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**REPORT OF THE LITTLE OWL FOOD INQUIRY.  
1936-37.**

**(ORGANISED BY THE BRITISH TRUST FOR  
ORNITHOLOGY.)**

BY

ALICE HIBBERT-WARE, M.B.O.U. (Analyst).

*REPORT OF THE SPECIAL COMMITTEE.*

LATE in 1935 it was suggested to the British Trust for Ornithology that the differences of opinion which had developed regarding the normal food of the Little Owl (*Athene noctua vidalii*) would make it very hard for those responsible to take sound decisions on the question how much, if at all, to protect this species by law. It was represented that a full and impartial inquiry was necessary, and the Scientific Advisory Committee agreed to promote such an inquiry, with the help of Miss A. Hibbert-Ware, M.B.O.U., who volunteered to undertake the heavy work of analysis. As it was clear that an investigation could only be of value if it was carried on according to unquestionably scientific methods, we were asked to serve as a Special Committee to decide upon the most suitable technique and to deal with any difficulties arising on scientific points.

As the course of the investigation and the methods used are fully described in the following pages, we can confine our report within very brief limits. After considering various alternative methods of analysing the material and presenting the results, we agreed upon that which Miss Hibbert-Ware has followed, and are fully satisfied with the scientific accuracy of the facts recorded, and with the validity of the inferences drawn.

In view of the wide currency which has been given to statements that the Little Owl is a wholesale destroyer of game-chicks, poultry-chicks, and song-birds, every effort was made through members of the Trust and personal contacts, through the Press, and through the British Broadcasting Corporation to obtain all possible evidence of harm of this nature traceable to the species. Not all those who had been persistent in repeating vague statements of this nature proved ready to try to substantiate them, and a separate investigation had to be carried out during 1937 in order to give increased scope for the collection of material from game estates and similar areas likely to yield evidence of damage. The outcome of these efforts has been to yield proof of only

negligible destruction of game, poultry or wild birds of all ages, and to show that except in abnormal circumstances Little Owls feed almost wholly upon such insects, other invertebrates and small mammals as can be readily picked up on the ground during the hours of feeding—largely from dusk in the evening to early morning.

To this conclusion one qualification is necessary, and arises from the fact that the investigation was confined to the years 1936 and 1937, when the Little Owl population was definitely below its highest level. During the period of rapid multiplication of the species, which seems to have come to an end some years ago, there may well have been local tendencies to depart from the normal diet owing to the greater competition for food or a relative lack of the kinds usually preferred; this latter condition was, in fact, found to cause deviations in food habits of Little Owls that had colonized open islands or shingle, where the normal diet was unobtainable.

At the present time, however, it is evident that sweeping statements about the damage done by the Little Owl have little justification in fact. Such a conclusion can safely be reached on the evidence of the present investigation, and it may be expected to hold good so long as there is no great alteration in the status or habits of the species. It may be well to add that this verdict must not be interpreted as an expression of opinion in favour of the original introduction of the Little Owl or of foreign birds in general, matters not within our terms of reference.

No one can read Miss Hibbert-Ware's Report without appreciating the enormous amount of careful, arduous and often unpleasant work which has fallen upon her in the course of this investigation, and without being impressed by the number of persons scattered all over the country who have gone to very considerable trouble in order to help in setting this difficult question at rest. It would be out of place here to attempt elaborate compliments to those who have taken part, but they will have the satisfaction of knowing that they have had some share in bringing the methods of science to bear at a point where they were particularly needed and conspicuously absent at the time when this work was done.

W. E. COLLINGE,  
J. C. F. FRYER,  
F. C. R. JOURDAIN,  
N. B. KINNEAR.

*(Miss HIBBERT-WARE'S REPORT.)*

## GEOGRAPHICAL DISTRIBUTION OF THE LITTLE OWL.

LOCAL races of the Little Owl are widely distributed over central and south Europe, N.W. Africa and Egypt to W. Egypt and S.W. Asia. In Britain the bird was introduced from Holland. It belongs to the sub-species *Athene noctua vidalii*. Previously the species had been recorded only as a rare visitor.

## HISTORY OF INTRODUCTION AND COLONIZATION OF THE LITTLE OWL IN GREAT BRITAIN.

Charles Waterton (about 1843) attempted to introduce the Little Owl into Walton Park (Yorks) from Rome, having been impressed by the fact that "it is much prized by the gardeners in Italy for its uncommon ability in destroying insects, snails, slugs, reptiles and mice" (Essay on "Civetta"). Apparently this effort was unsuccessful.

Later, other attempts were made in East Yorkshire, Hampshire, Hertfordshire, Northamptonshire and Kent, but only two of the latter were successful. These two introductions were as follows:—

1. In 1889, after several importations Lord Lilford discovered a pair breeding at Lilford, near Oundle (Northants). From that year it multiplied and spread outwards in all directions from county to county.

2. Between 1874 and 1900 Mr. E. G. B. Meade-Waldo also made several importations of the Little Owl at Stonewall Park, Edenbridge (Kent). In 1879 he recorded one breeding pair. By 1900 the bird had become abundant in Kent and had spread into the surrounding counties.\*

It appears therefore, that it is from these two centres that the Little Owl eventually spread over the greater part of England and Wales. It rapidly became a bird of evil repute and widespread charges were made against it of serious depredations on song birds and game and poultry chicks. At the same time, food remains in pellets and gizzards showed clearly that a considerable part of its food consisted of rodents and insects, *etc.*, that are detrimental to the agriculturist.

\*See "The Spread of the Little Owl from the Chief Centres of its Introduction", by H. F. Witherby and N. F. Ticehurst: *Brit. Birds*, Vol. 1, April, 1908.

## ORGANIZATION OF THE INQUIRY.

Accordingly, in 1935, the British Trust for Ornithology decided to undertake a thorough investigation of the economic status of the Little Owl. It was arranged that the food remains of the bird derived from every possible source and every type of country should be examined and analysed\* on a very large scale. The investigation was to be numerical, *i.e.*, the animals represented among the food remains were to be counted and collected for future reference. The Report will show that this was very fully done. The one weak point was that, in spite of special appeals being made to them, people interested in game took part in the Inquiry to a very small extent. Accordingly a second investigation was arranged by which the analyst's attention should be completely concentrated on material sent from sites where game and poultry were either preserved or were abundant. This was done during the nesting season of 1937. The following Report embodies the results of these investigations, which were begun in February, 1936, and completed in July, 1937.

It is only by means of careful field work combined with laboratory work that a just estimate can be obtained as to whether an animal is deserving of protection or condemnation. This is especially true of any species of wild life that has been introduced into a country, to live possibly under different conditions from those prevailing in its natural habitat. This Inquiry has been worked with a view to obtaining *facts* about the Little Owl, facts in the field and facts in the laboratory. For this reason it has been necessary to eliminate from the resulting report all pre-conceived notions based on evidence now impossible to verify as certain. The Inquiry has accordingly been restricted to field work, carried on in close touch with laboratory work, covering a period of one and a half years and including two nesting seasons. Evidence about the nature of the food drawn from general correspondence has likewise been confined to this period, though, by a concession, reports for 1935 sent by people interested in game-rearing have been included.

