

**Bills, Eggs, and Nests of Captured Arctic Terns  
(*Sterna paradisaea* Pont.)  
and Common Terns (*Sterna hirundo* L.).**

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(Med et dansk resumé: Næb, æg og reder af fangede Havterner (*Sterna paradisaea* Pont.) og Fjordterner (*Sterna hirundo* L.)).

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**Introduction.**

The observations were carried out in the bird sanctuary, Tipperne, near the western coast of Denmark (about 55°53' n. lat., 8°13' e. long.). A short description of the sanctuary and the routine observations were published by ANDERSEN (1948, pp. 125–126). The author lived there as an inspector during the six summer months through 1940–1948.

In 1946 Dr. Å. VEDEL TÅNING asked me to form an estimate of the ratio between the numbers of nests of *Sterna hirundo* L. and *S. paradisaea* Pont. in the sanctuary, and to band as many birds as possible of the two species. Therefore, I started catching terns on their nests with a trap only slightly different from that described by HAVERSCHMIDT (1946). As the trapping had to be done during the time when we were busy recording all nests in the sanctuary, only a few birds were taken each year.

In no case was there any doubt as to the identification of the birds captured. The two species were easily distinguished by the colour of the plumage, including the blackish line on the outer primary, the length of the tarsus, and the colour of the bill and feet. It is unlikely, therefore, that the two species interbreed in the western part of Denmark (cf. KULLENBERG 1946, p. 76).

When a bird was captured, it was banded and the following items were recorded: The length (sliding calliper) and colour of the bill, including the length of its black tip, the place of the nest on the map, the amount and character of the nest material, and the length and breadth of the eggs.

The present paper contains the information gained by these observations.

**The bill.**

## Length of bill.

The distribution of the length of the bills of 114 *S. paradisaea* and 61 *S. hirundo* is shown by the probit diagram, fig. 1. The approximately linear graphs show a mean of 33.00 mm for *S. paradisaea* and 35.85 mm for *S. hirundo* with the standard deviations 1.55 mm and 1.70 mm, respectively. The standard error of the means are found by dividing these two figures by the square roots of 114 and 61, respectively. Thus the difference

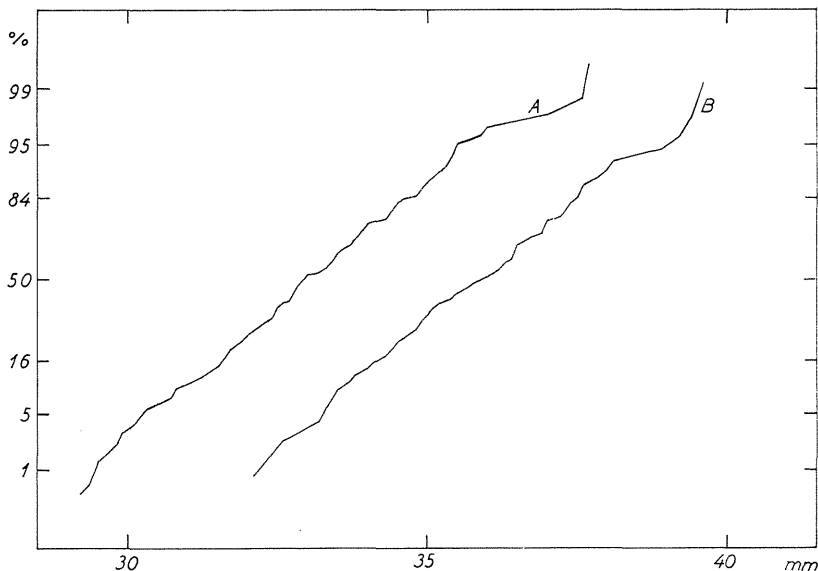


Fig. 1. Cumulative frequency distribution according to the length of the bill of 114 *S. paradisaea* (A) and 61 *S. hirundo* (B). Abscissa: length of bill in mm. Ordinate: frequency percentage on a probit scale.

In preparing the graphs in fig. 1-4 the cumulative frequency percentages were calculated as  $100(n-0.5)/N$ , where  $n$  is the number of observations less than or equal to the abscissa and  $N$  is the total number of observations.

The abscissa corresponding to the ordinate 16% (respectively 84%) is one standard deviation less (respectively greater) than the mean (corresponding to 50%).

*Fordeling af næblængde hos 114 Havterner (A) og 61 Fjordterner (B). Kurverne er summerede hyppighedsfordelinger. Abscisse: næblængde i mm. Ordinat: procentisk hyppighed efter probitskala.*

*For figurerne 1-4 er hyppighedsprocenten udregnet som  $100(n-0.5)/N$ , hvor  $n$  er antallet af observationer, der er mindre end lig med den tilsvarende abscisse, og  $N$  er det samlede antal observationer.*

*Abscissen svarende til 16% (hhv. 84%) er een gange spredningen mindre (hhv. større) end middeltallet, der svarer til 50%.*

TABLE 1.

