THE NATURAL HISTORY OF THE SCARBOROUGH DISTRICT

VOLUME ONE

72 Aa
0
SCA

Natural History Museum Library
000002027

SCARBOROUGH

[March 1954]

12, The Close,
Newby.
Scarborough.

British Museum of Natural History,
The General Library,
Cromwell Road,
London. S.W.7.

Dear Sir,

In answer to your letter dated March 17th I have pleasure in sending herewith a copy of Vol.1 Natural History of the Scarborough District. Vol.11, Zoology, should appear about the end of the year.

The work you mention "Complete Flora and Fauna of the Scarborough District" refers to the same book, it was already in active preparation in 1949 and its final title was not settled until later.

Yours faithfully,

F. Cunningham

Joint Editor
Scarborough Field Naturalists' Societ

P.S. We have no regular bulletin or journal yet FC

12, The Close,
Newby.
Scarborough.

British Museum of Natural History,
The General Library,
Cromwell Road,
London. S.W.7.

Dear Sir,

In answer to your letter dated March 17th I have pleasure in sending herewith a copy of Vol.I Natural History of the Scarborough District. Vol.II, Zoology, should appear about the end of the year.

The work you mention "Complete Flora and Fauna of the Scarborough District" refers to the same book, it was already in active preparation in 1949 and its final title was not settled until later.

Yours faithfully,

Joint Editor
Scarborough Field Naturalists' Soci

THE NATURAL HISTORY OF THE SCARBOROUGH DISTRICT

VOLUME 1 - GEOLOGY and BOTANY

WILLIAM SMITH

From a portrait by Forau in the Rooms of the Geological Society of London

See note on page V

THE
NATURAL HISTORY
OF THE
SCARBOROUGH DISTRICT

VOLUME 1 - GEOLOGY and BOTANY

Edited by
G. B. WALSH, B.Sc., and F. C. RIMINGTON, M.P.S.

with a Foreword by
Professor W. H. PEARSALL, D.Sc., F.R.S., F.L.S.,
Quain Professor of Botany in the University of London
at University College

THE SCARBOROUGH FIELD NATURALISTS' SOCIETY
Founded 1889

Set in Linotype Bookprint by S. G. McWhan, Scarborough
Printed and Bound by G. A. Pindar & Son, Scarborough

First Published 1953

CONTRIBUTORS

Professor W. H. PEARSALL, D.Sc., F.R.S., F.L.S.
L. BAIRSTOW, M.A., F.G.S.
P. C. SYLVESTER-BRADLEY, B.Sc., F.G.S.
R. J. R. GIBLETT, M.A., Cantab., F.R.G.S.
DOROTHY PERKINS.

Extract from letter of 31 May 1954 from F. C. Rimington, Joint Editor of The Natural History of the Scarborough District, Vol.I, to L. Bairstow:

"The question of the precise publication date is not easy..... the binders sent me exactly eight copies on or about November 10th last.,"[sic] "but is"[sic] "was almost Christmas before the last copies arrived. We usually say that we published in December 1954" [sic - but obviously a slip for 1953 !] "but a case could be made out for November !"

L. Bairstow,
8 June 1954.

E. A. WALLIS.
G. B. WALSH.
J. WEATHERELL.
Professor E. A. SPAUL (Co-opted).

Set in Linotype Bookprint by S. G. McWhan, Scarborough
Printed and Bound by G. A. Pindar & Son, Scarborough

CONTRIBUTORS

Professor W. H. PEARSALL, D.Sc., F.R.S., F.L.S.
L. BAIRSTOW, M.A., F.G.S.
P. C. SYLVESTER-BRADLEY, B.Sc., F.G.S.
R. J. R. GIBLETT, M.A., Cantab., F.R.G.S.
DOROTHY PERKINS.
F. C. RIMINGTON, M.P.S.
JOYCE ROBERTSON.
HAROLD ROWNTREE.
G. B. WALSH, B.Sc., M.R.S.T.
J. WEATHERELL.

PUBLICATION COMMITTEE

A. J. WALLIS, Chairman.
F. C. RIMINGTON, Secretary.
J. P. BEST, Treasurer.
R. J. R. GIBLETT.
Miss D. PERKINS.
Miss J. ROBERTSON.
H. ROWNTREE.
E. A. WALLIS.
G. B. WALSH.
J. WEATHERELL.
Professor E. A. SPAUL (Co-opted).

NOTE ON FRONTISPIECE

WILLIAM SMITH, 1769-1839.

William Smith, one of the greatest pioneers of modern geology, was born at Churchill in Oxfordshire, the son of the village blacksmith. His father died in 1776, and when his mother re-married, he was left a good deal to his own resources. He taught himself elementary mathematics and surveying, and laid the foundations of his study of stratigraphical geology. As a surveyor he was employed in coal-mining and canal-making and thus gained exceptional opportunities for his great work on the study of the relation of definite fossil species and the strata in which they were found.

From time to time he published treatises and maps embodying the results of his researches. These brought him name and fame but unfortunately money difficulties caused him to lose his home and possessions. After some years of struggle he became (1828-33), land-steward to Sir John Johnstone, at Hackness. Here he thus came in touch with a band of local workers, including William Bean and John Williamson the geologists, and Thomas Hinderwell the local historian. Owing to their efforts the Scarborough Philosophical Society was founded and the Scarborough Museum was built in 1828-29, largely to Smith's design. In 1835, Smith left Hackness Grange and lived in Newborough House in Bar Street, a district long since rebuilt. In 1831 he received the first award of the now coveted Wollaston Medal, and in presenting it, the President, Adam Sedgwick, called him "the Father of English Geology," a title which has clung to him ever since. In 1839, while on his way to a meeting of the British Association in Birmingham, Smith caught a chill and died at Northampton, where he was buried.

FOREWORD

By Professor W. H. PEARSALL, D.Sc., F.R.S., F.L.S.
Quain Professor of Botany in the University of London at University College.

North Yorkshire is a pleasant place and the Scarborough district is not least among its attractions. Here in a compact area are samples of most of what makes North Yorkshire so charming—varied rocks, moors and wolds, valleys and escarpments, woodlands and meadows. The Vale of Pickering has long been numbered among the classical sites in glacial geology and recent excavations at Flixton are yielding revealing information about the early post-glacial period, its flora and fauna. All these things bear on the origins of the present variety and interest of the plant and animal life.

It may seem odd that so interesting a place should have had to wait so long for a description of its biological interests but the pages that follow give some idea of the magnitude of the descriptive task involved as well as of the thoroughness with which it has now been completed.

It is thus a pleasure to commend this work both to naturalists and to the general public. It is a labour of love and one which appears at an opportune moment. If a knowledge of this varied life is useful in interpreting the past, it will be equally useful for comparison with the future. The face of England is rapidly changing. We must envisage much of North Yorkshire being converted to woodland once more, a type of vegetation now sparse after 3,000 years of human activity. We must hope to reproduce the best of the old, the forest that was once there, coupled with a greater soil fertility and a greater productivity. We must not lose sight of the present beauty and variety. When we learn that North Yorkshire is to be scheduled as a National Park, we can congratulate ourselves that now we have the means to sample and understand its natural history. We hope that in the future more attention may be given to its preservation than has always been possible in the past.

PREFACE

For a century and a half Scarborough has been notable for its keen naturalists, some of whom have won national, or even international, fame. Among them have been William Smith, the founder of the science of stratigraphical geology; the botanists (Professor) William C. Williamson and George Massee; the entomologists Robert Lawson, said by E. C. Rye to be the finest beetle-collector in Europe, and Thomas Wilkinson who worked out many hitherto unknown life-histories in the Microlepidoptera; William Bean the conchologist, and in our own time W. J. Clarke, the noted student of marine life.

In 1820 a number of local naturalists mooted the idea of a philosophical society, which was actually formed in 1827 under the presidency of Sir J. V. B. Johnstone, Bart., and in 1829 the rotunda of the museum was opened. In 1858 this society was amalgamated with the Archaeological Society, and in 1861 the wings of the museum were added to the original circular building. In 1889 the Field Naturalists' Society was founded and was finally affiliated with the Philosophical and Archaeological Society.

With many hard-working and competent field-naturalists as members and with equally competent visitors to the town, a considerable body of information concerning the natural history of the district was built up and carefully recorded. In addition much was published in the two organs of the Yorkshire Naturalists' Union—the "Transactions" and "The Naturalist." This information has now been collated and as far as possible checked by able authorities, and forms the subject-matter of the present work. It aims at giving as far as possible a comprehensive and accurate account of the plant and animal life of the district during the years of which we have knowledge, and will thus be available for future generations who may wish to study any floristic or faunistic changes that may take place.

It is probable that data have been missed, but as far as we have been able to check them, any errors of inclusion are due to mistakes in identification which almost inevitably take place at times. The Editor (c/o The Museum, Wood End, The Crescent, Scarborough), will be very glad to receive information as to mistakes and omissions which can then be entered in the Recorders' record-books.

The Society acknowledges the debt of gratitude it owes to the many eminent naturalists who through the years have helped unstintedly in the elucidation of the many problems which have confronted its members. In the compilation of the present volumes we have consulted many authorities and in almost every case we have received cheerful uncomplaining help, even though at times it has involved much work. It is hoped that every such authority has been thanked in the appropriate section, but if one has been omitted, it has been through inadvertence and not to any lack of appreciation of the valuable aid rendered. In particular we would thank Professor W. H. Pearsall of the University of London for contributing the Forward, and Professor E. A. Spaul of the University of Leeds, who has been our guide, mentor and friend from the inception of this work to its completion.

The publication of this book would have been impossible without generous financial assistance from the Royal Society, the Corporation of Scarborough, the Executive Committee of the (late) Scarborough Philosophical and Archaeological Society, and the executors of the late W. J. Clarke.

CONTENTS

FOREWORD—Professor W. H. Pearsall - - - vii

PREFACE—Editorial - - - - - - - ix

THE SCARBOROUGH DISTRICT—G. B. Walsh - - 1

THE GEOLOGY OF THE SCARBOROUGH AREA
R. J. R. Giblett - - - - - - - - - 8

A STRATIGRAPHICAL GUIDE TO THE FOSSIL LOCALITIES OF THE SCARBOROUGH DISTRICT
P. C. Sylvester-Bradley - - - - - 19

FRESH WATER ALGAE—G. B. Walsh - - - 49

ALGAE - DIATOMS—G. B. Walsh - - - - 56

MARINE ALGAE - SEAWEEDS—Dorothy Perkins - 67

FUNGI—F. C. Rimington - - - - - - 81

LICHENS—F. C. Rimington - - - - - - 167

HEPATICAE - LIVERWORTS—Joyce Robertson - - 184

MUSCI - MOSSES—Joyce Robertson - - - - 189

VASCULAR PLANTS—Harold Rowntree - - - 206

HEATHLAND AFFORESTATION IN THE SCARBOROUGH DISTRICT—J. Weatherell - - 286

LIST OF PLATES

I	WILLIAM SMITH - - - - - -	Frontispiece
II	SCARBOROUGH FROM THE SPA -	Facing Page 2
III	SALTERGATE INN AND THE CENTRAL MOORLANDS - - - -	Facing Page 14
IV	THE MOREL (Morchella vulgaris (Pers.) Boud.) - - - - -	Facing Page 90
V	A COMMON PUFFBALL (Lycoperdon perlatum Pers.) - - - -	Facing Page 150
VI	DWARF CORNEL (Cornus suecica L.) -	Facing Page 234
VII	MAY LILY (Maianthemum bifolium (L.) Schmidt) - - - - -	Facing Page 260
VIII	DEEP-PLOUGHED MOORLAND FOR TREE PLANTING - - -	Facing Page 292
	MAP OF THE DISTRICT - - -	End of Book

ACKNOWLEDGEMENTS

The Editors desire to express their grateful thanks to the following for permission to reproduce the photographs which illustrate this book. The Geological Society of London for the loan of the frontispiece block, the Scarborough Corporation (Pl. II and III), the British Muesum of Natural History (Pl. IV and V), Mr. J. P. Best (Pl. VI and VII), and Her Majesty's Forestry Commission (Pl. VIII).

THE SCARBOROUGH DISTRICT

G. B. Walsh

Landwards, the area studied in this survey is roughly circumscribed by a line running from Robin Hood's Bay to Sleights and Goathland, then down Newton Dale to Pickering, and across country to Malton, Weaverthorpe and Flamborough. Seawards, it has no definite boundary, but is more or less delimited by the area fished by the local fishing-boats.

A description of the coast will be found in the Introduction to the paper on " Marine Fauna ".

The land falls very naturally into three main areas—the moors, the Wolds and the Vale of Pickering in between, with the two smaller divisions of the cliffs and the moorland valleys.

The moors occupy the whole of the northern part of the area, rising rapidly from the plain to a height of about 500 feet and then more gradually to a height of about 960 feet in the north of our district. During the Glacial Epoch their surface rose above the ice but was doubtless covered with snow. Whether there were nunataks on which forms of life could persist seems to be very doubtful and conclusions based on the present known distribution of insects and plants on unglaciated areas are likely to be invalidated as knowledge accumulates. As the Ice Age passed away, an elaborate system of lakes and overflow channels followed which gave the moors so much of the characteristic structure and appearance which they have to-day. For an account of this interesting subject the student is referred to the works of Prof. P. F. Kendall and Dr. F. Elgee. For many centuries the moors were fairly thickly populated by prehistoric man who has left many relics of his existence in earthworks, ancient tracks, tumuli (howes), and in tools and weapons. These are still being carefully investigated and many of the results are exhibited in the Scarborough Museum. There are few signs of Roman influence on the moors of our area, the camps at Cawthorn and the road across Wheeldale Moor being just outside our western boundary. For further discussion on the moors the reader is referred to the sections on " Geology ", " Afforestation ", " Flowering Plants " and " Lepidoptera ".

To the south, the Wolds rise fairly steeply on their northern edge. They are characteristic chalk hills with a thin layer of soil, rounded contours and dry valleys. For many centuries they were comparatively thickly peopled by prehistoric man, but they persisted into modern times as dreary wastes which were some of the last haunts in Britain of the wolf and the great bustard. Until the middle of the 19th century they were chiefly sheep-runs until the Sykes family of Sledmere introduced modern farming methods and the Wolds became fertile agricultural land.

Between the moors to the north and the Wolds to the south lies the Vale of Pickering, running east and west. As the Ice Age passed away this area collected the water from the hills all round it and formed "Lake Pickering", which overflowed through Malton Gap and Gilling Gap. Then for thousands of years it formed a sodden marshy tract slowly filling with peat which is now 9-18 feet in depth. It had no roads across it—even in Roman times there was no road from Malton to Pickering, though there was a rough raised causeway from Sherburn to Wykeham. Travellers had to cross by a dangerous track from Staxton to Seamer with the help of guides who lived at the "Hospital" kept by the Knights of St. John at Spital Corner at Staxton; or else they went round by the morainic higher ground that followed the coast from Filey to Scarborough. In 1807 the Hertford River was cut to drain the marshy land and in later years more drainage work, such as the Sherburn Cut, was taken in hand, but even yet this area is a favourite haunt of various species of waterfowl. According to the late Prof. A. Gilligan, through the centuries the sand from the bed of the lake has been driven by the north-west winds to form a sandy area between Flixton and Sherburn on which are the famous Ganton Golf-links, and which yields sand for building purposes. At Star Carr, near Seamer, Mr. J. A. W. Moore has discovered an important Mesolithic lake settlement which is being investigated by Dr. J. G. D. Clark, of Cambridge University, and this may well prove to be the richest settlement of this age in north-western Europe.

These three features, moors, Wolds and Vale of Pickering, run eastwards to the sea, forming very characteristic coast scenery. The Wolds end in the magnificent chalk cliffs of Speeton, Bempton and Flamborough; the culminating point is a nearly perpendicular precipice at Speeton which is upwards of 400 feet high; southwards, the height diminishes until at Flamborough the cliffs are only 150 feet high. They are the breeding haunt of numerous sea-birds, such as guillemots, puffins and kittiwakes, and the eggs are collected during late May and early June, great care being taken not to take so many as to reduce the source of supply. The moors form their highest cliffs at Ravenscar which is upyards of 600 feet above sea-level. There are not the same precipices here as at Bempton, but there is a plant-covered undercliff called Beast Cliff almost untouched by human hand, the home of foxes, badgers and cormorants, and carpeted with ferns and wild flowers. Between these northern and southern cliffs of Ravenscar and Bempton is a stretch of cliffs of varying height with many beautiful bays, as at Scarborough, Cayton and Filey. As a rule the cliffs are relatively low, capped with boulder clay, and in many places, e.g., Hayburn Wyke, Cornelian Bay, Cayton Bay and Primrose Valley, clothed with vegetation.

The last division is the moorland valleys. These are usually glacial overflow valleys, sometimes, as in Newton Dale and to a less extent in Forge Valley, steepsided and of romantic beauty, sometimes of a gentler but still beautiful character as in Thornton Dale

Plate II

SCARBOROUGH FROM THE SPA

By kind permission of the Scarborough Corporation

facing page 2

(Ellerdale), Lowdales, Highdales and Troutsdale. The lower portion of each dale flattens and widens as it approaches the plain, but the steep sides and the narrower upper portion are usually well timbered. Most of these dales formerly formed part of the Royal Forest of Pickering, the greatest forest in Yorkshire, which at the time of the Conqueror was 16 miles long and 4 miles wide. Little by little this was cut down until it disappeared as an entity in the 17th and 18th centuries. Raincliffe Wood, which covers 700-800 acres, is about 3 miles from the middle of Scarborough. It derives its name from Hrafn, who was probably one of the Scandinavian invaders. The oldest record relating to it under its present name is dated 1282, when it probably formed part of the Forest of Pickering; it has apparently been woodland ever since that time. It was more or less replanted about 1860 by the Earl of Londesborough and the only noteworthy old trees in it now are the three oak trees in the middle path through the wood, which are perhaps about 350 years old. After various vicissitudes the wood finally became the property of the Corporation of Scarborough to be preserved in perpetuity as a piece of typical English woodland. The wood is rich in animal and vegetable life, and has many lovely paths.

It will be seen that until fairly modern times each of the great divisions of the district—the moors, the Wolds and the Vale of Pickering, was inhospitable in character. The soil was poor and difficult to cultivate, passage across them was difficult and in early days almost impossible; and so they were, by their very inaccessibility, cut off from the rest of England and from the social and religious changes of the time. Thus the Reformation passed unnoticed in some of the remoter areas, and so we find little nests of the old religion still surviving in secluded spots such as Egton Bridge. Roads were few and far between. The main east and west roads from very early times followed a track between the rough country of the uplands and the marshy country of the plain. In Saxon times little villages were built on these roads, usually where a stream from a valley crossed it; thus on the northern road there are Ayton where the Derwent crosses, Brompton with its springs, and Thornton-le-Dale where Dalby Beck crosses it; Pickering is built on the delta of the glacial overflow stream from Newton Dale; on the road at the foot of the Wolds similar phenomena determine the position of such villages as Flixton and Ganton. In the moorland area there are only two north to south roads, both following high ground—one from Thornton-le-Dale and Pickering to Whitby, and the other from Scarborough to Whitby. Other roads running north from the Pickering Valley lose themselves in the moorland valleys such as Beedale and Sawdondale, or run into a transverse valley such as Troutsdale. The high road from Scarborough to Filey follows the coastal moraine and then passes over the Wolds to Bridlington. In the Wolds themselves there are few north to south roads of any importance.

Even at the present time the district is far from the great centres of population and is sparsely populated, especially in the Pickering Valley and on the high moors, in some parts of which it is possible to tramp for hours without meeting a human being or seeing a sign of human dwelling. The only town of any size is Scarborough (45,000), with far smaller populations at Filey, Pickering and Robin Hood's Bay.

The numerous village names ending in -ham and -ton betoken a strong Saxon element in the population, with a later sprinkling of a Danish element with village names, such as Newby and Scalby, ending in -by. Probably many settlers were Norse or Swedish and there are Norse or Swedish place terms such as " force ", " foss ", " wyke " and " dike ", and village names such as Skelder and Darnholm. Like their Scandinavian ancestors most of the people to-day have grey or blue eyes, they omit the initial aspirate and speak slowly and deliberately.

Great changes are now taking place in the general character of the area, partly as a direct or indirect result of the two wars :—

1. The military have taken many thousands of acres of moorland, such as Fylingdales Moor for practice with artillery or trackless vehicles. The effects of this on the countryside are wholly bad, vegetation is destroyed and so the surface layer is exposed to erosion by wind and water; fires are started which do much damage; owing to the destruction of the plant covering which served as a storehouse for water, rain runs away rapidly instead of being conserved for periods of drought; and many wild creatures of interest to the hiker and the nature-lover, e.g. the grouse and curlew, are being destroyed or driven away.

