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**REPORT ON THE SWALLOW ENQUIRY, 1934.**

BY

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THE chief object of this enquiry has been to establish the average size of broods of the Swallow (*Hirundo r. rustica*) in each summer month and in different localities, comparing altitude of these localities, type of agriculture and whether rural or urban.

Supplementary questions also were asked which could be conveniently investigated at the same time ; the dates of first and last eggs and broods : proportion of nests used more than once in a season ; the relation of Swallows with domestic animals, with destructive creatures and with other species of birds that usurp their nests ; their association with House-Martins (*Delichon u. urbica*) ; the prevalence of parasites, their species and their effect on their hosts ; size of clutch and subsequent size of brood ; and local weather notes.

The second main object of the enquiry was to take a census of the pairs of Swallows nesting in widely separated localities to see if any principle governing their distribution could be discovered.

Twenty-two helpers took part in this enquiry in 1934 ; of these twelve took a census (several making a census only), with significant results.

The following are the localities from which reports were received ;

In those marked C a census was taken.

1. Baldernock Parish, Stirling (J. Bartholomew), 250/300 feet, limestone, rural, dairy farming.
2. Isle of Man (F. A. Craine), slightly above sea-level, agricultural, crops by rotation.
3. Dalston, 7 miles S.W. of Carlisle, Cumberland (R. H. Brown), 300 feet, clay subsoil, rural, grazing land, stock-breeding ; very mild and rather wet climate.
4. 3 miles radius of Ullswater, Cumberland/Westmorland (Dr. H. J. Moon), 400 feet (average elevation), chiefly igneous rock with varying depths of glacial drift ; rural.
5. Robin Hoods Bay, N. Riding, Yorkshire (H. O. Rodgers), inlet on N.E. coast hills rising to 700 and 800 feet. Observed nests, 2/300 feet. Jurassic lias ; rural ; mixed farming—many small farms.

6. Near Huddersfield, W. Riding, Yorkshire (J. C. S. Ellis), 300 to 800 feet. Lower coal measures, urban; almost entirely pasture (2/300 acres oak wood). C.
7. Heywood, Lancashire (I. Whittaker), 300 to 1,450 feet; industrial, urban and rural (with 5 square miles moorland); dairy-farming. C.
8. Myddleton and Houghton Green, near Warrington, Lancashire (W. Ritson), 25 to 50 feet; rural; boulder clay; mainly arable (potatoes, cabbages, corn) and some dairy farming.
9. Area north of Stalybridge, S.E. Lancashire/N.E. Cheshire border (H. Livesey), 445 to 925 feet; industrial, urban and rural; poor grass land, cattle only. C.
10.  $4\frac{1}{2}$  miles radius from Alderley Edge, E. Cheshire (E. Cohen), 200 to 300 feet; rural and suburban; red marl and red sandstone (Keuper); mainly cattle pasture.
11. Antrobus and Sevenoaks, N.W. Cheshire (A. W. Boyd), 150 to 284 feet; rural; Keuper marl; mixed farms (potatoes, wheat, etc.) and cattle—many small farms. The area includes 300 acres of rough grazing (reclaimed moss-land) without farm-buildings. C.
12. S.E. corner of Anglesey (R. R. M. Jones), 60 feet; bordered by the sea; limestone; pastures with a small area of crops. C.
13. Parishes of Laugharne, Llandawke, Llansadwrnen, Carmarthen-shire (J. F. Thomas), 10 to 480 feet (most nests below 100 feet). Chiefly old red sandstone with ten farms on "blown sand"; rural; dairy and cattle raising.
14. Skokholm, Penbroke (R. M. Lockley), 50 to 150 feet. Old red sandstone. An island of rough grazing, heather and bracken. C.
15. Parishes of Colwall, Mathon, Bosbury, Coddington, E. Hereford (J. D. Wood), about 250 to 1,114 feet. Mainly between 300 and 450 feet. Old red sandstone with a strip of Silurian rocks on the east, limestone and shale in south; rural, with scattered villages; orchards, hop-fields and pastures. C.
16. Bruton, Somerset (P. A. D. Hollom), 300 to 450 feet; clay; rural; almost entirely grassland. C.
17. Staunton, Nottingham (Miss F. K. Staunton).
18. Salthouse, Kelling, and Weybourne, north Norfolk coast (R. M. Garnett), sea-level to 260 feet; sandy overlying clay; rural; arable and heath-land and coastal marshes; main crops barley and sugar-beet. (Nesting birds almost all concentrated in the three villages included in the area of the census—4,160 acres). C.
19. Hemsby, E. Norfolk coast (Miss J. M. Ferrier), 100 feet; subsoil clay; rural; cereal crops. (Area of census includes 27 acres of foreshore). C.
20. 5-7 miles E.N.E. of Ipswich, Suffolk (A. Mayall), 100 to 150 feet; sandy; rural; arable and pasture; much heath-land and woodland. C.

21. Near Seaford, Sussex (J. F. Thomas), up to 700 feet; chalk; rural with small semi-suburban area; rough pastures with better grazing in valley; corn crops 2 per cent. to 3 per cent. The 12 square miles area of the census comprised 8 square miles of typical downland; the remaining 4 square miles contain the narrow Cuckmere valley shut in by steep-sided downs. C.
22. Tenterden, Kent (H. F. Ticehurst), 250 feet; Wealden clay; rural; mixed farming; grassland and small woods.

It will be seen that though the north has been fairly well represented, observers in the midlands have been few, but the country has been covered well enough to provide a very fair sample of the whole.

