-	-
Hidden Bay	43°31'146°08'	30.12.83	C	3	2	-	2	-	-
Unnamed Bay	43°31'146°07'	30.12.83	D	-	-	-	-	-	-
Ketchem Bay	43°32'146°07'	30.12.83	C	-	2	-	2	-	-
Wilson Bight	43°33'146°05'	28.12.83	A	2	4*	2	2	-	-
Window Pane Bay	43°28'146°01'	26.12.83	A	1	2	-	1	-	-
Island Bay	43°27'146°01'	26.12.83	D	-	1	-	-	-	-
Noyhener Beach	43°24'145°59'	24.12.83	C+D	2	15	2	5*	-	-
Stephens Beach	43°23'145°58'	24.12.83	A	4	4	-	14**	-	-
Spain Bay	43°22'145°58'	24.12.83	A	2	2	-	4	-	1
Hannant Inlet	43°23'145°59'	24.12.83	C+D+F	17	2	6	-	-	4
TOTALS				83	66	14	66	1	9

Key + All locality names are those used in the TASMAP series, sheets 8210 (South-east Cape), 8110 (South-west Cape), 8011 (Port Davey), and 8111 (Old River).

A Sandy beach with rocky sections
B Rocky beach with sandy sections
C Sandy beach
D Rocky shoreline with several short pebbly beaches
E Rocky beach
F Tidal mudflats.

* one breeding record
** two breeding records
*** three breeding records

Masked Lapwing - scattered along the coastline in pairs but not common. Observed both on ocean beaches at New Harbour, Wilson Bight and Noyhener Beach and on the exposed rock platforms at Rocky Boat Inlet. This species was most numerous on the tidal mudflats of Hannant Inlet, where 42.9% of all lapwings were observed.

Hooded Plover - recorded from the majority of sandy beaches in the region, but absent from pebble beaches, rocky coastlines and the tidal mudflats of Hannant Inlet. The highest densities were on the beaches south of Port Davey (i.e. Stephens and Noyhener Beaches), where 28.8% of the total were recorded.

Red-necked Stint - the only record was of a single bird at the mouth of New River on Prion Beach.

Latham's Snipe - four flushed from sedgeland at several creek mouths on the west side of Hannant Inlet, one flushed by the side of a creek at Spain Bay, and four flushed from sedgeland on the edge of Freneys Lagoon behind Cox Bight were the only records of this species.

Nesting Records.

Nest searching was not conducted on all beaches with equal intensity and the time differences between some of the beaches allowed for few comparisons to be made.

Three species were recorded breeding:

Pied Oystercatcher - this species was found nesting on four beaches (refer to Table 1) and in all cases birds were incubating. The nest sites were generally in the storm tide zone of the beach but one of the nests at New Harbour was located on the edge of a primary sand dune, approximately one metre above the beach.

Sooty Oystercatcher - recorded nesting at three localities (refer to Table 1). In one area, Louisa Island, three nests were located on ledges along the rocky shoreline. At the two other sites both nests were situated on rock stacks. The pair at Surprise Bay were nesting in a sandy depression on a rock stack about three metres above the low tide zone of the beach. The pair at Wilson Bight was breeding on a rock stack about five metres above an exposed rock platform approximately one hundred metres offshore. In all cases the adults were incubating.

Hooded Plover - recorded nesting on five beaches (refer to Table 1). In all seven pairs were found to be breeding, and were at varying nesting stages from digging a shallow nest depression (Noyhener and Osmiridium Beaches) to incubating (Osmiridium Beach) to young about to leave the nest (New Harbour) and young at runner stage (Stephens Beach). No juvenile birds were observed in the company of adults. The nest sites were either situated in the storm tide zone near the base of abutting sand dunes (Surprise Bay, Osmiridium and Noyhener Beaches) or on dunes overlooking the beach (Stephens Beach and New Harbour). At Stephens Beach the nest was located on the edge of a large blowout in the midst of an extensive aboriginal midden about ten metres above the beach. While at New Harbour the nest was located under a *Leucopogon* bush on the edge of a small blowout in a primary sand dune overlooking the beach and about one metre above the beach level.

Additional Species.

Luckman and Luckman (1972) recorded the Red-capped Plover as common on Stephens Beach and Ketchem Bay. However, this species was not noted by Green and Mollison (1961) or observed during the present survey.