Another reason for this restriction is that the Little Owl appears to be considerably less numerous in some districts than it was a few years ago. It is obvious that the consequent enlargement of the food territory of individual pairs might

\*The writer already had a considerable experience in work of this nature, for which see the paper in the *Essex Naturalist*, 1923, Vol. XX, pp. 142-50, on "An Examination of the Gizzard Contents of Certain Birds".

have a marked influence on the nature of their prevalent food. No game preservers, for instance, have recorded more than "possibly six pairs; it is very common" for 1937 whereas it is said that "on one estate in Norfolk 151 were killed in 1926 and 77 in 1928". In order to discover the bird's present economic status, it has been necessary to restrict evidence to what has been proved about it during the period of the investigation.

#### SCOPE OF THE INQUIRY.

The Inquiry has consisted of two parts: (1) A general investigation for a full year, from February, 1936 to 1937. (2) A special game-chick and poultry investigation from March, 1937, to July 10th.

*The General Investigation.* 73 helpers sent material to be analysed from 34 counties and 81 localities (Table 1). This material consisted of pellets, nest and larder remains and gizzards. All but a very few of the helpers obtained the material from haunts of the Little Owl known to them and they notified this fact on their labels.

These helpers included a group of 20 regular workers who operated in 15 counties and made a great feature of field work. They studied the habits of the Little Owl with special reference to the problems connected with its food. They sent their records to the writer. Whenever a difficult case involving circumstantial evidence only occurred, they followed it up. They gathered material from nests and holes, clearing them to the base, and collected pellets from known roosting and feeding haunts.

The result of the combined effort of the field workers is that 2,460 pellets have been analysed, the material from 76 nests and holes has been examined and the gizzard contents of 28 Little Owls have been identified. The combined results furnish the numerical data of the investigation.

A large number of correspondents sent records of their experiences of the Little Owl, but no material. These were valuable and have been included in the Report, provided that they belong to the period February, 1936 to 1937. The numerical results of the investigation are, however, exclusively confined to material that has been examined by the writer.

TABLE I.  
COUNTIES AND LOCALITIES FROM WHICH FOOD MATERIAL WAS SENT.

PART I.			
<i>County.</i>	<i>Locality.</i>	<i>County.</i>	<i>Locality.</i>
1. Bedfordshire	Bedford	18. Leicestershire	Market Harborough
2. Berkshire	Newbury		Lough- borough
3. Buckinghamshire	Olney	19. Middlesex	Hillingdon
4. Cambridgeshire	Abington	20. Monmouthshire	Abergavenny
	Girton		Bassaleg
	Hildersham	21. Norfolk	Old Hunstanton
	Histon		Woodbast- wick
	Knapwell	22. Northampton- shire	Addington
	Milton	23. Nottinghamshire	Bingham
	Longstanton	24. Northumberland	Gunnerton
	Over	25. Radnorshire	Llanbister
	Sawston	26. Shropshire	Ludlow Wellington
	Swaffham	27. Somersetshire	Bruton
5. Carmarthenshire	Landbeach	28. Staffordshire	Trentham
6. Cheshire	Abercorran	29. Suffolk	Barton Mills Brandon Ipswich
	Gawsworth		Lavenham
	Warrington		Mildenhall
	Stockport		Saxmundham
7. Cornwall	W. Looe	30. Surrey	Fetcham Godalming Goodwood Limpsfield Wimbledon Common Wimbledon Golf Links
8. Denbighshire	Corwen		Wisley
9. Derbyshire	Derby	31. Sussex	Woking Burwash Fittleworth Seafood Rye
10. Devon	Plymouth		Aldbourne
	Roburgh	32. Wiltshire	Bredon Hill
11. Dorset	Beaminster	33. Worcestershire	Malvern Dudley
12. Essex	Chelmsford		Barnsley
	Harold Wood	34. Yorkshire	Bolton Percy Filey Wakefield
	Hedingham		
	Castle		
	Little		
	Burstead		
	Quendon		
	Waltham		
	Abbey		
13. Hampshire	Shanklin		
(Isle of Wight)			
14. Hertfordshire	Bricket Wood		
	Bushey		
	Heath		
	St. Albans		
15. Huntingdon- shire	Brington		
	Winwick		
16. Kent	Ashford		
	Stockbury		
	Tenterden		
17. Lancashire	Castleton		

NUMERICAL STATUS OF THE LITTLE OWL.

Four sources have been tapped for estimates of the numerical status of the Little Owl from 1935 to 1937.

(1) Eleven of the regular observers have made a census for a half or three-quarter mile radius, from one of the haunts they have had under observation. In several cases this has been very exact, accompanied by a survey map of that part of the district. Hence these results provide a very certain record. Moreover they come from widely separated points of England. (2) Records drawn from correspondents' letters. These have their value in that they are first-hand impressions, not intended for publication, of people interested in the Little Owl. They refer, of course, to localities very limited in extent. (3) Records drawn from the forms sent by Mr. Middleton to be filled in by observers in many parts of the British Isles. It should be understood that some of these forms were collected from the outside edge of the bird's area, more with the intention to discover whether it is spreading northwards and westwards than to find the present numerical status in areas already populated by it. This list is valuable in that it shows that the species is still almost unknown in Scotland, Northumberland, Cumberland and in parts of Yorkshire and Wales. (4) A few Reports are given from Local Natural History Transactions for 1936. In this year, on the suggestion of the British Trust for Ornithology, a number of regional and local societies chose the species for special study.

CENSUS MADE WITHIN (APPROXIMATELY) A HALF-MILE RADIUS.

Milton (Cams.) : " 2 nests in a  $\frac{1}{2}$ -mile radius."

Girton (Cams.) : " 2 nests in a  $\frac{1}{2}$ -mile radius."

Shaugh (Devon) : " Two families within  $\frac{1}{2}$ -mile west of Guest House."

Castleton (Lancs.) : " No others within  $\frac{1}{2}$ -mile. Mine was an isolated pair."

Osgathorpe (Leics.) : " 3 pairs on this farm of 105 acres, 1 mile square with a ring fence. Little Owl common in Charnwood Forest."

Wellington (Shrops.) : " 4 pairs on this estate. Taking the castle as a centre, all are well within a  $\frac{1}{2}$ -mile radius. Little Owl common here."

Ludlow (Shrops.) : One pair per  $\frac{1}{2}$ -mile approximately.

Mildenhall (Suffolk) : 2 nests within  $\frac{1}{2}$ -mile. No increase during the past 3 seasons in this district.

Limpsfield (Surrey) : 3 nests within a  $\frac{3}{4}$ -mile radius. 2 of them were 400 yards apart, the third rather over a mile away. A circle of  $1\frac{1}{4}$ -miles radius includes 4 nests.

Seaford (Sussex) : 3 pairs in a radius of  $\frac{3}{4}$ -mile.

Wakefield (Yorks.) : " The area surveyed was  $1\frac{3}{8}$  square miles. The Little Owl population (breeding pairs) was 3. During the taking of the Census in 1937 an area of  $\frac{1}{2}$ -mile radius from each breeding tree was explored to discover additional pairs if possible. None were found."