#### AVERAGE SIZE OF SWALLOW BROODS (previously published).

A number of figures giving the average size of Swallow broods have already been published and may well be briefly recapitulated here. Mr. H. W. Robinson's figures for Lancashire and Westmorland seem to have been the first records of this kind:—

#### AVERAGE SIZE OF BROODS.

*Perthshire* (Lord Scone, B.B. XXI., 157).

Year.	Nests.	Average Brood.
1927	15	4

*Cumberland and Westmorland* (R. H. Brown, B.B. XXI., 178).

Year.	Nests.	Average Brood.
1925	16	4.2
1926	20	4.0
1927	25	4.0

*Lancashire and Westmorland* (H. W. Robinson, B.B. XVI., 164).

Year.	Nests.	Average Brood.	Year.	Nests.	Average Brood.
1909	11	3.27	1917	70	4.3
1910	45	3.89	1918	51	4.19
1911	60	4.4	1919	59	4.11
1912	20	3.95	1920	14	4.5
1913	22	3.27	1921	16	3.81
1915	38	4.65	1922	22	4.13
1916	42	4.0			

Yorkshire (J. C. S. Ellis, *B.B.* XXVI., 256-7).

Year.	Nests.	Average Brood.
1932	{ 9—1st broods.	4.55 (average eggs 4.88).
	{ 8—2nd „	4.0 (average eggs 4.25).
1933	11 broods.	{ 4.1 (1st brood)
		{ 4.0 (2nd „ )

Cheshire (A. W. Boyd, *B.B.* XXIV., 160, XXV., 226, XXVI., 255, XXVII., 232).

Year.	Nests.	Average Brood.	Year.	Nests.	Average Brood.
1927	50	3.98	1931	106	3.98
1928	71	3.9	1932	103	4.01
1929	94	4.06	1933	107	4.31
1930	121	4.28	[1934	104	4.03]

The earlier broods in each year invariably had the larger average.

#### AVERAGE SIZE OF BROODS.

Carmarthenshire (J. F. Thomas, *B.B.* XXVII., 201/2).

Year.	Nests.	Average Brood (for August).	Year.	Nests.	Average Brood. (for August).
1923	32	3.94	1929	45	3.96
1924	24	3.96	1930	36	4.06
1925	40	3.90	1931	46	4.11
1926	45	4.04	1932	50	3.96
1927	41	3.90	10 years' average 1923-1932		3.92
1928	32	3.34	1933	51	3.71
			[1934	89	3.86]

Somerset (P. A. D. Hollom).

Year.	Nests.	Average Brood.
1929	22	4.64 (June)—for June and July 38 nests,
1931	16	4.63 ( „ ) average 4.48( <i>B.B.</i> XXIII., 249)
[1934	19	4.37 ( „ )]

Kent (H. F. Ticehurst, *B.B.* XXVII., 232).

Year.	Nests.	Average Brood.
1933	{ 18—1st broods	4.27
	{ 13—2nd „	3.15
[1934	27	3.63]

Sussex (H. J. Emmet, *B.B.*, XXVIII., 146).

1934. In 7 nests 31 eggs were laid, 26 hatched, 20 young fledged.

AVERAGE SIZE OF BROODS (Present Enquiry).

Locality.	Total broods examined	Month	Number Containing						Total Young	Aver- age of Broods	Total No. of Broods	Aver- age for Year	Nearest Recording Station	WEATHER			Sun hours daily mean
			1	2	3	4	5	6						Mean Max.	Temp. Min.	Inches Rain	
1. Baldenock, Stirling.	9	June	—	—	1	—	5	3	46	5.11	—	Renfrew (Circ. 7 miles S.W.).	57.1	43.0	2.42	4.85	
	5	July	—	—	—	2	3	23	4.60	—	May	65.9	48.4	1.89	5.87		
	5	Aug.	—	1	—	2	2	20	4.00	22	4.4	June	70.4	52.3	2.34	7.44	
	3	Sept.	—	—	2	—	1	8	2.66	—	—	Aug.	63.9	50.0	3.80	3.35	
2. Isle of Man.	4	June	2	—	—	2	—	10	2.5	—	—	May	55.4	44.5	3.36	5.79	
	4	July	—	1	—	3	—	20	3.33	14	3.3	June	62.7	50.8	2.24	8.04	
3. Dalston, Cumberland.	9	July	—	—	—	5	4	40	4.44	—	—	July	68.0	55.8	0.46	8.22	
	9	Aug.	—	—	2	5	4	40	4.44	27	4.3	Aug.	62.4	52.6	3.43	5.96	
4. 3 miles' radius of Ullswater, Cumberland.	32	June	1	4	10	—	14	127	3.96	—	—	—	—	—	—	—	—
	20	July	—	—	7	—	12	87	4.35	80	3.97	Ambleside, (8/9 miles S.).	58.4	41.4	4.16	4.12	
	19	Aug.	—	—	6	7	6	76	4.00	—	—	May	68.2	48.1	1.77	6.53	
	8	Sept.	—	1	5	2	—	25	3.12	—	—	June	73.3	51.3	1.53	6.72	
	1	Oct.	—	—	1	—	—	3	3.00	—	—	Aug.	64.9	49.9	5.74	3.73	
5. Robin Hood's Bay, N.E. Yorkshire.	4	June	—	2	1	1	—	11	2.20	—	—	Sept.	64.4	48.4	10.26	4.03	
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6. Nr. Huddersfield, Yorkshire.	5	June	—	1	—	3	—	17	3.40	—	—	Huddersfield.	60.3	43.0	1.41	4.44	
	5	July	—	—	—	2	3	23	4.00	19	4.05	June	67.1	48.4	1.07	5.17	
	2	Sept.	—	—	1	4	—	29	4.14	—	—	July	74.0	54.0	1.58	7.48	
7. Heywood, Lancashire.	21	June	—	—	4	8	9	89	4.23	21	4.23	Sept.	67.0	50.3	1.00	4.72	
	—	—	—	—	—	—	—	—	—	—	—	Bolton (9 miles W.).	58.2	44.7	3.41	4.48	
—	—	—	—	—	—	—	—	—	—	—	—	June	67.4	50.6	2.03	6.31	
—	—	—	—	—	—	—	—	—	—	—	—	July	73.0	55.2	2.83	7.55	
—	—	—	—	—	—	—	—	—	—	—	—	Aug.	61.1	51.4	4.88	3.01	
—	—	—	—	—	—	—	—	—	—	—	—	Sept.	65.3	49.3	3.49	3.67	

