TABLE 1 : Variation of mean flock size with wind strength

southerly wind strength category	mean flock size	sample standard deviation
Light	2.23	2.12
Moderate	4.70	5.68

Anova (Single classification) : $F_{1,77} = 7.6736$; $p > .01$.

Conclusions

The results presented in this paper provide limited further support for the hypothesis of a leading line effect in Honey Buzzard migration through Malta. The tests described above should be repeated when a more extensive set of angular data becomes available.

References

MARDIA,K.V. 1972. Statistics of directional data. Academic Press : London & New York.

THAKE,M.A. 1977. Synoptic scale weather and Honey Buzzard migration across the central Mediterranean. *Il-Merill* 18:19-25.

THAKE,M.A. 1980a. Gregarious behaviour among migrating Honey Buzzards. *Ibis* 122:500-505.

THAKE,M.A. 1980b. Autumn migration of the Honey Buzzard through Malta in relation to weather. *Il-Merill* 21:13-17.

THAKE,M.A. 1983. Evidence for the existence of a leading line effect in Honey Buzzard migration through Malta. *Il-Merill* 22:8-9.

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MIGRATION OF THE SANDWICH TERN IN EAST SICILY

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The Sandwich Tern *Sterna sandvicensis* is a scarce autumn migrant to Malta (Sultana & Gauci 1982), with no autumn records in some years (Cachia Zammit & Attard Montalto 1980).

On the other hand, along the nearby south-east Sicilian coast it is a very common autumn visitor with a definite, and sometimes huge, southward movement. A good counting station along the east Sicilian coast is Capo Murro di Porco (135 km. north-west of Malta) near Syracuse, where large numbers of Sandwich Terns moving to the south are recorded every year from early August to late November, with peaks in the last ten days of October. In 1980 the author counted 348 birds during 18 observation hours from 8th October to 11th November; and in 1981, 397 from 23rd August to 22nd November during 22 observation hours. A more systematic count in 1982 totalled 1,403 during 81 observation hours from 1st September to 28th November, with peaks of 334 on 25th October during 150 observation minutes and 195 on 31st October during 140 observation minutes.

Table 1 includes all the 2,148 birds counted in the three autumns and shows the percentage of terns that passed singly or in flocks of different sizes (largest flock counted was of 63 birds).

Table 1	Flock size	1	2-10	11-20	21-30	31-63
	Percentage	2.33	51.23	24.09	10.52	11.80

No definite relation with weather was noted, but most of the largest counts were on days with clear sky, south or south-west light winds and smooth sea. Only a few wintering birds were recorded from late November.

Spring passage is not so well defined. In late February, but mostly from mid-March to early April, I recorded small flocks or single birds, most moving to the north, but some to the south (the last are probably terns that wintered in the Tyrrhenian Sea and that fly south before moving to the east, crossing the Messina strait). Spring passage is probably more marked well offshore and involves large flocks, like the one of 100+ recorded near Comino on 20 April 1969 (Sultana & Gauci 1982). Migrating Sandwich Terns generally pass very close to Capo Murro's cliff. It is unusual to record birds further offshore than 200-300 m. They fly low (below 20 m. above the sea) in loose flocks with the birds, at least one or two, calling incessantly. Sometimes, especially with strong side winds, they prefer to fly in compact line formations, very close to the surface of sea.

Sandwich Terns do not usually flock with other migrating sea-birds. In all the 144 flocks (comprising at least 3 birds) recorded in autumn 1982, the author recorded only four instances of Black-headed Gulls *Larus ridibundus* associated (one, two, one and three flocking respectively with 16, 9, 11 and 8 terns) and two of Mediterranean Gulls *Larus melanocephalus* (one and one flocking with 5 and 11 terns). In five instances large flocks of tens of gulls of both species and a few associated terns were recorded moving all together to the south, with the terns always at the head of the flock.

Sandwich Terns on passage in Sicily originate from Black Sea colonies as shown from recoveries of ringed birds and disperse to winter in the west and central Mediterranean (Brichetti & Isenmann 1981, Isenmann & Czajkowski 1978). During westward movement they clearly closely follow the coastline of eastern and southern Sicily so that only a few are recorded from the Sicilian channel islands.

A similar pattern of autumn migration across the central Mediterranean, due to the leading line effect of the Sicilian coasts, occurs in other *Laridae* like the Mediterranean Gull and the Slender-billed Gull *Larus genei* whose autumn passages, respectively in October-November and August-September, are well marked in south-east Sicily but practically unrecorded in Malta.

References

BRICHETTI, P. & ISENMANN,P. 1981. Studio preliminare sull'evoluzione degli effetivi nidificanti di laridae e sternidae nelle vallate di Comacchio (Italia) e nella Camargue (Francia).*Riv.It.Ornit.*51 (3-4) : 133-161.

CACHIA ZAMMIT, R. & ATTARD MONTALTO, J. 1980. Systematic list for 1977 & 1978. *Il-Merill* 21: 26-43.

ISENMANN, P. & CZAJKOWSKI, M.A. 1978. Note sur recensemente de Larides entre Nice et Naples en decembre 1977. *Riv.It.Ornit.*48 : 143-148.

SULTANA, J. & GAUCI, C. 1982. A new guide to the birds of Malta. The Ornithological Society : Valletta.

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THE ADVANTAGES OF MAJORITY DECISION MAKING

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Social interactions resulting in the formation of groups or flocks have been investigated extensively. Flocking is likely to convey several advantages, including lower susceptibility to predation (Kenward 1978), improved predator detection (Bertram 1980), increased accuracy of orientation (Waltraff 1978, Thake 1980), and transfer of information about feeding sites (Ward &Zahavi 1973, DeGroot 1980). There is another possible advantage, namely that decisions made in a social context might be more accurate.

Nearly two centuries ago, Condorcet (1785) showed that a majority decision made by a group of humans is more likely to be correct than the same decision made by a single individual. Recent extensive theoretical work in the social sciences has yielded many interesting theoretical results (excellent review in Grofman *et al.* 1982, and in press). Some time ago, Lorenz (1952) suggested that decisions made by flocks of animals might involve a concensus. Yet, social decision making in animals has remained largely uninvestigated, despite the fact that a great many decisions are made by the individual in a context which at a glance might be expected to allow that individual to take advantage of information available from other individuals. In this paper, the theoretical basis of majority decision making by animals is outlined and the adaptive significance of behaving in this way is stressed.

Majority decision making : a model

Consider a set of environmental conditions under which an individual performs behaviour "P" (some unspecified behaviour having biological significance) with probability p, and performs behaviour "Q" with probability q, such that $p + q = 1$. Membership of a flock of n individuals is assumed not to alter the values of p or q for the individuals. If so, the probabilities of various combinations of decisions are given by the terms in the expansion

$$(p + q)^n = 1.$$

For example, consider a flock of three individuals. There are four possibilities : p^3 represents an unanimous decision to perform "P", p^2q representing the case where one in-