Length in mm of the bills and their white tips in recaptured  
*S. paradisaea*.  
*Næblængden og længden af den hvide næbspids hos genfangne Hav-*  
*terner (mm).*

band no. <i>ring nr.</i>	years of capture <i>fangst- og genfangst-år</i>	length at capture		length at recapture		difference	
		<i>længde ved fangst</i>	<i>bill white tip</i>	<i>længde ved genfangst</i>	<i>bill white tip</i>	<i>forskel</i>	
		<i>næb</i>	<i>hvid spids</i>	<i>næb</i>	<i>hvid spids</i>	<i>næb</i>	<i>hvid spids</i>
730805	1946-1948	33.0	?	33.1	1.5	+ 0.1	?
730823	1946-1948	35.2	?	35.4	2.0	+ 0.2	?
730822	1946-1947	35.4	?	34.9	0.0	- 0.5	?
731011	1947-1948	32.8	1.5	32.9	1.0	+ 0.1	- 0.5
731151	1948-1949	32.3	0.5	32.0	1.0	- 0.3	+ 0.5

TABLE 2.

Length in mm of the bills of three old *S. paradisaea* banded as  
nestlings.  
*Næblængden hos tre gamle Havterner, der var mærket som unger. (mm).*

band no. <i>ring nr.</i>	age (years) <i>alder (år)</i>	length of bill <i>næblængde</i>	length of white tip <i>længde af hvid næbspids</i>
RK 7516	14	32.1	1
10780 T	10	32.8	0
19901 T	10	32.4	1

TABLE 3.

Distribution of trapped terns according to the length of the white  
tip of the bill.

*De fangne terners fordeling efter længden af den hvide næbspids.*

length of white tip (mm) <i>længde af hvid næbspids</i>	number of <i>S. paradisaea</i> <i>antal</i>	number of <i>S. hirundo</i> <i>antal</i>
4.0		1
3.5		
3.0		1
2.5	8	6
2.0	12	22
1.5	12	8
1.0	34	17
0.5	9	4
0.0	27	2
total	102	61

of the means is highly significant, although the distributions overlap widely. The ranges of variation were 29.2–37.7 mm for *S. paradisaea* and 32.1–39.6 mm for *S. hirundo*. The rather straight lines (fig. 1) seem to show that the difference in length of the bills of the two sexes is very small. However, a sexual difference may be obscured by the discontinuous wearing off of the tip of the corneous sheath (cf. below).

The records of recaptured *S. paradisaea* give no reason to believe that the length of the bill varies with age (table 1). The length of the bills of three very old birds were all less than the mean, but their departure from the mean was well below the standard deviation (table 2, cf. fig. 1).

#### White tip of bill.

In the majority of the terns trapped the upper mandible had a white (or gray) tip 0–4 mm long. It was fragile and sometimes broke off when the bird snapped at the sliding caliper. It seems to be connected with the shedding of an outer layer of the corneous sheath of the bill. Its varying length and absence in one fourth of the *S. paradisaea* seem to show that it is broken off now and then also under natural conditions, thus smoothing any sexual differences in the length of the bill.

#### Black tip of the bill.

As the best field character distinguishing the two species at close range WITHERBY *et al.* (1944) emphasize for *S. hirundo* (*loc. cit.* p. 28): “black tip to scarlet or orange-red bill” and *S. paradisaea* (*loc. cit.* p. 36): “deep blood-red bill without black tip” and they add in parenthesis: “Exceptional Arctic Terns show a little blackish at tip of bill in breeding-season, but this is so unusual as to be of almost no practical importance”.

The difference in the main colour of the bill was an unailing distinguishing character also at Tipperne (when the bird was in the hand, dead or captured), but the presence or absence of a black tip was not, as about one third of all *S. paradisaea* trapped had black at the tip of the bill, although as a rule it was less extended and not so clear black as that of *S. hirundo*.

TABLE 4.  
*Sterna paradisaea*. Length of the black tip of bill (mm).  
 Høvterne. Længden af den sorte næbspids (mm).

length of bill (mm) <i>næblængde (mm)</i>	29.0-31.9	32.0-32.9	33.0-33.9	34.0-37.9
	5	3	1	5
	6	4	6	6
length of black tip (mm)	9	5	7	8
	12	7	8	10
		8	8	11
		10	10	11
<i>længde af sort næbspids</i>		11	12	12
		12	12	21
		12	14	22
		15	15	
average <i>gennemsnit</i>	8.0	8.7	9.3	11.8
number with black tinge at tip <i>antal med antydning af sort spids</i>	1	1		
number without black tip <i>antal uden sort spids</i>	20	20	16	23
total number <i>antal ialt</i>	25	31	26	32

On the colour of the bill of *S. paradisaea* WITHERBY *et al.* (1944, p. 39) write: "Bill (ad. winter) blackish, (ad. summer) blood-red, tip very occasionally blackish, (juv. and 1st summer) black". The birds of this species with black at tip of the bill may therefore be either young birds or birds which have not entirely changed the corneous sheath of the winter. Observations on the captured birds may contribute to the decision of which explanation is the right one. Table 4 gives the length of the black tip measured along culmen. The table shows that the average length of the black tips present increases with the length of the bill, and, above all, the maximum length of it increases.

