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## Epping Forest Survey.

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1948.

# The Epping Forest Survey.

SIXTH YEAR.

## Report on the Survey of the Ludgate Plain Area, 1946-7.

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### 1. Introduction.

Ludgate Plain is an open area in the forest surrounded by woodland, and is in what was previously referred to as the "Outer Survey Area," i.e., a circle of one mile diameter centred on the Cuckoo Pits. But whereas the Cuckoo Pits area, surveyed mainly during 1942-4<sup>1</sup>, is deep in the forest and has been extensively dug for gravel, ponds being thus formed, the Ludgate Plain area is on the fringe and has no ponds; it is also much more level and liable to become waterlogged. Both areas are named on the 6-inch Ordnance Survey Map. The object in making a survey of Ludgate Plain and its surroundings was mainly to compare it with the Cuckoo Pits area, and it is on the basis of such a comparison that the present report has been prepared. Unfortunately, it has not been possible to study as many aspects of the ecology of the area as was done at Cuckoo Pits, but some effort has been made to work out better techniques for study, as will be evident particularly in the section dealing with birds.

Once again, the survey has been a team-effort, although the team has rather dwindled in numbers. Messrs K. W. Bourne, P. Day, J. H. G. Peterken, J. Ross, E. A. Round, P. F. C. Rumsey, D. G. Tucker, and A. C. Wheeler have been the mainstays of the work, and the responsibilities in preparing the report are as follows:—Sections 2, 3 and 4—D. G. Tucker; Section 5—J. Ross; Map—K. W. Bourne and D. G. Tucker.

### 2. General Description of Area.

The area chosen for survey extends from the boundary of the Forest, running between Ludgate House and the Cuckoo Brook, eastwards and south-eastwards to beyond the further edge of Ludgate Plain. The south-western boundary is the Cuckoo Brook, and the eastern boundary is not closely defined, being intended to include the eastern forest fringe of Ludgate Plain to a depth of say 50-100 yards. The area is thus approximately triangular, including about 20 acres, of which about 3 acres are Ludgate Plain itself. The map shows the main topographical features of the area. (The well-marked tracks shown by double broken

<sup>1</sup> Report on the Survey of the Cuckoo Pits Area, 1942-44," *London Nat.* for 1944, pp. 39-65.

lines have been fairly carefully surveyed; those shown by single broken lines are approximate.) The boundaries are in continuous woodland except that the north-western side is bounded by fields (once grass, but now cultivated), and the short northern edge is bounded by the garden of Ludgate House, a large cottage with some week-end bungalows in its grounds.

It is not possible to divide the area into many distinct vegetation units, so rather more arbitrary and indistinct divisions have been made for reference purposes. These are indicated on the map by dotted letters, and can be scheduled thus:—

- A. Ludgate Plain (except for B).
  - A1. Southern part by brook.
  - A2. The narrow "neck."
  - A3. Main part of Plain.
  - A4. The northern "neck."
- B. Eastern part of Plain, overgrown chiefly with bramble.
- C. Eastern margin of Plain, subdivided to correspond with A.
- D. Western margin of Plain, subdivided to correspond with A.
- E. Eastern woodland:—Subdivided to correspond to slight variations in vegetation, thus:—
  - (E0. Thicket at north, largely blackthorn).
  - E1. Northern part with beech but little hornbeam.
  - E2. Middle part with hornbeam but no beech.
  - E3. Southern part with both beech and hornbeam.
- F. Western woodland, fairly uniform but somewhat thinner along the N.W. boundary, subdivided to correspond with A. The woodland just south-west of the brook is designated FO, although not strictly part of the Survey area.

These divisions are not used much in the present report, but are given so that later reference, if required, will be possible. The width of the margins is to be determined by the vegetation itself—blackthorn, rose, and perhaps also hawthorn, being the typical marginal vegetation dominants.

The area as a whole is fairly level, and can get considerably waterlogged after rain. In a wet season some years ago, the plain was relieved by driving a plough approximately by the western side of the main track, and blinks, *Montia fontana* L., has occurred there. The soil is somewhat finer than that in the Cuckoo Pits Area, and a sample from 3 inches depth in the centre of A3 gave the following analysis:—

Organic matter .....	27%	
Coarse sand .....	27%	
Fine sand .....	26%	
Silt and clay (mostly silt) .....	20%	
Water lost on air-drying .....	158%	Percentage of dry weight.
Water lost on heating over steam .....	10%	Percentage of dry weight

The sample was collected some hours after rain, and it is evident that the waterholding capacity of the soil is high. Pear Tree Plain (area M of the Cuckoo Pits Survey) had only 29% (6 hours after rain) and sand comprised 73% of the dry weight, there being only 4% silt and clay.