2. Afforestation is covering much of the moorland with forests of coniferous trees, and though in many ways it is a useful and desirable service, nevertheless it destroys the moors as many of us know and love them.

3. A definite change is taking place in the tree population. Hedgerow timber is being cut down and not replaced. Furthermore, deciduous woodland is being felled, and if replaced at all, supplanted by coniferous forests. This is having a marked influence on the appearance of the countryside and also on the plants and animals that are associated with the different types of woodland. It is an excellent thing that a large area of woodland—mainly deciduous—such as Raincliffe Wood should have been acquired by the Scarborough Corporation, so that future generations may see this type of beautiful English woodland at its very best.

4. Drainage too, is taking away many of the haunts of plant or bird. In an endeavour to prevent floods, rivers are straightened and trees on their banks are removed so that water may get away; whether this is wholly good remains to be seen, for riparian occupiers point

out that trees hold up the banks and that their removal may cause the loss of valuable agricultural land. Drainage in the Vale of Pickering is lowering the water-table, and so rendering more land available for agriculture.

5. Changed agricultural practices are having very pronounced results. The increasing use of the mechanical tractor has rendered possible the cultivation of larger fields; so hedgerows have been destroyed or at any rate cut low, and field margins have been removed. The injurious effects of the removal of the hedgerows, which acted as a wind-break, are seen in pronounced wind-erosion now taking place, and the destruction of hedgerow timber has taken away much of the typically English beauty of the countryside. Mechanical tractors, etc., by destroying nests and nesting birds, are already responsible for the loss to the countryside of the corncrake and the decrease in numbers of the lapwing; and by rendering unnecessary the use of so many horses have lowered the amount of stable manure available for the land, and so have necessitated the increased use of artificials. It is probably too early yet to say whether these will have any injurious effect on farmland, but certainly less humus is available, and it has been pointed out that the increased incidence of certain diseases, for example, club-root, may be due to loss of alkalinity of the soil due to the use of acid manures, such as superphosphate and ammonium sulphate.

6. Finally, the use of tarmac on roads is probably harmful to roadside vegetation and animal life, but it is difficult to say whether its influence is more destructive (though in a different way) than the clouds of dust which used to be raised on the old macadam roads. Certainly there was a period, just after the beginning of the century, when dust was blamed for the destruction of larvae of the tiger moth and drinker moth which were feeding on roadside vegetation. Nowadays there is a certain amount of evidence that they are commoner than they were. Finally. perhaps rain draining from the roads may affect the fish life of the rivers.

The correlative of this at sea is the highly injurious effect of floating oil from the tanks of ocean-going vessels. One effect of this is all too evident in the occurrence of many dead sea-birds which are thrown up on our coasts each year; these have died an extremely painful death due not merely to the coating of oil on the plumage with resulting inability to fly or to keep warm, but also to its actual lethal action on the alimentary canal which suffers extensive injury causing death.

The only information available as to the climate of the district is that kindly furnished by the Borough Meteorologists of Scarborough and Bridlington; owing to lack of equipment similar information was not available for Whitby, nor from the Grammar Schools at Whitby and Pickering. The information received is as follows, the records being the average over a period of ten years :

	Temperature Degress Fahrenheit		Rainfall Inches		Sunshine Hours and Minutes	
	Brid.	Scar.	Brid.	Scar.	Brid.	Scar.
January	43.9	42,9	2.86	1.84	43, 15	44, 00
February	46.2	44.2	2.06	1.61	53, 45	66, 40
March	49.0	47.2	2.75	1.85	100, 15	119, 00
April	56.5	51.0	1.94	1.49	142, 22	156, 00
May	57.3	55.8	1.64	1.89	220, 15	191, 55
June	63.8	61.9	.85	1.89	241, 05	173, 00
July	65.1	65.8	2.01	2.38	202, 20	173, 00
August	69.1	65.4	2.88	2.44	172, 45	165, 55
September	63.0	61.9	2.01	1.71	115, 15	137, 05
October	57.1	54.6	2.91	2.90	104, 03	96, 05
November	49.2	48.6	3.84	2.40	54, 25	51, 00
December	44.6	44.0	1.93	2.33	46, 30	33, 20
Average	55.4	53.6				
Total			27.68	24.73	1496, 15	1407, 00

The dominant wind is the south-west, but in April and early May the north-east often blows for some 4-6 weeks; it is a cold dry wind which causes April to be the dryest month of the year at Scarborough. Bridlington is partially protected from it by the Wolds and by Flamborough Head, whereas Scarborough has no headland to the north and the moors, being further away, afford little shelter; this explains the greater difference in temperature in April between the average temperature at Bridlington (56.5 F.) and that at Scarborough (51.0 F.). On the high moors the wind is very powerful, and so the vegetation is stunted. Moreover, as the cold dry winds blow in spring, they often kill opening buds and young leaves on trees, so that growth is checked on the north and east, and the trees tend to lean over to the land side.

The temperature in the immediate neighbourhood of Scarborough is much influenced by its proximity to the sea, this influence showing itself within about 2-4 miles from the sea; thus in winter the streets in Scarborough may be wet with rain, at the Mere there may be sleet, and at Ayton snow and frost. Conversely, in the summer it may be quite cool by the sea, whereas Ayton is warm. As to the effects of elevation, the temperature falls about 1° F. for every 100 yards of ascent, so that on Fylingdales Moor (960 feet), the mean temperature is about 3.5° lower than in Scarborough.

The rainfall, too, is much influenced by elevation, increasing towards the higher moors. F. Elgee, 1912, " The Moorland of North-Eastern Yorkshire ", p. 59, says, " In the heart of the moorland the rainfall is reported to be as high as 36 inches . . . . over the whole moorland area the average probably lies between 32 and 36 inches, an average of 7 to 11 inches higher than at many places in the plains ".

The lower total hours of sunshine recorded for Scarborough as compared with Bridlington may be occasioned by the close proximity of high hills immediately to the west of the town which, on the average cut off the sunshine about a quarter of an hour earlier each day during the whole of the year.

For a further discussion on the climatic and other ecological factors of the area the reader is referred to the articles on " Afforestation ", " Flowering Plants " and " Lepidoptera ", to F. Elgee (t.c.) and to J. G. Baker, 1906, 2nd edition, " North Yorkshire ".

There are few mineral products of any importance. Sand and gravel, mainly of glacial or river origin, are worked in many places and there are quarries for chalk and for building stone. Jet from the Whitby shales has been used for ornaments since prehistoric times and alum used to be made at the Peak Alum-works just north of Ravenscar, until it was ousted by cheaper foreign material almost a century ago; the works later were used for brickmaking. Surface coal of flood origin is used to a slight extent by local farmers north of Staintondale, but it is of poor quality and of no economic significance; hopes were raised by a deposit of iron ore near Bickley, but it too is only poor in quality and quantity. Peat is used as fuel on many farms and cottages, as are " flaughts " which consist of the top layers of a heather moor. There are large peat workings on the Harwood Dale Moor just north of the Falcon Inn. The area is shown on the map as being about 30 acres, but the area worked is considerably less, probably not more than two or three acres. The peat is 10-14 feet thick and overlies an old forest consisting of Scots pine and birch, the stumps of which are left standing when the peat is removed. Certain people have " rights of turbary " or rights to cut peat, and it has been generally assumed that these are the tenants of the Derwent Estate and certain cottagers in the Harwood Dale area, but apparently there are no records, apart from one appertaining to Murk Head Farm, either to prove or disprove the claim.

In 1950 it has been reported that rich deposits of potassium compounds, chiefly sylvinite (potassium chloride) and polyhalite (a compound sulphate of potassium, calcium and magnesium) have been found in the most northern parts of our area and just outside it. If anticipation is equalled by achievement, this is a fact of profound national and economic significance, but it is far too early yet to say what effect it will have on the amenities of the district or on the distribution and density of population, both natural and human.

Such, in very brief outline, is the district covered by this Survey. Its great variety of ecological conditions has resulted in a very rich fauna and flora, as revealed in the following pages; but the authors and compilers are well aware that future workers still have before them a wide field of investigation, many parts of which have been very inadequately studied or not even touched.

THE GEOLOGY OF THE SCARBOROUGH AREA

R. J. R. Giblett, M.A. Cantab., F.R.G.S.

Geologically, this area of North East Yorkshire is amongst the most interesting in the country ; in fact, there are few areas where the whole sequence of strata throughout the whole era can be studied as thoroughly and in such small compass. The entire Jurassic series from the Lower Lias to the Upper Oolites and above them to the Cretaceous, which succeeded the Jurassic, are to be found within a few miles of Scarborough.

Such an area could not fail to attract geologists, and many whose names are amongst the greatest and whose work has had lasting effect may be recalled. William Smith, "The Father of English Geology," who lived at Hackness, began the work and his results were first published in 1799. His nephew, John Phillips, followed him, and later, Professor Williamson, son of the first curator of Scarborough Museum, continued the study of the region and there were many others. Many books have been written about the district and to these the reader should turn if he wishes to pursue the subject in greater detail. The object of this chapter is to introduce him to the geology of the area against which the Scarborough Naturalists' Society carries out its work. As the underlying rocks determine very largely the soils of the area, except where they are overlain by more recent deposits, such as boulder clay, this district, with its variety of soils, provides a widely differing flora and fauna amongst which the naturalist finds ample material for his observations.

For those not so familiar with this part a brief glance at the purely physical structure may be a useful introduction. From this point of view the area falls into three well defined sections ; the Moors to the north, the Vale of Pickering in the centre, and the Wolds to the south, the whole forming two anticlinal ridges with a faulted synclinal trough between. The Moors have their axis of folding running westwards from Ravenscar, the rocks dipping to the north and south of this axis. The longer slope is to the south where the strata dip beneath the Vale of Pickering, the shorter to the north where it is bounded by a fault along the valley of the River Esk. On the east the arch of the anticline has been cut into by the sea, forming the fine cliffs north of Scarborough, especially at Ravenscar, while to the west it has been deeply dissected into numerous beautiful dales, and at a later date further cut into by glacial action, one outstanding example of the latter being Newton Dale.

The Vale of Pickering, once the bed of a glacial lake, has the flatness of contour which belongs to almost undisturbed sedimentary deposits and exhibits many features which remind one of some parts of the Fen District of East Anglia.

South of the Vale rise the slopes of the Wolds, which, like the Moors, have a southward dip, disappearing finally under the recent deposits of the Humber Plain. The earth movements which produced these folds took place, in all probability, during the Tertiary Epoch, a period of great earth movements which produced many of the great mountain ranges of the world.

THE ROCKS OF THE DISTRICT.

It is difficult to describe in any detail the various rocks to be found in the district. They should be studied either in a museum where they can be seen and possibly handled, or in situ when exploring the district. It may be useful, however, at this point, to give a brief account of the chief features of some of the more widely distributed rocks, which belong, in general, to the Lias and the Oolitic (see table). Of these rocks, the Lias, the earliest, has three divisions :—the Lower, which in its upper part consists of ironstone separated by blue shale and in its lower part of limestones similarly separated ; the Middle series composed mainly of shales and shaly sandstones with nodules of ironstone, which, farther north, give rise to the Cleveland iron ore beds ; the Upper series consists mainly of shales interbedded with limestones or calcareous shales, in the upper part of which is the Alum Shale and in the lower part the Jet Rock. The Jet, which once provided the material for a very thriving industry at Whitby, was formed from vegetable matter in the shale, hardened by the access of air. The Alum Shale was once worked to a considerable extent near Robin Hood's Bay and at Saltwick Nab, near Whitby. The works associated with this mineral were discontinued about 1821. Next in the series and more recent than the Lias come the Lower Oolites, which are, in the main, calcareous rocks, a one-time shallow-water deposit. The limestone of this series is oolitic or pisolitic, i.e. composed of larger pea-sized grains, and showing distinctive current bedding. In fact only the clays appear to have had quiet water conditions for their formation.

It is in Yorkshire that these rocks reach their finest development, and these estuarine deposits are here separated by marine beds, such as the Grey Limestone and the Millepore.

Of these Oolites the Dogger includes beds of sandstone, limestone and shales with concretions to which the name "Dogger" is usually applied. The Estuarines are alternations of shales and sandstone with occasional thin seams of coal ; they are sandy in the lower regions and shaly in the upper. The Scarborough Limestone and the Millepore are the most important of these marine beds. The limestone is not a pure limestone but contains calcareous shales and sandstones. At the top of this comes the Cornbrash, thin bands of ferruginous limestone, rubbly in character, with some calcareous shales at the bottom. The Millepore, often called a limestone, is not, however, a pure limestone, at least where it appears in coastal exposures. It is, in fact, a hard calcareous sandstone. Further inland it does actually become a true oolitic limestone.

These latter beds are separated from the Upper Oolites by the Kellaways, beds of sands and sandstones, upon which lies the Oxford Clay. This is a blue-green or grey clay, yellow and brown at the surface and decidedly shaly at the base, but showing no definite structure in its upper parts. In this district it has lost many of its characteristics and become a greyish sandy shale containing fossils.

The Corallian in this area consists chiefly of calcareous rocks, shelly

limestones and oolites, all showing much current bedding. In addition there are corals, sands and some clays consisting of three sandy series separated by limestone beds, reaching in Yorkshire its greatest thickness in this country. These rocks form the upper levels of the Tabular Hills, sloping from Helmsley Moors, where they rise to just over 1000 feet, to about 290 feet at Gristhorpe Cliffs.

Above the Corallian comes the Kimmeridge Clay, easily distinguishable from the Oxford Clay by its colour—a very dark shaly clay, brown in its upper surfaces, when exposed to weathering.

The chalk of the Wolds, although thinner than that of Southern England, has the same general characteristics, except that no gault or greensand lies beneath it. Instead, there are deposits of Red Clay, the colour being due to iron stain. In Yorkshire this reaches a considerable thickness, but at Speeton Cliff it consists largely of marls and clays, still with the same red colour, and forms the Speeton Clays. The chalk above, especially the Middle Chalk, is generally harder than its southern counterpart, but, unlike it, is quite devoid of flints.

There is only one example of volcanic activity in the area. Across the Moors, north westward from a point near the coast a few miles south of Whitby, runs a dyke of dark bluish-grey andesite, some eighteen to twenty feet wide. This forms a conspicuous ridge in some parts. It is of later date than the Teesdale volcanic, and is probably of Tertiary age.

THE JURASSIC ROCKS.

Upper Oolite		Speeton Clay
		Kimmeridge Clay
		Upper Calcareous Grit
		Upper Limestone
Middle Oolite	Corallian	Middle Calcareous Grit
		Lower Limestone
		Passage Beds
		Lower Calcareous Grit
		Oxford Clay
		Kellaways
		Cornbrash
		Upper Estuarine
		Grey Limestone
Lower Oolite	Inferior Oolite	Middle Estuarine
		Millepore
		Lower Estuarine
		Dogger
		Blea Wyke Sands
	Upper Lias	Alum Shale
		Jet Shale
		Grey Shale
Lias	Middle Lias	Ironstone Series
		Sandy Series
	Lower Lias	Upper with ironstone
		Lower with sand and marl

THE JURASSIC AGE.

The rocks of this district belong to the Mesozoic or Secondary era, the earliest part of which is known as the Triassic, the later as the Jurassic, so named by a French geologist after the Jura Region of France, where the same rocks were studied.

It is on these earlier, or Rhaetic, Beds that the Jurassic Rocks rest in orderly succession. They were formed under marine conditions without any intervening land period, at a time when Britain as we know it to-day did not exist. The Rhaetic Beds had been deposited in an enclosed, almost stagnant, sea which was succeeded by a fresh supply of sea water. This was the beginning of a new era of deposition and of a new phase in the geological history of Britain, the Mesozoic.

The Lower Jurassic Rocks are essentially shales, blue or blue-grey in colour, formed from muds deposited in the new sea, as is happening on the margins of the continents to-day. Yorkshire must have been situated near the shallower margin of this sea, as sands are mixed with the clays, evidence of shoreline conditions where the sea was not very deep.

The Lias began, then, with shallow water deposits, followed by deeper and quieter water conditions allowing the deposition of more muds, the present shales. Another shallow phase followed, during which the sandstones of the Middle Lias were laid down. A deepening of the sea then occurred and the Middle Lias Limestones, formed by the replacement of carbonate of lime by ferrous carbonate, subsequent oxidation converting it to ferric oxide, indicate clear and relatively deep water. These deeper-water conditions undoubtedly continued throughout the Upper Lias which is, in this area, almost always shale. In general then this area was under moderately deep water during the Lias.

A rise in the bed of the sea preceded the next stage, the Oolitic, and the area became the estuary of a great river which deposited its load of mud and silt. This marks the Estuarine Period. A further sinking of the sea bed, faster than the deposition of these deltaic deposits, allowed the sea once again to invade the area and marine conditions prevailed for a time, during which deposits such as the Scarborough Limestone, the Millepore Oolite and the Ellerbeck Beds were formed. Deposits choking the delta resulted in the formation of a peat swamp, so that seams of coal are a feature of this series of rocks.

The estuarine conditions ended with the return of marine conditions and the formation of the last of the Lower Oolites, the Cornbrash, well developed on the coast near Scarborough.

The Middle Oolites began with the Kellaways Sandstone—named after a Wiltshire village—followed in their turn by the deep water Oxford Clays. Shallower seas then followed and in them the calcareous sandstones and limestones of the Corallian were formed. The coral deposits such as those to be found in quarries near Seamer clearly indicate

shallower and warmer, clearer seas in the area for some time. A return of deeper seas, with the deposition of the Kimmeridge and Speeton Clays, brought the Jurassic to a close.

These sedimentary rocks, flat and horizontal when deposited, were formed, by subsequent earth movements, into a series of low anticlinal ridges and troughs running approximately east and west. The arch of the main northern anticline runs from Ravenscar westwards across Egton and Glaisdale High Moors and reaches its greatest height, just under 1500 feet, on Whorlton Moor. In the south the anticline formed the Wolds, with its axis near Market Weighton.

Between these lies the Vale of Pickering, the syncline between the two arches, faulted along its north and south sides, its strata of clays now hidden beneath more recent alluvial and glacial deposits.

Beneath the chalk, to the south, the Lower Oolites are missing, presumably removed by denudation before the Cretaceous period, so that the chalk rests on the Kimmeridge and Speeton Clays in the north and unconformably on the Lias to the south.

The Speeton Clays mark the beginning of the Cretaceous Period, representing a mud zone similar in some respects to the Lias deposits. This clay passes into the Red Chalk, the colour being due to iron stain ; then to the Grey and finally to the White Chalk. Changes in the relative positions of land and sea masses opened up the seas in the area to new organisms, whose remains, carbonate of lime, now form the chalk.

It is probable that the whole Jurassic series was subjected to considerable denudation in pre-cretaceous times, before the subsidence which allowed the Cretaceous Sea to invade the area and cover it with chalk, which it undoubtedly did.

Subsequent folding uplifted the area and the chalk, relatively soft and easily eroded, was removed completely from the moors, remaining only in the south. Once the chalk had gone further erosion reduced the moors to a new base level and formed a peneplain, more resistant moorland grits and sandstones then forming larger areas to the north of the Vale of Pickering.

At a still later date action by rivers and glacial overflows cut the deep dales and isolated outliers like those around Silpho and Hackness, while rivers, cutting through the grits and on to the softer clays beneath, formed many of the moorland dales.

THE ICE AGE IN NORTH EAST.

No account of the geology of this part can omit some reference to the effect of the glaciation of the district.

The Quaternary Era saw Britain, together with the rest of north west Europe, invaded by Arctic conditions, resulting in the accumulation of ice-sheets, especially on the higher ground.

In common with the rest of northern Britain our Yorkshire area was subject to the icy conditions and they have left their mark on the geology of the area no less than on its physical appearance. The glaciation here was effected by ice coming from some distance, for example from the Lake District and Pennines, even from Scandinavia, and not as might be supposed by ice from the high ground of the Moors. These, in point of fact, were left uncovered for the greater part, even during the period of maximum glaciation. One lobe of the ice sheet moved south down the Vale of York, blocking the entire western side of the area and closing the fault gap at Coxwold, thus stopping any possible drainage to the west. Ice flowing down the eastern side of the Cleveland area was forced against the east side of the Moors by the Scandinavian ice which impinged on the coast, completely blocking any drainage to the east, and forcing its way some five miles up the Vale of Pickering as far as Brompton. The entire coastal district of our area was covered with a thick layer of boulder clays containing for example erratics, from Westmorland (Shap Granite) and even Larvikite from Scandinavia.

