

The flora of walls in south-eastern Essex

R. M. PAYNE

49 Galton Road, Westcliff-on-Sea, Essex

ABSTRACT

The flora of 650 walls in south-eastern Essex is analysed, with emphasis on the relative frequency of species on walls of different kinds. Comparisons are made with other surveys of wall-flora.

AIM AND SCOPE OF THE SURVEY

During the four years 1973–1976, I kept 650 walls and series of walls in south-eastern Essex under observation, with the primary aim of discovering the relative frequency of different species of flowering plants and ferns in such habitats. The area covered was that part of S. Essex, v.c. 18, roughly east of a line running south from Chelmsford through Billericay to Tilbury.

Of the 650 walls surveyed, 278 (43%) were urban garden walls (or series of walls), 182 (28%) were churchyard walls, 47 (7%) railway walls, 41 (6%) walls of secular buildings other than railway buildings, 44 (7%) retaining walls (including some also in the other categories) and 79 (12%) walls in relatively rural areas (other than churchyard, railway and retaining walls). River and sea walls were wholly excluded. Separate lists were made of the species found on these different types of walls.

Little attention was paid to the composition of walls, because, apart from some church walls of Kentish ragstone, almost all walls in south-eastern Essex are made of bricks. The size of the task and limitations of time precluded consideration of ecological factors (aspect, shade, adjacent vegetation, etc.).

NOTES ON THE METHODS USED

The unit for the survey was either a single wall or a series of adjacent walls of similar construction and age. Thus in churchyards the stone fabric of the church and the brick perimeter wall of the churchyard would be treated as separate units.

Each wall included in the survey supported at least one plant at some time during the four years, and each was visited at least twice, at different seasons, though most of the walls were visited much more often.

Plants growing at the extreme base of a wall were ignored, since these would probably be rooted in the ground and therefore not truly rupestral. Similarly, wall-tops with an obvious accumulation of soil were excluded from the survey.

On garden walls, all plants not likely to have been deliberately planted were included. It was of course usually practicable to list only the plants growing on the outside of garden walls, to which species of horticultural origin would be likely to have spread by natural means.

THE FLORA IN GENERAL

A total of 286 species was recorded, of which 83 (29%) were probably or certainly of horticultural origin; included in this category are not only obvious garden escapes such as *Aster* cf. *novi-belgii*, *Campanula portenschlagiana* and *Linaria purpurea*, but also such species as *Tanacetum parthenium*, *Fagus sylvatica*, *Polystichum setiferum* and *Sorbus aucuparia*, which are either not native in south-eastern Essex or, as wall plants, are highly likely to be derived from garden specimens.

Of the 286 species, 200 (70%) were found on fewer than ten of the 650 walls, 164 (57%) on fewer than five walls, and indeed 85 (30%) on only one wall. The order of frequency of the 47 species which occurred on at least 5% of the walls is shown in Table 1.