The vegetation shows no significant differences from that of the comparable portion (area M) of the Cuckoo Pits Area as far as it is possible to judge without quantitative data. It has not been thought worth while to prepare complete lists of the plant species in these circumstances. In any case, small differences in the vegetation could hardly be regarded as of ecological importance in view of the large factor of chance which must necessarily influence a stationary population of plants—in contrast with the considerable elimination (certainly a very large reduction) of the influence of chance in taking averages of many observations on a mobile population such as the birds.

The distribution of the more important plant species is shown on the map by the use of initial letters which correspond to the following names:—

I = <i>Ilex Aquifolium</i> L.	Ca = <i>Carpinus Betulus</i> L.
Pr = <i>Prunus spinosa</i> L.	Q = <i>Quercus Robur</i> L.
R = <i>Rubus fruticosus</i> L. (agg.).	F = <i>Fagus sylvatica</i> L.
Ro = <i>Rosa canina</i> L. (agg.).	Je = <i>Juncus effusus</i> L.
Cr = <i>Crataegus monogyna</i> Jacq.	D = <i>Deschampsia caespitosa</i> Beauv.
Ep = <i>Epilobium angustifolium</i> L.	Ho = <i>Holcus lanatus</i> L.
Sa = <i>Sambucus nigra</i> L.	Fe = <i>Festuca ovina</i> L. (agg.).
Ga = <i>Gallium saxatile</i> L.	Pt = <i>Pteris aquilina</i> L.
Cn = <i>Cnicus</i> spp.	

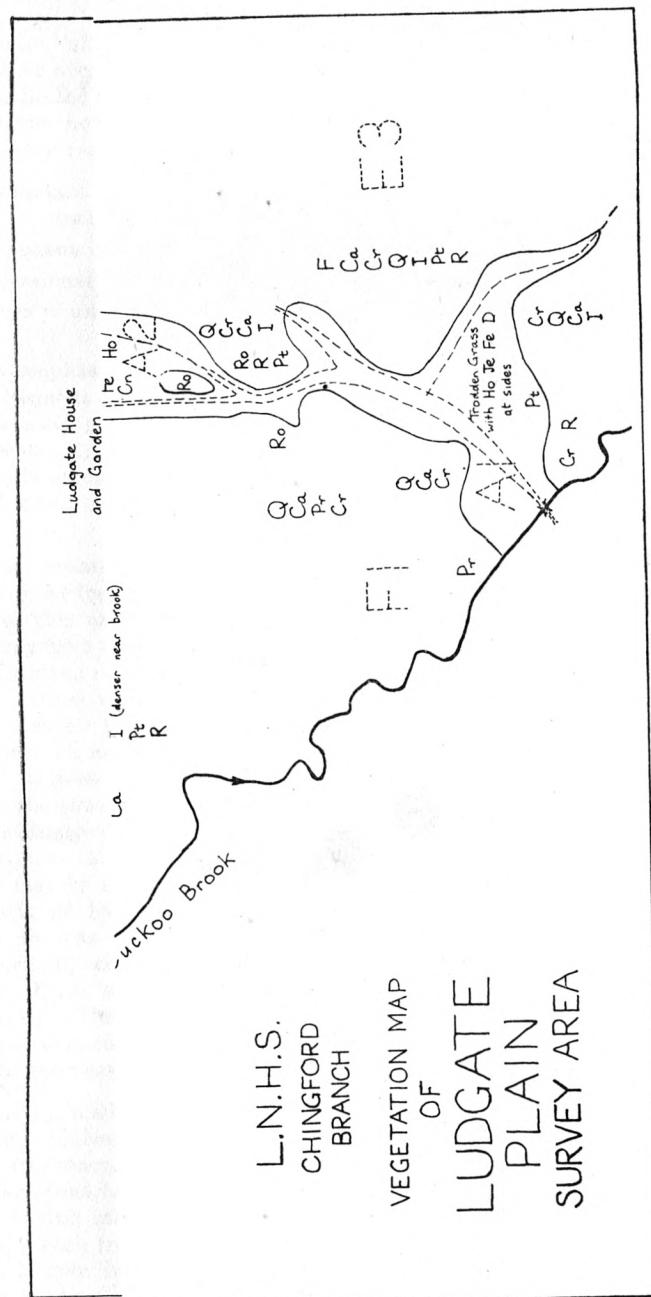
These are used on the map in approximate order of abundance.