Not only was the eastern drainage, namely that of the Esk and Derwent, completely stopped, but their upper valleys became lakes which drained into each other over spurs, across which they cut well defined overflow channels along the edge of the ice.

The water from the Eskdale series of lakes eventually found an outflow southwards over a col and drained away through the deep overflow channels now known as Newton Dale, adding its water to the already rapidly growing lake which occupied the blocked lowland between the Moors and the Wolds, Pickering Lake.

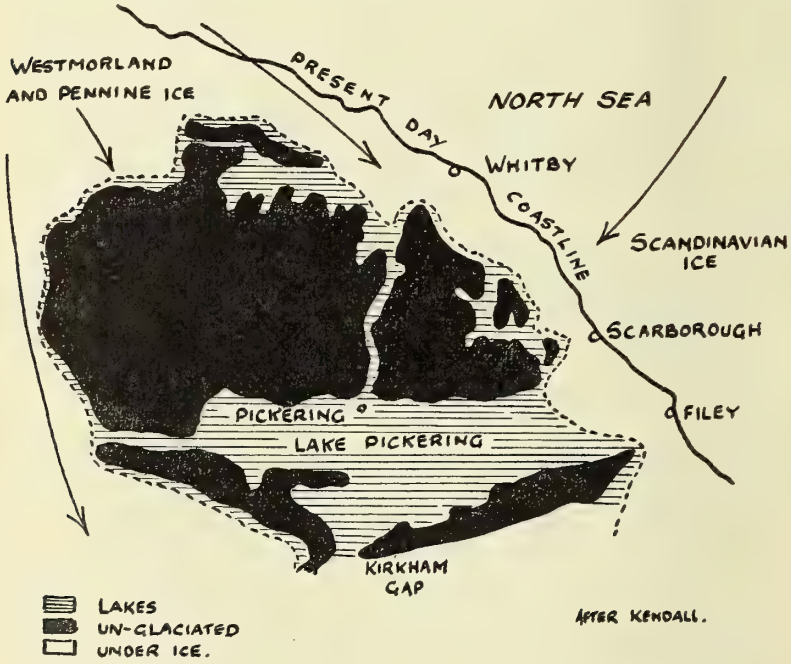
Small lakes and streams on the Moors, near the present site of the Falcon Inn, were forced to drain to the south west and the water flowed down Jugger Beck channel to join a lake in Harwood Dale. This subsequently overflowed into Langdale and filled the valleys of Highdales and Lowdales to form Lake Hackness.

The streams which formerly occupied this complex valley system once reached the sea through the valley now known as Sea Cut, but this was blocked by ice, so a new overflow had to be cut. Thus Forge Valley came into existence at the lowest point over which Lake Hackness could drain away. This outlet was deflected at its southern end by the glacier which had forced its way up the Vale of Pickering, and the stream flowed along the base of the hills depositing its load in a long sloping bank, until it finally joined Pickering Lake. The level of this lake rose steadily especially when the melt water from the ice was added to it, and a low col at Kirkham offered an outlet. The enormous flow of water over this col cut the Kirkham Gorge.

When the lake drained, having in the meantime accumulated layers of new material over its underlying clays, the rivers found their way to the east blocked by the ridge of boulder clay along the coast so the new outlet from the vale followed Kirkham Gorge, as it does to-day.

Hence, for some distance inland from the coast of the area the rocks are overlain by boulder clays, moraines and glacial drifts, while many of the valleys owe their present form to overflows from the glacial lakes. The boulder clays may be seen capping the cliffs both north and south of Scarborough and one of the largest erratics lies at the Valley end of Royal Avenue and another at Seamer Station.

The floor of the Vale of Pickering has little difference in level throughout its entire length and in consequence the drainage is poor. One thing of interest is the deltaic deposit at the south end of Newton Dale, upon which Pickering is built.



MODERN TOPOGRAPHY.

So much for the remote past, but it may be of interest to conclude by indicating the relationship between some of the rocks and the present day features of the countryside.

The oldest rocks, the Lias, form the base of the uplands of the Moors and crop out on the sides of many of the dales. They are followed by the Lower Oolites in which the absence of fossil remains and the presence of thin coal seams indicate the Estuarine conditions already referred to. Larger areas of Estuarine Sandstones form the moors to the east of the area and the tops of many of the ridges separating the dales. Here they form the decided crags at the top of the slopes. The "Cheesestones" are remnants of this cap. The Ellerbeck Beds separate

SALTERGATE INN AND THE CENTRAL MOORLANDS

By kind permission of the Scarborough Corporation

facing page 14

these from the later sandstones, which were, however, removed from a large area of the uplands, but remain to form the Riggs between the dales on the south side of the Esk Valley. The centre portion consists of grey limestone and fossiliferous grit, the latter forming prominent parts of Glaisdale Moor, while the Moor Grit, easily recognised by its compact whitish structure, forms moors between Whitby and Scarborough.

The wide moorlands of Harwood Dale and Fylingdales show the shales and sandstones of the Upper Estuarine series, these marking the close of the Estuarine Period and the encroachment of the sea, with the deposition of the Oolites.

Of these the Kellaways and Calcareous Grits can be seen in the Tabular Hills where the grit caps the moors to form features such as Allerston High Moor. It is through this that the gorge of Newton Dale is cut.

Along the north side of the Vale of Pickering the Corallian forms the hills overlooking the vale.

The Chalk lies to the south and shows many of the characteristics of such areas ; rolling hills, dry valleys and intermittent streams, called "Gypsies." The coast farther south at Flamborough has the caves and stacks familiar on chalk coasts.

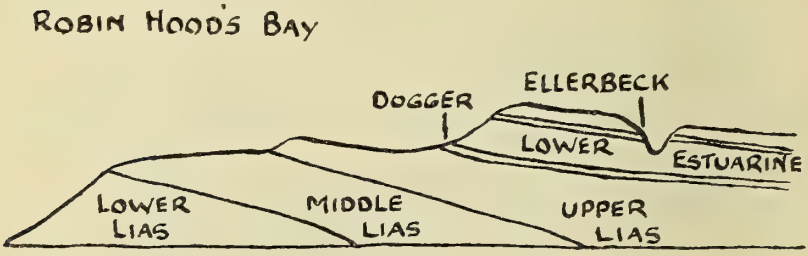
Nor is the connection confined to the inland areas alone as the present coastline shows the relationship no less clearly. South of Whitby, where the Esk occupies a pre-glacial valley along a fault line with a downthrow of 200 feet on the west side, the cliffs show the Inferior Oolite and the Upper and Middle Lias especially well below Hawsker.

From North Cheek, the northern point of Robin Hood's Bay, of harder Middle Lias, to the Peak at the south end of the bay, also of more resistant rock, the Lower Lias has been eroded by the action of the sea to form the long curve of the bay. The shaly reefs are clearly seen at low tide. The high cliffs from Ravenscar to Scalby Mills run roughly N.N.W. to S.S.E. and have been determined largely, if not entirely, by a series of faults which follow much the same direction. The Oolites which are the main rocks of this part of the coast, are covered with a considerable thickness of glacial drift. This drift is itself the main constituent of the low cliffs from Cloughton to Scarborough. The headland which separates the two bays at Scarborough is due to the resistance of the sandstones of which it is composed. Estuarine Sandstones and the shales and sandstones known as Scarborough Limestone, are responsible for the cliffs of the South Bay, their well-marked jointing aiding the erosive action of the sea. At Cornelian Bay the cliffs are largely of Boulder Clay, while farther south, beyond Osgodby Nab, Calcareous Grits and Oxford Clay form the greater part of the coastline. Thence to Filey, the Corallian, capped by Boulder Clay, runs out to form the Brigg, a long reef forming the north end of the bay. The clay cliffs south of the Brigg are a fine example of weathering by rain action. From Speeton southwards the chalk appears and the cliffs here show the usual characteristic features.

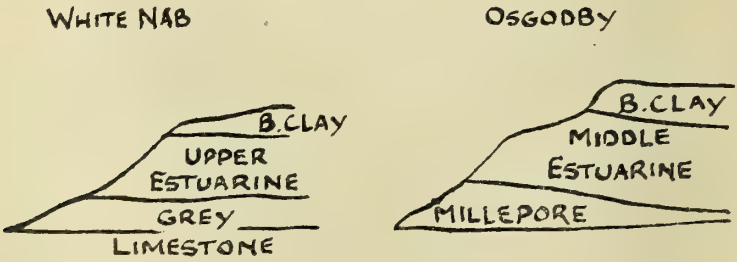
LOCAL EXPOSURES.

Those who would like to study the rocks of the area in situ may do so with very little trouble as many of the best exposures are within easy reach of Scarborough, on the coast both north and south of the town. The short list and the simple sketches which follow by no means exhaust the possibilities for inspection on the spot, and many books on this area, notably Kendall and Wroot's "Geology of Yorkshire," will provide many more examples.

The most readily accessible exposures of the Lias are at Robin Hood's Bay, where the Lower, Middle and Upper Lias can be seen from Bay Town northwards along the cliffs. Care is essential when walking along the foreshore as the tide may trap the visitor unfamiliar with its ebb and flow in this part.

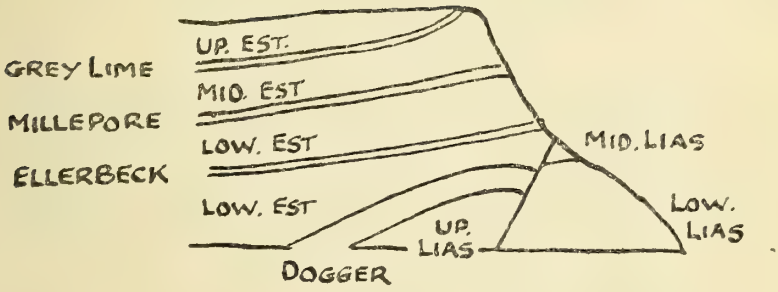


Osgodby Nab, the north point of Cayton Bay ; White Nab, at the south end of Scarborough ; Cloughton Wyke and Blea Wyke, to the north of the town, all show the Lower Oolites, the most complete example of this series being at Blea Wyke.

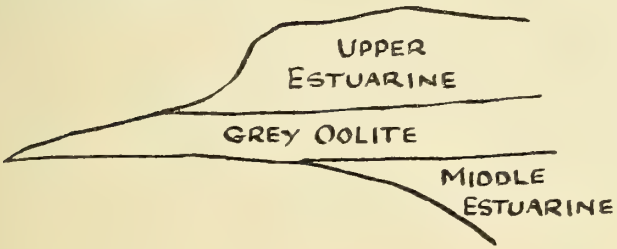


The Upper Estuarine and Scarborough Limestone appear at White Nab and the Upper Estuarine, Middle Estuarine and Grey Oolite form Hundale Point at Cloughton Wyke.

BLEA WYKE

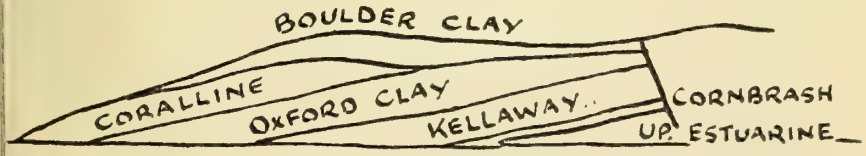


CLOUGHTON

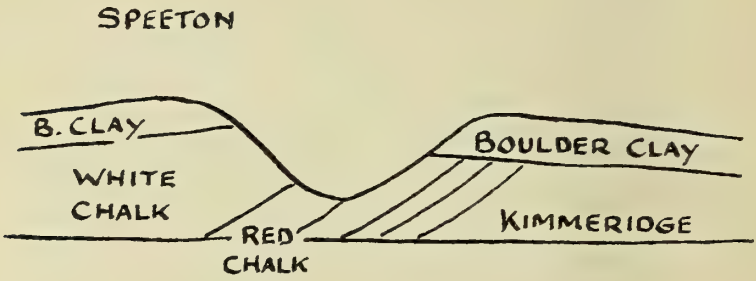


For the Upper Oolites one should go to Red Cliff on the south of Cayton Bay or to Gristhorpe Cliff, where the Kellaway, Oxford Clay and Calcareous Grit are to be found in the face of the Cliff.

GRISTHORPE



Speeton Cliffs, especially on the south side of the Gap, give one the chance to examine the Cretaceous Series as the Red and White Chalks are exposed in the cliff face, capped by Boulder Clay.

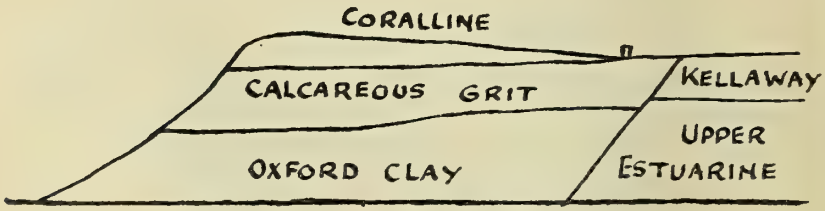


The Corallian, which is located in the Hackness area, is also within easy reach of the visitor to the dales which are in that district.

To those who do not wish to go far from the town the Castle Hill has much to offer, the Coralline Oolite, Calcareous Grit and Oxford Clay being well shown there ; while on Oliver's Mount, the hill overlooking the town on the south side, the Grit, Oxford Clay, Kellaway, Cornbrash and Estuarine Shale may be examined.

The Scarborough Museum also contains much of great interest to the geologist, including an excellent collection of the fossils to be found in the neighbourhood.

SCARBOROUGH CASTLE HILL



A STRATIGRAPHICAL GUIDE TO THE FOSSIL LOCALITIES OF THE SCARBOROUGH DISTRICT

P. C. Sylvester-Bradley, B.Sc., F.G.S.

INTRODUCTION

The Scarborough district is classic ground for the fossil collector. Even before the days when William Smith lived at Hackness (1828-35), British geologists, both amateur and professional, had been richly rewarded by the local strata†. The Museums, not only of the district, but of the whole country, testify to the energy of these early collectors. In spite of the quantity and quality of the material, however, much of it fails to fulfil the exacting needs of modern geological research. Much of it is unlocalised. There is now a need for fossils with records of their exact stratigraphical horizons and geographical locations. There are many critical sections from which no fossil, however beautifully preserved, is of great scientific value unless its position relative to some easily recognised datum is measured to the nearest inch. Care should therefore be taken to note the stratal succession and lithological boundaries of such sections before recording their fossil contents. Collectors will greatly benefit the science if they are willing to loan their finds to specialists in the various groups. Officials of local or national museums can usually give advice as to whom such specimens should be sent.

The following catalogue of localities is intended as a guide to the collector. Details of the section are only listed if not already published ; otherwise a bibliographic reference is given‡ It is to be regretted that space also forbids giving detailed lists of fossils. All that has been attempted is to indicate the general features. This omission is not as serious as it might be, for Fox-Strangways' encyclopædic list of Yorkshire Jurassic fossils, though in much need of revision, is still of practical value (Fox-Strangways, 1892b).

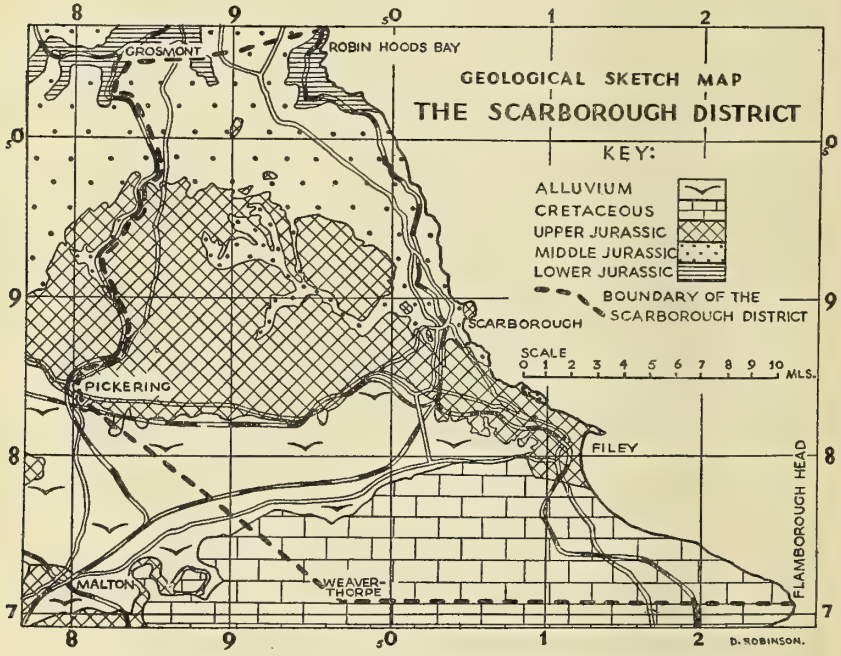
The arrangement of Stages and Zones is as follows :—Upper Cretaceous, after C. W. and E. V. Wright (1942); Lower Cretaceous, after Spath (1923, 1924 and 1941), as summarised by Morley Davies (1947) ; Upper and Middle Jurassic, after Arkell (1946) ; Lower Jurassic, after Spath (1942). The map references, given immediately after each locality, are to the national grid (as reproduced on all Ordnance and Geological Survey maps published since the war, and also on the folding map included in this volume). A good map for use in the field is the 1 : 25000 Ordnance Survey map (approx. 2½-in. to the mile). Some of the Geological Survey maps of the district are out of print, but will be re-issued in due course. The one inch maps

† As the work of Smith's nephew, John Phillips (1829), and that of Young and Bird (1822) admirably demonstrate.

‡ Most of these references are to Fox-Strangways, 1892a. Later relevant Geological Survey publications repeat these sections. Fox-Strangways 1904 gives fine annotated photographs of the cliffs south of Scarborough.

bear two numbers, as follows : Old Series, 96NE, 95NW, 96SE, 95SW, 95SE ; corresponding to the New Series numbers, 43, 44, 53, 54, and 55. The maps of the two series are identical. The $\frac{1}{4}$-in. maps of the district are numbered 4, 7 and 8.

The strata are dealt with from the younger to the older, zone by zone. The localities are numbered in succession. Under each zone the various exposures are dealt with first as shown on the coast (from south to north) and then as developed inland (from east to west). The exact limits of the district dealt with are shown on the geological sketch map.



The numbers round the margin refer to the National Grid figures.

The preparation of this catalogue has been made possible only by the kind collaboration of the following friends, who supplied records of much unpublished information : Mr. Leslie Bairstow (for the Middle and Lower Lias) ; Prof. T. M. Harris (for the Jurassic plants) ; Dr. Vernon Wilson (for the Corallian Beds) ; and Mr. C. W. Wright (for the Cretaceous rocks).

The compiler records his thanks for their ready co-operation. The compiler has also referred to his own field notes, and to published works. Dr. W. J. Arkell and the late Dr. R. H. Rastall have kindly checked and criticised the MS., and Mr. R. V. Melville has helped in other ways.

CATALOGUE*

The names of recorders are :

L.B.—Leslie Bairstow. V.W.—Vernon Wilson.
T.M.H.—T. M. Harris. C.W.W.—C. W. Wright.
P.C.S.B.—P. C. Sylvester-Bradley.

QUATERNARY

PLEISTOCENE **The Speeton Shell Beds**

Pre-glacial shells (**Tellina, Cardium, Mytilus, Littorina,** etc.).

1. Middle Cliff Ridge. Speeton. 147758. Versey, 1938. Fox-Strangways, 1904, p. 83. Lamplugh, 1881.

CRETACEOUS

Compiled from notes by **C. W. Wright, M.A., F.G.S.,** and published records.

CHALK†

SENONIAN **Upper Chalk**

Inoceramus lingua zone‡

Inoceramus ; sponges (many species of lithistids and hexactinellids) ; **Micraster ; Scaphites, Baculites** and other ammonoids.