## SUMMARY OF STATEMENTS FROM CORRESPONDENTS' LETTERS.

- I. *Little Owl common or increasing.*  
 Bucks. (High Wycombe) : Many Little Owls in this district.  
 Berks. (Newbury) : Common here.  
 Carmarthen (Abercorran) : Increasing among the sandhills.  
 Dorset (Evershot) : Numerous.  
 Kent (Tenterden) : Common. 2-3 pairs per  $\frac{1}{2}$ -mile radius.  
 Somerset (Banwell) : The bird is quite common round here.  
 Staffs. (Burton-on-Trent) : Fairly common.  
 Sussex (Burwash) : Common.  
 „ (East Grinstead) : Plenty here.  
 Yorks (Bolton Percy, West Riding) : Not uncommon.  
 „ (Copmanthorpe, West Riding) : Increased during last 5 years.
2. *Little Owl scarce or decreasing.*  
 Berks. (Abingdon) : Have seen none round here.  
 Cambs. (Wilburton) : Much less common than formerly.  
 Devon (Roburgh) : Have decreased almost to point of extinction.  
 Hants. (Ventnor, I.W.) : The last 5 or 6 years has decreased and now I never hear it.  
 „ (Shanklin, I.W.) : Not nearly as many as a few years back.  
 „ (Swanmore, Southampton) : Scarcer. Here only one pair.  
 Kent (Maidstone) : Not many and those almost always in orchards.  
 Lincs. (Gainsborough) : Not many.  
 Merioneth (Aberdovey) : Decreased during last three years.  
 Northants. (Northampton) : Rather scarce in this locality.  
 Oxon (Goring) : Fairly scarce. When found, shot.  
 Yorks. (Filey, North Riding) : Not in numbers to constitute a menace.  
 „ (Leeds, West Riding) : None near Harewood, the district I "work" for birds.

## REPORTS ON FORMS COLLECTED BY MR. MIDDLETON IN 1936.

- Anglesey : Still a rare bird.  
 Carmarthen (Llangadock) : Only one seen during year.  
 Cumberland (Windermere) : None seen in this district.  
 Denbigh (Wrexham) : None.  
 Devon (Barnstaple) : No Little Owls.  
 Hants. (West Wickham) : Little Owls are decreasing in numbers.  
 Kent (Charing) : Number seems to be on the decrease.  
 Lancashire (Preston) : Never heard of one in the district.  
 Montgomery (Welshpool) : None to record.  
 Northumberland (Belford) : None.  
 Notts. (S. Notts. generally) : Have observed very few.  
 Oxon (Woodstock) : None near Wootton.  
 Shropshire (Oswestry) : Rarely seen here.  
 Somerset (Frome) : Not present in this district.  
 Surrey (Camberley) : None in district.  
 Sussex (Five Ashes) : Very few to be seen now.  
 „ (Crawley) : Numbers now negligible.  
 Yorks. (Whitby, North Riding) : Becoming rare.  
 „ (Goathland, North Riding) : A great rarity.  
 „ (Settle, West Riding) : Never seen or heard in this district.  
 „ (Skelmanthorpe, West Riding) : Have only known of two Little Owls in this district during 60 years.  
 „ (Skipton, West Riding) : None.  
 „ (Kirkby Underdale, East Riding) : Not many.

## LOCAL COUNTY REPORTS RECENTLY PUBLISHED.

- Berks. : Certainly not increasing (Oxon Report, 1936).  
 Bucks. : Common and stable in parts. Decreasing in a few (Oxon Report, 1936).  
 Herts. : Has become comparatively scarce in many districts of W. Herts. (Trans. Herts. N.H. Soc. Report on Birds for 1935).  
 Oxon : During last seven years numbers seem more or less stable (Oxon Report, 1936).  
 Somerset : Common. Increasing in Exmoor district.

Though it cannot be inferred from the above lists that the Little Owl is decreasing as a species throughout the British Isles, nevertheless it is clear that it is not nearly so common in some localities as it once was. For the district round Girton the writer can speak with authority, for she has known every nest in a half-mile radius for the past six years. In 1932 there were six ; in 1937 two. Nor in this case is the decrease probably due either to the gun or to building operations, for the gun is seldom used in the district and the previous nest sites were not on land now occupied by houses. Mr. Howard Lancum mentions that at Roburgh (Devon), " Little Owl now appears to be nearly extinct". From the Isle of Wight where the bird was once very frequent, the reports are the same and a study of the lists shows a similar decrease in other localities as in Kent and Surrey. When watching from the train or car, it is a far less common sight than it was a few years ago to see Little Owls perched on posts, tree stumps and telegraph wires.

There is some evidence to show that the Little Owl itself may be largely responsible for this apparent diminution. The helpers had not been asked to give details of the numbers of eggs, or young in the nests they observed, but fortunately several of them did so. Of 17 records received, six nests contained two eggs or young, six nests had three, and five nests had four. As the numbers were usually greater a few years ago,\* these figures point to the probable conclusion that the Little Owl is not increasing at the same rate that it did during the first years of its colonization.

\* This was confirmed in the following note sent me by the Rev. F. C. R. Jourdain:—

" A point which should be taken into consideration is the diminution in the rate of reproduction which appears to have taken place of late years. From reference to diaries I find that about 1902-5 in Northamptonshire four or five was about the normal clutch, while sets of six occurred fairly frequently, and I have several records of seven eggs. Nine young were reported on good authority in one nest in Derbyshire. At the present time the average clutch is probably about three, and fours are not infrequently met with, so that the decrease in the average number of young reared must be considerable."

It is important to realize that a decrease in numbers may have a distinct influence on the nature of the food of a bird by increasing the amount available to it of the natural food of the species.

THE FIELD WORK OF THE REGULAR OBSERVERS.  
(INQUIRY—PART I.)

Table 2 and the notes that follow will show that the general investigation has been of a very comprehensive nature from every point of view. The field workers volunteered their help mainly in response to (1) an appeal from the Trust, (2) a broadcast by the B.B.C.; (3) an article in the *Zoo* magazine.

TABLE 2.  
THE AREAS WORKED BY REGULAR FIELD OBSERVERS. PART I.

<i>County and District.</i>	<i>Type of Country and Little Owl Sites.</i>	<i>Game or Poultry near Sites.</i>
1. Berkshire, Newbury.		
2. Cambridgeshire, Longstanton.	Park and field. Feeding haunts of 2 pairs.	Poultry.
3. Cambridgeshire, Milton.	Fen and river meadows. Holes in trees.	—
4. Cambridgeshire, Girton.	Fields by village. Nests and holes.	Poultry.
5. Carmarthenshire, Laugharne.	Sandhills. Grassfields and hedges. 4 feeding haunts.	—
6. Devon, Plymouth (Shaugh).	Farmland. Feeding haunts of 2 pairs.	Poultry.
7. Essex, Harold Wood and Little Bursted.	Farmland (near woods). 3 nests.	Game preserve. Wild game. Poultry.
8. Herts., St. Albans.	Poultry farm. Nest in farm garden.	Poultry on large scale.
9. Lancashire, Castleton.	Estate. Nest in old building.	None.
10. Leicestershire, Loughborough (Osgathorpe).	Poultry farm. Nest against farmhouse.	Poultry on large scale.
11. Leicestershire, Market Harboro' (East Farndon).	Field. Nest.	—
12. Norfolk, Old Hunstanton.	Field bordering game estate. Feeding haunts of one pair.	Game preserve. Wild game.
13. Shropshire, Wellington.	Apley Castle Estate. 4 nests.	Wild game.
14. Shropshire, Ludlow.	Orchard. 2 nests.	Wild game.