AVERAGE SIZE OF BROODS (Present Enquiry).

Locality.	Total broods examined	Month	Number Containing						Total Young	Average age of Broods	Total No. of Broods	Average for Year	Nearest Recording Station	WEATHER			Sun hours daily mean
			1	2	3	4	5	6						Mean Max.	Temp. Min.	Total Inches Rain	
1. Baldenock, Stirling.	9	June	—	—	1	—	5	3	46	5.11	—	Renfrew (Circ. 7 miles S.W.).	57.1	43.0	2.42	4.85	
	5	July	—	—	—	2	3	23	4.60	—	65.9		48.4	1.89	5.87		
	5	Aug.	—	1	—	2	2	20	4.00	22	4.4		70.4	52.3	2.34	7.44	
	3	Sept.	—	2	—	—	—	8	2.66	—	—		63.9	50.0	3.80	3.35	
2. Isle of Man.	4	June	2	—	—	—	—	10	2.5	14	3.3	Douglas.	55.4	44.5	3.36	5.79	
	6	July	—	1	2	3	—	20	3.33	—	—		62.7	50.8	2.24	8.04	
	4	Aug.	—	—	1	2	1	16	4.00	—	—		68.0	55.8	0.46	8.22	
3. Dalston, Cumberland.	9	June	—	—	—	—	5	4	40	4.44	4.3	—	—	—	—	—	
	9	July	—	—	2	5	2	36	4.00	27	—		—	—	—	—	—
4. 3 miles' radius of Ullswater, Cumberland.	32	June	1	4	10	—	14	3	127	3.96	—	Ambleside (8/9 miles S.).	58.4	41.4	4.16	4.12	
	20	July	—	—	7	—	12	1	87	4.35	—		68.2	48.1	1.77	6.53	
	19	Aug.	—	—	6	7	6	76	4.00	80	3.97		73.3	51.3	1.33	6.72	
	8	Sept.	—	—	1	5	2	25	3.12	—	—		64.9	49.9	5.74	3.73	
5. Robin Hood's Bay, N.E. Yorkshire.	1	Oct.	—	—	—	—	—	3	3.00	—	—	—	64.4	48.4	10.26	4.03	
	4	June	—	2	1	1	—	11	2.20	—	—		—	—	—	—	—
6. Nr. Huddersfield, W. Yorkshire.	5	June	—	1	1	3	—	17	3.40	19	4.05	Huddersfield.	60.3	43.0	1.41	4.44	
	5	July	—	—	—	2	3	23	4.60	—	—		67.1	48.4	1.56	5.12	
	7	Aug.	—	—	—	1	4	29	4.14	—	—		74.6	54.0	1.56	7.76	
	2	Sept.	—	—	—	—	1	8	4.00	21	4.23		67.6	38.3	3.00	4.72	
7. Heywood, Lancashire.	21	June	—	—	4	8	9	89	4.23	—	—	Bolton (9 miles W.).	58.2	44.7	3.41	4.48	
	—	—	—	—	—	—	—	—	—	—	—		67.4	50.0	2.83	6.21	

Mean Max.	Temp. Min.	Total Inches Rain	Sun hours daily mean
65.1	48.4	1.89	5.87
70.4	52.3	2.34	7.44
63.9	50.0	3.80	3.35
62.2	47.7	5.02	4.64
55.4	44.5	3.36	5.79
62.7	50.8	2.24	8.04
68.0	55.8	0.46	8.22
62.4	52.6	3.43	5.96
60.8	51.8	4.61	5.39
58.4	41.4	4.16	4.12
68.2	48.1	1.77	6.53
73.3	51.3	1.33	6.72
64.9	49.9	5.74	3.73
64.4	48.4	10.26	4.03
60.3	43.0	1.41	4.44
67.1	48.4	1.56	5.12
74.6	54.0	1.56	7.76
67.6	38.3	3.00	4.72
67.0	48.3	1.37	4.76
58.2	44.7	3.41	4.48
67.4	50.0	2.83	6.21
73.1	55.2	4.83	7.55
64.1	51.4	4.83	3.01
65.3	49.3	3.49	3.67

AVERAGE SIZE OF BROODS (*Present Enquiry*).