The distribution of the length of bills with a black tip compared with those without a black tip is shown in fig. 2. It appears that the distribution of the length of the bills without a black tip forms a straight line (a normal distribution), whereas the line for those with a black tip is broken, following the other distribution above the mean (50 %), but showing a deficit of members below the mean.

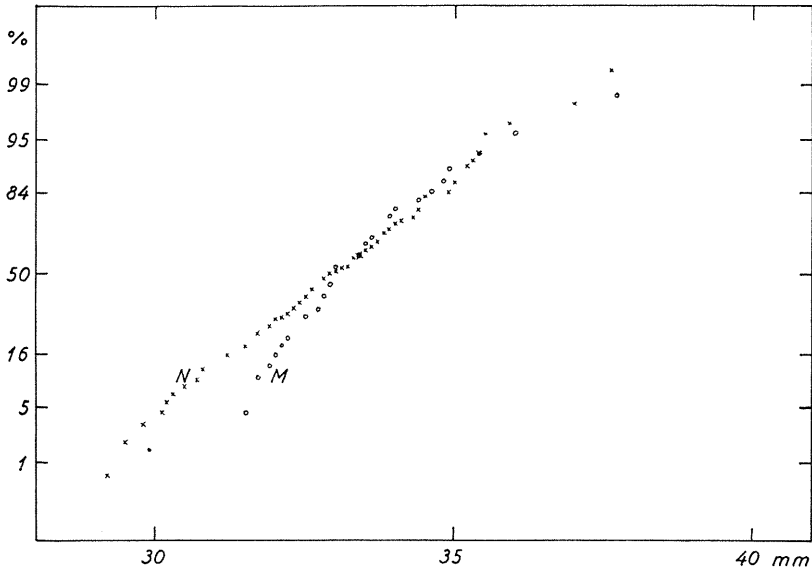


Fig. 2. *S. paradisaea*. Cumulative frequency distributions according to length of 79 bills without a black tip (N) and 35 bills with a black tip (M). Abscissa: length of bill in mm. Ordinate: frequency percentage on a probit scale (cf. remarks on fig. 1).

Fordeling af næblængde hos Havterne. Summerede hyppighedsfordelinger for 79 jugle uden (N) og 35 med sort næbspids (M). Abscisse og ordinat som fig. 1 (se forklaringen til fig. 1).

In fact it is a truncated distribution: If 17 % of the total is added at the lower end, this is raised by 14 %, and the graph becomes nearly straight.

Taken together the table (4) and the graph (fig. 2) show that black tips are longer and more frequent in long bills than in short ones. However, it is unlikely that young birds have longer bills than old ones, whereas it is very likely that bills with incompletely shed corneous sheaths are longer than normal ones. It is therefore reasonable to believe that the black tips are due to incomplete shedding of the winter sheath.

The fact that the distribution according to length of bills with a black tip is truncated speaks in favour of this belief.

However, observations on recaptured birds suggest that delayed shedding may be most frequent in young birds, in the first or two first years of life. The length of the black tip of the bill of recaptured birds is shown in table 5. It appears that (1) none of the three old birds (10, 14, and 14 years old)

TABLE 5.

*Sterna paradisasa*. Length of black tip of bill in recaptured birds.  
*Længde af sort næbspids hos genfangne Havterner.*

band no. <i>ring nr.</i>	year of <i>årstal for</i>		length of black tip (mm) <i>længde af sort spids (mm)</i>	
	capture <i>fangst</i>	recapture <i>genfangst</i>	at capture <i>ved fangst</i>	at recapture <i>ved genfangst</i>
730805	1946	1948	0.7	0
730822	1946	1947	11.3	blackish tinge 12
730823	1946	1948	0	0
731011	1947	1948	0	slight tinge 8
731151	1948	1949	0	0
RK 7516	1934	1948	nestling	<i>unge</i> 0
10780 T	1933	1947	nestling	<i>unge</i> 0
19901 T	1936	1946	nestling	<i>unge</i> 0

TABLE 6.

*Sterna hirundo*. Length of black tip of bill measured on culmen  
 (mm).

*Fjordterne. Længden af den sorte næbspids målt på næbryggen (mm).*

length of bill (mm) <i>næblængde (mm)</i>	32.0-34.9	35.1-36.4	36.5-39.6
	10	10	14
	10	12	14
	12	13	14
	13	14	15
	13	14	16
	13	15	16
length of	13	16	17
black tip	14	16	17
mm	14	16	17
	14	16	18
<i>længde af</i>	15	16	18
<i>sort næbspids</i>	16	18	18
	16	19	18
	17	19	18
	17	19	18
	20	20	19
	20	23	19
	21	35	19
	21		19
			20
			21
			23
			23
			37
average <i>gennemsnit</i>	15	17	19

had black on their bills. The same was the case in two birds being 3 years old in 1948 (730805 and 730823). (2) One bird changed from 0.7 mm black tip in 1946 to no black in 1948, and one from 11.3 mm black tip in 1946 to 12 mm blackish tinge in 1947.