2. Flamborough Station. 195701. Wright Bros., 1942, pit 122. Rowe, 1904, p. 26. Many sponges (C.W.W.).
3. North of White Hill (1). 164715. Wright Bros., 1942, pit 113. Rowe, 1904, pit 22.
4. North of White Hill (2). 159723. Wright Bros., 1942, pit 114.
5. Bridlington-Filey road, fork to Speeton. 148732. Wright Bros., 1942, pit 124. Rowe, 1904, pit 14.
6. North Dale Pit. 154717. Wright Bros., 1942, pit 111. Rowe, 1904, pit 20. Roadside pit, becoming overgrown, but yielding fairly abundant fossils of **Scaphites binodosus** subzone (C.W.W.).
7. East Leys Farm Pit. 144707. Wright Bros., 1942, pit 110. Rowe, 1904, pit 21. A small pit in a field by roadside, showing about 12-ft. of extremely fossiliferous chalk of the **Scaphites binodosus** subzone (C.W.W.).
8. Roadside. Dotterel Inn to Grindale. 132730. Wright Bros., 1942, No. 117.

Marsupites testudinarius zone

Marsupites plates. The only good exposures lie along the cliffs south-east of Flamborough Head, outside the Scarborough district.

Uintacrinus westfalicus zone

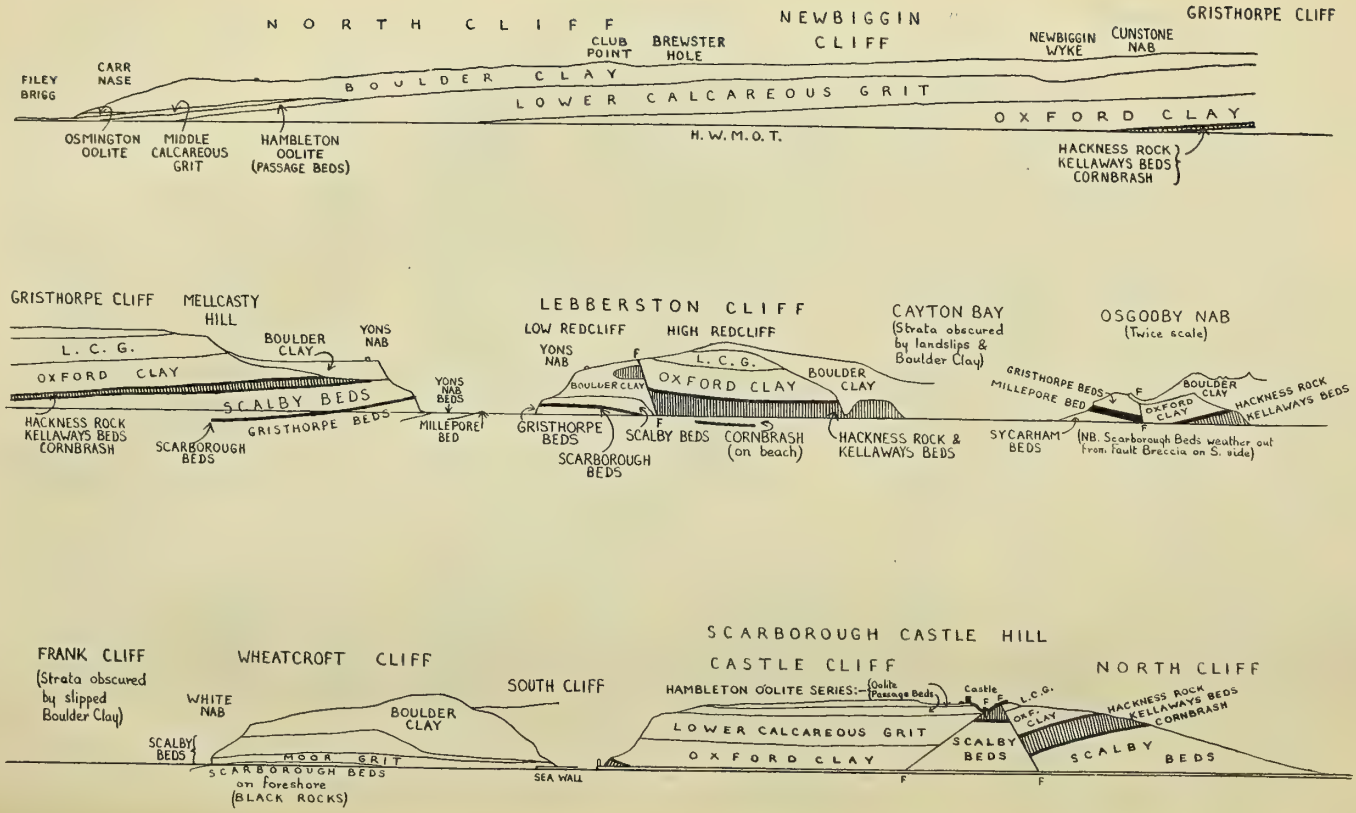
Uintacrinus ossicles, sponges, occasional **Echinocorys** and **Inoceramus.**

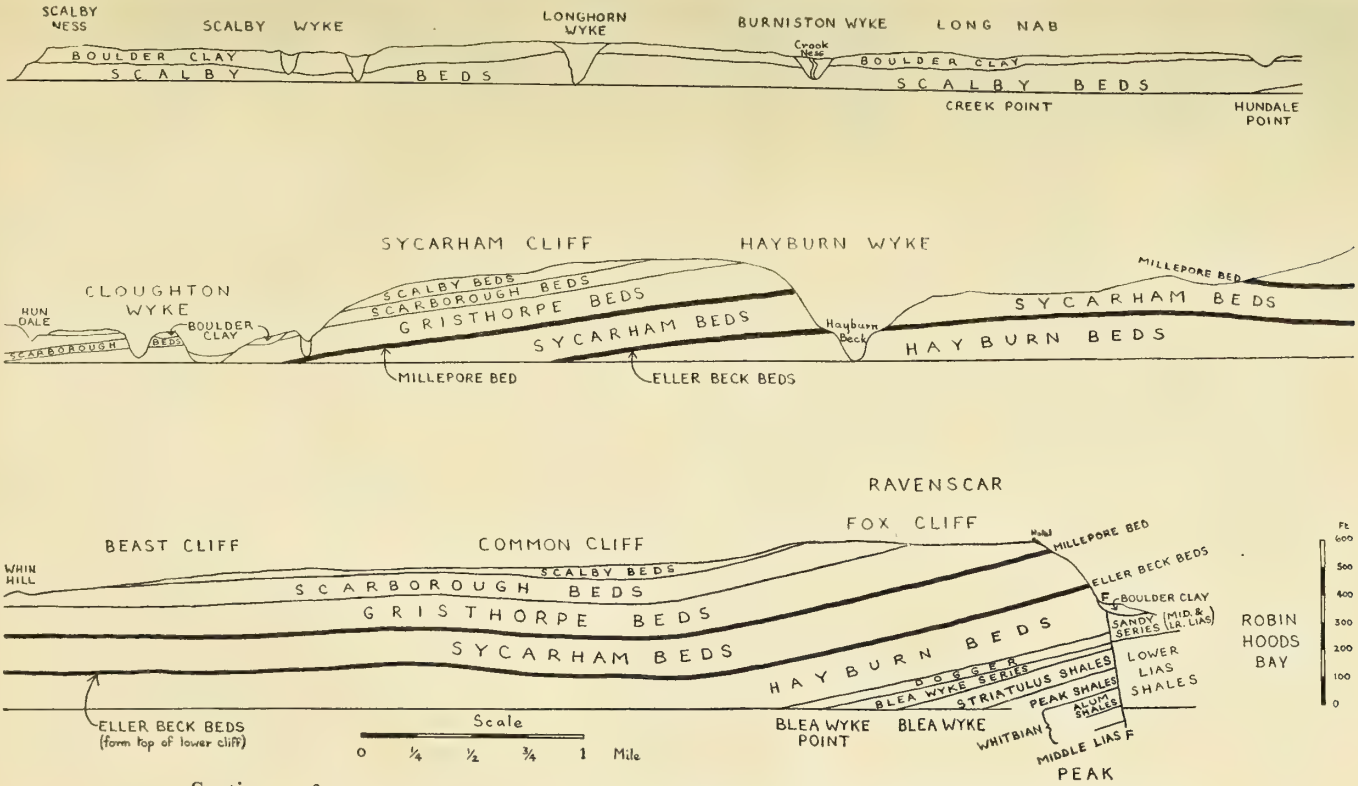
9. Speeton Crossing Pit. 150738. Wright Bros., 1942, pit 115. Rowe, 1904, pit 13 (C.W.W.).

* Note. In every case where sections are given, the beds are listed from the top to the bottom, but numbered from the base upwards.

† Rowe's (1904) paper remains the classic guide to the chalk of the coast sections. The Wright Brothers' (1942) recent catalogue of the inland exposures of the Wolds is invaluable to the collector.

‡ Equivalent to the **Offaster pillula** and **Actinocamax quadratus** zones of southern England.


NORTH CLIFF
NEWBIGGIN CLIFF
GRISTHORPE CLIFF
FILEY BRIGG
CARR NASE
CLUB POINT
BREWSTER HOLE
NEWBIGGIN WYKE
CUNSTONE NAB
BOULDER CLAY
LOWER CALCAREOUS GRIT
OXFORD CLAY
OSMINGTON OOLITE
MIDDLE CALCAREOUS GRIT
HAMBLETON OOLITE (PASSAGE BEDS)
H.W.M.O.T.
HACKNESS ROCK
KELLAWAYS BEDS
CORNBRASH
GRISTHORPE CLIFF
MELLCASTY HILL
L.C.G.
BOULDER CLAY
YONS NAB
OXFORD CLAY
SCALBY BEDS
GRISTHORPE BEDS
YONS NAB BEDS
MILLEPORE BED
HACKNESS ROCK
KELLAWAYS BEDS
CORNBRASH
SCARBOROUGH BEDS
LEBBERSTON CLIFF
LOW REDCLIFF
HIGH REDCLIFF
YONS NAB
L.C.G.
BOULDER CLAY
OXFORD CLAY
BOULDER CLAY
GRISTHORPE BEDS
SCARBOROUGH BEDS
SCALBY BEDS
CORNBRASH (on beach)
HACKNESS ROCK & KELLAWAYS BEDS
CAYTON BAY
(Strata obscured by landslips & Boulder Clay)
SYCARHAM BEDS
OSGODBY NAB
(Twice scale)
GRISTHORPE BEDS
MILLEPORE BED
BOULDER CLAY
OXFORD CLAY
HACKNESS ROCK
KELLAWAYS BEDS
(NB. Scarborough Beds weather out from Fault Breccia on S. side)
FRANK CLIFF
(Strata obscured by slipped Boulder Clay)
WHEATCROFT CLIFF
SOUTH CLIFF
WHITE NAB
BOULDER CLAY
SCALBY BEDS
MOOR GRIT
SCARBOROUGH BEDS on foreshore (BLACK ROCKS)
SEA WALL
SCARBOROUGH CASTLE HILL
CASTLE CLIFF
NORTH CLIFF
HAMBLETON OOLITE SERIES:—
Oolite
Passage Beds
Castle
L.C.G.
OXF. CLAY
HACKNESS ROCK
KELLAWAYS BEDS
CORNBRASH
LOWER CALCAREOUS GRIT
OXFORD CLAY
SCALBY BEDS
SCALBY BEDS
F
F
F



Sections of strata as seen in the cliffs between Filey Brigg and Peak (Ravenscar).

Hagenowia rostrata zone (=**Micraster coranguinum** zone). Fossils usually rare, except for **Inoceramus,** in the lower part of the zone, exposed in the localities given, though much commoner in the cliffs west of High Stacks (C.W.W.).

10. High Stacks. 257704. Rowe, 1904, pp. 217-221.
11. Selwicks Bay. 255708. Rowe, 1904, pp. 215-217.
12. Foxholes. 012735. Wright Bros., 1942, exposure 102.
13. Weaverthorpe. 973709. Wright Bros., 1942, pits 87, 88. Vertical chalk. Fossils rare.

Micraster cortestudinarium zone

Micraster, Echinocorys, Inoceramus

14. Newcombe. 242721. Rowe, 1904, pp. 211, 212.
15. North of Breil Head. 248717. Rowe, 1904, pp. 212-215, Pl. 29. (Difficult of access, as graphically described by Rowe.)

TURONIAN

Holaster planus zone

Holaster, Echinocorys, Inoceramus, brachiopods, etc.

16. North Sea Landing and Holme's Gut. 238722. Rowe, 1904, pp. 208-211
17. Hunmanby. 090788, where lane to Pilmoor Farm crosses escarpment Wright Bros., 1942, pit 119 (C.W.W.).

Middle Chalk

Terebratulina lata zone

Inoceramus lamarcki, Conulus, Holaster planus and brachiopods (**T. lata, " Rhynchonella " cuvieri,** etc.)

18. Great and Little Thornwick. 233724. Rowe, 1904, pp. 207, 208.
19. Kit Pape's Spot 181747. Rowe, 1904, plates 17, 18, 19 (" Zone of **Terebratulina gracilis**")

Inoceramus labiatus zone

Inoceramus labiatus and **" Rhynchonella " cuvieri.**

20. Kit Pape's Spot to Speeton Cliffs. 1774 to 1575. Rowe, 1904, plates 17, 18, 19 (" Zone of **Rhychonella cuvieri** "). Fossils sparse, but to be found in well weathered sections (C.W.W.).

CENOMANIAN

Lower Chalk

Holaster trecensis zone

Holaster, Discoidea and small brachiopods.

21. Kit Pape's Spot. 181747. Rowe, 1904. Plates 17, 18, 19 (marked " **Holaster subglobosus** ").
22. Speeton Cliffs. 1674, 1774. Fox-Strangways, 1904, p. 79 (Plenus Marls—the " Black Band "—and upper part of Grey Chalk).

Holaster subglobosus zone*

Echinoids (**Holaster, Hemiaster, Discoidea,** etc.), lamellibranchs (especially **Inoceramus**), and very rare ammonites (**Schloenbachia**). (C.W.W.).

23. Speeton Cliffs. 1674, 1774. Fox-Strangways, 1904, pp. 79-80. Cliff foot exposures southwest of main Red Chalk section (lower part of Grey Chalk and upper Red Chalk, above the " Grey Band "). Sparse fossils but of considerable variety ; echinoids of great interest in well weathered exposures (C.W.W.).

* Equivalent to the **Schloenbachia varians** zone of southern England.

ALBIAN†

Stoliczkaia dispar zone — RED CHALK‡

Belemnites (**Neohibolites listeri** = " **Belemnites minimus** "), **Nautilus,** lamellibranchs, terebratulids (**Concinnithyris** spp.), occasional crinoids, asteroids, echinoids and anthozoa (C.W.W.).

24. Speeton Cliffs. 1675, 1674. Fox-Strangways, 1904, pp. 77-78. Extensive scars and cliff foot exposures, often partly covered by cliff falls (" Grey Band " of the Red Chalk and upper part of the lower Red Chalk). In the absence of ammonites it is impossible to zone these beds accurately and it is only on an assumption that this part of the Upper Albian Red Chalk is assigned to this zone (C.W.W.).

Pervinquieria inflata zone

Ammonites (**Pervinquieria, Euhoplites**), belemnites, **Inoceramus anglicus, I. tenuis, " Terebratula " dutempleana** (= " **biplicata** ")

25. Speeton Cliffs. 1675, 1674. Red and grey-green marly clay with large indurated lumps is seen below the harder Red Chalk and above the " Minimus " Marls (C.W.W.).

SPEETON CLAY

The facies of the Albian, Aptian and Neocomian, known as the Speeton Clay, is unique in this country and has its nearest parallel in northern Germany. The clays are only intermittently exposed by the vagaries of landslip and sea scour but well repay the attention of the careful collector. The best guide to this difficult ground is Lamplugh, 1924, and the map reproduced as fig. 1 of that paper. For greater stratigraphical details see Lamplugh, 1889, and, for the ammonites and zonal correlation, Spath, 1924. It should be noted that, in addition to the more or less permanent cliff and cliff foot exposures mentioned below, there are occasionally very good exposures on the beach towards low tide mark.

Euhoplites lautus zone

It is to be presumed that this zone is represented by some part of the " Minimus Marls " ; see the zone below.

Hoplites dentatus zone

Rare ammonites (**H. dentatus**) and innumerable belemnites (**Neohibolites** spp.).

26. Cliff foot opposite King Rock, Speeton. 1575, 1675. Lamplugh, 1924, p. 20 and p. 15 " Minimus Marls ". (Upper ' A ' beds). Sporadic and incomplete sections only, occasionally yielding crushed impressions of the zone fossil (C.W.W.)).

Douvilleiceras mammillatum zone

Probably unrepresented.

† The zones from the Albian downwards to the base of the Cretaceous are founded on successions in the south of England, France, Russia, etc., and are not necessarily applicable in Yorkshire ; in fact most of the zone fossils have not been found here. The scheme however must be used in the absence of a properly established one for the northern faunal province. The fossils quoted here are merely those that characterise the northern equivalents of the zones (C.W.W.).

‡ Partly Cenomanian in age. See Exposure 23.

Leymeriella tardefurcata zone

This zone is suggested by the occurrence of the **Leymeriella** noted below.

27. Cliff foot opposite King Rock, Speeton. 1575, 1675. Lamplugh, 1924, p. 20 and p. 15. "Bright greensand streak"—a glauconitic band with corroded nodules, lying immediately below the "Minimus Marls". A few fragments of a late species of **Leymeriella** have been found with lamellibranchs and fish teeth (C.W.W.).

Diadochoceras nodosocostatum zone

The belemnite **Neohibolites wollemanni** may be taken as indicating this zone (C.W.W.).

28. Cliff foot opposite King Rock, Speeton. 1575, 1675. Lamplugh, 1924, p. 20 and p. 15. Top "**ewaldi**" beds. **N. wollemanni** is not uncommon though often only found in rolled fragments (C.W.W.).

APTIAN

Acanthoplites subnodosocostatum and **Cheloniceras martini** zones

Missing.

Deshayesites deshayesi zone

Belemnites (**Parahibolites**) and ammonites (**Deshayesites** spp. and **Aconeceras**). Probably only the two lower subzones are represented (**weissi** and **bodei**).

29. Cliff foot opposite King Rock, Speeton. 1575, 1675. Lamplugh, 1924, p. 20 and p. 15. Lower **ewaldi** beds and topmost 'B' beds. The belemnites occur in patches. Fragments of **Deshayesites** and small specimens of **Aconeceras** are rather common (C.W.W.).

Costidiscus recticostatus zone

Parancyloceras, Toxoceratoides in the upper subzones and the lamellibranch **Grammatodon securis** are common ; belemnites are rather rare (C.W.W.).

30. East of Speeton Gap. 157754. Lamplugh, 1924, p 15. Upper 'B' beds (above Cement Beds) (C.W.W.).

NEOCOMIAN

Heteroceras astieranum zone

Large ammonoids (**Hoplocrioceras**, etc) are fairly common in the cement nodules ; belemnites (**Oxyteuthis** and **Aulacoteuthis**) are common and many species of gastropods and lamellibranchs occur occasionally (C.W.W.).

31. Black Cliff and Speeton Beck Ridge. 1575. Lamplugh, 1924, p. 15 and fig. 1 ; 1889, fig. 7. Middle 'B' or Cement Beds, about 50 feet (C.W.W.).

Paracrioceras emerici and **Pseudothurmannia augulicostata** zones

Ammonoids, belemnites, gastropods and lamellibranchs are rather common in bands (C.W.W.).

32. Black Cliff and foot of Speeton Beck Ridge 1575. Lamplugh, 1889, fig. 6. Clays, seen to about 90-ft. (lower part of 'B') (C.W.W.)

Subsaynella sayni zone

Ammonites (**Simbirskites** spp., **Spitidiscus,** criocerates, etc.) ; belemnites (**Hibolites jaculoides**, etc.), gastropods, lamellibranchs, brachiopods (**Terebratulina martiniana**), **Cidaris** spines and plates, large foraminifera, etc., common in different bands. All four subzones well developed (C.W.W.).

33. Black Cliff Ridge, Black Cliff, and foot of Speeton Peck Ridge. 151757 to 153756. Lamplugh, 1889, fig. 5, beds C 1—6. Clays about 85-ft.

Crioceras duvali zone

Uncoiled ammonoids (**Crioceras, Aegocrioceras**) and belemnites (**Hibolites**) are common ; several other species of ammonites, gastropods and lamellibranchs are fairly common (C.W.W.).

34. Middle Cliff and Black Cliff Ridge, Speeton. 148758 to 15057575. Lamplugh, 1889, fig. 5, bed C7. Clay and hard bands, 8-ft. 6-in.