Further Luckman and Luckman (1972) recorded the Bar-tailed Godwit and Greenshank at Kelly Basin on the north side of Port Davey. These species as well as other common migratory species to Tasmania do not appear to be common in this region of the state but undoubtedly occur irregularly in small numbers.

The Double-banded Plover was not recorded during the present survey, nor by Green and Mollison (1961) or Luckman and Luckman (1972), whose observations were made in the area in late spring and summer. However, as this species is most prevalent in Tasmania from mid-autumn to early spring it is likely to occur in the area but has so far escaped attention due to few observers visiting this area in the winter months.

Summary.

A low diversity of wader species occurred along the coast of south-west Tasmania. The three common species, the Pied Oystercatcher, Sooty Oystercatcher and Hooded Plover, comprised 90.0% of all waders counted. All three species were recorded breeding in a number of localities. Migratory waders were poorly represented and only the Latham's Snipe could be regarded as a somewhat plentiful migrant. Species such as the Red-necked Stint, Bar-tailed Godwit and Greenshank appear to occur only infrequently.

References.

Green, R. H. and Mollison, B. C. (1961) Birds of Port Davey and the south coast of Tasmania. Emu 61, 223-236.

Luckman, J. S. and Luckman, L. E. (1972) Birds recorded in south-west Tasmania. Tas. Nat. 31, 3-5.

BACK ISSUES OF THE STILT.

For those members who have waited patiently and in vain for their copies of The Stilt 1, 2, and 3, extra copies of these back issues will be printed in the near future. To ensure that no-one misses out, would you please write to the Secretary, A.W.S.G., c/- R.A.O.U. if you have not received any issue of The Stilt for which you have paid.

Marilyn Hewish.

OPEN NOTEBOOK.

Two Unusual Waders sighted at Lake Illawarra.

On the 24 October 1983 while observing waders at the entrance to Lake Illawarra I noticed a wader I could not recognise among a group of Grey-tailed Tattlers *Tringa brevipes*. As the angle of light was bad I decided to move to the other side of the group. During this action the birds flew off over Windang Bridge. I made my way around to the other side of the bridge and on to Picnic Island. Off the southern side of the island, on a small samphire covered mudflat, I relocated the group of birds I was looking for. I picked out the odd bird and began observing it with a x20 spotting scope. The long upturned black bill and bright orange legs left no doubt that the bird in question was a Terek Sandpiper *Tringa terek*. The Terek Sandpiper is considered rare in the Illawarra area and has only been observed here on a few occasions. The bird was later observed by Lindsay Smith and Ron Imisides and remained in the area for a period of three days.

While on Windang Island on 28 October 1983, Ron Imisides and I noticed a small wader with a longish bill on the rocks on the southern side of the island. (Windang Island lies approximately two hundred metres off the entrance to Lake Illawarra and is accessible at low tide by a connecting sand bar.) The bird was observed through a x20 spotting scope and it was immediately identified as a species of Tattler.

We moved around to get the bird in better light and put the scope on it again at a distance of twenty metres. The bird was now in full sunlight and the following details were noted:- the upperparts were dark grey, the head had a pale white eyebrow and a long straight blackish bill with a nasal grove extending nearly to the end of the bill, the underparts were a palish grey with dark barring extending from the neck to the belly and under-tail coverts, the legs were dull yellow. The bird was observed for twenty minutes while it casually went about preening itself, and we then decided to put it up to check its call. This consisted of a series of eight, short, trill whistles rolled together and descending in volume. The bird was flushed three times and gave the same response in each instance. This left no doubt in our minds that the bird was a Wandering Tattler *Tringa incana*. The bird was later observed by Lindsay Smith and Kevin Wood who are familiar with the species from overseas and agreed with our identification.

Chris Chafer,
14 Brookfield Avenue,
Warilla, N.S.W.. 2528.

Foot-shaking in Mongolian Plovers.

On 7 February 1984 at Clinton Conservation Park, South Australia, I was observing a group of Mongolian Plovers roosting on a sandy inland lake at high tide. My attention was focused on one bird exhibiting foot-shaking behaviour similar to that described by Stephen Keeling in The Stilt Spring 1982.

This bird shook its right foot on four occasions within about five minutes. The interesting thing about this behaviour was that it always occurred prior to the retraction of the right leg into the underparts. The bird would then stand on the left leg.

By shaking the foot, sand grains would probably be removed, thus the body feathers would be kept clean upon retraction of the leg.