The suggestion is contradicted, however, by no. 731011 changing from no black to 8 mm slight tinge.

For comparison with *S. paradisaea* the length of the black tip of the bills of 61 *S. hirundo* is shown in table 6. All captured birds of the latter species had black at the tip of the bill and some at the base too. In two cases the entire culmen was black.

STEINBACHER & GOETHE (1935) recorded two cases of *S. hirundo* without any black at the tip of the bill. This is remarkable since the 61 specimens captured at Tipperne had an invariably clear black tip. It may perhaps be a seasonal phenomenon since at Tipperne all terns were captured between 22. May and 30. June, whereas STEINBACHER took his specimen well over a month later, on the 9. Aug.

### **The eggs.**

#### Egg size.

The description of the size of the eggs of a species of birds is complicated, because the variation of the size is due to a number of distinct causes (cf. ANDERSEN 1957). Firstly it is known that the variation between clutches is significantly greater than within clutches. The variation between clutches is partly due to age. Secondly, (in the Herring-Gull, at least) the variation between the two first laid eggs is less than between the mean of these and the last egg laid (to each of these variations are attached one degree of freedom). Thirdly, as far as the egg breadth is concerned, the variation between the mean of the two first laid eggs and the last one seems to be composed of a systematic component, which is a function of the age, and a stochastic component, which is of the order of magnitude of the difference between the two first laid eggs (at least in the Herring-Gull, cf. ANDERSEN 1957, pp. 14-15 and fig. 6, p. 19). Fourthly, clutches of two eggs may be originally of two eggs, or they may be originally of three eggs of which one has been lost, and in this case it makes a great



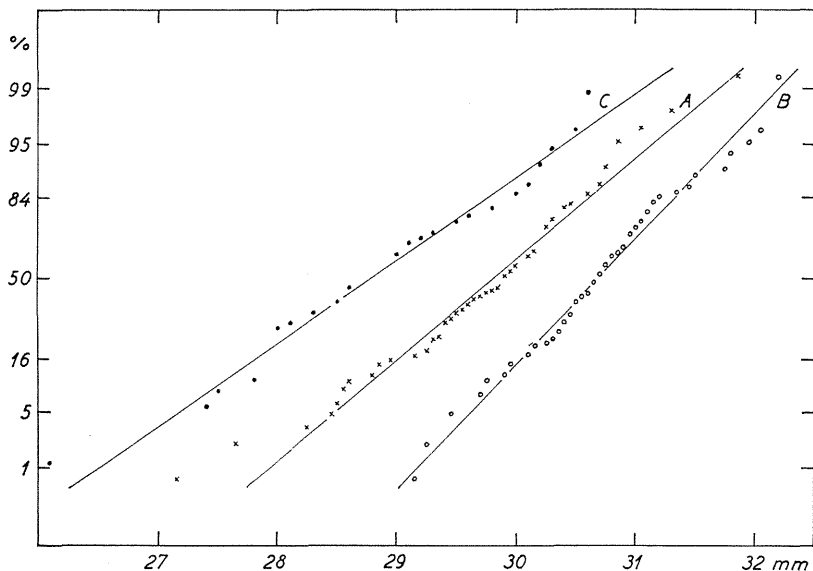


Fig. 3. Cumulative frequency distributions (according to breadth and irrespective of clutches) of 43 eggs (29 clutches of 1 egg and 7 clutches of 2 eggs) of *S. paradisaea* from East Greenland (C), 74 eggs of *S. paradisaea* from Tipperne 1948 (A) (3 clutches of 1 egg, 31 of 2 eggs, and 3 of 3 eggs), and 72 eggs of *S. hirundo* from Tipperne 1948 (B) (3 clutches of 2 eggs and 22 of 3 eggs). Abscissa: breadth in mm, ordinate: frequency percentage on a probit scale (cf. remark to fig. 1).

*Fordeling af bredden af 47 æg (29 et-kuld og 7 to-kuld) af Havterne fra Østgrønland (C), 74 æg (3 et-kuld, 31 to-kuld og 3 tre-kuld) af Havterne fra Tipperne 1948 (A) og 72 æg (3 to-kuld og 22 tre-kuld) af Fjordterne fra Tipperne 1948 (B). Kurverne er summerede hyppighedsfordelinger, uanset kuld. Abscisse: ægbredde i mm, ordinat som fig. 1 (se figurforklaringen til fig. 1).*

difference whether it is one of the two first laid eggs or the last one that has been lost. Finally, there may be a difference in the size of the eggs in various parts of the distributional area of a species as shown below for *S. paradisaea*.

A complete description of the size of the eggs is, therefore, impossible without knowing the sequence in which the eggs have been laid. However, a rough description may be given by the distribution of the size of the eggs irrespective of clutches, but it should be remembered that the variance of these distributions contains two systematic components (the absolute size as well as the variance within clutches are functions of the age of the mother bird, cf. ANDERSEN 1957), and, therefore, these distributions must be handled with extreme caution.