Locality.	Total broods etc. annid.	Month	Number Containing						Total Young	Average for Year	Total No. of Broods	Average for Year	Nearest Recording Station	WEATHER		Sun hours daily mean	
			1	2	3	4	5	6						Mean Max.	Temp. Min.		Total Inches Rain
16. Bruton, Somerset.	19	June	—	1	2	6	9	1	83	4.36	89	4.36	Bath. (20 miles N.).	63.6	45.9	1.08	7.37
			—	—	—	—	—	—	—	—	—	—		—	70.6	53.0	1.47
18. Salthouse, etc., Norfolk.	8	June	—	4	3	11	6	—	29	3.62	—	Cromer. (6/9 miles E.).	59.4	44.9	2.64	6.43	
	23	July	1	2	3	11	6	88	3.82	—	64.6		50.7	1.93	6.09		
	19	Aug.	1	2	5	9	2	66	3.47	51	3.66		71.3	55.6	0.78	8.29	
	1	Sept.	—	—	—	1	—	4	4.00	—	—		68.7	54.7	1.66	6.01	
19. Hemsby, Norfolk.	16	June	—	—	2	8	6	—	68	4.25	—	Yarmouth.	57.6	45.5	1.17	6.68	
	11	July/Aug.	—	7	4	—	—	37	3.36	30	3.86		61.7	52.5	1.29	6.76	
20. E. Suffolk.	9	June	—	—	—	—	—	—	—	—	—	Felixstowe. (6 miles S.).	68.3	57.0	3.93	8.85	
	10	July	—	1	3	2	5	—	42	4.20	—		68.2	55.1	1.78	6.83	
	11	Aug.	—	1	—	6	4	—	46	4.17	31		4.0	67.1	53.3	1.51	6.84
	1	Sept.	—	1	—	—	—	—	2	2.00	—		—	—	—	—	—
21. Seaford, Sussex.	3	June	—	—	1	—	2	—	13	4.33	—	Seaford.	59.1	45.5	2.45	7.43	
	6	July	—	—	—	5	1	25	4.16	9	4.2		64.7	50.8	0.74	7.64	
22. Tenterden, Kent.	11	June	2	1	1	2	4	1	41	3.72	—	Lympne. (15 miles E.).	61.7	55.3	1.83	8.99	
	7	July	1	2	1	1	2	—	22	3.14	—		70.0	55.3	1.11	6.53	
	6	Aug.	—	—	—	6	—	—	24	4.00	27		3.63	69.0	55.3	1.11	6.53
	3	Sept.	—	—	—	2	—	—	11	3.66	—		—	—	—	—	—

AVERAGE SIZE OF BROODS (*Present Enquiry*).

664 broods in all were examined and of these (taking all months together):—

14 or 2.1 per cent. contained one young only; 43 or 6.47 per cent. contained two; 115 or 17.3 per cent. contained three; 261 or 39.3 per cent. contained four; 210 or 31.6 per cent. contained five; 21 or 3.16 per cent. contained six.

In all 2,665 young were ringed or counted giving an average of 4.01 for all broods recorded.

In those cases where local weather reports were not supplied by the observer, reports for 1934 kindly supplied by Mr. R. G. K. Lempfert of the Meteorological Office for the nearest recording station have been added to the figures above, in an attempt to show a connexion between temperature, rain and sunshine and the size of broods, but it must be remembered that the comparison of the average of a small number of broods with that of a much larger number may lead to conclusions that are not properly founded.

The first brood, or at least the broods in June and July, are almost always the largest, but there is one noteworthy case—Ullswater, Cumberland—where the June brood was definitely smaller than those in July and August (the July broods will, of course, have been first broods for the most part), whereas from a Cumberland district outside and clear of the mountains a smaller number of broods gives a different result.

The highest average of June broods is found in Stirling, the most northerly of the localities in which records were taken, and this suggests an association between longer daylight and larger broods, though the actual sunshine records are no higher than, or not so high as, many of those in localities further south. On the whole it would seem that the higher sunshine figures of E. and S. actually go with a rather smaller brood; Norfolk and Kent figures, for example, are smaller than those from less sunny Lancashire.

The amount of rainfall cannot be shown to have any appreciable effect on the size of broods.

The number of September broods is too small to justify any conclusion being drawn from them, though such figures as we have show that the most northerly locality gives the lowest average, just as it has the shortest hours of daylight.

Data from other Scottish localities in 1935 will be most welcome.



## FIRST AND LAST EGGS AND BROODS.

The first egg was found on May 10th at Seaford, Sussex, where the next seven nests had their first eggs between May 25th and May 30th. The first eggs recorded in other localities were on May 15th N.W. Cheshire, May 16th Huddersfield, Yorkshire, May 18th Hemsby, Norfolk, May 28th Anglesey, May 29th Leicester, May 29th Ullswater, May 30th/June 1st Warrington, Lancashire, June 4th Isle of Man, June 25th Skokholm, Pembroke.

Two early broods were hatched on June 1st (Alderley, Cheshire) and June 2nd (Kelling, Norfolk), from which we may conclude that the first eggs were laid on or about May 11th and May 12th respectively. The date on which Swallows began to lay does not seem to have been influenced by latitude to any extent, nor by altitude, as is reported from Huddersfield, where at 543 feet the earliest eggs are annually laid, though the area examined extends from 300 feet to 700 feet.

Last broods were observed or ringed in the nest:—September 4th (Stirling), September 10th Huddersfield, September 11th Kelling and Hemsby, Norfolk, September 14th N.W. Cheshire, September 16th Kent, September 21st (flew) Anglesey, and one very late brood is recorded from Ullswater, where the last egg was laid on about September 30th and the young left the nest on October 29th.