TABLE 1. PERCENTAGE OCCURRENCES ($\geq 5\%$) ON ALL WALLS

* of garden origin		† status doubtful	
<i>Poa annua</i>	54	<i>Phyllitis scolopendrium</i> †	9.5
<i>Sonchus oleraceus</i>	35	<i>Lamium album</i>	9.1
<i>Senecio vulgaris</i>	33	<i>Capsella bursa-pastoris</i>	8.9
<i>Epilobium adenocaulon</i>	32	<i>Sagina apetala</i>	8.5
<i>Senecio squalidus</i>	29	<i>Epilobium angustifolium</i>	8.3
<i>Hedera helix</i> †	27	<i>Acer pseudo-platanus</i>	8.0
<i>Dryopteris filix-mas</i> †	22	<i>Anthriscus sylvestris</i>	7.4
<i>Antirrhinum majus</i> *	20	<i>Sedum acre</i> †	7.2
<i>Sambucus nigra</i>	19	<i>Hordeum murinum</i>	6.9
<i>Corydalis lutea</i> *	18.3	<i>Campanula portenschlagiana</i> *	6.9
<i>Mercurialis annua</i>	18.2	<i>Poa pratensis</i>	6.8
<i>Sagina procumbens</i>	18.2	<i>Pteridium aquilinum</i>	6.6
<i>Cymbalaria muralis</i>	17.4	<i>Lolium perenne</i>	6.2
<i>Lamium purpureum</i>	16.6	<i>Poa angustifolia</i>	6.2
<i>Urtica dioica</i>	16.0	<i>Agropyron repens</i>	6.0
<i>Taraxacum officinale</i> agg.	15.7	<i>Ballota nigra</i>	6.0
<i>Stellaria media</i>	14.6	<i>Conyza canadensis</i>	6.0
<i>Rubus fruticosus</i> agg.	14.5	<i>Euphorbia pepus</i>	6.0
<i>Bromus sterilis</i>	14.3	<i>Holcus lanatus</i>	6.0
<i>Veronica sublobata</i>	14.3	<i>Aster cf. novi-belgii</i> *	5.7
<i>Galium aparine</i>	11.9	<i>Centranthus ruber</i> *	5.7
<i>Arrhenatherum elatius</i>	11.7	<i>Convolvulus arvensis</i>	5.2
<i>Dactylis glomerata</i>	11.4	<i>Plantago lanceolata</i>	5.1
<i>Poa trivialis</i>	10.3		

Table 2, which is based on a similar table published by Kent (1961), compares the frequency of the 20 commonest wall plants in the present survey with the frequency of some of them as recorded in wall surveys in Middlesex, the London area, Durham and Cambridge.

Poa annua stands out as the predominant species in four of these lists, but other plants show remarkable dissimilarities in frequency. Durham might be expected to have a different flora from Essex, being 350 km to the north and with a colder, wetter climate. Indeed, nine species among the commonest 14 on Durham walls (Woodell & Rossiter 1959) do not appear in Table 2: these are *Epilobium angustifolium*, *Dactylis glomerata*, *Epilobium montanum*, *Acer pseudo-platanus*, *Lolium perenne*, *Plantago lanceolata*, *Poa pratensis* agg., *Rumex obtusifolius* and *Senecio jacobaea*. (The last-named was found on only four walls in south-eastern Essex). Species prominent in the Cambridge survey (Rishbeth 1948) but considerably less so in south-eastern Essex are *Festuca rubra*, *Arenaria serpyllifolia*, *Tanacetum parthenium*, *Acer pseudo-platanus*, *Capsella* and *Epilobium angustifolium*. Of the two segregates of *Arenaria serpyllifolia* in Essex, I found *A. leptocladus* twice as frequently as *A. serpyllifolia* (as did Grose (1957) on Wiltshire walls); neither occurred on urban garden walls. *Epilobium adenocaulon* has clearly increased enormously in south-eastern England even in the 15 years since the Middlesex survey, when both *E. angustifolium* and *E. montanum* were much commoner wall species. The high figures shown for *Corydalis lutea* reflect the greater proportion of garden walls in the Essex survey. *Mercurialis annua* and *Veronica hederifolia* agg., neither of which figures prominently in any of the other surveys, are abundant urban weeds in south-eastern Essex. All rupestral specimens of the latter that I examined appeared to be the segregate *V. sublobata*, which Kent (1975) states to be also the usual Middlesex plant.