TABLE 7.

Mean and standard deviation of breadth and length (in mm) of 43 eggs of *S. paradisaea* from East Greenland, 74 eggs of *S. paradisaea* from Tipperne 1948 and 72 eggs of *S. hirundo* from Tipperne 1948. *Gennemsnit og spredning for bredde og længde (i mm) af 43 havterneæg fra Østgrønland, og 74 havterneæg og 72 fjordterneæg fra Tipperne 1948.*

	<i>S. paradisaea</i> Greenland Grønland	<i>S. paradisaea</i> Tipperne	<i>S. hirundo</i> Tipperne
mean of breadth <i>gennemsnit af bredde</i>	28.4	29.8	30.7
standard deviation <i>spredning</i>	0.97	0.82	0.66
mean of length <i>gennemsnit af længde</i>	40.4	41.8	41.9
standard deviation <i>spredning</i>	1.54	1.27	1.78

Distributions according to length and breadth irrespective of clutches are given in figs. 3 and 4 for *S. paradisaea* and *S. hirundo* from Tipperne 1948 and, for comparison, for a sample of *S. paradisaea* from East Greenland (from LØPPENTHIN 1932, pp. 78–79). The graphs show good approximations to normal distributions.

The means and standard deviations of the 6 distributions are given in table 7. The table clearly shows that the eggs of *S. paradisaea* from Greenland are smaller on an average than those from Tipperne. A comparison between the eggs of *S. paradisaea* and *S. hirundo* from Tipperne shows that their mean length is almost equal, but the breadth of the eggs of *S. paradisaea* is smaller on an average than that of the eggs of *S. hirundo*. (It should be remembered that the standard error of the mean is found by dividing the standard deviation by the square root of the number of eggs in the sample).

#### Clutch size.

It is generally accepted that *S. paradisaea* as a rule lays 2 eggs, and *S. hirundo* 3 eggs, but, as far as I am aware, empiric distributions have never been published. (The distribution given by GOETHE (1939, p. 44) for *S. hirundo* may include clutches of *S. paradisaea* (cf. *loc. cit.* p. 43)).

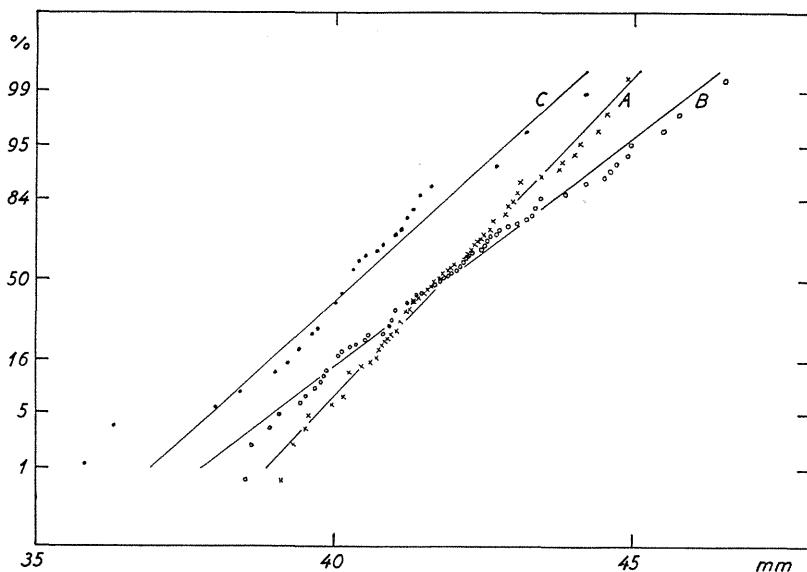


Fig. 4. Cumulative frequency distributions (according to length) of the eggs dealt with in fig. 3. Abscissa: length in mm, ordinate: frequency percentage on a probit scale (cf. remarks to fig. 1).

*Fordeling efter længde af de samme æg, som ligger til grund for fig. 3. Kurverne er summerede hyppighedsfordelinger, uanset kuld. Abscisse: æglængde. Ordinat som fig. 1 (se forklaringen til fig. 1).*

Table 8 gives the sizes of a number of clutches of the two species at Tipperne together with those of *S. paradisaea* in East Greenland. The Greenland clutches were separated in brooded and non-brooded ones according to LØPPENTHIN (1932, pp. 78–79). Most of the Danish clutches were brooded, but some may be not yet full. In both localities some smaller clutches may be remains of bigger ones from which one egg had been eaten by other birds.

The table shows that at Tipperne as many as 25 % of the nests of *S. hirundo* contained two eggs only, and 9 % of those of *S. paradisaea* had 3 eggs. The latter species seems to lay smaller clutches in East Greenland. Some of the one-egg clutches of *S. paradisaea* from Tipperne may belong to old birds since the two 14-years-old birds had one egg only. However, the 10-years-old one had two eggs, and it should be remembered that the captured birds may be males and in that case we do not know the age of the female bird.