## PROPORTION OF NESTS USED MORE THAN ONCE IN A SEASON.

The proportion of nests used more than once differs in the most surprising way in each locality: thus in Stirling (22 broods) one nest, and in Suffolk (31 broods) no nest was used twice, whereas near Carlisle thirteen out of fourteen pairs used the same nest twice and the fourteenth pair reared only one brood.

Other figures were as follows:—

Huddersfield 26.6 per cent.—(4 nests in 15) used twice.  
 Warrington, Lancs.—2 nests used twice (29 broods).  
 Alderley, Cheshire—3 nests used twice (35 broods).  
 N.W. Cheshire—40 per cent. nests used twice (104 broods).  
 Anglesey—3.95 per cent. nests used twice (51 broods).  
 Hemsby, Norfolk—1 nest in 16 nests used twice.  
 Kelling, Norfolk—5 per cent. nests used twice (51 broods).  
 Tenterden, Kent—8 nests used twice, and 3 used three times (27 broods).

It is noticed that on their return Swallows generally re-line and use an old nest and the making of a second nest or

use of a second old nest seems to be quite arbitrary, and to follow no principle that can be understood.

#### SIZE OF CLUTCH AND SUBSEQUENT SIZE OF BROOD.

The usual clutch is five eggs, six eggs, though not infrequent, are far less common. Seven eggs were found at Bangor, North Wales (J. S. Barrington); from Kent, H. F. T. reports that of those nests he examined one or two held clutches of six eggs and one of eight eggs; in N.W. Cheshire there was one clutch of nine eggs (possibly the laying of two hens) from which only four young hatched, and three survived.

Carlisle—very few infertile or addled eggs and small mortality among young are reported.

Huddersfield—19 nests averaged 4.21 eggs, 4.05 young.

Alderley, Cheshire—22 nests averaged 4.63 eggs, 3.9 young.

N.W. Cheshire—24 nests averaged 4.54 eggs, 3.75 young.

Carmarthen—11 nests averaged 4.27 eggs, 3.6 young.

Notts—12 nests averaged 4.41 eggs, 4.16 young.

N. Norfolk—25 nests averaged 4.52 eggs, 3.56 young.

Seaford, Sussex—5 nests averaged 4.4 eggs, 3.4 young.

Anglesey—2.27 per cent. eggs were found to be addled and 2.32 per cent. young dead.

#### RELATION TO DOMESTIC ANIMALS.

It has been found that the nesting sites of the great majority of Swallows are associated with domestic animals, of which cows are first favourites; pigs are very attractive and horses also, though recent reductions in the number of stables occupied by horses have made them of less importance to the bird; hen-houses are often occupied, but the number of pairs nesting in dwelling-houses is comparatively small. The figures from Norfolk and Suffolk alone fail to show a predominance of this association.

This question, as it was originally framed, did not make proper allowance for those birds that nested in sheds or other buildings in close proximity to domestic animals, with which, of course, they were associated; a second note was circulated suggesting that these should be included with those nesting in stable or byre actually occupied by animals.

The following figures show the extent of this association:—

Stirling:

In occupied byre or styre 10; in dwelling-house 1.

Carlisle:

All in cow-byres, cattle sheds or hen-houses (27 broods).

Ullswater:

In occupied buildings 54 (stable 2; cows 36; pigs 14; hens 2).

In unoccupied buildings and lean-to sheds 10.

## Huddersfield :

In occupied buildings 13 (horse 2 ; pig 6 ; cow 1 ; dog 1 ; hens 3).  
 In occasionally-used " bull-sheds " 3 } Not associated with  
 In unoccupied buildings 3 } animals.

## Heywood, Lancashire :

In farms with domestic animals 37.  
 In unoccupied buildings 6.  
 Under bridges 4.

## Near Warrington, Lancashire :

In farms with animals or fowls 10.  
 In unoccupied buildings 7.

## Alderley, Cheshire :

Associated with domestic animals or fowls 16 ; no association 20,  
 but except three sites all were within 50 yards or less of fowls.

## N.W. Cheshire :

Associated with cattle, horses and pigs 77.  
 In buildings occupied only by fowls 8.  
 In dwelling-houses and sheds where no association with animals  
 or hens 12.

## Anglesey :

In buildings occupied by animals 28.  
 In dwelling-houses 3.  
 In unoccupied buildings 43.

## Carmarthenshire :

Associated with animals 97.  
 In buildings where animals and fowls always present 19.  
 In buildings where animals present daily for short time 43.  
 In buildings such as cartsheds, etc., 35.  
 In places far from animals 5.

## Kelling, etc., Norfolk :

In occupied buildings and hen-houses 29.  
 In dwelling-houses and unoccupied buildings 37.

## Hemsby, Norfolk :

In occupied buildings and hen-houses 15.  
 In unoccupied buildings 46.

## E. Suffolk :

Associated with animals and fowls 6.  
 In unoccupied buildings with no such association 25.

## E. Hereford :

Associated with animals 88 pairs.  
 Not so associated 8 pairs.  
 Of these 96 pairs 62 exact nesting-sites noted :—cowshed or  
 pig-stye 26 (42 per cent.), in barns 19 (30 per cent.), in hop-kilns 9,  
 outhouses 5, gateway 2, hen-house 1.

## Somerset :

Associated with animals 50.  
 Not so associated 14.  
 Of these 64 nests 37 were in buildings actually occupied by  
 animals, 2 in dwelling-houses and 25 in unoccupied buildings.



occupied nest ; in N.W. Cheshire two Wrens' nests were built in old nests ; in Anglesey three Wrens' nests and in E. Hereford six Wrens' nests were reported.