<i>County and District</i>	<i>Type of Country and Little Owl Sites.</i>	<i>Game or Poultry near Sites.</i>
15. Suffolk, Mildenhall.	Field. Garden. 2 nests.	Wild game.
16. Surrey, Old Woking.	River meadows. 1 nest and holes.	Wild game.
17. Surrey, Limpsfield and Lingfield.	Woods. 6 nests.	Wild game.
18. Sussex, Seaford.	Downs. Feeding haunts of 3 pairs (or 2).	Poultry on one site.
19. Yorkshire, Wakefield.	Bretton Park Estate. 3 nests and many holes.	Game preserve.
20. Yorkshire, Barnsley (Kexborough).	Park and pasture. 2 feeding haunts.	Game preserve and poultry near one site. Wild game on both.
21. Worcestershire, Dudley (Gornal).	Farmland on Himley Hall Estate. 1 nest and feeding haunt.	Poultry. Wild game.

The numbers refer to the Districts, as do those in the list of Workers, to follow.

#### THE REGULAR FIELD WORKERS, WITH NOTES OF THEIR WORK.

1. MR. G. BROWN, Newbury. Sent Little Owls at intervals for gizzard investigation.

2. MR. M. GOODCHILD, King's School, Cambridge. Collected pellets regularly from feeding haunts at his home at Longstanton, Cambs., and also at Brington and Winwick, Hunts.

3. MR. K. HUMPHRIES, Milton. Collected pellets and "larder" contents.

4. GIRTON FIELD CLUB. Collected pellets and cleared nests.

5. MR. J. F. THOMAS, Laugharne. Visited 4 feeding haunts very frequently during April to May and August, 1936. Pellets collected were rich in insect remains especially from the sandhills. Sites worked: (1) on inner edge of sandhills, near rough grassland; (2) grass fields and hedges; (3) valley with stream and grass fields.

6. MRS. BABB, Shaugh (Plymouth). Visited two feeding haunts daily, to observe the birds and collect pellets, from July to December, 1936. "The near haunt,  $\frac{1}{4}$  mile from the house, was used by 4 fully fledged young birds and parents. They stayed in fields early morning and evening. At night they came on to the moor. This family was on Collard farm.  $\frac{1}{2}$  mile away on another farm was another family. The pellets were gathered from granite posts, boulders and trees." These pellets were remarkable for their insect contents and large size.

7. MR. R. WARREN AND BRENTWOOD SCHOOL FIELD CLUB. Mr. Warren made several clearances of 2 nests and holes

at Harold Wood and also interesting observations of food habits. He and his school club also cleared a nest and holes at Little Burstead several times.

8. MR. A. DICKINSON, St. Albans. Sent pellets from nest and also valuable records of observations of Little Owls made on his poultry farm.

9. MR. H. S. L. UTLEY, Castleton. Collected pellets at intervals from nest in wall of ruined building. "An isolated pair in an industrial district." "I have seen the birds flying about at all times of day."

10. MR. C. H. SMITH, Osgathorpe (Leics.). Sent pellets and material from nest on his poultry farm, together with valuable records of observations made during two nesting seasons.

11. MR. A. BEVIN, Market Harborough. Sent pellets at intervals from and under nesting hole in oak.

12. MISS JOHNSON, Old Hunstanton. Collected pellets and material from a feeding haunt on edge of an estate from September 3rd to end of October, 1936.

13. MR. A. O. ROLLS, Wellington (Shrops.). Made observations on habits and collected material from 4 nests on Apley Castle Estate during two nesting seasons. Wild game abounded round the nest sites.

14. DR. A. H. ZAIR, Ludlow. Sent pellets and records through the nesting season of 1936. "The nest was situated in an orchard surrounded by fields. There were partridges, pheasants and wild ducks in the owls' radius."

15. MR. A. GRANTHAM, Mildenhall. Sent material from 2 nests and haunts from a field and a wooded garden. Constantly spoke of the large numbers of wild game breeding in the field. Made careful observations on Little Owls' habits.

16. MR. D. G. PUMFRETT, Old Woking. Collected much material from a "breeding hole in a willow about 20 yards from the River Wey". The hole was 10 feet from ground and from 18-24 inches long. Frog remains very abundant in nest. Pellets, wings, etc., also sent from entrance to rabbit burrows. Observations were continued throughout the year of inquiry.

17. MR. K. R. CHANDLER, Limpsfield and Lingfield. Had 5 nests under observation in 1936. Sent copious material from them, finally clearing some of them to the base.

18. MR. J. F. THOMAS, Seaford. Visited three feeding haunts twice weekly (except during holidays) for a full year. "The sites are all chalk valleys with one side steep." One site, the gateway of an old barn, had chickens near by on both sides. Frequently found pellets at the mouth of rabbit holes. The Seaford pellets were remarkable on account of their rich insect contents at all seasons.

19. MR. J. C. S. ELLIS, Bretton Park, Wakefield. Observed the nests and feeding haunts of 3 pairs from March, 1936, to July, 1937, and a fourth site in 1936. These sites were on Viscount Allendale's estate, strictly preserved for game in 1936, not so in 1937. The sites were worked with great thoroughness and with the friendly collaboration of the keepers. Every possible hole was explored, the observer being obliged sometimes to use his fingers as pincers to procure the material therein. Every problem was tackled in the field and discussed by correspondence. Every feather found was examined and identified either by the analyst or at the British Museum. The sites in Haigh Wood, Bretton Park, Hoyland Bank and Estate Office were all the same type of country, and the nests in the first three were in an oak near a running stream or swamp. The fourth nest was not found, though the site was clearly a feeding haunt. One site was 400-500 yards from the Pheasant field, 1936; two were  $\frac{1}{2}$  to  $\frac{3}{4}$  mile and the fourth was on the edge of it.

20. MISS FALWASSER, Barnsley. In May and June, 1936, collected pellets and food remains from two Little Owl haunts, *i.e.*, at Kexborough and Cannon Hall Park, near Barnsley. These remains showed a preponderance of rodents.

21. MRS. AYRE, Gornal (Dudley). Made observations from April to December, 1936. Was impressed by fact that the young birds followed the cattle as they moved to fresh grazing, finally returning with the cattle. Sent many pellets from and under nest. "The Owls are on the edge of the Black Country. On three sides are slag heaps. Their field is the beginning of open country towards Shropshire. Himley Hall is a mile away. Domestic fowl are reared 50 yards from the nest, a few ducks 200 yards away. Also there are three Partridge nests within a radius of 50 yards from the pellet tree." The Owls' nest was found in a tree in the same place, just after this was written.

#### THE GAME-CHICK AND POULTRY INVESTIGATION.

##### (PART 2.)

The investigation consisted largely of the examination of the gizzards of Little Owls shot on game estates (see Table 3). The results are shown in Table 6. Nest or larder contents and pellets were sent from three new localities and from four of the 1936 sites.

The laboratory work in Part II was of a very intensive character. An extremely close search was made with the help of the microscope and reagents for possible hidden traces of game or poultry chicks.

TABLE 3.  
DETAILS OF INQUIRY. PART II.