As far as mosses and liverworts are concerned, Mr Peterken reports that these are generally similar to those of the Cuckoo Pits area, and no species have been found at Ludgate Plain which did not appear at Cuckoo Pits, nor are there any significant omissions from the Ludgate Plain list.

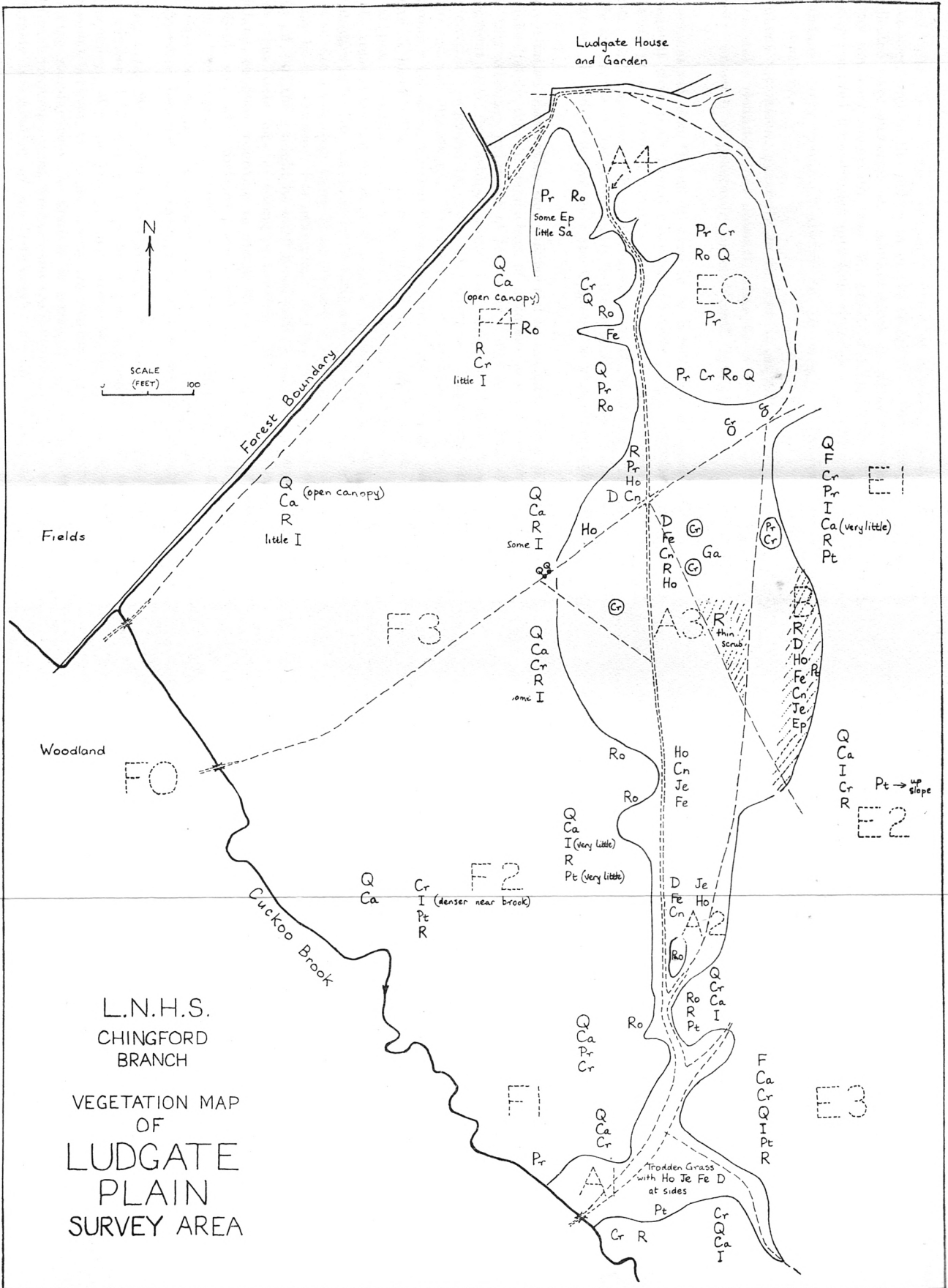
Mr Ross reports on Mycetozaa thus:—"The areas of open plain are not productive of Mycetozaa. Searching among brambles was unproductive. In F3 *Leocarpus fragilis* (Dickson) Rostafinski was found; this species was not reported in the survey of Cuckoo Pits. A few years ago *Badhamia utricularis* (Bulliard) Berkeley was found emerging from the bark of hornbeam logs (see *Lond. Nat.* for 1945, p. 71); three such situations were near the Ludgate Plain area, and one perhaps was in E2. The logs lying in the F sections are very often old oaks without bark and yield little except in the most favourable conditions; because of the very restricted rainfall after July, 1947 was a very adverse time for these organisms."