In N.W. Cheshire a House-Sparrow (*Passer d. domesticus*) built in an old nest as has been done on several occasions previously ; in Anglesey two House-Sparrows ; and at Kelling, Norfolk, young Swallows were ejected from the nest by House-Sparrows.

Other birds that have built in Swallows' nests are :— Spotted Fly-catcher (*Muscicapa s. striata*) in E. Hereford ; Robin (*Erithacus r. melophilus*), in whose nest a Cuckoo (*Cuculus c. canorus*) was reared, in Kent, where a Robin's nest on a rafter was itself used by a Swallow after the young had flown and a Swallow's brood was reared in it.

#### INTERFERENCE BY DESTRUCTIVE ANIMALS AND BIRDS.

Rats and mice are responsible for most damage. Rats occasionally kill adults or young at Carlisle ; at Ullswater they destroyed four nests in 1934, at Warrington one nest, and one (probably rats) in N.W. Cheshire. Mice were responsible for the destruction of six at Ullswater ; at Skokholm they destroyed a second brood and in Kent eggs in one nest were found to be sucked—probably by mice. In the autumn a mouse (probably a long-tailed field-mouse) made a nest in a Swallow's nest built in a hen-shed in N.W. Cheshire.

Cats destroyed two nests at Ullswater and one in N.W. Cheshire. An Owl took one sitting bird at Ullswater.

A certain amount of human interference must be expected, though the Swallow benefits from superstition in Cheshire and Hereford\* and is protected on that account ; in Anglesey it has been noticed that when Swallows nest in a cow-shed the irritant black flies are kept out and they are encouraged to nest for that reason.

#### RELATION TO HOUSE-MARTINS.

Martins and Swallows can hardly be said to compete for nesting-sites ; the great majority of Swallows build inside buildings, whereas Martins build under eaves or in the roofs of open hay-sheds. There is little evidence that there is any hostility and nests occur on the same farms.

Martins are far more patchy and concentrated in their distribution and appear to be more fickle ; their numbers fluctuate in a remarkable degree and those of the Swallow

\* In a Derbyshire locality it is believed that cows will give bloody milk if the Swallows' eggs are taken.

are far more constant. Thus in an area at Bruton, Somerset, 104 pairs of Martins, in 1929, were reduced, in 1931, to 63, and in 1934 to 34.

Where Martins and Swallows occur together Martins are usually in the majority, as might be expected of a bird that nests in colonies. One instance gives possible evidence of antipathy: in two Dutch barns at Ullswater a pair of Swallows built on low beams beneath a colony of Martins and in each case the Swallows deserted.

In many districts the two species do not overlap to any extent; in 2,717 acres in N.W. Cheshire Martins occur in only six farms; in four of these Swallows also nest (nine pairs of Swallows and eleven of Martins), and in two farms Martins alone breed. In one or two cases both species occupy the same cart-shed and nest in close proximity.

In E. Hereford, in an area of twelve square miles, Martins and Swallows were both found nesting in eleven sites, but in each case the Martins occupied the dwelling-house and the Swallows the out-buildings, so that there was little competition; in these eleven sites fifty pairs of Martins nested and eighteen pairs of Swallows. In three villages of N. Norfolk 158 pairs of Martins and 54 of Swallows nest; there is no evidence of hostility and the nesting-sites are so different (Martins along the fronts and sides of the houses, Swallows in farm buildings and sheds) that there is no reason for them to clash.

#### PARASITES OF SWALLOWS AND ANIMALS FOUND IN THEIR NESTS.

In this section of the enquiry few of the observers took adequate part, but of the material sent for investigation Mr. H. Britten, of the Manchester Museum, has sent the following report:—

“ A complete summary of the inhabitants of over twenty Swallows' nests, examined from various localities, from the beginning of July to the middle of September, 1934, and also including several dead birds taken from the nests, has proved of exceptional interest. The nests were from the following localities:—

Edgerton, Huddersfield, J. C. S. Ellis;

Laugharne, Carmarthen, J. F. Thomas;

Penmon, Anglesey, R. M. Jones;

A number of Cheshire localities by E. Cohen and A. W. Boyd.

In addition a single dipterous larva was sent from Kelling, Norfolk, by R. M. Garnett, having dropped from the corner of a young bird's mouth, where it had evidently been sucking the bird's blood. A similar larva was sent in by A. W. Boyd, which had dropped from a young bird. In both cases the young birds had been taken out of the nest for ringing.

## PARASITES FOUND IN SWALLOWS' NESTS.

(i) *Siphonaptera*.

*Ceratophyllus gallinæ* Schrank. This is the flea which one usually finds in such numbers in hen-houses, and also in the nests of many birds; it was present in two of the nests examined, and was breeding in them, as adults, larvæ and pupæ cases were found.

(ii) *Diptera*.

*Phormia sordida* Zett. = *Protocalliphora cærulea* R.-D. of certain authors; one of the blue bottle flies.\* The pupal cases of this fly were present in some nests in numbers, but in most cases the flies had emerged before the nests were taken. Two larvæ from widely-separated localities were sent in, having dropped from the young birds when taken from the nest to ring, also several of the young birds were found dead in the nests where these pupæ cases were present, this suggesting that the fly may be a means of reducing the numbers of the nestlings considerably; but in other nests where there were dead nestlings present there was no trace of pupal cases of the fly, but the red mites were in countless thousands, so that it is quite possible that the constant drain on the young birds by the sucking of these mites may also result in the death of one or more of the young birds; it is to be hoped that in the coming nesting season this will be borne in mind and careful examination of the whole nest be made where dead birds are present, or perhaps it would be best to take the whole nest and pack it intact to the investigator. The larvæ of this fly have been recorded from the nests of many birds, but although some hundreds of nests of various birds have been investigated in the Manchester Museum during the past few years, I have found it only in Swallows' nests.