<i>County, District, Sender.</i>	<i>Type of Country.</i>	<i>Material sent for Analysis.</i>
Bucks., Olney. Miss G. Savory.	Grass and woodland. Many wild partridges. A few pheasants.	Pellets.
Cheshire, Wimslow. Mr. E. Cohen.	Farmland, with lap- wings, partridges, snipe, etc.	Pellets and material from "larder".
Cheshire, Nr. Macclesfield. Mr. R. E. Knowles.	Game Estate, (Swythamley).	1 Gizzard.
Derbyshire, Radburne. Capt. W. K. Marshall.	Radburne Hall Estate. No preserving but wild game near nest site.	Pellets and nest material.
Essex, Harold Wood. Mr. R. Warren.	Border of game estate.	Nest material.
Gloucestershire, Lechlade. Mr. H. L. Elwell.	Ampney St. Peter Game Estate.	19 Gizzards.
Herefordshire, St. Weonards. Mr. S. C. Denison.	Treago Castle Game Estate.	2 Gizzards.
Hereford, Garway. Brig.-Gen. T. H. F. Bate.	Game Estate.	3 Gizzards.
Leicestershire, Osgathorpe. Mr. C. H. Smith.	Poultry Farm.	Records of nesting season.
Middlesex, S. Harrow. Mr. G. A. Shave.	—	1 Gizzard.
Shropshire, Bridgnorth. Miss F. Pitt.	Pheasant and par- tridges preserved and poultry reared within $\frac{1}{4}$ mile from field containing nest, site near a 30-acre wood.	2 Gizzards. Pellets from nest.
Shropshire, Wellington. Mr. A. O. Rolls.	Apley Castle Estate (much wild game).	Pellets.
Surrey, Old Woking. Mr. D. G. Pumfrett	Nest in tree in damp meadow. Wild game abundant.	Nest clearance and pellets.
Surrey, Limpsfield. Mr. K. R. Chandler.	Nests in wooded country. Some wild game.	Nest clearance and pellets.
Yorkshire, Wakefield. Mr. J. C. S. Ellis.	Bretton Park Estate.	Pellets and full records of observations.

The general features of the three kinds of material collected for analysis, *i.e.*, pellets, nest and larder contents and gizzards are now described.

#### PELLETS.

A pellet or food-casting consists of the indigestible parts of the food which are evacuated from the gizzard (stomach) by way of the gullet and bill. A typical owl pellet consists of a neat packet of such objects as fur, feather, bones and the hard chitinous parts of insects.

Typical Little Owl pellets ( Plate ) are from 3-4 cm. long by 1.3 cm. wide ( $1\frac{1}{4}$ - $1\frac{1}{2}$  by  $\frac{1}{2}$  inch). They are sometimes considerably shorter or longer but the girth is always much the same. Autumn pellets, composed almost entirely of insects, are frequently over 5 cm. (2 inches) whereas soil pellets containing earwigs, etc., are often less than 3 cm. They are usually rounded at the ends, though occasionally one end is narrowed almost to a thread. As this is very usual with Kestrels' pellets, great care has been taken and if more than one pellet in a batch has shown this feature, the set has been rejected, unless it came direct from a Little Owl's nest. Pellets of the Kestrel have a narrower girth than those of Little Owl and are usually harder and more compact.

No confusion is likely between the pellets of Little Owl and those of any bird except Kestrel. The Little Owl has been found only rarely to swallow stones and never more than one or two. Pellets containing stones have, therefore, all been rejected as those of Crow, Jackdaw or Magpie. Pellets of other species of owls are invariably larger both in girth and length and so gave no trouble, though they were frequently sent as those of Little Owl. ( Plate. )

A typical pellet weighs 1.2 to 1.3 grams. It was interesting to find that this was the case, whatever were the constituents. Exceptionally large or small pellets naturally varied slightly from normal weight. All the batches were thoroughly dried and the weights recorded, but as no useful purpose has apparently been served by so doing, the weights are omitted from the Report.

The appearance of a pellet foreshadows its probable contents. A *rodent or bird pellet* is grey and soft. Frequently the fur or feather is so comminuted that it requires a microscope to detect its structure. More often it is distinguishable at once, though both fur and feather may be present in the same pellet. A *game or poultry chick pellet* is quite unlike one composed of any other kind of bird. The absence of grey feather

and the presence of light-coloured down produces a light yellowish brown pellet, different in aspect from all others. Such was the case with all results of the Zoo and Guildford experiments (described later) and with the two pellets from Mildenhall containing a wild game-chick. The down in all these pellets formed a close envelope unlike the soft grey covering found in those composed of other birds.

*Insect pellets* are either wholly composed of chitinous fragments, in which case they are dark in colour and loose in texture, or more often the beetles, etc., are embedded in a matrix of dung, soil, moss or grass. Usually a rodent and bird pellet also contains fragments of beetles.

To get an accurate numerical record it is necessary to analyse any one gathering from the same site as a batch, not individually. Especially during the nesting season, the jaws of a mouse, for example, may be found in one pellet, the bones in two others and the fur in several. Very careful sorting and pairing have had to be done. Diagnostic parts that are usually present, such as the jawbones and tibia of mammals, humerus and femur of birds, femurs of *Geotrupes* (dor beetle), heads of carabids and staphylinids, elytra and thorax of *Agriotes* (click beetle) have been collected from any one batch, compared with other parts present and then counted. Birds in pellets present a difficulty in that the bill and quills are seldom swallowed, hence though easily recorded as "birds" the species can sometimes not be named. But during the nesting season, the remains of the same bird were generally found in nest, larder and pellets and were therefore identifiable by matching bones in pellets with wings and quills in the other places. A Little Owl usually has more than one pellet-evacuation site. Mr. J. F. Thomas had several for each of the three Little Owls he observed. He visited the spots twice weekly, often saw the bird and frequently found Little Owl feathers amongst the pellets. Occasionally he found some at the base of a post from which he knew that the bird watched for prey. He writes: "Genuine Little Owl pellets are always found under perches with a distinct view, in fact, now when looking for pellets, I disregard all places except where a branch runs parallel to the hedge giving a view of the open. Mr. A. Grant-ham gives a lucid account of the method by which pellets can be located. "In each case I have seen the birds in the locality during the day and have proved that when seen like this they are never far from their general haunts. The next point is to locate the nearest group of large and partly decayed trees. Then a very close search of the ground beneath these usually

results in the finding of pellets. The enclosed pellets are the result of several weeks study in this method as I saw a Little Owl a few weeks ago  $\frac{1}{4}$  mile from the actual spot I visited yesterday. It led me to discover some old elms and a grass paddock at the rear of a house. I obtained permission to search beneath these trees and found besides these pellets, the nesting hole containing young birds. I found no pellets around the nesting tree but beneath trees in close proximity.'

(The sitting bird and nestlings evacuate into the nest itself, hence the difficulty of some workers in finding pellets beneath the nest. Also, midsummer herbage often hides any that may have been dropped below the tree.)

During August and September young birds apparently drop pellets on any spot whilst hunting. Large insect pellets of young birds can be found daily on a field in Girton during these months and there are similar records from elsewhere.

#### PERIODICITY OF PELLET-EVACUATION.

To this problem there is no certain solution to offer. No observer has been able to watch a Little Owl in the act of ejecting a pellet. Mr. J. F. Thomas found six pellets in seven days in a shed on the Downs in March, but others may have been evacuated elsewhere and as the bird deserted the spot no further records were made. Mrs. Babb collected pellets at Shaugh from the same place daily for many weeks, but the young had left the nest, so it was impossible to gauge how many birds were responsible. Captive Little Owls have been proved to evacuate one (or two small ones) daily. From the scanty traces of food in many of the gizzards of birds shot by day, it seems likely that a pellet is evacuated after the night's feeding and before the bird becomes inert by daylight. The immense number of insects that are active by night found in single pellets also suggests that the pellet resulting from the night's feeding is evacuated before day. The number of such insects found in gizzards have only rarely equalled those found in single pellets.