Jamie Matthew,
14 Peter Street,
Lockleys, Adelaide, 5032.

Mating of Red-capped Plovers.

Whilst watching waders at the Meridian Road swamps, Merbein South, Victoria on 7 December 1983, a pair of Red-capped Plovers were observed in the act of copulation. The plovers were some 20 metres from the observer on a muddy island, devoid of vegetation, in one of the shallow saline drainage basins which make up the Meridian Road swamps. At first sighting the male was following closely in the footsteps of the female who then stopped and the male mounted almost immediately. The actual act of copulation lasted for two minutes and five seconds. During this time the female remained motionless while the rump of the male quivered up and down. At the very climax (pun intended) of the act, the male rolled onto his back taking the female with him. For one or two seconds the birds remained in this inverted position with legs pointing skyward until both reverted to the upright position. Both birds then stood side by side for a few moments before flying off in different directions.

Jeff Campbell,
C/- Farmilo,
Private Bag,
Meringur via Red Cliffs,
Vic. 3496.

Migratory Waders in the 'Inland'.

An article by Michael Sharland entitled 'Southern Limits for Migrating Waders' (The Bird Observer, August 1983) contains several statements that could lead the reader to assume that migratory waders settle only on the coastline. Such statements include '... to invade in their thousands certain favoured places on the Australian coastline ...'; 'These waves of migrants from the north expend themselves on various parts of the coast'; and 'Some, however have been seen resting at water holes in Central Australia and in a short while resuming their overland flight'.

Even given the ambiguous nature of the term 'Central Australia', unavoidable though it may be, contentions such as those quoted above suggest categorically that migratory waders never settle in the inland of Australia. In fact in many inland regions, including the Sunraysia area of north-western Victoria and south-western New South Wales, migratory waders are present during all months of the year. As an illustration of this, some numbers of waders noted during the 1983 Summer National Wader Count, conducted in this area by members of the Sunraysia Bird Observers Club, can be cited, e.g. Sharp-tailed Sandpiper - 443, and Red-necked Stint - 163. During the 1983 Winter National Wader Count the numbers were 7 and 488 respectively for the same species. Although these numbers are well down on those obtained in many coastal regions during the same period, it is apparent that inland areas such as the Sunraysia are certainly not devoid of migratory

waders. Monthly counts at one area of wader habitat in the Sunraysia are currently being carried out and from previous experience are expected to further illustrate the perennial numbers of breeding and over-wintering waders in this area.

Jeff Campbell,
C/- Farmilo,
Private Bag,
Meringur via Red Cliffs,
Vic. 3496.

Diet of Waders in the Coorong, S.A.

As part of a study on the Coorong ecosystem for the South Australian Department of Environment and Planning, I carried out some work on the diet of waders in this area in the autumn of 1982. The research involved observations on foraging waders, the collection and analysis of mud samples and the analysis of oesophageal and stomach contents from waders in both the North and South Lagoons of the Coorong. Most observations were of Banded Stilt, Red-necked Avocet, Curlew Sandpiper, Red-necked Stint, Red-capped and Double-banded Plovers.

Results showed that most species appeared to be generalists, feeding on a wide variety of plant and animal material. Small fish, *Ruppia* seeds, *Ruppia* tubers, a gastropod mollusc *Coxiella striata*, beetles and other insect material were important food items for waders in autumn 1982, particularly in the South Lagoon - a very saline environment. Small crustaceans (e.g. amphipods) and polychaete worms (mainly *Ceratonereis erythraeensis*) were abundant in mud samples from the North Lagoon and are likely to be important food sources for waders there. However, the small number of waders collected from the North Lagoon did not allow the confirmation of this hypothesis.

I hope that a more detailed paper on this research will eventually be published in The Emu.

P. A. Paton,
47 Gilbert Street,
Gilberton, 5081.

Northern Distribution of the Hooded Plover in N.S.W.

On the 28 August 1983, Ron Imisides and I located a pair of Hooded Plovers *Charadrius rubricollis* along Bherwerre beach, which is located in Wreck Bay on the southern side of the Jervis Bay Nature Reserve. The birds were approximately four kilometres north-east of the oceanic entrance to Sussex Inlet and were roosting in a large clump of beachwashed seaweed. The birds allowed us to approach to within ten metres and then walked off to begin chasing and catching sandflies. After about fifteen minutes of feeding the birds again found a clump of seaweed and settled down to roost.