TABLE 2. PERCENTAGE OCCURRENCES IN VARIOUS SURVEYS OF THE 20 COMMONEST SPECIES IN THE PRESENT SURVEY

	650 Essex walls	500 Middlesex walls	72 London walls	66 Durham walls	Cambridge walls*
<i>Poa annua</i>	54	48	37.5	40	(1)
<i>Sonchus oleraceus</i>	35	18.6	12.5		
<i>Senecio vulgaris</i>	33	9.2	13.9	28	(8)
<i>Epilobium adenocaulon</i>	32	4			
<i>Senecio squalidus</i>	29	25	22.2		
<i>Hedera helix</i>	27	2			
<i>Dryopteris filix-mas</i>	22	34.8	27.8		
<i>Antirrhinum majus</i>	20	7	4.2		(4)
<i>Sambucus nigra</i>	19	5.6	1.4	41	(7)
<i>Corydalis lutea</i>	18.3	2			
<i>Mercurialis annua</i>	18.2	0.2			
<i>Sagina procumbens</i>	18.2	17.4	9.7		
<i>Cymbalaria muralis</i>	17.4	23.6	6.9		(5)
<i>Lamium purpureum</i>	16.6	2			
<i>Urtica dioica</i>	16	4			
<i>Taraxacum officinale</i> agg.	15.7	12.6	11.1	64	(2)
<i>Stellaria media</i>	14.6	3.6			
<i>Rubus fruticosus</i> agg.	14.5	1.6		23	
<i>Bromus sterilis</i>	14.3	2			
<i>Veronica sublobata</i>	14.3	0.6			
Total number of species	286	204	83	168	186

* order of frequency

Table 3 lists the commonest species on each of the six types of walls studied. In each column only those species which occurred on at least 20% of the walls are included.

URBAN GARDEN WALLS

150 species were recorded from garden walls in built-up areas, a surprisingly large number perhaps partly accounted for by the prevalence in the Southend conurbation of burr walls, i.e. brick walls made of clinkers, which provide a more favourable habitat for seedlings than the conventional smooth brick wall. Among native plants particularly associated with urban garden walls were *Mercurialis annua* (86% of its sites), *Epilobium montanum* (73%), *Euphorbia peplus* (69%), *Veronica sublobata* (67%) and *Lapsana communis* (60%); all except *Lapsana* are common garden weeds in this area. It is perhaps surprising that as many as 47% of the sites for *Pteridium aquilinum* were walls of this type, since this is neither a garden plant nor a common garden weed. *Calystegia silvatica*, slightly commoner throughout the survey than *C. sepium*, was predominantly (86%) a plant of urban garden walls, whereas *C. sepium* occurred equally on urban and rural walls.

CHURCHYARD WALLS

Although churchyard walls in south-eastern Essex tend to be rich in numbers of species (160 species in total), I have not found such a marked disparity between these and other walls as Kent (1964) noted in Middlesex, where he ascribed the disparity partly to a colonizing of churchyard walls from relict populations of wild plants still growing in the churchyards though extinct in the surrounding urban areas. This is probably because even now south-eastern Essex is, on the whole, more rural than Middlesex. Nevertheless, the following 13 species were seen only on churchyard walls during the present survey: *Cynosurus cristatus*, *Fragaria vesca*, *Fraxinus excelsior*, *Ligustrum vulgare*, *Oxalis*

exilis, *Potentilla sterilis*, *Ranunculus repens*, *Raphanus raphanistrum*, *Ribes nigrum*, *Sonchus arvensis*, *Tussilago farfara*, *Urtica urens* and *Veronica agrestis*. In addition, five species were found mainly on churchyard walls: *Glechoma hederacea* (84% of its sites), *Symphoricarpos rivularis* (75%), *Parietaria diffusa* (67%), *Potentilla reptans* (61%) and *Veronica chamaedrys* (57%).

I am uncertain to what extent *Hedera helix* is a genuine rupestral plant; I endeavoured to record it only where it appeared to be rooted in a wall, but whether it can survive indefinitely without contact with the ground may be doubted.

It is interesting to compare the fern flora of these Essex churchyard walls with that of similar sites in Norfolk, which were investigated by Silverwood (1965). The most striking difference is the much greater frequency of *Polypodium* in Norfolk. In his survey, Silverwood found ten species of ferns, of which *Polypodium vulgare* agg. was slightly more numerous than *Dryopteris filix-mas*, the other species in order of decreasing frequency being *Phyllitis scolopendrium*, *Asplenium adiantum-nigrum*, *Asplenium ruta-muraria* and *Asplenium trichomanes*, with *Polystichum aculeatum*, *P. setiferum*, *Ceterach* and *Pteridium* all very scarce. In the rather drier and much more polluted south-eastern Essex, I found eight species on church walls, of which *Dryopteris filix-mas* was much the commonest, followed by *Phyllitis*; considerably rarer were *Asplenium adiantum-nigrum*, *A. ruta-muraria*, *Polypodium* and *Pteridium*, with *Asplenium trichomanes* and *Dryopteris dilatata* very scarce. As I suggested in an earlier paper (Payne 1960), the retention of its fronds by *Polypodium* throughout the year may make it less able to withstand pollution than some other ferns: sulphur dioxide pollution is known to be more intense in the autumn and winter months.