TABLE 8.

Distribution according to clutch size of 36 clutches of *S. paradisaea* from East Greenland 1930 (separated in brooded and non-brooded ones), 113 clutches of *S. paradisaea* and 60 of *S. hirundo* from Tipperne 1946–1949.

*Fordeling efter kuldstørrelse af 36 havternekuld fra Østgrønland 1930 (adskilt i rugede og ikke rugede) og 113 havternekuld og 60 fjordternekuld fra fra Tipperne 1946–1949.*

number of eggs per clutch <i>antal æg pr. kuld</i>	<i>S. paradisaea</i>		Tipperne	<i>S. hirundo</i> Tipperne
	Greenland non-brooded <i>ikke rugede</i>	Greenland brooded <i>rugede</i>		
1	21	8	17	0
2	1	6	86	15
3			10	45
total	22	14	113	60
mean clutch size <i>middel kuldstørrelse</i>		1.4	1.9	2.8

### The nest material.

In the years 1946–1949 notes were made of the material in 170 nests, 110 of *S. paradisaea* and 60 of *S. hirundo*. The quality of the material was recorded as fine (f), medium (m), and coarse (c), and the quantity of each of these was recorded as little (+), medium (++), or much (+++), *e. g.* small amounts of fine material: (+f), or much of medium size and a little coarse material: (+++ m + c). The results are shown in tables 9 and 10. It appears that *S. paradisaea* on an average uses less and finer material than *S. hirundo*.

The species of plants used as nest material were not noted systematically, but *S. hirundo* may use *e. g.* *Holcus lanatus* and *Elymus arenarius*, and *S. paradisaea* may use *e. g.* "fine grass", *Elymus arenarius* and *Phragmites vulgaris*, and both may use the very abundant dry excrement of geese. *S. paradisaea* may lay its eggs without any use of nest material on living *Agrostis alba*, or on bare soil in a hole in the turf.

Both species used more and coarser material on the Polde than at Tipperne. This may be due to the fact that at Tipperne the soil is mostly covered with a continuous turf, whereas in many places on the Polde it is gravel or sand with scattered

TABLE 9.

Frequency percentage distribution, according to the quality of the nest material, of 110 nests of *S. paradisaea* and 60 nests of *S. hirundo* from Tipperne 1946–1949. (0 = no material, f = fine, m = medium, and c = coarse).

*Procentisk fordeling, efter materialets finhed, af 110 havterneder og 60 fjordterneder fra Tipperne 1946–1949 (0 = intet redemateriale, f = flnt, m = mellem og c = groft).*

	0	f	f + m	m f + c f + m c	m + c	c
<i>S. paradisaea</i>	3	50	2	30	2	13
<i>S. hirundo</i>	–	22	–	33	17	28

TABLE 10.

Frequency percentage distribution, according to the quantity of nest material, of 110 nests of *S. paradisaea* and 60 nest of *S. hirundo* from Tipperne 1946–1949.

*Procentisk fordeling, efter mængden af materiale, af 110 havterneder og 60 fjordterneder fra Tipperne 1946–1949 (+ = lidt, ++ = mellem og +++ = meget).*

	no kind represented by more than little 0 to (+ m + c) <i>ingen slags repræsenteret ved mere end lidt (+)</i>	one kind represented by medium (++) (+ + f) to (+ f + + c) <i>een slags repræsenteret ved mellem (++)</i>	at least two kinds represented by medium (++) or one kind by much (+++) (+ + f (+ + m) to (++ + m (+ + + c) <i>mindst to slags repræsenteret ved mellem (++) eller een slags ved meget (+++)</i>
<i>S. paradisaea</i>	56	36	8
<i>S. hirundo</i>	17	33	50

lymegrass, and more nest material may be necessary on the latter sort of ground, or it may be due to the fact that washed up, coarse plant material is very abundant in the Polde.

### Recoveries of banded birds.

During the years 1941–1948 102 adults and 53 young of *S. paradisaea* and 60 adults and 67 young of *S. hirundo* were banded.

Birds banded as young and recaptured on their nests.

Table 11 shows the data of 3 *S. paradisaea* banded as chicks and recaptured on their nests. They were 10, 14, and 14 years old.

TABLE 11.

*S. paradisaea* banded as chicks and recaptured on their nests in Tipperne.