The birds have been recorded here for the past three years and we believe that this is the most northerly point of distribution for the Hooded Plover in eastern Australia.

Chris Chafer,
14 Brookfield Avenue,
Warilla, N.S.W. 2528.

AUSTRALASIAN WADER STUDIES GROUP - CATCH TOTALS

SPECIES	A	C	E	F	H	L	O	P	Q
Pied Oystercatcher	32	44							
Sooty Oystercatcher		2							
Masked Lapwing		63			3			1	
Grey Plover			5			2			
Lesser Golden Plover	2								
Hooded Plover	2						3		
Mongolian Plover						23			1
Double-banded Plover	4	58					11		
Large Sand Plover						540			1
Oriental Plover						35	30		
Red-capped Plover	5	11	13		4	59		1	3
Black-fronted Plover	2	11						4	1
Black-winged Stilt		1	6		1	3		3	
Banded Stilt			1						
Red-necked Avocet			1			13			
Ruddy Turnstone						26			
Eastern Curlew		8							
Whimbrel						4			
Grey-tailed Tattler					9	94			21
Common Sandpiper						1		35	
Greenshank			1			1			
Marsh Sandpiper						12			
Terek Sandpiper	1	2				117			15
Latham's Snipe					3				
Black-tailed Godwit						4			
Bar-tailed Godwit	28				6	214			1
Red Knot	3	20	10			131			3
Great Knot			7			583			2
Sharp-tailed Sandpiper		134	2	2	15	114			5
Red-necked Stint	775	1805	584	11	13	530	13		
Curlew Sandpiper	218	713	211	4	10	856	1		11
Broad-billed Sandpiper						191			
Asian Dowticher						2			
Red-necked Phalarope						1			
TOTALS	1072	2882	841	17	64	3531	58	44	64

BANDER'S CODE:

A = Tasmanian Shorebird Study Group
* C = Victorian Wader Study Group
E = Western Australian Wader Study Group
F = Jim McNamara, Adelaide, South Australia
H = Bill Lane, Centr. & Nth. N.S.W.
L = AWSG North-west Expedition
O = Alan Lashmar, Kangaroo Island, S.A.
* P = Ken Mills, Kununurra Area, W.A.
* Q = Peter Woodall and Bill Horton, Lytton, Moreton Bay, Qld.

* = Six months to June, 1983 only.

WOULD ALL BANDERS PLEASE SUBMIT THEIR TOTALS TO THE AWSG SO THAT THIS TABLE CAN INCLUDE ALL BANDING OF WADERS IN AUSTRALIA.

AUSTRALASIAN WADER STUDIES GROUP

Office Bearers

Chairperson	Dr. Clive Minton, 165 Dalgetty St., Beaumaris, Victoria, 3193.
Secretary	Mrs. Brenda Murliss, 34 Centre Ave., Vermont, Victoria, 3133.
Treasurer	Mr. David Henderson, P.O. Box 29, Legana, Tasmania, 7251.
Editor "The Stilt"	Mr. Peter Dann, P.O. Box 403, Cowes, Phillip Island, Victoria, 3922.
AWSG Library	C/- RAOU, 21 Glastone St., Moonee Ponds, Victoria, 3039.
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New South Wales	Mr. Alan Morris, 'Greycliffe House', Greycliffe Ave, Vaucluse, NSW 2030.
	Hunter Bird Observers Club, C/- J. Perry, 8 Denby St., Garden Suburb, NSW 2288 (Newcastle area).
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Northern Territory	Mr. Tony Hertog, CSIRO Wildlife Research, P.O. Bag 44, Winnellie, N.T. 5789.
Western Australia	Mr. Mike Bamford, 5 Elizabeth St., South Perth, Western Australia, 6151.
	Mr. Doug Watkins, 3 Jane Rd., Applecross, Western Australia, 6153.
South Australia	Mr. Niven McCrie, 40 Gilbert St., Gilberton, S.A. 5081.
	Mr. David Close, 30 Diosma Dve., Coromandel Valley, S.A. 5051.
Tasmania	Mr. Bob Patterson, 89 Summerleas Rd., Ferntree, Tas. 7010.
Papua-New Guinea	Mr. Brian Finch, P.O. Box 496, Port Moresby, Papua-New Guinea.
New Zealand	Miranda Field Naturalists Trust, P.O. Box 39180, Auckland West, New Zealand.

Contributions to "The Stilt" should be sent to the Editor.