TABLE 3. PERCENTAGE OCCURRENCES ($\geq 20\%$) ON DIFFERENT TYPES OF WALLS

	Urban Garden Walls	Church- yard Walls	Railway Walls	Retaining Walls	Rural Dividing Walls	Walls of Buildings
<i>Poa annua</i>	73	26.4		39	73	44
<i>Senecio squalidus</i>	36.3		45	36	28	46
<i>Sonchus oleraceus</i>	50		26	25	43	24
<i>Epilobium adenocaulon</i>	36.0			32	47	41
<i>Senecio vulgaris</i>	48	20		23	43	
<i>Hedera helix</i>		52	21	25	28	
<i>Dryopteris filix-mas</i>	23				24	56
<i>Arrhenatherum elatius</i>		24.7	30	32		
<i>Urtica dioica</i>		25.3		23	37	
<i>Lamium purpureum</i>			23	32	27	
<i>Rubus fruticosus</i> agg.		27	30	23		
<i>Sambucus nigra</i>		25.8			24	22
<i>Dactylis glomerata</i>			23	25	23	
<i>Bromus sterilis</i>				20	28	
<i>Taraxacum officinale</i> agg.				23	24	
<i>Lamium album</i>			21	23		
<i>Antirrhinum majus</i>	41					
<i>Corydalis lutea</i>	38					
<i>Mercurialis annua</i>	36.3					
<i>Cymbalaria muralis</i>	29					
<i>Capsella bursa-pastoris</i>					28	
<i>Galium aparine</i>					27	
<i>Pteridium aquilinum</i>						27
<i>Phyllitis scolopendrium</i>			26			
<i>Sagina procumbens</i>	22					
<i>Veronica sublobata</i>	22					
<i>Poa angustifolia</i>			21			
<i>Sagina apetala</i>					20	
<i>Stellaria media</i>					20	

RAILWAY WALLS

Railway walls proved to have a more distinctive flora than those of churchyards. Of a total of 110 species, the following 15 were found only on railway walls (which comprise both dividing and retaining walls, as well as walls of stations and other railway buildings): *Bromus ramosus*, *Cardamine flexuosa*, *Ceterach officinarum*, *Epilobium lanceolatum*, *Equisetum arvense*, *Heracleum sphondylium*, *Hieraceum perpropinquum*, *Inula conyza*, *Pastinaca sativa*, *Senecio erucifolius*, *Sinapis arvensis*, *Smyrniolum olusatrum*, *Solidago canadensis*, *Leucanthemum vulgare* and *Triglochin maritimum* (on a bridge over a brackish dyke). In addition, 75% of *Stellaria holostea* sites were railway walls, as were 69% of sites for *Asplenium trichomanes* and 60% for *Artemisia vulgaris*.

Senecio squalidus is revealed as the railway wall plant *par excellence*, but a remarkable absentee from this column of Table 3 is *Poa annua*, which was recorded from only 13% of railway walls. Yet grasses in general, mainly perennial species, were found to occupy six of the top 22 places, compared with only two (both annuals) in the overall list, doubtless because of the proximity of grassy railway banks to most of these wall sites. Ferns are also prominent, *Dryopteris filix-mas* surprisingly ranking below four other species. *Asplenium adiantum-nigrum*, though occurring in slightly fewer sites than the other two Spleenworts, is much more numerous where it does occur, hundreds of plants growing on the brick walls of several bridges over the derelict Woodham Ferrers—Maldon line which opened in 1889 and closed in 1939, an interesting parallel to Cambridgeshire, where Walters (1969) records an old railway wall containing 'hundreds of plants . . . more than all the other Cambridgeshire sites put together.'