### 3. Birds.

In the study of the Cuckoo Pits area, 1942-4, the birds were studied by the simple but crude process of noting what was seen while walking



L.N.H.S.  
CHINGFORD  
BRANCH  
VEGETATION MAP  
OF  
LUDGATE  
PLAIN  
SURVEY AREA



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about and, after three years, compiling a list of species in order of abundance according to the judgment of the recorder. Of course, the notes collected were numerous and contain much information, but this was mostly not very important from the point of view of the survey. The species recorded were divided into four abundance groups:—

A = abundant = very common, always to be seen in considerable numbers.

F = frequent = common, generally to be seen in numbers.

O = occasional = definitely not unusual, often to be seen.

R = rare = unusual, of practically no ecological significance.

It was emphasized that O and R were to be interpreted as somewhat more frequent than their literal meaning indicates. The distribution among these groups worked out thus:—A, 3 species; F, 9 species; O, 27 species; R, 19 species. This distribution suggests that the O group was made too large—it comprises nearly half the total number of species. The R group should be larger than the O group to give reasonable results.

When detailed observation was commenced at Ludgate Plain it was found immediately that a comparison of different areas made on the basis of this arbitrary judgment of frequency would be of little value. The judgment of O, for instance, might have changed, different people were involved in the judgment, it was all too vague. Therefore a sample count method was introduced. The observer walked slowly over a fixed route through the area, writing down every bird seen or heard reasonably near at hand. The route was designed to sample the whole area as far as possible without too much risk of counting the same birds twice; the time taken was fixed at 50 minutes approximately. The rule for deciding whether or not to count a bird was—do not record a bird which is so far away that there is no chance of detecting other birds which may be in between. For example, a Jay can be seen or heard a long way off, but there might be small birds such as warblers in between which one has little hope of seeing or hearing. This rule in practice, in woodland, confines recording to about 30 yards on each side of the route. Birds seen at a distance were noted only to complete the list of species. The counts were made by observers working singly. There are discrepancies among the results obtained by the four or five different observers, but these are thought to be only secondary effects.

Having made 20 or 30 counts through the year, we can take the average number of birds of each species seen on one count as the index of its frequency. We can then say that species having an average number per count between two given limits are frequent, or occasional, etc. Once having standardized the method of counting and the numerical range of each frequency class, we can compare different areas on a sound basis, largely independent of the individual ideas of the various different workers.

Various numerical ranges have been tried on available Epping Forest data, and the most satisfactory scheme appears to be

- A, more than 4 per count on average.  
 F, 1.75-4 per count on average.  
 O, 0.5-1.75 per count on average.  
 R, less than 0.5 per count on average.

This, in effect, gives a range of two or three to one to each of the first three groups. It means that a species seen only once every other time is classed as rare. This is probably sound from the ecological point of view, although obviously controversial. An acceptable alternative nomenclature might be "Usual" and "Occasional" in place of "Occasional" and "Rare" respectively.

As regards the number of species in each group, this works out as follows:—

Abundance.	At Ludgate Plain.	At Highams Park. <sup>2</sup>
A	6 species.	7 species.
F	4	2
O	13	6
R	29	20

This is obviously not unreasonable, and is certainly better than the Cuckoo Pits grouping.