Acanthodiscus radiatus zone

This is the most fossiliferous zone of the Speeton Clay. The **Subastiera sulcosa** subzone (Bed C 8) yields a variety of ammonites, and the **Lyticoceras regale** subzone (Bed C 9) the subzonal ammonite, belemnites (**Hibolites**), the lamellibranch **Buchia keyserlingiana** and the "Speeton Shrimp" (**Meyeria ornata**) commonly. In the **Acanthodiscus ebergensis** subzone (C 10-11) the belemnite genera **Hibolites** and **Acroteuthis** are both common. Beds D 1 (the "Compound Nodular Bed") and upper D 2 (**Lyticoceras noricum** subzone) yield abundant belemnites (**Acroteuthis** spp.), ammonites (especially **Lyticoceras** spp. and **Distoloceras**) and other fossils (C.W.W.).

35. New Closes Cliff to foot of Middle Cliff, Speeton. 146759 to 150758. Lamplugh, 1889, fig. 4 and 5, beds C 8—11 and D 1, 2.

Polyptychites polyptychus zone*

Belemnites (**Acroteuthis** spp.) are abundant, ammonites rather rare (C.W.W.).

36. West end of Middle Cliff, Speeton. 147759 to 149758. Lamplugh, 1889, fig. 4, beds D 3—6. D 5 is full of **Lingula,** and D 4 of **Astarte senecta** (C.W.W.).

Platylenticeras heteropleurum zone

Missing.

Subthurmannia boissieri zone

Missing according to Spath. Represented by Beds D 6-8 according to Swinnerton (C.W.W.).

37. Beach opposite Middle Cliff Ridge, Speeton. 148759. Lamplugh, 1889, fig. 4, beds D 6—8. D 6, the "Pale Beds", contain many belemnites and lamellibranchs of a few species ; D 7 and D 8 yield the large belemnite **Acroteuthis lateralis** (C.W.W.).

Parodontoceras callistoides zone

Missing.

*The **Olcostephanus schenki** and **Kilianella roubaudiana** "zones" are here regarded as equivalent to the upper part of the **polyptychus** zone.

UPPER JURASSIC

PURBECKIAN and PORTLANDIAN

Missing.

KIMERIDGIAN — KIMERIDGE CLAY

Aulacostephanus pseudomutabilis and higher zones

Ammonites (sometimes crushed, but uncrushed in nodules), belemnites, **Discina, Lucina**, etc. The zonal arrangement is very ill known. If a good exposure is ever found careful collecting from a measured section will produce valuable results (P.C.S.B.).

38 New Closes Cliff, Speeton. 147760. Lamplugh, 1889, p. 582. Fox-Strangways, 1892a, p. 373.

39. Off Middle Cliff, Speeton. 149759. Lamplugh, 1889, fig. 3.

40. Snainton to Thornton Dale. Ammonites have been obtained from Thornton Dale railway cutting, now grassed over (Fox-Strangways, 1892a, p. 375). Any temporary exposure in the clay of this district is likely to yield fossils of interest (P.C.S.B.).

Rasenia mutabilis, R. cymodoce and **Pictonia baylei** zones

41. Mile Haven, Speeton Bay. 122791. Recorded by Judd (1868) but by nobody since. He lists ammonites, **Exogyra nana, Rhactorhynchia inconstans,** etc.

OXFORDIAN

CORALLIAN BEDS

Compiled from notes by **V. Wilson, M.Sc., Ph.D. F.G.S.,** and published records.

The Yorkshire Corallian comprises a sequence of gritstones and oolitic limestones. The Upper Calcareous Grit is exposed only at Pickering, while the lower subdivisions are well seen in the coastal areas (V.W.).

A detailed account of the eastern region of our district, invaluable to the collector, is given in Wilson, 1949.

Ringsteadia pseudocordata zone

No evidence has yet been obtained for this zone in Yorkshire. In the south of England it is represented by the Upper Calcareous Grit, which facies was therefore later in appearance there than in Yorkshire (Arkell, 1945).

Decipia decipiens and **Perisphinctes cautisnigrae** zones

The Upper Calcareous Grit of Yorkshire is probably mostly of **D. decipiens** age, but the further discovery of ammonites may show that it extends down into the **P. cautisnigrae zone** (Arkell, 1945).

Upper Calcareous Grit

Abundant **Amoeboceras alternoides** and **Decipia decipiens** have been recorded (Arkell, 1935-48); lamellibranchs are abundant, of which **Chlamys midas** can be used as an index fossil (P.C.S.B.).

42. Binkleys, Silpho. 964918. No exposure, but scattered pebbles in the fields are full of fossils, including ammonites (P.C.S.B.).

43. Howldale. 816837. Fox-Strangways, 1892a, p. 348. A fine exposure. 6-ft. of very fossiliferous Upper Calcareous Grit with large ammonites is separated from the underlying Osmington Oolite Series by 2-ft. of argillaceous marl known as the "Throstler Clay" (P.C.S.B.).
44. Pickering Quarries, east side of Newtondale, north of the town. 798845 to 804852. Fox-Strangways, 1892a, pp. 349, 365. Fine-grained sandstones and sandy shales with **Lucina fulva, Pleuromya uniformis, Ostrea** sp. and ammonite casts, about 20-ft. (V.W.).

Perisphinctes plicatilis zone

Embracing both the Osmington Oolite Series and Middle Calcareous Grit.

Osmington Oolite Series*

The Osmington Oolite is very fossiliferous and in its upper part has coral reef facies—a true reef and an inter-reef channel facies; these occur in the Seamer-Brompton-Ayton district (V.W.).

45. Filey Brigg. 129816. Wilson, 1949, Beds 32 to 34.
46. Crossgates Quarries, Seamer. 024842 to 029842.
    2. Coral Rag with compound corals **Thamnasteria** and **Isastrea,** simple corals **Thecosmilia** and **Rhabdophyllia** and many lamellibranchs, gastropods, etc. 5½-ft.
    1. Oolites and pisolites with **Pseudomelania heddingtonensis, Bourguetia** and other gastropods, **Chlamys fibrosa, Exogyra nana** and many other lamellibranchs. For detailed section see Fox-Strangways, 1892a, p. 344. Ammonites (**Perisphinctes, Cardioceras, Aspidoceras,** etc., including some giants) have geen found in the "Snake Bed" (6-ft. below base of Coral Rag). 28-ft.
47. Betton Farm Quarries. 001855, 002857. Two quarries N. and S. of main road, about ½ mile N.E. of East Ayton. Some 15-ft. of soft mudstones and inter-reef channel debris with occasional stacks of coral reef in position of growth. Large numbers of **Bourguetia saemanni** and other gastropods, with "**Terebratula**" **kingsdownensis,** echinoid teeth and many lamellibranchs (V.W.).

This facies of the Coral Rag extends westward as far as Brompton and there are many small quarries opened in it in this area, some of which are listed below :

48. East Ayton. 991854 (near "The Lodge"). Very fossiliferous.
49. Bell Heads Upper Quarry, Silpho. 968911. Fox-Strangways, 1892a, p. 347.
50. Yedmandale Quarry. 982852. Fox-Strangways, 1892a, p. 346. Cidarid spines, **Bourguetia saemanni, Exogyra nana** abundant (P.C.S.B.).
51. Ebberston. 897832 and 898833. (There is some doubt as to the age of this coral rag. It is usually regarded as Osmington Oolite, separated from the Lower Calcareous Grit to the north by a fault. It might be a westerly development of the Hambleton Oolite coral reef) (P.C.S.B.).
52. Howl Dale. 816837. Fox-Strangways, 1892a, p. 348. See exp. 43.
53. Pickering Quarries. 798845 to 804852. Fox-Strangways, 1892a, p. 349.

Middle Calcareous Grit

A gritstone with fossils at Filey, but in Forge Valley and westward to Pickering has more the characters of an impure limestone with, at the latter locality, the well-known **Trigonia** shell beds (V.W.).

* The "Upper Limestone" and "Coral Rag" of Fox-Strangways.

54. Filey, on the north and south sides of the Carr Naze and Brigg. 129816. Wilson, 1949, Beds 25 to 31. Good sections in brown calcareous sandstones, including the Filey Brigg Grit, with occasional thin shelly seams and lenticles containing **Gervillella aviculoides, Trigonia densicostata, Chlamys fibrosa** and many other shells (V.W.).
55. Pickering. 803852 (east side of Newtondale, about ¾ mile N. of Pickering). 40-ft. of gritty limestones with the well-known **Trigonia hudlestoni** shell beds. Also present are **Perisphinctes maximus** and other perisphinctids, **Pseudomelania heddingtonensis, Trigonia reticulata, Chlamys fibrosa** and many other lamellibranchs (V.W.).

Cardioceras cordatum zone

Hambleton Oolite Series

The Hambleton Oolite Series in the Hackness district consists of :

3. Oolites (= " Lower Limestone " of Fox-Strangways), 30-50-ft.
2. Coral-sponge Reef, c. 11-ft.
1. Greystone, Wall Stone or Passage Beds, 30-40-ft.

At Scarborough the lower gritty beds, corresponding to the Greystone, are usually referred to as the Passage Beds. At Filey all the beds are gritty, the oolites not being developed; they are profusely fossiliferous. Ammonites (**Cardioceras, Peltoceras,** etc.) occur in the lower beds at Filey, and, rarely, in the Greystone inland. No ammonites are certainly known to have come from the Oolites which cannot therefore be dated with certainty. They are well exposed in the Hackness district and at Scarborough (exposures 57, 59 and 60) and energetic search might well reward the collector (P.C.S.B.).

56. Filey, on the north side of the Carr Naze. 129816. Wilson, 1949, Beds 1 to 24. Some 28-ft. of gritstones and detrital limestones of shallow water origin with many serpulids, **Exogyra nana, Gryphaea dilatata, Lopha gregarea, Thurmannella thurmanni, " Terebratula " fileyensis, Holcospongia floriceps, Millericrinus echinatus, Cardioceras costicardia** and many other fossils (V.W.).
57. Scarborough, on the north and east slopes of Castle Hill. 049896. Wilson, 1949. Beds 1 to 15.
    2. Impure oolitic limestones. 26-ft.
    1. Variable series of gritstones and detrital limestones, 28-ft. These lower beds contain many of the fossils found in similar beds in the Filey Carr Naze section (V.W.).
58. Hackness, quarry near the east end of Hackness Head, west of Hackness village. 965905.
    2. Coral-sponge Rag, 11-ft.
    1. Brown gritty unfossiliferous limestones, 15-ft.

    The Hambleton Oolite Coral Rag is unique in the British Corallian sequence ; it contains a rich fauna of corals (**Isastrea** and **Thamnasteria**), calcispongiae (**Holcospongia** and **Peronidella** spp,), many terebratulids, cidarid spines, gastropods and lamellibranchs. The above section is typical of many similar sections in the Hackness Hills, from all of which this coral-sponge fauna can be collected in abundance. A few yards west of this quarry and at a slightly higher level is another shallow quarry in which are seen a few feet of the normal oolite which overlies the coral-sponge rag (V.W.).
59. Silpho, immediate west of the village. 957917. Oolite with thin clay and brashy partings 20-ft. Fossils include " **Nerinea** " spp., **Pseudomelania,** and other gastropods with many lamellibranchs (**Camptonectes, Chlamys, Exogyra,** etc.) and occasional belemnites (V.W.). Arkell (1945) has recorded the find of an ammonite from the Passage Beds of Lowdales. Perhaps this came from the beds exposed beside the track on the hillside below Silpho quarry.

60. Suffield Quarries. 979902, large quarry in active work in oolites ; 977901, old quarry in similar beds. 983902 and 984904 show coral rag (P.C.S.B.).

South and west of Hackness there is an extensive spread of shelly oolite occurring at the base of the Hambleton Oolite Series (the " Wallstone " of William Smith and " Greystone " of Fox-Strangways). Quarries are very numerous. A few only need be mentioned :—

61. Wallis Quarry. 987960. About 35-ft. of oolites.
62. Ayton Weir Quarry. 989857.
63. Beedale Quarries. 962848, 961852. **Cardioceras quadrarium** and **Goliathiceras sidericum** have been recorded. (Arkell, 1945, p. 347).
64. Ruston Quarry. 952850.
65. Wydale Quarry. 930825. About 40-ft. of Oolites and Greystone. Ammonites (**Cardioceras costicardia,** large peltoceratids, etc.) have been recorded from this locality (Arkell, 1945, p. 347), as also a " very rich shell-bed " (Fox-Strangways 1892a, p. 320 ; Hudleston, 1878, p. 415, fig. 14) (P.C.S.B.).
66. Well Dale Quarries. 914838, 911837, 910834.
67. Sandsprunt Quarry. 906835.
68. Oxdale Quarry, Allerston. 882837.
69. Cross Plantation Quarry, Allerston. 880836. About 12-ft. oolites with coral band at top associated with **Exogyra nana** lumachelle (P.C.S.B.).
70. Caulklands Quarries. 843836 and 843838. Fox-Strangways, 1892a, p. 328.
71. Wilton Heights Plantation. 860843. About 15-ft. oolites with lenticular oyster beds and corals at several levels near base (P.C.S.B.).
72. Thornton Dale. 834834.
73. Mount Pleasant, Lockton. 851908.

Lower Calcareous Grit

(Extending down into the **Quenstedtoceras mariae** zone, Arkell 1945)

The thick Lower Calcareous Grit forms magnificent cliffs on the coast, though often inaccessible without ropes.

74. Filey, cliff section in north side of Carr Naze. 129816. Wilson, 1949, Beds A, B & C. The uppermost part of the Lower Calcareous Grit—the Ball Beds—is well exposed and has yielded **Cardioceras** cf. **reesidei, C.bukowskii,** spp. of **Goliathiceras, Peltoceras, Aspidoceras** and **Perisphinctes** and lamellibranchs, belemnites and serpulids (V.W.).
75. High Red Cliff, Cayton Bay. 077841. The Lower Calcareous Grit occurs in the top of the section but fossils are rare (V.W.).
76. Scarborough, cliff sections on north and east sides of the Castle Hill 051894. Wilson, 1949, Beds A, B & C.
    3. The " Ball Beds ", 14-ft.
    2. Hard cherty sandstone, 3-ft. 6-in.
    1. Thickly bedded buff gritstones, 49-ft.

    Spicules of **Rhaxella perforata** are abundant in the main mass of the gritstones while the " Ball Beds " yield the same fossils as are found in these beds at Filey (V.W.).

Both natural and artificial sections of the Lower Calcareous Grit are very frequent inland. Only a few can be listed here. The beds have not been searched with the care their interest deserves. Careful measurements should be made of any section before commencing operations (P.C.S.B.).

77. Suffield Cross (roadside quarry, 1,100 yards N.N.E. of Suffield). 988917. Thickly bedded brown sandstones, 20—25-ft.
    Thurmannella thurmanni, Pinna lanceolata, Gervillella aviculoides, Chlamys fibrosa, Isognomon sp., **Nucleolites scutatus** and other fossils (V.W.).

78. Suffield Moor. 937935. Small quarry in fossiliferous beds.
79. Breaday Gill. 970932. Good natural section.
80. Whetstone Quarry. 986873.
81. Beedale. 950870 ? Interesting ammonites of the **Q.mariae** zone have been found in Beedale " presumably from the lowest layers of the Lower Calcareous Grit " (Arkell, 1935-48, pp. 348-9). The exact locality is not known, and needs rediscovery. No more picturesque district for such a quest could be desired, though a vegetation almost tropical in its luxuriance renders the task more difficult (P.C.S.B.).
82. Allerston Quarries. 883831 and 875834. Fox-Strangways, 1892a, p. 310.
83. Musdale Quarry. 851841. About 15-ft. yielding doggers containing ammonites (P.C.S.B.).
84. Hazelhead Moor. 861942. Magnificent section of lower part of Lower Calcareous Grit and Upper part of Oxford Clay (P.C.S.B.).
85. Hole of Horcum. Several exposures in small " griffs ", e.g. 842938 (P.C.S.B.).

Quenstedtoceras mariae zone

Embracing all the Oxford Clay of the coast and also the lower part of the Lower Calcareous Grit (see above, especially exposure 81).

OXFORD CLAY

The Oxford Clay of our district undergoes many bewildering changes of facies which cannot be properly worked out until adequate fossil evidence is forthcoming. It is known to be much thinner in the Hackness district than on the coast, apparently on account of sandy facies encroaching both from above and from below. In the Malton district and further south-west on the other hand, the clay facies extends well down into the Callovian (see Fox-Strangways, 1892 a, Plate 5) (P.C.S.B.).

86. High Red Cliff, Cayton Bay. 077842. Fox-Strangways, 1904, p. 39 and Pl. 4. Crushed **Quenstedtoceras,** etc. (P.C.S.B.).
87. Castle Hill, Scarborough. 053890. Fox-Strangways, 1904, p. 38 (see long list of fossils). Ammonites (**Cardioceras scarburgense, Quenstedtoceras** spp., **Creniceras renggeri, Aspidoceras, Taramelliceras,** etc. See Arkell, 1945) have been found in some abundance, but only near the base of the clay (P.C.S.B.).

CALLOVIAN

by **P. C. Sylvester-Bradley.**

Although by etymology " Callovian " is named after the village of Kellaways in Wiltshire, the type locality of the Stage is specifically stated by d'Orbigny to be the " Kelloway Rock " of Phillips (1823), i.e., as developed in the Scarborough District of Yorkshire (see Arkell, 1946).

HACKNESS ROCK

Quenstedtoceras lamberti and **Peltoceras athleta** zones

The village of Hackness, and the country around, together present one of the most lovely landscapes of rural England. To geologists

Hackness is especially precious in that it was the home of William Smith during his latter years. Copies of his maps of the district still hang in Hackness Hall. Unfortunately the quarries and mines which in Smith's time yielded the freestone which he christened " Hackness Rock " have (with the exception noted below) disappeared (Sheppard, 1939). The Hackness Rock is very fossiliferous, and is well known for its abundant and varied ammonites **(Hecticoceras, Quenstedtoceras, Peltoceras, Kosmoceras,** etc.) but has also a long list of lamellibranchs and gastropods. The name " Hackness Rock " was first used as a synonym of " Kellaways Rock ", but it is now taken (after Spath, 1926) to represent only the upper part of the Kellaways Rock of the Survey Memoirs. It possesses quite a different fauna from the rock below. There is usually a varying thickness of sandstone, somewhat barren of fossils, between the Hackness Rock and the Kellaways Rock proper. Until diagnostic fossils have been found in this sandstone it would seem best to restrict the term " Hackness Rock " to the sandy limestone, sometimes oolitic, often packed with cephalopods, which lies on top of the sandstone, and increases from 3-ins. at Cunstone Nab to 2-ft., at Scarborough and Hackness. The two zones of the Hackness Rock occur in close juxtaposition, and fossils should be collected with care for accuracy.

88. Cunstone Nab. 099832. This is probably the most fossiliferous locality.
    13. OXFORD CLAY, seen to many feet.
    12. Impersistent nodular oolite, 2-in.
    11. Grey shale full of crushed **Quenstedtoceras,** 3-in.
    10. Brown clay, 2-in.
    9. HACKNESS ROCK. Oolite full of ammonites and belemnites, 3-in.
    8. KELLAWAYS ROCK. Yellow mottled sandstone ; belemnites, 8-ft.
    7. Grey shale, 8-ft. 6-in.
    6. CORNBRASH, 10-in.
    5. Shelly black shale, 3-in.
    4—1. SCALBY BEDS (Upper Estuarine Series).

89. Gristhorpe Cliff. 097833 to 085837. There are many temporary exposures below the Oxford Clay displayed by the constant cliff falls.

90. High Red Cliff. 077842. Leckenby, 1859, p. 5 ; Fox-Strangways, 1904, p. 33 and Pl. 4. The 1-ft. 6-in. band of oolite at the top of the " Kellaways Rock ".

91. Castle Hill, south side. 052888. The best section on Castle Hill that remains since the construction of the Marine Drive. The upper 2-ft. of the " Kellaways Rock ".

92. North Cliff, Scarborough. 044893. Fox-Strangways, 1904, p. 35 and Pl. 10. The upper two feet of the " Kellaways Rock ".

93. Hackness Quarry. 966907. Off the Lowdales Road. 2-ft. of hard sandy limestone overlying the main sandstone of the " Kellaways Rock ".

94. Newtondale. Presumably the Hackness Rock is to be found capping the great scars between Levisham and North Dale, but the diagnostic fossils have not yet been recorded from this locality.