#### NESTS AND "LARDERS".

Some Little Owls take their larger prey to a hole, such as a rabbit burrow, tunnel among tree roots or a hole in a tree stump and there prepare it for the young. Wings and portions of the bodies of birds and mammals are usually found in such holes. They are known as "larders" but they appear to be primarily used for "carving" purposes. As the freshly procured food is sometimes found in it awaiting use, the term

"larder" is partly suitable but it does not appear to be used for food storage. This subject will, however, be dealt with later in the Report.

Other Little Owls appear to take their food direct to the nest, possibly because there is no suitable hole near at hand. In such cases the nest contents consist of three layers:—

(1) The fresh or partly used rodent and bird food.

(2) Below this are the wings, tail quills and legs of birds (occasionally a beak or head), bones of mammals and frogs and elytra of cockchafers and dor beetles.

(3) Reaching to the base is a thick layer of debris representing the crushed pellets and faeces, sometimes of more than one season, mixed with woody fibre and humus.

It is impressive that in the nest and holes are found the remains of larger prey than usually occur in food castings at other times of year, *e.g.*, large rats and medium-sized rabbits. The largest birds recorded in 1936, namely Mistle-Thrush and Lapwing, also occurred during the nesting season only. Even the beetles, found in large numbers in nest debris, are mostly large species. Cockchafers and dor beetles are the most frequent and stag beetles are not uncommon locally. No proof has been found in the nest contents that delicate food in the form of passerine nestlings, chicks or young rodents is taken by preference as food for the young. All is grist that comes to the mill and the larger the grist the better. Such is the evidence of the nests and larders.

The contents of a nest are not a pleasant sight. One bird makes a big splash and a mass of wings, feathers and legs looks more like a shambles than it really is when pieced together. The following lists of nest contents (Table 4) may be taken as typical of those of most nests, for there is little variety in the food remains found in any of them.

*"Roughage."*

Strange objects are frequently found in nests and holes, such as horse, cow and goat hair and tufts of feathers of adult poultry fowls. These have probably been collected as "roughage" to clean out the gizzard and to provide the pellet matrix when soft food, such as earthworms, has been used.

It is well known that captive birds of prey must be provided with such objects for health's sake. The presence of a few feathers of large birds in nests and holes when there are no other traces in the form of bones, legs or heads can only be accounted for in this way. For instance, pigeon's feathers are easily obtained almost anywhere on the ground and the

TABLE 4.  
CONTENTS OF EIGHT NESTS.

	Lavenham (Suffolk)	Little Burstead (Essex)	Old Woking (Surrey)	Limpsfield (Surrey) Nest 1	*Shanklin I. of Wight	*Radburne (Derby)	*Beidnorth (Shropshire)	Limpsfield (Surrey) Nest 5
Dates of Clearance	May 16 " 27	June 6 " 20	June 21 " 29	July 7	June 1 1936	May to June, 1937	June 24 1937	June 18 1937
<i>Mammals :</i>								
Rabbit ...	—	2	—	1	—	—	—	1
Rat ...	2	1	1	1	—	—	—	1
Mouse ...	14	—	1	6	1	3	—	1
Vole ...	5	4	3	9	2	2	1	1
Shrew ...	3	1	2	1	—	—	—	—
Mole ...	—	—	1	—	—	—	2	—
<i>Birds :</i>								
Starling ...	7	6	2	5	—	4	1	2
Blackbird	—	3	1	2	—	—	1	1
Song-Thrush	1	2	2	1	1	—	1	1
Mistle- Thrush...	1	—	—	—	—	—	—	—
House- Sparrow	1	2	—	—	—	—	—	—
Chaffinch...	1	—	—	—	—	—	—	—
Skylark ...	1	—	—	—	—	—	—	—
Jay ...	—	1	—	—	—	—	—	—
<i>Reptiles &amp; Amphibians :</i>								
Lizard ...	—	2	—	—	—	—	—	—
Frog ...	—	—	Many	1	—	—	—	—
<i>Insects and other</i>								
<i>Invertebrates</i>								
Melolonthids	—	—	39	64	12	7	8	27
Scarabæids	3	2	1	34	2	10	7	11
Staphylinids	—	1	7	—	—	—	—	—
Carabids ...	61	24	40	52	—	—	—	7
Necro- phorids	—	1	8	2	—	—	—	—
Elaterids	6	2	—	7	2	—	—	—
Curculionids	15	—	9	8	4	—	—	—
Millipedes	Many	—	—	Many	—	—	—	—
Woodlice	Many	—	—	Many	—	—	—	—
Earthworms	Many	Many	—	Many	—	—	—	Many

\* Only the upper layer of this nest was collected.

remains of a plucked chicken, so often found near a farm, provide good material for "roughage".

It is clear that nest holes and larder holes should be studied together if an accurate estimate of the food is to be obtained. In most cases the observers have found and cleared both. In such cases the analyst has had to be careful not to count the same bird or rodent twice or even three times. The wings of a bird are frequently found in a larder, the tail quills, legs and sometimes head in the nest and the smaller feathers and bones in pellets in or under the nest. In the same way parts of the carcass of a large rat may be left in the larder, other parts in the nest, whilst some of the bones, including the jaws, may occur in pellets. The parts of the larger prey must therefore be very carefully pieced together. Another difficulty is that feathers undergo rapid deterioration in the nest and may become frayed and discoloured very rapidly, due to both mechanical and chemical action within the nest.

The presence of birds' wings in the nest does not always mean that no larder hole has been used. Mr. C. H. Smith records for the pair under his close observation: "I have been watching the nest hole and also the larder every day. As the four young birds are nearly a fortnight old, all the food is now taken direct to the nesting hole. There has been nothing in the larder for the last four days." He had found that during the earlier stages, including incubation, the larder had been largely used for carving purposes. Certainly in this case the use of a larder marked the earlier stages of breeding. When the parents became extremely busy the food was taken direct to the nest.

#### THE NEST AFTER THE NESTING SEASON.

The nesting hole continues, at least with some Little Owls, to yield food remains after the young birds have left it. A Limpsfield nest, for instance, that was thoroughly cleared on July 7th showed on September 4th this remarkable assemblage:

Rabbits, 1; Rats, 4; Mice, 5; Voles, 3; Shrews, 2; Starlings, 3; Blackbirds, 1; Song-Thrush, 1; Frogs, 1; (Beetles) Melolonthids, 13; Scarabaeids, 4; Staphylinids, 6; Carabids, 829; Necrophorids, 2; Elaterids, 16; Curculionids, 4; Cerambycidids, 7; Lucanidids, 9.

Of the Carabids 705 were the genus *Pterostichus* and almost entirely *P. madidus*.

This list probably marks the transition between the normal food of the nesting season and that of the rest of the year.

It is from August onwards that insects predominate over every other kind of food. It is not known whether it is the juvenile birds or adults or both that use the nest for feeding purposes when its primary function is over nor for how long this practice is continued.

#### GIZZARD CONTENTS. PARTS I AND 2.

A study of the contents of the 51 gizzards examined during the whole Inquiry shows that :—

(1) There is no striking difference to be found in the contents of gizzards sent from all types of country during Part 1 of the Inquiry and those from game estates in Part 2.

(2) There is an increase in the number of small rodents in Part 2 of the Inquiry. This is common to all material received in 1937, including the districts from which material was also sent in 1936.