In spite of the difficulties in comparing Cuckoo Pits results with others because of the lack of a numerical basis of assessment of frequency, it is still very striking how closely the more common species agree in their frequency designation—see Table 1.

Species.	Ludgate Plain.	Cuckoo Pits.	Highams Park.
Great Tit	A	A	A
Blue Tit	A	A	A
Starling	A	F	A
Chaffinch	A	F	A
Crow	A	F	O*
Blackbird	A	A	A
Wren	F	F	O
Robin	F	F	F
Woodpigeon	F	O	A*
Greenfinch	O	O	A*
House Sparrow	O	Absent	A*

Only four species among these more common ones (they are marked with an asterisk) present inconsistencies. The high figure for Crow at Ludgate Plain may be an effect of the proximity of the open fields. The queer results for Woodpigeon and Greenfinch are to a large extent accounted for by a seasonal unbalance in the number of counts made; these species are of the order of 4 to 8 times more common in winter than in summer, and there is a preponderance of spring and summer counts at Ludgate

<sup>2</sup>See D. G. Tucker, "The Mammals and Birds of Highams Park," *London Naturalist* for 1946, No. 26, pp. 109-116.

Plain. The results for House Sparrow are easily explained by the proximity or otherwise of houses.

One or two differences among the O and R species which are evidently attributable to the proximity of fields at Ludgate Plain are shown in Table 2:—

TABLE 2.

Species.	Ludgate Plain.	Cuckoo Pits.	Highams Park.
Green Woodpecker	O	R	R
Skylark	R	Absent	R (one record)
Turtle Dove	R	Absent	Absent

For the most part, the results are what would naturally be expected; this is, of course, a satisfactory conclusion. A full statement of the numerical abundance of each species, based on 20 counts during 1946\*, with notes where necessary, is given in Tables 3-5, and Table 6 indicates those species which were present at Cuckoo Pits although absent from Ludgate Plain. The total number of species recorded for Ludgate Plain in one year was thus 54, compared with 60 at Cuckoo Pits over the three-year period. Gulls flying over are excluded in both cases.

TABLE 3.

SPECIES "ABUNDANT" AND "FREQUENT" AT LUDGATE PLAIN.

Species.	Average No. per count at		Remarks.	
	Ludgate Plain.	Cuckoo Pits.		
A at Ludgate Plain.	Great Tit	9.0	A	
	Blue Tit	5.3	A	
	Starling	5.3	F	High figure for L.P. due to flock on 2.6.46.
	Chaffinch	4.7	F	
	Crow	4.4	F	
	Blackbird	4.2	A	A rather conspicuous bird. This may have caused C.P. assessment to be high.
F at Ludgate Plain.	Wren	2.9	F	
	Robin	2.6	F	
	Woodpigeon	2.5	O	High figure for L.P. due to flock of 22 on 30.6.46. Would have been 1.3 without this flock.
	Jay	1.9	F	

\*Actual dates of counts:—Jan. 15, Mar. 3, Apr. 28 (3 counts), May 26, June 2 (2 counts), June 30 (3 counts), July 28 (2 counts), Aug. 2, 4, 12, Sept. 8, 27, 29 and Oct. 5. Thus Winter was rather poorly represented. Over half these counts were made by Mr A. C. Wheeler.

TABLE 4.  
SPECIES "OCCASIONAL" AT LUDGATE PLAIN.

Species.	Average No. per count at		Remarks.
	Ludgate Plain.	Cuckoo Pits.	
Willow-Warbler	1.6	O	
Jackdaw	1.4	Flying over	Due to open border of
Rook	1.3	only.	L.P.
Coal Tit	1.4	F	
Whitethroat	1.1	O	
Marsh Tit	1.0	F	
House-Sparrow	0.8	Absent	Due to Ludgate House.
Long-tailed Tit	0.8	O	
Greenfinch	0.75	O	
Chiffchaff	0.7	O	
Song Thrush	0.6 (?)	O	Data not certain.
Greater Spotted Woodpecker	0.55	O	
Green Woodpecker	0.5	R	Due to open border of
			L.P.
Little Owl	0.5	Absent	

(14 species)

TABLE 5.  
SPECIES "RARE" AT LUDGATE PLAIN.