(iii) *Acari*.

*Dermanyssus gallinæ* Redi.; Red Mite. This was present in practically every nest, in some they were swarming in countless numbers, and even the dead birds sent in from the nests were swarming with this mite. In two different nests where dead birds were present, these mites were in astonishing numbers, and there was nothing else in the nest to account for the death of the young birds.

(Dr. Moon reported that the young developed somewhat slowly when the infestation was very heavy.)

## OTHER ANIMALS (NOT PARASITES) FOUND IN SWALLOWS' NESTS.

(i) *Psocidæ*.

*Troctes divinatorius* Müll.

*Lepinotus inquilinus* Heyd. These two Psocids (book-lice) were present in several nests, probably feeding on the dead mites and other animal matter.

(ii) *Orthoptera*.

*Forficula auricularia* L. Common earwig. A few examples in one nest.

(iii) *Hemiptera*.

*Lyctocoris campestris* F. Only present in one nest, although of frequent occurrence in nests of other birds, where they often suck the pupæ of fleas; even the larger pupæ of moths are pierced and sucked

\*A note on this fly has already been published in *British Birds*, Vol. XXVIII., p. 22, showing it to be widespread in England.

by these predatory bugs. Their principal food in these nests is evidently the red mites, and they can often be seen with a fairly large mite attached to the end of the proboscis by the lancets which have penetrated well inside the mite's body.

(iv) *Lepidoptera*.

*Borkhausenia pseudopretella* Staint.

*Endrosis lactella* Schiff.

*Tinea pelliionella* L. The larvæ of these three moths were present in most nests, in one case all three were in the same nest, but in most cases two were always present. These larvæ were feeding on the feathers used as lining in the nests.

(v) *Coleoptera*.

*Cartodere ruficollis* Marsh. A few specimens of this tiny beetle in one nest; it is a regular inhabitant of barns and haylofts.

*Amara apricaria* Sturm. One of the ground beetles which it is difficult to account for in the nest; it was evidently only a straggler.

(vi) *Diptera*.

*Hæmatopota pluvialis* L. A male example of this common "cleg" was taken near a Swallow's nest and sent in with the query as to whether it had any connexion with the nest. The predatory larvæ of these flies breed in swampy places, and the males hover much in the same way as those of the common hover flies when waiting for their mates.

*Fannia scalaris* F. This fly is very similar to the small house fly and was taken close beside a Swallow's nest. Its flat bristly larva is found in dung and vegetable detritus of all kinds, but has never been seen in any nest.

(vii) *Pseudoscorpiones*.

*Cheridium museorum* Leach. In several nests this interesting little pseudoscorpion was present, and from the colour of the stomach contents it had evidently been preying on the red mites.

(viii) *Acari*.

*Glyciphagus domesticus* De G. Present in only one nest. This mite is usually abundant in most outbuildings, living on all kinds of detritus.

From the above remarks it will be readily seen how very necessary it is to have the whole of the lining of any nest taken, and in those where dead birds are found, the whole structure of the nest should be sent, as many of the blood-sucking dipterous larvæ burrow into the mud of the nest itself to pupate. The dead bodies of nestlings themselves should also be sent, so that they may be closely searched."

HARRY BRITTEN,

MANCHESTER MUSEUM.

6.2.1935.

### CENSUS.

The twelve areas chosen for a census comprise a great diversity of terrain: an island, cattle-raising country and arable farming, coastal villages, a fruit-growing district, north-country industrial districts and moorland at altitudes ranging from sea-level to 1,450 feet.



These sample areas cover rather more than .01 per cent. of the land surface of England and Wales and the principal types of country seem to be fairly well represented.

The numbers before each locality correspond with the fuller descriptions earlier in the text.

*Census Results. Swallow, 1934.*

Locality.	Area in Acres.	Altitude.	Type.	Breeding Pairs.		Pairs of House-Martins.
				Number	Density per 1,000 Acres.	
6. Huddersfield.	2,400	300-800 ft. (2 prs. at 750 ft.) (3 prs. at 700 ft.)	Urban and upland pasture.	12	5	Nil.
7. Heywood, Lancashire.	8,320	300-1,450 ft. (2 prs. at 900 ft.) (6 prs. at 750 ft.)	Industrial and urban; 40% moorland.	47	6	19
9. Stalybridge, Lancashire-Cheshire border.	3,040	445-925 ft.	Industrial and urban with poor pastures.	10/15 (approx.)	3.5	Nil.
11. Antrobus and Sevenoaks, N.W. Cheshire.	2,717	150-284 ft.	Rural. Dairy and mixed farms. 300 acres reclaimed moss-land.	88/90	33	27
12. S.E. Anglesey.	1,515	0-60 ft.	Rural pasture.	62	40	1
14. Skokholm Island, Pembrokeshire.	240	0-150 ft.	Rough grazing and heather.	1	4	Nil.
15. Colwall, Herefordshire.	7,680	250-1,114 ft.	Fruit and hop country with pasture and scattered villages.	96 Circ.	12	198
16. Bruton, Somerset.	2,560	300-450 ft.	Pasture and some woodland.	66	26	34
18. Salthouse, N. Norfolk.	4,160	0-260 ft.	Sea-coast villages, arable and much heathland.	54	13	158
19. Hemsby, Norfolk.	1,739	0-100 ft.	Rural, arable (corn).	61	35	?
20. Near Ipswich, E. Suffolk.	5,120	100-150 ft.	Arable and pasture, much heath and woodland.	18	4	?
21. Seaford, Sussex.	7,680	0-750 ft.	Coastal downland and river valley.	23	3	22
	(5,120) (2,560)	(downland (valley	alone) alone)	(8) (15)	(2) (6)	