*Havterner mærket som unger og genfanget på reden på Tipperne.*

band no.	banded: locality and date	recovered: locality and date	number of eggs	distance from mothers nest
<i>ring nr.</i>	<i>mærket: lokalitet og dato</i>	<i>genfanget: lokalitet og dato</i>	<i>antal æg</i>	<i>afstand fra moderens rede</i>
Skovgaard Viborg 19901 T	Langli (near Esbjerg) 5. July 1936	Fuglepold 19. June 1946	2	43 km
Skovgaard Viborg 10780 T	Langli (near Esbjerg) 2. July 1933	N. Rad 24. June 1947	1	43 km
RK 7516	Grønødde Pold Nymindestrøm 21. June 1934	Rødsandshage 24. June 1948	1	1.5 km

Two of these birds nested 43 km away from their parents' nests. This shows that the colonies of *S. paradisaea* at Tipperne, the Polde, and Langli belong to the same "group" as defined by AUSTIN (1951, p. 1): "A distinct, concrete group of individuals which is self-sustaining and relatively free from association with other groups during the nesting season, "in other words, a population of all individuals which have a chance of getting offspring in common in the second generation, because their offspring in the first generation have a chance of breeding in the same site (on the meaning of "site" see below). The group seems to extend further south since a *S. paradisaea* (RK 7537) banded as a chick at Tipperne in 1934 was found dead 18. June 1938, *i. e.* during the breeding season, 150 km south of Tipperne (TÅNING 1944, p. 187).

Birds banded as adults and recaptured on their nests.

Table 12 shows the data of 7 *S. paradisaea* banded as adults and recaptured on their nests and, in addition, one found dead during the breeding season. All of them were banded and recovered at Tipperne.

TABLE 12.

Data of 8 recovered *S. paradisaea* banded as adults in Tipperne.  
*Oplysninger om 8 Havterner, der er mærket og genfanget på Tipperne.*

band no. <i>ring nr.</i>	date of banding <i>dato for mærkning</i>	date of recovery <i>dato for genmelding</i>	number of years free <i>antal aar fri</i>	distance moved (km) <i>afstand flyttet (km)</i>	way of recovery <i>genmeldings- maade</i>
730822	31. May 1946	26. May 1947	1	0.00	captur. on nest <i>fanget på rede</i>
730823	31. May 1946	3. June 1948	2	0.00	do.
731011	16. June 1947	8. June 1948	1	0.00	do.
730805	24. May 1946	28. June 1948	2	0.46	do.
731151	10. June 1948	22. June 1949	1	1.00	do.
731012	17. June 1947	4. June 1950	3	1-1.5	do.
731112	3. June 1948	7. June 1957	9	1-2	do.
730944	11. June 1947	28. June 1950	3	0.1-0.8	found dead <i>fundet død</i>

The table shows that 3 terns have returned to nest within less than 10 m of the formerly occupied place, but 4 birds nested 0.5 to 2 km away from the former nest. This seems to show that *S. paradisaea* regards the whole sanctuary as its site, this word taken in the sense as used by AUSTIN (1949): "The place to which a bird tends to return for nesting year after year". At Tipperne *S. paradisaea* as a rule does not return to the very place where it has nested before, as does *S. hirundo* in Cape Cod (AUSTIN 1949).

Birds recorded from outside the sanctuary.

Of the terns banded during the years 1941-1948 4 *S. hirundo* were recorded from outside the sanctuary (table 13). It is remarkable that all banded terns recorded from Tipperne were *S. paradisaea* (obviously because a higher percentage of this species was banded), whereas only *S. hirundo* was recorded

TABLE 13.  
*S. hirundo* recorded from outside the sanctuary.  
*Fjordterneer genmeldt uden for reservatet.*

band no. ring nr.	banded mærket	recovered genmeldt
731039	5. July 1947 Bjerregaard Pold 20 days old <i>20 dage gammel</i>	7. Aug. 1949 Donslund, Houborg (55°38'N, 8°57'E) found dead <i>fundet død</i>
731223	26. June 1948 Bjerregaard Pold 21 days old <i>21 dage gammel</i>	15. July 1948 Barsø, Løjt Kir- keby (55°07'N, 9°33'E) found dead <i>fundet død</i>
731228	26. June 1948 Bjerregaard Pold 27 days old <i>27 dage gammel</i>	13. July 1948 Kampen, Sylt (54°57'N, 8°22'E) found dead <i>fundet død</i>
730906	1. June 1947 Bjerregaard Pold  ad. captured on nest  <i>ad. fanget paa rede</i>	10. July 1948 Enkhuizen, Ijsselmeer, Netherland (52°42'N, 5°20'E) captured with a wounded wing <i>fanget med saaret vinge</i>

from outside the sanctuary. This may mean that *S. paradisaea* migrates more directly towards its wintering grounds, from where they are less likely to be recorded.

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### Summary.

Terns of the species *S. paradisaea* and *S. hirundo* were captured on their nests in the biggest Danish sanctuary, Tipperne. The paper gives the information gained by observations on the birds and their eggs and nests.

The two species did not interbreed.

The mean length of the bill was 33.00 mm for *S. paradisaea* and 35.85 mm for *S. hirundo* (fig. 1). The means were significantly different although the distributions overlapped widely. There was no reason to believe that the length of the bill varied with age.

At a rule, the upper mandible of the terns had a white, fragile tip, which seems to be connected with the shedding of an outer layer of the corneous sheath.