(3) One only of the 51 gizzards contained a pellet ready for evacuation, 25 contained enough fresh material to justify the conclusion that a pellet was in process of formation. The other 25 were practically empty. A few particles, mere "left-overs" from the last evacuation, sometimes enabled identifications to be made. Examples of such fragments were the rostrum of a weevil, one pincer of an earwig, the scales of a moth, a few rodent hairs and feather barbs.

Thus there is but little evidence to be obtained from these gizzard contents that the Little Owl is a great day feeder. Nor can these 51 Little Owls, judging from the nature of their last meal, be considered as specially partial to game-chicks or to birds of any kind. But in the opinion of the writer, gizzard evidence though helpful is less satisfactory than that from nests and pellets, as it is limited to the evidence from the last meal only.

TABLE 5.

#### GIZZARD CONTENTS. INQUIRY PART I. FEBRUARY, 1936 TO 1937.

<i>County and Locality.</i>	<i>Sender, Date, Sex of Little Owl.</i>	<i>Gizzard Contents.</i>
1. Bucks. (Newbury).	G. Brown. Feb. 1st. ♂	Contained 1 pellet composed of 6 earwigs, 4 larvae, 2 <i>Chrysomela</i> , 1 <i>Pterostichus madidus</i> , 3 <i>Staphylinus aeneocephalus</i> . Moss.
2. Cheshire (Warrington).	Prof. R. Newstead Feb. 13th ♀	(Killed by telegraph wires.) 2 Field voles (4 lower jaws, etc.). (Analysed by sender.)

County and Locality.	Sender, Date, Sex of Little Owl.	Gizzard Contents.
3. Bucks. (Newbury).	G. Brown. March 13th. ♀	8 beetles (4 <i>Geotrupes</i> , 1 <i>Nebria brevicollis</i> , 1 <i>Staphylinus aeneocephalus</i> ). Fragments of a Little Owl's feather.
4. N. Wales (Corwen District).	Prof. R. Newstead. April 13th. ♀	1 Field vole. Elytra of <i>Aphodius</i> and <i>Agriotes</i> sp. (Analysed by sender.)
5. do.	do. April 13th. ♀	Remains of 1 Meadow-Pipit. Several elytra <i>Aphodius</i> sp. (Analysed by sender.)
6. Wilts. (Aldbourne).	Capt. W. Brown. May 11th. ♀	4 Woodlice. 1 <i>Geotrupes</i> . 3 Weevils. Other beetles. Setæ of earthworm.
7. Bucks. (Newbury).	G. Brown. May 11th. ♂	102 earwig pincers (51 insects.) 7 <i>Pterostichus madidus</i> , 10 <i>Harpalus æneus</i> , 1 <i>Staphylinus olens</i> .
8. Northumberland (Gunnerton).	J. Russell Goddard. May 25th. ♀	1 Starling (adult), (sacrum, broken bones, 1 foot, feathers from breast).
* 9. do.	do. May 25th. ♂	2 <i>Pterostichus</i> sp., 1 <i>Nebria brevicollis</i> , 1 <i>Amara</i> sp., 1 <i>Geotrupes</i> .
10. Cambridge-shire (Girton).	N. King. June 1st. Nestling of about 10 days.	Full gizzard. Chiefly cockchafer and <i>Geotrupes</i> , 2 fragments of bone. Moss. Much sand. (Found dead below nest.)
*11. Essex (Chelmsford).	Miss D. J. Brooks. June 19th. ♂	Head and scales of moth. A few hairs of bat. Gizzard empty except particles on walls.
12. Monmouth-shire (Abergavenny).	D. Carter. July 11th. ♀	3 large caterpillars and some small ones, 12 <i>Pterostichus</i> , 1 <i>Carabus violaceus</i> , 1 cockchafer. (Killed by car.)
*13. Kent (Stockbury).	K. Humphries. August 7th. ♀	9 beetle fragments (1 <i>Geotrupes</i> , 2 Carabid, beetles, etc.)
*14. Bucks. (Newbury).	G. Brown. Sept. 3rd. ♀	Millipede rings, 1 earwig, 1 <i>Geotrupes</i> , 2 Carabids, 1 <i>Staphylinus aeneocephalus</i> . (Very small remnants.)
15. N. Wales (Corwen District).	Prof. R. Newstead. Oct. 3rd. ♀	Filled with remains of insects, 215 earwig pincers, <i>Pterostichus</i> sp. <i>Geotrupes stercorarius</i> , grass. (Analysed by sender.)
*16. Bucks. (Newbury).	G. Brown. Oct. 20th. ♂	Empty except 1 Little Owl feather.
*17. Bucks. (Newbury)	G. Brown. Oct. 20th. ♂	17 earwig pincers (9 insects), 1 <i>Pterostichus</i> , 1 <i>Staphylinus aeneocephalus</i> (very small remnants.)
*18. do.	do. Nov. 11th. ♀	Empty.
*19. do.	do. Nov. 11th. ♂	Mouse fur and bone fragments, 1 earwig (pincers). (Very small remnants.)

\*Empty or with mere traces of food.

<i>County and Locality.</i>	<i>Sender, Date, Sex of Little Owl.</i>	<i>Gizzard Contents.</i>
*20. Nottinghamshire (Bingham).	R. E. Knowles. Jan. 7th. ♂	3 earwigs (pincers and fragments), 2 <i>Phytonomus punctatus</i> , vegetable matter. (Grit with insect particles.) Feather of Little Owl (broken up.)
*21. do.	do. Jan. 9th. ♀	"Nothing save elytra of <i>Amara apricaria</i> and fragments of a Staphylinid beetle." (Analysed by H. Britton, Manchester.)
*22. Monmouthshire (Wyestone Leys).	Brig.-Gen. T. H. F. Bate. Jan. 14th. ♀	2 weevils, 3 <i>Staphylinus aeneocephalus</i> , 2 other beetles. (Very small remnants.)
23. Suffolk (Saxmundham).	Lord Cranbrooke. Jan. 15th. ♂	1 field mouse (head and shoulders intact. Rest broken up. Stomach of mouse full of corn) 8 larvæ.
*24. Dorset (Beaminster).	Miss G. Lister. Jan. 23rd. ♀	Comminuted beetles. (Analysed by sender).
25. Cheshire (Gawsworth).	R. E. Knowles. Feb. 11th. ♂	1 field mouse (jaws, slice of skull, bones), 1 Carabid, beetles, 1 larva.
RESULTS: Rodents in 5 gizzards. Birds in 2 gizzards. Insects in 21 gizzards.		

TABLE 6.

## GIZZARD CONTENTS INQUIRY. PART II. MARCH, 1937, TO JULY.

<i>County and Locality.</i>	<i>Sender, Date, Sex of Little Owl.</i>	<i>Gizzard Contents.</i>
* 1. Yorkshire (Bretton Park Estate).	J. C. S. Ellis. March 16th. ♂	A few fragments of beetles.
2. Monmouthshire (Wyestone Leys).	Brig.-Gen. T. H. F. Bate. March 31st. ♂	Fragments of 1 rat (medium size), 1 earthworm, 3 <i>Pterostichus</i> .
* 3. do.	do. April 6th. ♂	1 small larva, 1 carabid head. (Very small remnants.)
* 4. Shropshire (Bridgnorth).	Miss Frances Pitt. April 9th. ♀	A few grey down feathers, 1 <i>Geotrupes</i> , 1 larva. (Very little.)
* 5. Shropshire (Bridgnorth).	Miss Frances Pitt. April 20th. ♂	Particles of 2 weevils, several minute larvæ, 4 rodent hairs. (Very small remnants.)
* 6. Gloucestershire (Ampney St. Peter).	H. L. Elwell. April 23rd. ♀	Empty except 3 very minute beetle fragments. (Shot 9 p.m.)
* 7. do.	do. April 24th. ♀	Fur of small rodent, 3 beetles (fragments). (Shot 7 p.m.) (Very little.)