	Total	Total	Average Density
12 Sample Areas ... ..	Acreege.	pairs of SWALLOWs.	per 1,000 Acres.
	47,171	538-545	11-12

*Census Results. House-Martins, 1934.*

Locality.	Area in Acres.	Breeding Pairs.	
		Number.	Density per 1,000 Acres.
6. Huddersfield ... ..	2,400	Nil.	Nil.
7. Heywood, Lancashire (16 prs. at 900 ft.) ( 3 prs. at 850 ft.)	8,320	19	2
9. Stalybridge ... ..	3,040	Nil.	Nil.
11. N.W. Cheshire ... ..	2,717	27	10
12. S.E. Anglesey ... ..	1,515	1	1
15. Colwall, Herefordshire ... ..	7,680	198	25
16. Bruton, Somerset ... ..	2,560	34	13
18. Salthouse, Norfolk... ..	4,160	158	38
21. Seaford, Sussex ... ..	7,680	22	3
(Valley only) ... ..	(2,560)	(22)	(8)
	Total	Total	Average Density
9 Sample Areas ... ..	Acreege.	Pairs.	per 1,000 Acres.
	40,072	459	11

*Census Results in Previous Years.*

(For purpose of comparison 1934 figures are given in brackets).

Locality.	Area.	SWALLOWs.		HOUSE-MARTINS.		Year.
		Breeding Pairs.	Density per 1,000 acres.	Breeding Pairs.	Density per 1,000 acres.	
6. Huddersfield ...	2,400	13	5	—	—	1932
		11	5	—	—	1933
		(12)	(5)	—	—	(1934)
11. N.W. Cheshire...	2,717	{ 112	42	—	—	1932
		{ approx. figures only (88-90)	(33)	(27)	(10)	(1934)
16. Bruton, Somerset	2,560	52	20	104	40	1929
		60	23	63	24	1931
		(66)	(26)	(34)	(13)	(1934)

*Census Results in Previous Years for Areas not included in 1934 Census.*

Year.	Oxford Suburban and Urban.	Oxford Rural Land Adjoining.	Total.
	7,680 acres.	28,160 acres.	35,840 acres.

	HOUSE-MARTIN.			
	Pairs.	Density.	Pairs.	Density.
1931 ... ..	325	42	432	15
1932 ... ..	323	42	392	14
			757	21
			715	20

W. B. ALEXANDER—*Jnl. Ministry of Agriculture* XL.

(No. 1, pp. 8-12).

Near Manchester.	Area.	SWALLOW.		HOUSE-MARTIN.	
		Pairs.	Density per 1,000 acres.	Pairs.	Density per 1,000 acres.
1933 ... ..	7,840	42 (approx.)	5	70	9

S. CRAMP & J. H. WARD—*Jnl. of Animal Ecology* III. (No. 1).

CENSUS SUMMARY.

(i) *The Swallow.*

From the figures so far available it seems clear that Swallows favour an area of a rural (rather than an urban) type, where suitable buildings for their nests prevail; that they nest in many districts in buildings occupied by domestic animals

is more easily accounted for by the abundance of suitable nesting-sites in these buildings than by the presence of the animals themselves, though the attraction of animals and the flies they bring must not be overlooked. Downland, heathland and moorland support very few pairs, just as they include few buildings; the highest altitude at which breeding pairs in the areas under observation have been found is 900 feet. In industrial and urban districts their density is low; in three areas in Yorkshire, Lancashire and Cheshire about five pairs per 1,000 acres were found and a previous census near Manchester confirms this figure exactly. Their density is highest in rural districts; as in N.W. Cheshire where there are many small farms; in Anglesey where large disused farms are occupied; in E. Norfolk where they build in out-buildings of cottages and in farm buildings; and in Somerset where the size of farm-building groups causes them to be more concentrated in fewer farms than in other areas. The Swallow is very much more generally distributed than the House-Martin.

(ii.) *The House-Martin.*

The House-Martin is far more a bird of the village or town than the Swallow and is wont to concentrate in colonies in restricted areas rather than breed in isolated pairs in many separate buildings, though isolated pairs often occur. Thus in an area of over 8,000 acres in Lancashire 19 pairs were concentrated in two groups; an area of about 4,000 acres in Norfolk contained 158 pairs of which 110 were in one small village. In Herefordshire they showed a possible tendency to a concentration near water, and in one village, where they were few, the presence of a flourishing colony of Swifts (*Apus a. apus*) may account for their small number. As will be seen from a comparison with figures of other years they are far more fickle than Swallows and fluctuate in number from year to year in an unaccountable way.

None of the 1934 figures showed a density so high as that of the Oxford census of 1931 and 1932, where concentration in the urban rather than the rural part of the census area was most marked.

Industrial and urban districts in the north of England show a very low density.

The favourite nesting-sites are the deep eaves of houses and other buildings and they also favour corrugated-iron haysheds, but many apparently suitable sites are unoccupied and a principle governing their distribution cannot be suggested from the scanty data so far available.