Species.	Average No. per count at		Remarks.
	Ludgate Plain.	Cuckoo Pits.	
Hawfinch	0.3	F	
Tree-creeper	0.25	O	
Mistle Thrush	0.25	O	
Turtle Dove	0.2	Absent	Due to open fields at L.P.
Meadow Pipit	0.15	R	
Nuthatch	0.15	R	
Blackcap	0.15	O	
Redstart	0.15	O	
Nightingale	0.15	R	
Swallow	0.15	O	
Swift	0.15	O	
Redwing	0.1	O	Figure for L.P. fails to allow for winter flocks.
Hedge-Sparrow	0.1	O	
Bullfinch	0.05	O	
Tree Pipit	0.05	R	
Pied Wagtail	0.05	R	
Goldcrest	0.05	O	
House Martin	0.05	O	
Nightjar	0.05	R	
Lesser Spotted Woodpecker	0.05	R	
Cuckoo	0.05	O	
Tawny Owl	0.05	O	
Sparrow Hawk	0.05	O	
Common Heron	0.05	R	
Stock Dove	0.05	R	
Goldfinch		Absent	
Yellow Bunting	Recorded,	R	
Skylark	but not on	Absent	
Mallard	counts.	O	
Woodcock		R	

(30 species)

TABLE 6.  
SPECIES "ABSENT" AT LUDGATE PLAIN BUT "PRESENT" AT CUCKOO PITS.

Linnet.	Lesser Whitethroat.
Reed Bunting.	Fieldfare.
Grey Wagtail—seen only at ponds in C.P.	Kestrel.
Willow-Tit—probably a matter of identification?	Lapwing—regularly seen in fields adjacent to L.P.
Garden Warbler.	Moorhen—due to ponds in C.P.
	Pheasant.

#### 4. Other Vertebrates.

Vertebrates apart from birds were merely recorded as observed, without any special searching or systematic counts. Thus the frequency given below is weighted very heavily by the factor of conspicuousness.

Apart from the wild animals, Ludgate Plain is visited by humans, dogs, cats, horses and cattle, and these form the most numerous group of vertebrate animals, other than birds. Their "abundance" is approximately the same as at Cuckoo Pits, except that cats do not appear there, but is too variable and too low for their effect on the rest of the community to be readily ascertained. During 16 bird counts at various times of the day and week, 185 humans, 18 dogs and 19 horses were observed, with no cats or cattle.

The wild vertebrates observed in 1946 were as follows, with total number observed shown in brackets:—

Grey Squirrel (22), *Sciurus carolinensis* Gmelin.  
Rabbit (13), *Oryctolagus cuniculus* (L.).  
Whiskered Bat (5), *Myotis mystacinus* (Kuhl.).  
Pipistrelle Bat (3), *Pipistrellus pipistrellus* (Schreber).  
Bank or Field Vole (2), *Clethrionomys glareolus britannicus* (Miller) or *Microtus agrestis hirtus* (Bellamy).  
Noctule Bat (1), *Nyctalus noctula* (Schreber).  
Stoat (1), *Mustela erminea stabilis* Barr.-Ham.  
Mole (1), *Talpa europaea* L.  
Grass Snake (1), *Natrix n. natrix* (L.).  
Frog (1), *Rana t. temporaria* L.  
Fallow Deer (1), *Dama dama* (L.).  
In addition, a Hare, *Lepus europaeus* L., was seen in 1947.

The most striking difference between this list and that for Cuckoo Pits is the absence of the red squirrel at Ludgate Plain. Other differences are very unimportant.

#### 5. Plant Galls.

Neither 1946 nor 1947 was a favourable period for the observation of oak galls in the Ludgate Plain area, which because of its exposure to the north is vulnerable to northerly winds. If such winds bring late frosts in May the oaks, or most of them, suffer severely, especially