Erymnoceras coronatum, Kosmoceras jason and **Sigaloceras calloviense** zones

Perhaps absent from the district, there being a great non-sequence between the Hackness and Kellaways Rocks, though Arkell (1945, p. 344) has recorded certain ammonites suggestive of the top part of the **E. coronatum** zone. West of Malton (outside our area) these zones are partly developed in Oxford Clay facies (Arkell, 1945). At South Cave, in East Yorkshire (44/93), the **S. calloviense** zone is well represented and very fossiliferous, abounding in ammonites and other fossils. According to Brinkmann, 1926, these zones may be partly represented by sandstones and ferruginous oolites between the Hackness Rock and the Kellaways Rock, but no fossil evidence supporting his theories has yet been published. Any ammonite found in these beds of doubtful age may be of great scientific importance if its exact locality is recorded. Dr. Arkell asks that special watch should be kept for the occurrence of **Erymnoceras** in Yorkshire.

KELLAWAYS BEDS

Proplanulites koenigi zone

Ammonites (**Kepplerites,** etc.) are sometimes abundant, with **Gryphaea, Lopha, Ostrea, Pleuromya,** etc., and belemnites are abundant at several horizons. The sandstones of the Kellaways Rock are usually ferruginous in the coast sections; inland they become massive and decalcified and contribute to much of the moorland scenery. The building stone of Hackness may well belong to the **koenigi** zone. In addition to the sandstones, the shales below, classed as " Shales of the Cornbrash " by early authors, are now usually regarded as part of the Kellaways Beds, though no ammonites have yet been recorded from them.

95. Newbiggin Wyke. 100828. Fox-Strangways, 1892a, p. 278.
96. Cunstone Nab. 099832. Beds 7 and 8 of loc 88 above. Abundant belemnites.
97. Gristhorpe Cliff. 097833 to 085837. Fox-Strangways, 1892a, p. 278.
98. High Red Cliff. 077842. Leckenby, 1859, p. 5 ; Fox-Strangways, 1904, p. 33 and Pl. 4. This is perhaps the best and most fossiliferous exposure now available. Ammonites and oysters are often abundant. Nodules in the clays below yield interesting decapod crustacea (Wright, 1860, p. 26).
99. Osgodby Nab. 065854. Poorly exposed beneath slipped boulder clay but very fossiliferous blocks can sometimes be found. See Fox-Strangways, 1892a, p. 281.
100. North Cliff, Scarborough. 044893. Fox-Strangways, 1904, pp. 34, 35 and Pl. 10.
101. Row Brow Wood Quarry. 006885.
    2. Soft yellow muddy sand seen to about 10-ft. ; occasional ammonites.
    1. Massive sandstone, coarse at the top, finer and softer below, seen to nearly 20-ft.
102. Hackness Quarry. 966907. Over 20-ft. of fine building stone still exposed, but not very fossiliferous. The discovery of ammonites would settle the question as to whether or no this sandstone should be grouped with the Hackness or Kellaways Rock. (See exp. 93).

103. Langdale Rigg. 931927. Opposite Birch Hall Camp on the west side of Langdale Rigg. An important quarry exposing the fossiliferous lower part of the Kellaways Rock.
104. Saltergate. 846947. Stream leading into Newtondale. Douglas and Arkell, 1932, p. 140. A good exposure of the shales at the base of the Kellaways Beds immediately above the main (lower) waterfall.
105. Huggitt's and Yew Tree Scars, Newtondale. 831940 to 843949. Fox-Strangways, 1892a, p. 283. Perhaps the finest inland section but the fossiliferous beds are often quite decalcified, even the belemnites and oysters remaining but as hollow casts.

UPPER CORNBRASH

Macrocephalites macrocephalus zone

The Cornbrash of our district is extremely fossiliferous. Most museums of the country boast a collection from the Scarborough Cornbrash. The fossils have recently been revised by Cox and Arkell, 1948-49. **Ornithella lagenalis** and other brachiopods, lamellibranchs (**Lopha marshii, Ostrea undosa, Trigonia cassiope, T. scarburgensis,** etc.) and gastropods are particularly abundant; ammonites rare but interesting (see Arkell, 1945, p. 340).

106. Newbiggin Wyke. 100830. Fox-Strangways, 1892a, p. 266.
107. Cunstone Nab. 099832. Beds 5 and 6 of exposure 88.
108. Gristhorpe Cliff. 097833 to 085837. Fox-Strangways, 1892a, p. 268 Exposed in many places along the cliff often easily accessible and very fossiliferous. The best locality in the district.
109. High Red Cliff. 077843. Fox-Strangways, 1892a, p. 268. Reef along foreshore, often covered by sand. In the past regarded as a valuable fossil locality. Now rather overgrown with seaweed.
110. Spring Hill Brick Pit (=Peacock's Quarry). 029874. (Behind Seamer Road Power Station). Cooke, 1896 ; Douglas and Arkell, 1932, pp. 140—141. Good exposure of very fossiliferous Cornbrash.
111. Saltergate, Newtondale. 846947. Douglas and Arkell, 1932, p. 140. The thickest developments of Cornbrash in the district. The lower 7-ft. of sandstone (Bed 2) were included in the Upper Estuarine Series (Scalby Beds) by Douglas and Arkell, but immediately underneath there is a layer of lenticular clay-ironstone nodules full of marine lamellibranchs, which must either still be Cornbrash or some lower (Bathonian) marine horizon previously undiscovered. No lower Cornbrash (the **Clydoniceras discus** zone, so well represented in the south of England) has yet been discovered in Yorkshire.

MIDDLE JURASSIC

THE DELTAIC SERIES

(= **The Estuarine Series** of Fox-Strangways)

(Compiled from notes by **T. M. Harris, M.A., F.R.S., P. C. Sylvester-Bradley** and published records.)

Recent proposals as to a revision of the nomenclature of the Middle Jurassic Rocks of Yorkshire (Hemingway, 1949, and Sylvester-Bradley, 1949) have been incorporated in the following account.

The fossil plants from the Deltaic Series of the Scarborough district are famous all over the world. In addition to plant beds yielding numerous and good specimens listed below there are many root beds

(especially in the Gristhorpe Beds of Cloughton Wyke), rocks containing microflora (leaves and spores) wood, and fallen blocks of shale from undiscovered localities in the cliff which yield good plants. A walk along the beach anywhere below the Deltaic cliffs between Gristhorpe and Robin Hood's Bay is almost certain to yield half a dozen such blocks (T.M.H.).

?BATHONIAN **The Scalby Beds***

There are no marine bands in the Scalby Beds and therefore nothing can be said of their age other than it is either Bathonian or late Bajocian. The base of the Scalby Beds contains massive grits, and has been called the " MOOR GRIT " by Fox-Strangways (P.C.S.B.).

112. Low Red Cliff. 083842. Black, 1929, pp. 404 and 409, and fig. 1. Red Cliff Plant Bed ; **Ginkgoites,** etc. For section in Gristhorpe Bay see Wright, 1860, pp. 28, 29.
113. White Nab. 059864. Black, 1929, pp. 404 and 409. (Washout). **Zamites** and **Ginkgoites.**
114. Between White Nab and the Spa 059864 to 047873. Casts of **Unio** are found " depending from the roof of some of the caves " Fox Strangways, 1904, p. 19.
115. Scalby Ness. 038911. Foot of cliff. Sandstone with various leaves, chiefly **Ginkgoites,** ferns (T.M.H.).
116. Scalby Wyke, " Channel G ". 031922. Black, 1929, p. 409 and figs. 1 and 2. **Ginkgoites,** ferns.
117. Scalby Wyke Plant Bed. 031924. Black, 1929, figs. 2, 3 and pp. 397 and 410. Muddy sandstone and clay. Ferns, conifers and **Ginkgoales** (insects, crushed lamellibranchs, twigs and cones in mudstone above).
118. Burniston Wyke, " Channel D ". 029929. Black, 1929, p. 409 and fig. 1. **Baiera** leaves.
119. Burniston Wyke. 0393. Black, 1929, p. 410. Lenticular shales at top of current bedded sandstone. Ferns, **Ginkgoites,** etc.
120. Crook Ness. 027935. The Burniston Footprint Bed. Forms a conspicuous shelf running round cliff. Hargreaves, 1913, 1914. Dinosaur footprints.
121. Brown Rigg Beck. 922004. Sandstone with **Ginkgoites** leaves (T.M.H).
122. River Derwent. 935946, 934957, 931964. Sandstone with **Ginkgoites** leaves and a few other species. In several other inland localities, notably Upper Kirk Moor, Fylingdales (9103), the Moor Grit has layers packed with cuticles of conifers, ginkgos and other tough leaved plants (T.M.H.).

BAJOCIAN

Parkinsonia parkinsoni and **Stephanoceras humphriesianum** zones

Scarborough Beds‡

Large ammonites (**Teloceras blagdeniforme, Stephanoceras triptolemus,** etc.) and large belemnites, with some beds crowded with lamellibranchs (**Gervillella scarburgensis, Meleagrinella lycetti, Pleuromya uniformis,** etc.). The fossils have been revised by Cox and Arkell, 1948-49. **Parkinsonia parkinsoni** has been recorded (Wright, 1860) from the upper beds at White Nab. The record needs confirmation (P.C.S.B.).

* The Upper Estuarine Series of Fox-Strangways.
‡ Or " Grey Limestone Series ".

123. Yons Nab. Reef extends seaward along Knotty Bink for about 1½ miles. 087839. Fox-Strangways, 1892a, p. 230. Full of **Meleagrinella** and **Ostrea** (P.C.S.B.).
124. Low Red Cliff. 082843. At foot of cliff. Fox-Strangways, 1892a, p. 230. Marine strata now measure 11-ft. 6-ins. (P.C.S.B.).
125. White Nab and Black Rocks. 059865. Fox-Strangways, 1892a, p. 231. The best exposure for ammonites (**Teloceras,** etc.) and belemnites, which cover a bed not far above low water mark (P.C.S.B.).
126. Hundale Point. 026949. Fox-Strangways, 1892a, p. 232. The most famous fossil locality.
127. Hayburn Wyke to Ravenscar. The Moor Grit caps the upper cliff most of the way, and the Scarborough Beds outcrop immediately below. They are easily accessible where paths from Ravenscar lead down the cliffs, e.g., 991009, 988012, 986014. Fox-Strangways, 1892a, p. 233 (P.C.S.B.).
128. Raven Gill, Harwood Dale. 946980 Fox-Strangways, 1892a, p. 233 ("Bloody Beck"). The finest inland section (P.C.S.B.).
129. Helwath Beck. 949985. Recent slipping has made good exposures (P.C.S.B.).
130. May Beck. 888014. Fox-Strangways, 1892a, p. 235.

?Otoites sauzei zone

Gristhorpe Beds*

The great majority of the 2000 old coal pits in the moors appear to be in this series, and the interiors of the spoil heaps still yield determinable plants (T.M.H.). No marine fossils are present, so no exact correlation is possible.

130. Gristhorpe Bay. 085841. For section see Wright, 1860, pp. 30, 31. The Gristhorpe Plant Bed. Available in the beach at mid and low tide. The best preserved and most varied Estuarine plants come from this and the succeeding locality (T.M.H.). Wright records **Unio** in his beds 15 and 18, not in the Scalby Beds, as suggested by Jackson, 1911a, p. 107 (P.C.S.B.).
131. Red Cliff Rocks. 081843. Remarks as for 130.
132. Cloughton Wyke (1). 020950. Bed yielding many **Williamsoniana** flowers, now available at low spring tides (T.M.H.).
133. Cloughton Wyke (2). 021955. Plant bed in cliff foot associated with coal seam (T.M.H.).

Sonninia sowerbyi zone

Yons Nab Beds

Above the true Millepore Bed there occurs at Yons Nab about 25-ft. of shales and sandstones with abundant **Trigonia** and other lamellibranchs in some beds, together with marine ostracods, plant fragments, etc. Dr. Hemingway suggests the apt name "Yons Nab Marine Series" for these beds. They are separated from the Millepore Bed by a few feet of shales from which only ostracods and plants have been recorded. The Yons Nab Beds are known only from this one locality (P.C.S.B.).

134. Horseshoe Rocks, Yons Nab. 085843. For section see Fox-Strangways, 1892a, pp. 207, 208.

* Or "Middle Estuarine Series."

Millepore Beds

Bryozoa (**Haploecia straminea**), crinoid ossicles, lamellibranchs and gastropods (P.C.S.B.).

135. Yons Nab. 082844. Fox-Strangways, 1892a, pp. 207, 208. Forms the massive, outer reef, about 15-ft. thick (P.C.S.B.).
136. Osgodby Nab. 066855. The finest exposure (Richardson, 1912, Pl. 23).
137. Cloughton Wyke. 021955. Fox-Strangways, 1892a, p. 208.
138. Staintondale to Ravenscar. 004987 to 982019. Fox-Strangways, 1892a, p. 210. The Millepore Bed outcrops near the base of the upper cliff, but is often obscured by scree. Some of the early fossil collectors labelled specimens "Staintondale Cliffs" (P.C.S.B.).

?Ludwigia murchisonae zone

Some 280 feet of deltaic sandstone, shales and thin coals with a marine intercalation (the Eller Beck Beds) about the middle. No exact correlation has yet been made (P.C.S.B.).

Sycarham Beds*

The flora of the Sycarham Beds agrees with that from the Gristhorpe Beds rather than with that from the Hayburn Beds (T.M.H.).

139. Beast Cliff. Northwards from 001955, in the middle region of the cliff. Grey and black shales with micro-fossils (chiefly fragments of conifer leaves and spores) (T.M.H.).
140. Common Cliff. 996005. U-shaped worm burrows (**Arenicolites statheri**). See Stather and Bather, 1925.

Eller Beck Beds

Nearly 20-ft. of marine sandstones and shales with one or two ironstone bands crowded with lamellibranchs (**Nucula, Astarte,** etc.) (P.C.S.B.).

141. Iron Scar, Cloughton Wyke. 017964. Fox-Strangways, 1892a, p. 195. U-shaped worm burrows occur near base.
142. Above Little Beck Alum Works. 883049. Fox-Strangways, 1892a, p. 196. This section still presents some good exposures in a most romantic setting (P.C.S.B.).
143. Walk Mill Force, Eller Beck. 833023. Fox-Strangways, 1892a, p. 197. The type locality, and still the most fossiliferous exposure. Dr. Rastall points out that the Geological Survey 1-inch map of the area is printed on a topographical base so out of date that it still shows the railway line about ½-mile further west than it is now, although the change was made in 1865. The locality is in the bank immediately below the present railway, unmarked on the geological map (P.C.S.B.).

Hayburn Beds†

The most fossiliferous locality is at Whitby (908 113), outside our area.

144. Hayburn Wyke. Classical locality was on beach. Not found by T.M.H. between 1944 and 1947.
145. Hayburn Beck. A plant bed outcrop at the foot of the cliff just south of the waterfall (010970) and also above the waterfall (T.M.H.).
146. Beast Cliff (1). 010980. Shaly sandstone with **Equisetites** in position of growth, exposed for a quarter of a mile (T.M.H.).
147. Beast Cliff (2). 008985. Plant-bearing rocks (Bennetitalean leaves, ferns, etc.) at foot of cliff north of Hayburn. Very local slight changes from year to year cover some and expose others (T.M.H.).
148. Brow Alum Quarry. 960022. A **Unio** bed, 18-in. above top of the Dogger, underlying a seat-earth and coal seam. Jackson, 1911b, p. 212.

* = Upper part of Lower Estuarine Series.
† = Lower part of Lower Estuarine Series.

THE DOGGER

Leioceras opalinum zone

It was formerly supposed that the Dogger of Blea Wyke was of **murchisonae** date (Richardson, 1912). Macmillan (1932) and Black (1934) have shown that the Dogger of the north-west region (outside the Scarborough district) is certainly of **murchisonae** age, but that that of Glaisdale and further east belongs to the **opalinum** zone (**costosum** subzone). In the lack of positive evidence, such as would be provided by the discovery of ammonites in situ, it seems wisest to regard the whole of the Dogger of Blea Wyke as of **opalinum** age (P.C.S.B.).

149. Blea Wyke. 991015. Fox-Strangways, and Barrow, 1915, p. 21. Rastall and Hemingway, 1939, p. 363. Versey and Hemingway, 1948, p. 14. Oolitic and sandy limestone, 40-ft., "**Nerinea,**" other gastropods ; **Astarte** and other lamellibranchs ; corals, etc., the shell material replaced by siderite (P.C.S.B.).
150. Peak. 979023. Rastall and Hemingway, 1939, p. 363.
151. Ravenscar brickworks. 970015. Rastall and Hemingway, 1940, p. 181.
152. Stoupe Brow Alum Works. 960022. Rastall and Hemingway, 1940, p. 183.
153. Howedale. 955017. Rastall and Hemingway, 1940, pp. 183, 4.

LOWER JURASSIC

UPPER TOARCIAN (YEOVILIAN) — UPPER LIAS

Lytoceras jurense zone‡ — **Blea Wyke Series, Striatulus Shales and Peak Shales**

One of the most interesting series of beds in the Jurassic of Yorkshire. Ammonites of all the sub-zones of the **jurense** zone except the top one (**aalensis**) probably occur, but need more patient collecting and accurate recording than they have yet received. Brachiopods, (including **Lingula beani**), lamellibranchs and serpulae are also abundant at certain horizons (P.C.S.B.).

154. Blea Wyke to Peak. 989014 to 980022. Versey and Hemingway, 1948, p. 14. See also Buckman, 1915, pp. 79-80 ; Rastall and Hemingway, 1939 ; Richardson, 1912 ; Rastall, 1905 ; and Hudleston, 1874 (P.C.S.B.).
155. Peak. 980021. Rastall and Hemingway, 1939, p. 363.

LOWER TOARCIAN (WHITBIAN)

Hildoceras bifrons zone — **Alum Shale Series**

Abundant ammonites (**Hildoceras** spp., **Dactylioceras commune,** etc.), **Nuculana ovum,** belemnites, fish, saurians, etc.

156. Blea Wyke to Old Peak. 989014 to 980022. Intermittent exposures along foreshore, beneath Peak Shales.
157. Peak Alum Works. 970016.
158. Brow Alum Works. 960012.

‡ Cut out by a non-sequence west of the Peak Fault, where the Dogger rests directly on the Alum Shales. Further to the west, the so-called "Dogger" is of **jurense** date (see Macmillan, 1932).

159. Howedale Beck. 955017. The most complete section. About 100-ft. of soft alum shales, the upper 20-ft. with cementstone nodules and a basal band of pyritous doggers with masses of ammonites and belemnites. Fox-Strangways and Barrow, 1915, p. 18
160. Falling Foss. 887036.
161. Little Beck Alum Works. 883048.

Hildoceras serpentinum zone* **Jet Rock Series**

Harpoceras spp., Phylloceras, Inoceramus dubius, belemnites, fish, saurian remains, etc.

162. Old Peak. 980024 (at the foot of the cliff, east of the fault). Fox-Strangways, 1892a, p. 129. Jet rock and bituminous shales with bands of large doggers and pyritous concretions, c. 100-ft.
163. Peak Alum Works. 970017.
164. Howedale. 952018.

Dactylioceras tenuicostatum zone **Grey Shale Series**

D. tenuicostatum and other ammonites and belemnites, in nodules.

165. Below Ravenscar Brick Works. 973015.
166. Howedale Gorge. 951019. Fox-Strangways and Barrow, 1915, p. 16. Grey Shales with bands of nodules containing the fossils. 30-ft.

UPPER PLIENSBACHIAN (DOMERIAN) MIDDLE LIAS

(Compiled from notes by **L. Bairstow** and published records).

The Geological Survey grouped as Middle Lias in this district the **Ironstone Series** (which further north includes the Cleveland Ironstone) and the underlying **Sandy Series;** but, when the Middle Lias is limited palaeontologically, the lower part of the Sandy Series is excluded.

Pleuroceras spinatum zone

Upper part (above the Pecten Seam) of the Ironstone Series of Fox-Strangways and Barrow, 1915, pp. 13, 61.

167. Peak Arm. 981026. A small exposure at low water on the east side of the Peak fault. **Pleuroceras** spp.

On the west side of the Peak fault the outcrop passes from Peak round Stoupe Brow, where it disappears under the boulder clay. No accessible exposure has been recorded, though according to Tate and Blake, p. 127, the beds are visible but relatively inaccessible in Howedale Beck (see locality 171). The nearest complete section accessible is on the coast (about 952076) at Normanby Stye Batts and the adjoining High Scar, a little north of our district.