\*Empty or with mere traces of food.

<i>County and Locality.</i>	<i>Sender, Date, Sex of Little Owl.</i>	<i>Gizzard Contents.</i>
* 8. Gloucestershire (Ampney St. Peter).	H. L. Elwell. April 26th. ♀	Empty. (Shot 9 p.m.; bird in poor condition.)
* 9. do.	do. April 26th. ♀	Rodent fur, 1 carabid, particles of beetles. (In good condition.) (Very little.)
*10. do.	do. April 28th. ♀	A very little rodent fur sticking to gizzard wall. (Good condition.)
11. do.	do. April 28th.	Many insect fragments, a little rodent, 6 earwigs (pincers), fur, 3 carabids. (Poor condition.)
12. do.	do. May 1st. ♀	Feather fragments with grey down, 1 field mouse, 1 <i>Geotrupes</i> , 2 small carabids, many beetle fragments.
13. Cheshire (Swythamley Park).	R. E. Knowles. May 6th. ♀	1 shrew, beetle fragments.
*14. Gloucestershire (Ampney St. Peter).	H. L. Elwell. May 7th. ♀	A few beetle fragments, a Little Owl feather. (Poor condition. Shot at 7.30 p.m.)
*15. do.	do. May 7th. ♂	Empty except fragments of one small beetle and a little grit and moss. .3 gram of comminuted whitish feathers. No grey down. No bill or bones. Game-chick? A few carabids.
*16. Monmouthshire (Wyestone Leys).	Brig.-Gen. Bate. May 14th. ♂	No bill or bones. Game-chick? A few carabids.
17. Gloucestershire (Ampney St. Peter).	H. L. Elwell. May 23rd. ♀	A little fur and flesh of small rodent, fragments of beetles, grass and moss. (Shot 12 p.m.)
18. do.	do. May 21st. ♀	Vole (fur, jaws and a few bones.) (Shot 7-8 p.m.)
19. do.	do. May 25th. ♀	Fur and flesh of small rodent, legs cockchafer, fragment of <i>Geotrupes</i> , grass.
20. do.	do. May 25th. Nestling.	Cockchafer and other insects.
21. do.	do. May 25th. Nestlings.	Cockchafer, click beetle, 2 carabids & others.
22. do.	do. June 6th. ♂	Full of cockchafers and 1 <i>Geotrupes</i> .
23. Herefordshire (Treago Castle, St. Weonards).	S. C. Denison. June 10th. ♂	A few small feathers of Black-bird, flesh of same, 11 carabids, 2 click beetles, 1 weevil.
*24. Gloucestershire (Ampney St. Peter).	H. L. Elwell. June 19th. ♂	Fragments of cockchafer. (Very small remnants). (Shot 11 p.m.)

\*Empty or with mere traces of food.

County and Locality.	Sender, Date, Sex of Little Owl.	Gizzard Contents.
25. Herefordshire (St. Weonards).	S. C. Denison. June 29th. ♂	Full of beetles, 23 heads, etc., of small carabids (e.g., <i>Harpalus</i> <i>æneus</i> ), pill beetles, etc.
26. Middlesex (Harrow).	G. A. Shave. June 27th. Fledged young.	2 voles (3 lower jaws & several bones), 1 nestling Lark (legs, 1 wing, feathers), 4 carabids, 1 <i>Geotrupes</i> , grit.

RESULTS: *Rodents* in 11 gizzards.  
*Birds* in 5 gizzards.  
*Insects* in 23 gizzards.

#### FEEDING HABITS OF THE LITTLE OWL.

It is now clear that the pellets, nest and larder contents and gizzards all show that a toll of rodents, birds and insects is taken by the Little Owl. These will be dealt with later in separate sections. The field observers have, however, worked hard to elucidate certain problems in connection with these three important food items, therefore the feeding habits of the Little Owl as observed by them and corroborated in the laboratory will now be discussed.

(1) Does the Little Owl hunt habitually by day as well as by night? Two of the observers have seen it, through field glasses, at various times of day, pick up from the ground objects too small to distinguish. Others have watched in vain to see this. Almost every correspondent who has seen it take a rodent or bird has mentioned 7 p.m. (summer time) as the hour when it became busy. It seems probable that, especially during the nesting season, it frequently picks up small prey, e.g., worms, insects, etc., during daytime but that rodents and birds are procured chiefly in early evening onwards and again near dawn. Weather, abundance or scarcity of food and other factors may cause differences in the behaviour of individuals in this respect. But even Little Owls must sleep some time during the 24 hours and several observers have surprised them whilst doing so during daytime.

#### EVIDENCE OF CORRESPONDENTS ON DAYLIGHT FEEDING.

"They get on the move about an hour before dusk. They seem lazy during the day. I spotted one perched near the trunk of an oak. It was still exactly the same six hours after, and got on the move and alert just as the light was going." (A. O. Rolls, Wellington, Salop).

"I don't know how far day hunting is individual but I think that the great majority do sleep more or less till evening. But

I have seen Little Owls on the alert in trees, pouncing down on some insect on the ground or picking over droppings in the road in the middle of the day." (Rev. F. C. R. Jourdain).

"I am certain the daytime feeding of the Little Owl is over-estimated. I have never once seen anything suggesting it round Bretton." (J. C. S. Ellis).

"I certainly think they do it in summer. What else can they be doing when they sit on rails and small trees on my rabbit warren and keep on going down to the ground and up again? I feel sure that here they feed fledged young in daylight, as I see them fly to the young, which call loudly." (H. F. Witherby).

Mr. C. A. Smith endorses this: "The old birds are to be seen hunting for food all day long now that the young birds are a fortnight old. Before the young arrive they are most active just after daybreak, returning to the trees about 7 a.m. (summer time)."

This problem must remain undecided, but it seems likely that Mr. Smith's experience applies to most Little Owls, namely that the general habit is to hunt very little by day for large prey except during the latter half of the nesting season, when family exigencies force them to be active.

There is also evidence to be found in the food remains that the Little Owl is not a great feeder by day.

(i) Half the number of Little Owls shot during daytime for the examination of their gizzards have revealed either no remains of food or very scanty fragments—mere "left-overs" from the last pellet evacuation (see Section on Gizzard Contents). It seems reasonable to suppose therefore that the pellet produced from the night and early morning food is evacuated before the bird becomes inert in the daytime.

(ii) The entomologists have been impressed by the fact that most of the insects occurring in large numbers in the food remains are species that hide by day and come into the open by night. The writer has walked with a flashlight turned on the ground over a Little Owl's feeding haunt at 11 p.m. *Pterostichus madidus* was running in hundreds and the pellets from that site consisted of little else for several weeks. By day it was difficult to find a single *Pterostichus* on that field.

The matter is important, for if the Little Owl is not a great day feeder, this may partly account for the fact that game and poultry chicks, which are usually under shelter by early evening have seldom been found in the food remains during the years of Inquiry.

(To be continued.)