as regards the male catkins on which many galls occur; this occurred in 1946. In 1947 because of the long and severe winter the occurrence of oak galls seemed to be restricted throughout the area. As the days arranged for members to visit the area in company were often inclement in the matter of weather the time devoted to searching was limited, particularly in 1947. In past times some oaks in the sections C3, FO, F1, F3 and F4 had given much better results than in the past two years. Trees in F1 and C3 bore galls of *Andricus seminatiois* Giraud some years ago, but the trees on the eastern margin of B suffered from a fire. In area B there is now a fair growth of *Epilobium angustifolium* L., and on these plants galls of *Perrisia epilobii* F. Löw were found and contained larvae; this gall has not been recorded for the Cuckoo Pits area. *Nepeta hederacea* Trev. grows in some quantity near Cuckoo brook in F2 and F3, and on these plants occurred galls of *Liposthenes latreillei* Kieffer and *Oligotrophus bursarius* Bremi. The Cynipid gall on ground ivy is now usually attributed in Britain to *L. latreillei*, although it cannot be distinguished from that of *Aylax glechomae* L.; attempts to breed flies from the Ludgate Plain galls were unsuccessful. The small galls of *Neuroterus schlechtendali* Mayr (possibly the alternate form of *N. aprilinus* Giraud) were found in F1, and insects bred from them; this gall was not recorded from Cuckoo Pits. The oak-apple gall (*Biorhiza pallida* Olivier) was rare in Epping Forest in 1947; one or two were seen in F4.

### The Climate, 1947.

By H. HAWKINS.

(Observed at 119 Beresford Road, Chingford.)

#### General Remarks.

**1947** WAS notable for the prolonged cold spell from January to March, and the unusually fine summer in July, August and September. From January 17th to March 8th ground frosts occurred every night, with two periods of seven and twelve days when the temperature was continuously below freezing point. Normal rainfall fell, mostly as snow, which remained on the ground most of the time.

A heat wave occurred at the end of May, and new temperature records were made for the time of year.

August for once justified its title of holiday month, with plenty of sunshine and almost no rainfall.

With an October nearly as dry, the annual rainfall of 20.22 inches came well below the Chingford average of 24.92 inches.

The table gives a summary of the year's figures. Definitions of terms, and information on the instruments used, may be found in the 1944 Report (*Lond. Nat.*, No. 24, 1945, p. 36).

Month	BAROMETER.			TEMPERATURE (degrees Fahr.).						GRASS.			RAIN.			THUNDER GALES, STORMS, FOG.			
	Max.	Min.	Avg.	Max.	Min.	Avg.	Daily Range.	Avg.	Max.	Min.	Avg.	Amt. Inches.	No. of Rainy Days.	Wet Days.	No.	No.	No.		
Jan.	30.35	29.20	29.84	39.97	30.10	35.03	9.87	42	46	-2	25.87	1.77	17	12	6	—	—	6	
Feb.	30.10	28.80	29.61	32.57	26.46	29.50	6.11	30	35	6	25.39	1.39	10	6	1	—	—	1	
Mar.	30.0	28.85	29.44	46.29	34.42	40.35	11.87	38	45	13	31.00	5.19	24	19	6	—	—	1	
Apr.	30.50	29.25	29.81	58.03	40.76	49.39	17.27	43	50	22	36.33	1.78	11	10	12	—	—	—	
May.	30.00	29.40	29.69	67.74	48.00	57.87	19.74	48	53	37	44.80	0.90	14	8	1	—	—	—	
June.	30.05	29.15	29.61	72.16	53.26	62.71	18.90	51	62	37	49.20	2.38	11	10	3	4	—	—	
July.	30.10	29.90	29.74	74.42	57.29	65.85	17.13	42	58	44	51.22	0.05	2	—	1	—	—	—	
Aug.	30.30	29.60	30.05	78.68	56.26	67.47	22.42	39	58	59	46.23	1.57	11	7	1	—	—	3	
Sept.	30.55	29.80	30.06	71.70	51.36	61.53	20.34	46	52	32	38.35	0.18	5	2	—	—	—	6	
Oct.	30.50	29.80	30.22	59.26	42.58	53.92	16.68	40	52	18	35.6	0.90	14	7	3	—	—	2	
Nov.	30.45	29.55	29.98	49.80	38.83	44.31	10.97	38	57	43	34.61	2.37	20	13	6	—	—	1	
Dec.	30.70	29.10	30.07	44.97	37.35	41.16	7.62	33	43	19	34.61	20.22	149	104	41	11	—	—	22
Year.	30.70	28.8	29.84	57.96	43.05	50.76	14.9	81	62	-2	39.41	20.22	149	104	41	11	—	—	22