Amaltheus margaritatus zone

Lower part (Pecten Seam and below) of Ironstone Series, and upper part of Sandy Series, of Fox-Strangways and Barrow, 1915, pp. 11, 13, 61. Casts of **Amaltheus** spp., with **Dentalium giganteum** and lamellibranchs (notably **Pseudopecten aequivalvis** and **Protocardia truncata**).

168. Peak Steel. 979026. Reef between the two main branches of the Peak fault; accessible only when the sea is below about half-tide. Ferruginous sandstones of the upper part of the Sandy Series.
169. Peak Cliff. 978022. Fox-Strangways and Barrow, 1915, p. 11. Upper part of the Sandy Series with **Amaltheus, Dentalium giganteum** and lamellibranchs.

* = **Harpoceras falcifer** zone.

170. Stoupe Brow railway cutting. 959025. Fox-Strangways and Barrow, 1915, p. 13. Ironstone Series.
171. Howedale Beck. 949025. Fox-Strangways and Barrow, 1915, p. 13 About 80-ft. of shales with ironstone nodules belong to the Iron stone Series and at least in part to the **margaritatus** zone.
172. Castle Chamber. 960066. Margaritatus and Algovianum Zones of Fox-Strangways, Barrow and Buckman, 1915, pp. 73-4. The lower part of the zone (lower part of upper portion of Sandy Series) is accessible in the cliff. **Amaltheus stokesi, Dentalium giganteum. Isocrinus** sp. and lamellibranchs. The whole thickness of the zone is visible here, and its higher beds become accessible in turn in the cliffs and on the foreshore to the north, just outside our district (L.B.).

LOWER LIAS

By **L. Bairstow, M.A., F.G.S.**

[Within our district the Lower Lias outcrops only in the Robin Hood's Bay area. Surprising as it may seem, there is no adequate published guide to the Lower Lias of Robin Hood's Bay. Mr. L. Bairstow has been studying these beds in detail since 1928 and his work is still in progress, though a provisional summary of the succession has appeared (Bairstow, 1948). In the following catalogue of localities, reference is made to the bed numbers of his MS. detailed section; some of these bed numbers were quoted by Spath, 1938. Until such time as Mr. Bairstow's work is published, the most useful geological map available is that of Tate and Blake (1876). Most of the exposures are accessible only when the sea is lower than about half-tide. On parts of this coast the collector should beware of danger from tides and from cliff-falls. P.C.S.B.]

LOWER PLIENSBACHIAN (CARIXIAN)

Prodactylioceras davoei zone

Lower part of Sandy Series of Middle Lias, and upper part of Ironstone Shales of Lower Lias, of Fox-Strangways, Barrow and Buckman, 1915, pp. 11, 61, 66. The zone is about 100 feet thick and includes about seventy lithological subdivisions grouped as approximately beds 600 to 581 in L. Bairstow's MS. detailed section. The base of the zone is estimated to be about 870 feet above the base of the Lias. Of the whole succession within the zone on the north side of Robin Hood's Bay, the best single rendering hitherto published is that of Tate and Blake, from about bed 32 of their **margaritatus**-beds (p. 110) down to about bed 27 of their **capricornus**-beds (p. 91). Specimens of **Gryphaea cymbium, Oxytoma inaequivalvis, Dentalium giganteum,** and capricorn ammonites including **Oistoceras** spp. and **Androgynoceras maculatum,** are abundant in certain beds.

173. Robin Hood's Bay : foreshore and base of adjacent cliff, between Ness Point and Castle Chamber. (Between 960062 and 960067.)

Tragophylloceras ibex zone

Middle part of Ironstone Shales of Buckman, 1915, p. 61. The zone is about 65 feet thick and includes about thirty lithological subdivisions grouped as approximately beds 580 to 564 in L. Bairstow's MS. detailed section. The base of the zone is estimated to be about 650 feet above the base of the Lias. Of the succession within this zone on the north side of Robin Hood's Bay, the best rendering hitherto published is that of Tate and Blake; from about bed 28 of their **capricornus**-beds (pp. 91-2) down to about bed 19 of their **Jamesoni**-beds (p. 79). The group of beds 28 to 33 of their **capricornus**-beds is repeated as the group of beds 1 to 7 of their **Jamesoni**-beds. **Lytoceras** sp., **" Passaloteuthis "** sp., **Hastites fusteolus, H. trunculus** and **Gryphaea obliquata** are fairly abundant in certain beds; **Beaniceras** sp., **Liparoceras heptangulare, Tragophylloceras** sp. and **Tropidoceras** sp. occur.

174. Robin Hood's Bay : foreshore and base of adjacent cliff, S.W. of Ness Point. (Between 958058 and 960061.)

Uptonia jamesoni zone

Lower part of Ironstone Shales, and upper part of Pyritous Shales, of Buckman, 1915, p. 61. The zone is about 150 feet thick and includes about 140 lithological subdivisions grouped as approximately beds 563 to 501 in L. Bairstow's MS. detailed section. The base of the zone is estimated to be about 500 feet above the base of the Lias. Of the succession within the zone on the north side of Robin Hood's Bay, the best rendering hitherto published is that of Tate and Blake, from about bed 20 down to about bed 55 of their **Jamesoni**-beds (pp. 79-81). They omitted about ten feet of strata at about bed 31. Specimens of **Uptonia jamesoni, Platypleuroceras** sp., **Polymorphites** spp., **Apoderoceras** spp., **" Pseudohastites "** sp., **" Passaloteuthis "** spp., **Hastites trunculus, Gryphaea obliquata, Pholadomya** spp., **Pinna folium, Pseudopecten priscus** and **Ditrupa circinata** are abundant in particular beds.

175. Robin Hood's Bay : foreshore and base of adjacent cliff, from the Landing to beyond Dungeon Hole. (Between 954050 and 957057.)

SINEMURIAN

Echioceras raricostatum zone

Lower part of Pyritous Shales and upper part of Siliceous Shales, of Buckman, 1915, p. 61. At Robin Hood's Bay the zone is about 60 feet thick and includes about forty-five lithological subdivisions grouped as approximately beds 500 to 486 in L. Bairstow's MS. detailed section. The base of the zone is estimated to be about 450 feet above the base of the Lias. Of the upper fifteen or twenty feet of the zone at Robin Hood's Bay, the best original version hitherto published is that of Tate and Blake, from about bed 56 of their **Jamesoni**-beds (p. 81) down to bed 1 of their **oxynotus**-beds (p. 73).

This version relates primarily to the northern exposure only, but the same beds can be recognised also in the southern exposure. Below bed 1 of their **oxynotus**-beds Tate and Blake's rendering is difficult to follow with certainty in any part of the bay; but approximately equivalent to their bed 1 is the top bed of Barrow's composite section of the upper part of his **Ammonites oxynotus** Beds (1882, pp. 4-5), and the upper part (nominally about 34 feet) of this section provides the least-unsatisfactory published rendering of the remainder of the succession Specimens of **Eoderoceras** spp., **Gleviceras guibalianum, Metechioceras** spp., **Leptechioceras** spp., **Echioceras** sp., **Nannobelus** spp. and **Isocrinus** sp. are fairly abundant in certain beds.

176. Robin Hood's Bay, southern exposure : most of the foreshore between Peak Steel and the Dock, Wind Haven ; and base of part of the adjacent cliff. (Between 979025, 976023 and 973024.)
177. Robin Hood's Bay, northern exposure : much of the foreshore south and east of Bay Town. (Between 955045 and 954050.)

Oxynoticeras oxynotum zone

Middle part of Siliceous Shales of Buckman, 1915, p. 61. At Robin Hood's Bay the zone is about 50 feet thick and includes about sixty lithological subdivisions grouped as approximately beds 485 to 462 in L. Bairstow's detailed section. The base of the zone is estimated to be about 400 feet above the base of the Lias. Of the succession within the zone as a whole, none of the published versions is markedly preferable to all others. All versions of its upper part are unsatisfactory. The best version of the middle part is that of Tate and Blake, from about bed 20 down to bed 28 of their **oxynotus**-beds (p. 74). Below this, the best version of the lithological succession is that of Simpson (1868, p. 55; repeated with slight alterations in a more accessible publication, 1942, p. xxii) comprising his Indurated Bands from division 16, lower part (which immediately underlies bed 28 of Tate and Blake), down to about division 20. Specimens of **Oxynoticeras** spp., including **O. simpsoni;** also of **Gagaticeras gagateum, Nannobelus** sp., **Protocardia oxynoti, Cardinia** sp. and **Isocrinus** sp. are abundant in certain beds.

178. Robin Hood's Bay, southern exposure : most of the foreshore and base of most of the adjacent cliff, from Peak Dock to near Miller's Nab. (Between 972024 and 971025.)
179. Robin Hood's Bay, northern exposure : base of cliff from Stoupe Beck to Mill Beck Nab (between 958035 and 955041), and foreshore adjoining the mouth of Mill Beck (between 958038 and 955045).

Asteroceras obtusum zone

Lower part of Siliceous Shales, and upper part of Calcareous Shales of Buckman, 1915, p. 61. At Robin Hood's Bay the zone is about 40 feet thick and includes about forty lithological subdivisions grouped as approximately beds 461 to 446 in L. Bairstow's MS. detailed section. The base of the zone is estimated to be about 360 feet above the base of the Lias. The best rendering of the succession hitherto

published is that of Tate and Blake, from about bed 31 down to about bed 45 of their **oxynotus**-beds (pp. 74-5). Specimens of **Aegasteroceras sagittarium, Promicroceras planicosta, Eparietites** spp., **Asteroceras** spp., **Nannobelus** sp., **Gryphaea obliquata** and **Isocrinus** sp. are abundant in certain beds.

180. Robin Hood's Bay foreshore, southern exposure : foreshore adjoining Miller's Nab. (Between 971026 and 970027.)
181. Robin Hood's Bay cliff exposure : between Miller's Nab and a point N.W. of Peter White Cliff. (Between 969027 and 961032.) The upper part of the zone rises slightly above the base of the cliff, which for a long distance almost follows the curving strike.
182. Robin Hood's Bay foreshore, northern exposure : central and eastern parts of the fan of reefs between Stoupe Beck, Mill Beck and a little seaward of Low Scar. (Between 959037 and 957042.)

Caenisites turneri zone

Middle part of " Calcareous Shales " of Buckman, 1915, p. 61. At Robin Hood's Bay the zone is about 35-ft. thick and includes about fifty lithological subdivisions grouped as approximately beds 445 to 427 in L. Bairstow's MS. detailed section. The base of the zone is estimated to be about 320 feet above the base of the Lias. The least unsatisfactory version of the succession hitherto published is that of Tate and Blake : from about bed 46 of their **oxynotus**-beds (p 75), which is the same as bed 1 of their **Bucklandi**-beds (p. 63), down to about bed 19 of their **Bucklandi**-beds (p. 64). Their rendering is difficult to follow in detail. **Promicroceras capricornoides, Microderoceras** sp., **Caenisites** spp., **Nannobelus** sp. and **Isocrinus** sp. occur. Lamellibranchs are fairly abundant; **Gryphaea obliquata, Modiolus laevis** and **Lucina limbata** are among the species present.

183. Robin Hood's Bay : northern part of foreshore off Miller's Nab ; and most of Flat Scars. (Between 971027 and 963034.) Best studied at spring tides ; during ordinary tides the zone is adequately accessible only for a short time near low water ; during neap tides the full width of its outcrop never emerges.

Arnioceras semicostatum zone

Lower part of Calcareous Shales of Buckman, 1915, p. 61. At Robin Hood's Bay the top of the zone is estimated with the aid of Messrs. Fison's No. 1 borehole, to be about 320 feet above the base of the Lias. In the bay at low tide more than 20 feet of the zone have been seen, including about twenty lithological subdivisions grouped as approximately beds 426 to 418 in L. Bairstow's MS. detailed section. No satisfactory rendering of the succession has hitherto been published. Specimens of **Arnioceras** spp., are abundant in certain beds ; **Euagassiceras** spp., **Nannobelus** sp. and lamellibranchs including **Gryphaea obliquata** occur also.

184. Robin Hood's Bay : seaward part of Flat Scars ; and Low Balk and beyond. (Between 966032 and 965034.) Even the upper beds of the zone can scarcely be reached except at low water of spring tides.

BIBLIOGRAPHY

This bibliography is not intended to be exhaustive, but lists those works likely to be of most value to the collector. Although many are out of print, most can be consulted in the Scarborough Public Library. Monographs, describing groups of fossils only some of which come from Yorkshire, are only here indexed if stratigraphical details are included.

ARKELL, W. J. 1929-1937.
Monograph of British Corallian Lamellibranchia.
Palaeont. Soc.

————, 1933.
The Jurassic System in Great Britain.
Oxford.

————, 1935-1948.
Monograph of Ammonites of English Corallian Beds.
Palaeont. Soc.

————, 1945.
The zones of the Upper Jurassic of Yorkshire.
Proc. Yorks. Geol. Soc., 25.

————, 1946.
Standard of the European Jurassic.
Bull Geol. Soc. Amer., 57.

BAIRSTOW, L. 1948.
In Versey and Hemingway, q.v.

BLACK, M. 1929.
Drifted Plant-beds of the Upper Estuarine Series of Yorkshire.
Quart. Journ. Geol. Soc., 85.

————, 1934.
Sedimentation of the Aalenian rocks of Yorkshire.
Proc. Yorks. Geol. Soc., 22

BLAKE, J. F. 1891.
The Geology of the Country between Redcar and Bridlington.
Proc. Geol. Assoc., 12.

BLAKE, J. F. and W. H. HUDLESTON. 1877.
On the Corallian Rocks of England.
Quart. Journ. Geol. Soc., 33.
(Many of the sections in this work are reprinted in Fox-Strangways, 1892a.)

BOSWELL, P. G. H. 1929.
' Cretaceous ' in : Handbook of the Geology of Great Britain.
Murby.

BRINKMANN, R. 1926.
Uber die sedimentäre Abbildung epirogener Bewegungen sowie über das Schichtungsproblem.
Nachrichten Gesellsch. Wiss. Göttingen, M-P Klasse, 1925.

BUCKMAN, S. S. 1913.
The ' Kelloway Rock ' of Scarborough.
Quart. Journ. Geol. Soc., 69 pp. 152-168.

————, 1915.
A palaeontological classification of the Jurassic rocks of the Whitby district ; with a zonal table of Lias ammonites.
In : Fox-Strangways and Barrow, 1915.

COOKE, J. H. 1896.
A section in the Lower Oolites of Scarborough.
Naturalist, 1896.

COX, L. R., and W. J. ARKELL. 1948-1949.
A Survey of the Mollusca of the British Great Oolite Series
Palaeont. Soc.

DAVIES, A. MORLEY. 1947.
An Introduction to Palaeontology.
2nd edit., **Murby.**

DAVIS, J. W. 1892.
On some sections in the Liassic and Oolitic Rocks of Yorkshire.
Proc. Yorks. Geol. Soc., 12, pp. 170, 214.

DOUGLAS, J. A., and W. J. ARKELL. 1932.
The stratigraphical distribution of the Cornbrash : 2. the north-eastern area.
Quart. Journ. Geol. Soc., 88.

ENNIS, W. C. 1937.
The Upper Beds of the Speeton Clay.
Trans. Hull Geol. Soc., 7.

FOX-STRANGWAYS. C. 1892a.
The Jurassic Rocks of Britain vol. 1. Yorkshire.
Mem. Geol. Surv.

————. 1892b.
The Jurassic Rocks of Britain, vol. 2. Yorkshire. Tables of Fossils.
Mem. Geol. Surv.

————, 1904.
The Geology of the Oolitic and Cretaceous Rocks south of Scarborough.
Mem. Geol. Surv., 2nd edit.

FOX-STRANGWAYS, C., and G. BARROW. 1882.
The Geology of the country between Whitby and Scarborough.
Mem. Geol. Surv., 1st edit.

————, 1915.
The Geology of the Country between Whitby and Scarborough.
Mem. Geol. Surv., 2nd edit.

HARGREAVES. J. A. 1913, 1914.
Fossil Footprints near Scarborough.
Naturalist, 1913, p. 92-95 ; 1914, pp. 154-156.

HEMINGWAY, J. E. 1949.
A Revised Terminology and Subdivision of the Middle Jurassic Rocks of Yorkshire.
Geol. Mag., 86, pp. 67-71.

HERRIES, R. S. 1910.
East Yorkshire ; in : " Geology in the Field."
Geol. Assoc.

HUDLESTON, W. H. 1874-8.
The Yorkshire Oolites.
Proc. Geol. Assoc., vol. 3, pp 283-333, 1874 ;
vol. 4, pp. 353-410, 1876 ;
vol. 5, pp. 407-494, 1878.

JACKSON, J. W. 1911a.
On **Unio distortus** Bean, and **Alasmodon vetustus** Brown, from the Upper Estuarine Beds of Gristhorpe, Yorks.
Naturalist, 1911, pp. 104-107, 119-122.

————. 1911b.
A new species of **Unio** from the Yorkshire Estuarine Series.
Naturalist, 1911, pp. 211-215.

JUDD, J. W. 1868.
On the Speeton Clay.
Quart. Journ. Geol. Soc., 24, pp. 250-5.

KENDALL, P. F., and H. E. WROOT. 1924.
Geology of Yorkshire.
Leeds, Vols. 1 and 2.

LAMPLUGH, G. W. 1881.
On a shell-bed at the Base of the Drift at Speeton near Filey, on the Yorkshire coast.
Geol. Mag., dec. 2, vol. 8.

————, 1889.
On the subdivisions of the Speeton Clay.
Quart. Journ. Geol. Soc., 45
————, 1924.
A review of the Speeton clays.
Proc. Yorks. Geol. Soc., 20.
LECKENBY, J. 1859.
On the Kelloway Rock of the Yorkshire Coast.
Quart. Journ. Geol. Soc., 15, pp. 4-15.
MACMILLAN, W. E. F. 1932.
Notes on Dogger horizons in north-east Yorkshire.
Proc. Yorks. Geol. Soc., 22.
PHILLIPS, J. 1829.
Illustrations of the Geology of Yorkshire ; part 1 : The Yorkshire Coast.
RASTALL, R. H. 1905.
The Blea Wyke Beds and the Dogger in north-east Yorkshire.
Quart. Journ. Geol. Soc., 61.
RASTALL, R. H., and J. E. HEMINGWAY. 1939.
The Blea Wyke Beds and the Dogger at Peak, Yorkshire
Geol. Mag., 76.
————, 1940.
The Yorkshire Dogger. 1. The Coastal Region.
Geol. Mag., 77, pp. 177-197; 257-275.
RICHARDSON, L. 1912.
The Lower Oolitic Rocks of Yorkshire.
Proc. Yorks. Geol. Soc., new series, vol. 17 (with appendices by S. S. Buckman and E. T. Paris).
ROWE, A. W. 1904.
The White Chalk of the Yorkshire coast.
Proc. Geol. Assoc., 18.
SHEPPARD, T. 1939.
William Smith and the Hackness Quarries.
Proc. Yorks. Geol. Soc., 24.
SIMPSON, M. 1868.
A Guide to the Geology of the Yorkshire Coast.
Illustrated with Sections, 4th (3rd) edit.
Whitby and London.
————, 1942.
The fossils of the Yorkshire Lias, etc., 3rd edit., with an Introduction by T. Sheppard.
Hull.
SPATH, L. F. 1923
On the Ammonite Horizons of the Gault and Contiguous deposits.
Summary of Progress for 1922.
Geol. Surv.
————, 1924.
On the Ammonites of the Speeton Clay and the Subdivisions of the Neocomian.
Geol. Mag., 61
————, 1926.
Notes on Yorkshire Ammonites.
Part X. On some post-Liassic Ammonites and a new species of **Bonarellia.**
Naturalist, 1926, pp. 321-6.
————, 1938.
A Catalogue of the Ammonites of the Liassic Family Liparoceratidae in the British Museum (Natural History).
Brit. Mus.
————, 1941.
A monograph of the Ammonoidea of the Gault. Pt. 14.
Palaeont Soc.