About one-third of all *S. paradisaea* had black at the tip of the bill. The distribution of these bills according to length was truncated (fig. 2) lacking representatives of the shortest bills (about 14% of the total). The black tip seems to be due to incomplete shedding of the winter sheath of the bill, and this in turn seems to be most frequent among young birds. The distribution of the length of the black tip in bills of *S. hirundo* is given in table 6.

The mean breadth of the eggs of *S. paradisaea* is significantly smaller than that of *S. hirundo*, but their mean length does not differ. The eggs of *S. paradisaea* measured by LØPPENTHIN in East Greenland were, on an average, significantly smaller than those from Tipperne (fig. 3 and 4).

At Tipperne 9% of the nests of *S. paradisaea* contained three eggs and 25% of those of *S. hirundo* two eggs only. *S. paradisaea* seems to lay smaller clutches in the Arctic.

On an average, *S. paradisaea* uses less and finer nest material than does *S. hirundo*.

Three *S. paradisaea* banded as chicks and captured on their nests at Tipperne were 14, 10, and 10 years old. They nested 43, 43, and 1.5 km away from their parents' nests. Thus the *S. paradisaea* in Tipperne belongs to a "group" (AUSTIN) extending far to the south.

Of the *S. paradisaea* banded and recaptured as adults four had moved their nests 0.5–2 km, while three had not moved at all. Thus this species regards the whole sanctuary as its "site" (AUSTIN).

Outside the sanctuary only four banded *S. hirundo* were recorded, and two only from abroad, viz. one from Germany and the others from the Netherlands.

## DANSK RESUMÉ

Næb, æg og reder af fangede Havterner (*Sterna paradisaea* Pont.)  
og Fjordterner (*Sterna hirundo* L.).

I årene 1946–1948 fangedes Hav- og Fjordterner på reden på Tipperne. Fuglene blev mærket, og der blev gjort notater om dem og deres æg og reder. Resultaterne forelægges her.

Adskillelsen af de to arter voldte aldrig vanskeligheder, så det er usandsynligt, at de blander sig i Vestjylland.

Næb. Næblængdernes hyppighedsfordeling hos de to arter er ikke fremstillet ved de sædvanlige trappepolygoner (søjlediagrammer), men i et probitdiagram (fig. 1), der har den fordel, at man straks ser, om fordelingerne er normale, og direkte kan aflæse middeltal og spredning. Selv om de to fordelinger lapper langt over hinanden, er forskellen mellem middeltallene i høj grad signifikant. De næsten rette linier i probitdiagrammet viser, at fordelingerne er tilnærmelsesvis normale. Der er derfor næppe større kønsforskel i næblængden. Den synes heller ikke at variere med alderen (tabel 1 og 2).

Den 0–4 mm lange, hvide spids på overnæbbet synes at stå i forbindelse med fældning af hornskedens yderste lag (tabel 3).

Ca. en trediedel af Havterne og alle Fjordterne havde sort næbspids (tabel 4 og 6). Den sorte spids hos Havterne synes at stå i forbindelse med en ufuldstændig fældning af den yderste del af hornskeden, som tilhører vinterdragtens sorte næb. Fig. 2 viser en afstumpet fordeling af længderne af næb med sort spids, hvilket betyder, at sortspidsede næb er sjældne under en vis længde, hvor fældningen åbenbart er fuldstændig. Tabel 5 tyder på, at ufuldstændig fældning måske er hyppigst hos unge fugle.

Æg og reder. Trods store betæneligheder (sml. ANDERSEN 1957) beskrives ægstørrelsen uafhængig af kuld. Probitdiagrammerne fig. 3 og 4 giver fordelingen af ægbredde og -længde for de to arter, og til sammenligning LØPPENTHINS prøve af Havterneæg fra Østgrønland. Gennemsnit og spredning for de tre prøver findes desuden i tabel 7. De østgrønlandske havterneæg er gennemsnitligt mindre end begge arters æg fra Tipperne. Af disse er fjordterneæggene gennemsnitligt bredere end havterneæggene, medens længderne ikke adskiller sig.

Af fjordternerederne på Tipperne indeholdt 25 % kun 2 æg, og 9 % af havternekuldene var på 3 æg. I Østgrønland synes Havternen at lægge mindre kuld end på Tipperne (tabel 8).

Havternen brugte gennemgående mindre og finere redemateriale end Fjordternen (tabel 9 og 10).

Genmeldinger. Tre af de fangne Havterner viste sig at være mærket som unger. De to var 14 og den tredje 10 år gammel. To af dem var mærket på Langli 43 km mod syd (tabel 11). Havterne på Tipperne og Langli må derfor antages at tilhøre samme gruppe (i AUSTINS betyding).

Af de Havterner, der blev mærket og genfanget på reden, havde 3 flyttet reden mindre end 10 m, medens 4 rugede 0.5–2 km fra den tidligere rede (tabel 12). Dette viser, at Havterne på Tipperne betragter hele reservatet som deres yngleområde («site» i AUSTINS betydning).

Uden for reservatet blev 4 Fjordterner genmeldt, nemlig 2 fra Jylland, 1 fra Tyskland og 1 fra Holland.

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