Of the 47 walls in this category, ten were on derelict lines, and on the whole these had the more varied flora, presumably because they were subject to less disturbance; indeed, every piece of railway brickwork examined on the long-abandoned Maldon line produced plants, whereas very many walls and bridges on active lines were quite barren (and therefore excluded from the survey).

RETAINING WALLS

This category, with a total of 114 species, overlaps with railway walls, and very slightly also with churchyard and garden walls. It supported ten species not found on dividing walls: *Bromus ramosus*, *Cardamine flexuosa*, *Carex divulsa*, *Ceterach officinarum*, *Equisetum arvense*, *Heracleum sphondylium*, *Polygonum cuspidatum*, *Senecio erucifolius*, *Smyrniolum olusatrum* and *Leucanthemum vulgare*. Eight of these were in fact confined to railway retaining walls. As Woodall & Rossiter (1959) remarked, it is difficult to determine whether a plant on a retaining wall has extended its roots through to the soil behind. *Equisetum arvense* and *Polygonum cuspidatum* must be particularly suspect here.

RURAL DIVIDING WALLS

This category comprises walls surrounding country estates and large gardens in semi-rural areas, farmyard walls and other walls outside the built-up areas. It does not include any churchyard, railway or building walls.

This is another category with a rich (154 species) and distinctive flora. No less than 18 species were found only on these walls, those marked * being of horticultural origin: *Asparagus officinalis**, *Cerastium semidecandrum*, *Erodium cicutarium*, *Fagus sylvatica**, *Geranium dissectum*, *G. lucidum*, *G. pusillum*, *Matricaria recutita*, *Papaver argemone*, *Pentaglottis sempervirens**, *Phleum bertolonii*, *Ribes rubrum**, *Rubus laciniatus**, *Spergularia rubra*, *Taxus baccata**, *Tragopogon pratensis*, *Verbascum nigrum* and *Vinca minor**. A further eight species were found predominantly on these rural walls: *Agrostis tenuis* (64% of its sites), *Arabidopsis thaliana* (63%), *Erophila verna* (75%), *Hypochoeris radicata* (57%), *Ilex aquifolium* (67%), *Saxifraga tridactylites* (80%), *Sisymbrium officinale* (54%) and *Vulpia bromoides* (71%).

WALLS OF SECULAR BUILDINGS (other than railway buildings)

Dryopteris filix-mas is the commonest species on walls of this category (80 species in total). *Pteridium* is also frequent and, together with *Buddleja davidii*, *Epilobium angustifolium*, *Lolium perenne*, *Hordeum murinum* and *Conyza canadensis*, was more commonly seen on these than on other walls.

ACKNOWLEDGMENTS

I am grateful to Mr D. H. Kent who kindly read the paper through while it was in manuscript, and to Mr C. E. A. Andrews who identified *Hieracium perpropinquum* for me.

REFERENCES

- GROSE, D. (1957). *The flora of Wiltshire*. Devizes.
KENT, D. H. (1961). The flora of Middlesex walls. *Lond. Nat.*, **40**: 29–43.
KENT, D. H. (1964). Notes on the flora of churchyard walls in Middlesex. *Lond. Nat.*, **43**: 13–16.
KENT, D. H. (1975). *The historical Flora of Middlesex*. London.
PAYNE, R. M. (1960). The ferns of Epping Forest. *Lond. Nat.*, **39**: 25–31.
RISHBETH, J. (1948). The flora of Cambridge walls. *J. Ecol.*, **36**: 136–148.
SILVERWOOD, J. H. (1965). Ferns on church walls in Norfolk. *Proc. bot. Soc. Br. Isl.*, **6**: 120.
WALTERS, S. M. (1969). Cambridgeshire ferns—ecclesiastic and ferroviatic. *Nature Cambs.*, **12**: 22–25.
WOODELL, S. R. J. & ROSSITER, J. (1959). The flora of Durham walls. *Proc. bot. Soc. Br. Isl.*, **2**: 257–273.

(Accepted June 1977)