————, 1942.
The ammonite zones of the Lias.
Geol. Mag., 79.
————, 1943.
A monograph of the Ammonoidea of the Gault. Pt. 16.
Palaeont. Soc.
STATHER, J. W., and F. A. BATHER. 1925.
U-shaped markings on Estuarine sandstone near Blea Wyke.
Proc. Yorks. Geol. Soc., 20, pp. 182-199.
SYLVESTER-BRADLEY, P. C. 1949.
Revised Nomenclature for Yorkshire Estuarine Series.
Geol. Mag., 86, p. 263.
TATE, R., and J. F. BLAKE. 1876.
The Yorkshire Lias.
London.
VERSEY, H. C. 1938.
The Speeton preglacial shell bed.
Naturalist, 1938.
VERSEY, H. C., J. E. HEMINGWAY and others. 1948.
International Geological Congress Guide to Excursion C.2.
North-East Yorkshire.
WILSON, V. 1933.
The Corallian rocks of the Howardian Hills (Yorkshire).
Quart. Journ. Geol. Soc., 89.
————, 1948.
British Regional Geology—East Yorkshire and Lincolnshire.
Geol. Surv.
————, 1949.
The Lower Corallian Rocks of the Yorkshire Coast and Hackness Hills.
Proc. Geol. Ass., 60, pp. 235-271.
WILSON, V., J. E. HEMINGWAY and M. BLACK. 1934.
A synopsis of the Jurassic Rocks of Yorkshire.
Proc. Geol. Assoc., 45.
WRIGHT, C. W. and E. V. WRIGHT. 1937.
The Speeton Clays of East Yorkshire.
Trans. Hull Geol. Soc., 7.
————, 1942.
The Chalk of the Yorkshire Wolds.
Proc. Geol. Ass., 53.
WRIGHT, T. 1860.
On the Subdivisions of the Inferior Oolite in the South of England, compared with the Equivalent Beds of that Formation on the Yorkshire Coast.
Quart. Journ. Geol. Soc., 16, pp. 1-48.
YOUNG, G., and J. BIRD. 1822.
A Geological Survey of the Yorkshire coast.
Whitby.

FRESH WATER ALGAE

Compiled by G. B. Walsh.

The following list has been compiled chiefly from W. West and G. S. West, " Alga Flora of Yorkshire ", Botanical Transaction of the Yorkshire Naturalists' Union, Vol. 5, 1901, and from various reports in the " Naturalist." We are deeply indebted to Mr. A. Malins Smith, M.A., who has brought it completely up-to-date in the light of Fritsch's revision of West's " British Fresh-Water Algae ", and has added some of his own unpublished local records.

The following abbreviations are used :—

D.W.B.—D. W. Bevan. R.H.P.—R. H. Philip.
E.M.L.—E. M. Lind A.M.S.—A. Malins Smith.
G.M.—G. Massee. G.B.W.—G. B. Walsh.
G.N.—G. Norman. W.—Wests' " Alga Flora of Yorkshire ".

CLASS I ISOKONTAE

GROUP 1 VOLVOCALES

CHLAMYDOMONADACEAE

GONIUM Mueller
pectorale Muell.—Scarborough Mere (W.).
PANDORINA Bory em. Pringsheim
morum (Muell.) Bory—Scarborough Mere (W.).

SPHAERELLACEAE

SPHAERELLA Sommerfeldt
lacustris (Girod.) Wittr.—Seamer, Scarborough Mere (W.).
VOLVOX (Linnaeus) Ehrenberg
globator Ehr.—Pool on Seamer Moor (D.W.B.).

PHACOTACEAE

PHACOTUS Perty
lenticularis (Ehr.) Stein—Pond in Valley Gardens, Scarborough, 1943 (A.M.S.).

PALMELLACEAE

SPHAEROCYSTIS Chodat
schoeteri Chod.—Peaty pools on moor near Cross Cliff, 1929 (A.M.S.).
GLOEOCYSTIS Naegeli
gigas (Kuetz.) Lag. (= **G. ampla** Kuetz.)—Scarborough Mere (W.).
vesiculosa Naeg.—On moist ground, White Nab, Scarborough (W.).

TETRASPORACEAE

TETRASPORA Link
gelatinosa (Vauch.) Desv.—Levisham (W.).
APIOCYSTIS Naegeli
brauniana Naeg.—Scarborough Mere (W.).

GROUP 2 CHLOROCOECALES

CHLOROCOCCACEAE

CHARACIUM Braun, A.
heteromorphum Reinsch—Scarborough Mere (W.).

HYDRODICTYACEAE

PEDIASTRUM Meyen
angulosum (Ehr.) Men.—Scarborough Mere (W.).
boryanum (Turp.) Men.—Scarborough Mere (W.); pond in Valley Gardens, Scarborough, 1943 (A.M.S.).
duplex Mey.—Scarborough Mere (W.).
biradiatum Mey.—Scarborough Mere (G.M.).
tetras (Ehr.) Ralfs
forma a. **Dispositio cellularum** 4—Scarborough Mere (W.).
forma b. **Dispositio cellularum** 1 + 7—Scarborough Mere (W.).
HYDRODICTYON Roth
reticulatum (L.) Lag.—Scarborough (G.M.).

SELENASTRACEAE

ANKISTRODESMUS Corda em. Ralfs
falcatus (Corda) Ralfs—Scarborough Mere (W.).
var. **acicularis** (Br., A.) West, G.S.—Scalby Beck, Scarborough Mere (W.).
DACTYLOCOCCUS Naegeli
infusionum Naeg.—Near Scarborough (W.).

DICTYOSPHAERIACEAE

DICTYOSPHAERIUM Naegeli
ehrenbergianum Naeg.—Scarborough Mere (W.).

COELASTRACEAE

COELASTRUM Naegeli
microporum Naeg.—Scarborough Mere (W.).
SCENEDESMUS Meyen
antennatus Bréb.—Scarborough Mere (W.).
obliquus (Turp.) Kuetz.—Scalby Beck, Scarborough Mere (W.).
bijugatus (Turp.) Kuetz.—Scarborough Mere. Hayburn Wyke (W.).
quadricauda (Turp.) Bréb.—Scarborough Mere (W.); pond in Valley Gardens, Scarborough, 1943 (A.M.S.).
var. **abundans** Kirchn.—Scalby Beck (W.).
denticulatus Lag., var. **linearis** Hansg.—River Derwent, Forge Valley (W.).

GROUP 3 ULOTRICHALES

ULOTRICHACEAE

ULOTHRIX Kuetzing
subtilis Kuetz., var. **variabilis** (Kuetz.) Kirchn.—Near Scarborough (W.).

ULVACEAE

ENTEROMORPHA Link
intestinalis (L.) Link—Not uncommon, Scarborough district (G.B.W.).

MICROSPORACEAE

MICROSPORA Thuret
floccosa (Vauch.) Thur.—Peaty pools on moors, Cross Cliff, 1929 (A.M.S.).
tumidula Haz.—Peaty pools on moors, Cross Cliff, 1929 (A.M.S.).
stagnorum (Kuetz.) Lag.—Newton Dale, peaty pools on moors, Cross Cliff, 1929 (A.M.S.).

PRASIOLACEAE

PRASIOLA Agardh
crispa (Lightf.) Men.—Scarborough (W.).

CLADOPHORACEAE

RHIZOCLONIUM Kuetzing
hieroglyphicum Kuetz., var. **kochianum** (Kuetz.) Stockm.—Cliffs near Scarborough (W.).
CLADOPHORA Kuetzing
crispata (Roth) Kuetz.—Near Scarborough (W.).
glomerata (L.) Kuetz.—Hayburn Wyke, Scarborough Mere (W.).

GROUP 4 CHAETOPHORALES

CHAETOPHORACEAE

CHAETOPHORA Schrank
incrassata (Huds.) Haz.—Scarborough Mere, 1881, very fine, 1890 (G.M.).
STIGEOCLONIUM Kuetzing
tenue Kuetz.—Scarborough Mere (W.).
MICROTHAMNION (Naegeli) Kirchner
strictissimum Rab.—Seamer, Scarborough Mere (W.).

COLEOCHAETACEAE

COLEOCHAETE Brébisson
scutata Bréb.—Scarborough Mere (W.).

PLEUROCOCCACEAE

PLEUROCOCCUS Meneghini
naegelii Chod.—Abundant.

GROUP 5 OEDOGONIALES

OEDOGONIACEAE

OEDOGONIUM Link
macrandum Wittr.—Newton Dale, 1929, abundance of dwarf males (A.M.S.).
BULBOCHAETE Agardh
varians Wittr.—Newton Dale, 1929, abundance of dwarf males (A.M.S.).

GROUP 6 CONJUGATAE

MESOTAENIACEAE

CYLINDROCYSTIS Meneghini
brebissonii Men.—Near Scarborough, peat deposit, Filey (W.); peaty pools on moors near Cross Cliff, 1929 (A.M.S.).

ZYGNEMACEAE

SPIROGYRA Link
tenuissima (Hass.) Kuetz.—Scarborough Mere (W.).
inflata (Vauch.) Rab.—Newton Dale, 1929 (A.M.S.).
calospora Cleve—Sleights (A.M.S.).
gracilis (Hass.) Kuetz., var. **flavescens** (Hass.) Rab.—Scarborough Mere (W.).
catenaeformis (Hass.) Kuetz.—Newton Dale, 1929 (A.M.S.).
longata (Vauch.) Kuetz.—Seamer, Scarborough Mere (W.).
porticalis (Vauch.) Cleve—Scarborough Mere (W.).
condensata (Vauch.) Kuetz.—Scarborough Mere (W.).
nitida (Dillw.) Link—Scarborough Mere (W.).
crassa Kuetz.—Scarborough Mere (W.).

MOUGEOTIACEAE

MOUGEOTIA Agardh
genuflexa (Dillw.) Ag.—Seamer (W.).
parvula Hass.—Scarborough Mere (W.).
depressa (Hass.) Wittr.—Scarborough Mere (W.).
viridis (Kuetz.) Wittr.—Newton Dale, 1929 (A.M.S.).
gracillima (Hass.) Wittr.—Seamer (W.).
ZYGOGONIUM Kuetzing em. de Bary
ericetorum Kuetz.—On damp ground, White Nab, Scarborough (W.); forming dark purple patches on damp soil on moors near Cross Cliff, and the submerged form in peaty pools in the same area, 1929 (A.M.S.).

DESMIDIACEAE

PENIUM Brébisson em. Luetkemueller
mooreanum Arch.—Moorland stream near Scarborough (W.).
truncatum Bréb.—Peat deposit, Filey (W.).
CLOSTERIUM Nitzsch
libellula Focke—Seamer (W.).
parvulum Naeg.—Near Scarborough, Levisham, Hayburn Wyke (W.).
venus Kuetz.—Scarborough Mere (W.); Flamborough (R.H.P.).
leibleinii Kuetz.—Scarborough Mere, River Derwent, Forge Valley (W.).
moniliferum (Bory) Ehr.—Hayburn Wyke, Staindale (W.); Newton Dale, 1929 (A.M.S.).
ehrenbergii Men.—Near Scarborough (W.); Flamborough (R.H.P.).
striolatum Ehr.—Seamer (W.); Newton Dale, 1929 (A.M.S.).

acerosum (Schrank) Ehr.—Scarborough Mere, River Derwent, Forge Valley (W.).
lanceolatum Kuetz.—Near Scarborough, Hayburn Wyke (W.); Flamborough (R.H.P.).
lunula (Muell.) Nitzsch—Scarborough Mere (W.); Newton Dale, 1929 (A.M.S.).
acutum Bréb.—Seamer, Scarborough Mere (W.).

PLEUROTAENIA Naegeli
truncatum (Bréb.) Naeg.—Newton Dale, 1929 (A.M.S.).

EUASTRUM Ehrenberg
didelta (Turp.) Ralfs—Scarborough Mere (W.).
oblongum (Grev.) Ralfs—Newton Dale, 1929 (A.M.S.).

MICRASTERIAS Agardh
denticulata Bréb.—Seamer (W.).

COSMARIUM Corda
cucumis Corda—Scarborough Mere (W.).
bioculatum Bréb.—Scarborough Mere (W.).
hammeri Reinsch—Scarborough Mere, peat deposit, Filey (W.).
praemorsum Bréb.—Scarborough Mere (W.).
punctulatum Bréb.—Scarborough Mere (W.).
nitidulum de Not.—Beast Cliff (W.).
eboracense West—Staindale (W.).
ochthodes Nordst.—Scarborough Mere (W.).
subspeciosum Nordst.—Scarborough Mere (W.).
globosum Buln.—Peat deposit, Filey (W.).
crenatum Ralfs—Peat deposit, Filey (W.); Flamborough (R.H.P.).
debaryi Arch.—Peat deposit, Filey (W.).
obliquum Nordst.—Peat deposit, Filey (W.).
laeve Rab., var. **septentrionale** Will.—Scarborough Mere (W.).
cucurbita Bréb.—Scarborough Mere (W.).
palangula Bréb.—Peat deposit, Filey (W.).

STAURASTRUM Meyen
dejectum Bréb.—Scarborough Mere (W.).
lunatum Ralfs—Scarborough Mere (W.).
hirsutum (Ehr.) Bréb.—Scarborough Mere (W.).
punctulatum Bréb.—Near Scarborough (W.).
muricatum Bréb.—Near Scarborough (W.).
cyrtocerum Bréb.—Scarborough Mere (W.).

ARTHRODESMUS Ehrenberg
incus (Bréb.) Hass.—Moorland stream near Scarborough (W.).

HYALOTHECA Ehrenberg
dissiliens (Smith) Bréb.—Newton Dale, 1929 (A.M.S.).

GROUP 7 SIPHONALES

VAUCHERIACEAE

VAUCHERIA de Candolle
geminata (Vauch.) DC.—Newton Dale, 1929 (A.M.S.).

CLASS II HETEROKONTAE

GROUP 1 HETEROCHLORIDALES

BOTRYOCOCCACEAE

BOTRYOCOCCUS Kuetzing
braunii Kuetz.—Near Scarborough (W.).

GROUP 2 HETEROCOCCALES

OPHIOCYTIACEAE

OPHIOCYTIUM Naegeli
majus Naeg.—Newton Dale, 1929 (W.).

GROUP 3 HETEROTRICHALES

TRIBONEMACEAE

TRIBONEMA Derbes et Solier
bombycinum (Ag.) Berb. et Sol.—Near Scarborough (W.).
tenerrimum Heer.—Peat Deposit, Filey (W.).

CLASS CHRYSOPHYCEAE

EUCHROMULINACEAE

CHRYSOPYXIS Stein
globosa Rich—Throxenby Mere, 1943 (A.M.S.).

CLASS RHODOPHYCEAE

GROUP FLORIDEAE

HELMINTHOCLADIACEAE

BATRACHOSPERMUM Roth
moniliforme Roth—Pickering water-cress beds (E.M.L.).
vagum (Roth) Ag.—Scarborough Mere (W.); Pickering (E.M.L.).

CLASS MYXOPHYCEAE (CYANOPHYCEAE)

GROUP CHROOCOCCALES

CHROOCOCCACEAE

MERISMOPEDIA Meyen
glauca (Ehr.) Naeg.—Scalby Beck, Scarborough Mere, peat deposit, Filey (W.).
CHROOCOCCUS Naegeli
macrococcus Rab.—Cornelian Bay (W.).
APHANOCAPSA Naegeli
rivularis (Carm.) Rab.—Scarborough Mere (W.).

GROUP HORMOGONEALES

OSCILLATORIACEAE

OSCILLATORIA Vaucher
limosa Ag.—Scarborough Mere, Hayburn Wyke (W.).
tenuis Ag.—Seamer (W.).
formosa Bory—Scarborough (W.).
SPIRULINA Turpin
major Kuetz.—Scarborough (W.).
PHORMIDIUM Kuetzing
autumnale (Ag.) Gom.—Scarborough (G.N.).

SCYTONEMATACEAE

TOLYPOTHRIX Kuetzing
tenuis Kuetz.—Near Scarborough (W.).

RIVULARIACEAE

RIVULARIA (Roth) Agardh
haematites (DC.) Ag.—Moorland rill near Scarborough (W.).

INDEX OF GENERA.

Ankistrodesmus 50
Aphanocapsa 54
Apiocystis 49
Arthrodesmus 53
Batrachospermum 54
Botryococcus 54
Bulbochaete 51
Chaetophora 51
Characium 50
Chroococcus 54
Chrysopyxis 54
Cladophora 51
Closterium 52
Coelastrum 50
Coleochaete 51
Cosmarium 53
Cylindrocystis 52
Dactylococcus 50
Dictyosphaerium 50
Enteromorpha 50
Euastrum 53
Gloeocystis 49
Gonium 49
Hyalotheca 53
Hydrodictyon 50
Merismopedia 54
Micrasterias 53
Microspora 51
Microthamnion 51
Mougeotia 52
Oedogonium 51
Ophiocytium 54
Oscillatoria 55
Pandorina 49
Pediastrum 50
Penium 52
Phacotus 49
Phormidium 55
Pleurococcus 51
Pleurotaenia 53
Prasiola 51
Rhizoclonium 51
Rivularia 55
Scenedesmus 50
Sphaerella 49
Sphaerocystis 49
Spirogyra 52
Spirulina 55
Staurastrum 53
Stigeoclonium 51
Tetraspora 49
Tolypothrix 55
Tribonema 54
Ulothrix 50
Vaucheria 53
Volvox 49
Zygogonium 52

ALGAE
DIATOMS

Compiled by G. B. Walsh

The following list has been compiled from :—

1. W. West and G. S. West, " Alga Flora of Yorkshire ", Botanical Transactions of the Yorkshire Naturalists' Union, Vol. 5, 1901.
2. Transactions of the Hull Scientific and Field Naturalists' Society, very kindly compiled and communicated by Mr. H. M. Foster.
3. W. Ward, " Diatoms from the Hole of Horcum ", 1938, North-Western Naturalist, December, pp. 222-5.
4. W. Ward, " The Diatom Flora of Thornton-le-Dale and District ", 1940, North-Western Naturalist, December, pp. 247-254.

The classification of the genera arranged in ten sub-orders is according to Hendey, 1937, and the nomenclature is according to Hustedt, " Die Süsswasser-flora Mitteleuropas ", 1930.

We are deeply indebted to the Rev. R. Fraser Bastow, F.R.M.S., who has helped and advised us in many ways, especially in classification and nomenclature.

Mr. Ward states that though the Hole of Horcum, from which there are many records, is plentifully supplied with water, there is a comparative dearth of species and individuals. He attributes this partly to lack of dissolved silica in the water and partly to the fact that the locality is a deep steep-sided depression which is deprived of the full intensity of the morning and evening sunlight.

In the neighbourhood of Thornton-le-Dale the best results have been obtained in the ponds and sluggish streams south of the Pickering-Scarborough highroad.

The following abbreviations have been used :—

G.M.—G. Massee.
F.W.M.—F. W. Mills.
G.N.—G. Norman.
R.H.P.—R. H. Philip.
W.W.—W. Ward.
West—W. & G. S. West as above.

ALGAE

Class BACILLARIOPHYCEAE—DIATOMEAE

Sub-order DISCINEAE

COSCINODISCACEAE

MELOSIRA Agardh

varians Ag., C.A.—Frequent; Scalby Beck (West); Thornton-le-Dale (W.W.).

distans (Ehr.) Kuetz., var. **nivalis** (Smith, W.) van Heurck—Lockton (West).
arenaria Moore—Near Scarborough (West); Thornton-le-Dale, Hole of Horcum (W.W.).
sulcata (Ehr.) Kuetz.—Filey Brigg (R.H.P.).

HYALODISCUS Ehrenberg
stelliger Bail.—Flamborough (G.N.).

CYCLOTELLA Kuetzing
kuetzingiana Thwaites—Abundant near Scarborough, 6/96 (West).

COSCINODISCUS Ehrenberg
radiatus Ehr.—Filey Brigg, Flamborough, in the stream at Little Thornwick Bay (G.N.).
excentricus Ehr.—Filey Brigg (G.N.).
oculus-iridis Ehr.—Filey Brigg, Flamborough (F.W.M.).
centralis Ehr.—Flamborough (F.W.M.).
normanii Greg.—Flamborough (F.W.M.).

THALASSIONEMA Grunow ex Hustedt
nitzschioides Hust.—Rock pools, Filey (R.H.P.).

ACTINODISCACEAE

ACTINOPTYCHUS Ehrenberg
undulatus (Bail.) Ralfs—Abundant at Filey Brigg (R.H.P.).

Sub-order AULACODISCINEAE

EUPODISCACEAE

EUPODISCUS Ehrenberg
argus (Ehr.) Smith, W.—Flamborough, from an ascidian (G.N.).

Sub-order AULISCINEAE

AULISCACEAE

AULISCUS Ehrenberg
sculptus (Smith, W.) Ralfs—Flamborough (G.N.).

Sub-order BIDDULPHINEAE

BIDDULPHIACEAE

BIDDULPHIA Gray
rhombus (Ehr.) Smith, W.—Flamborough (F.W.M.).

Sub-order ARAPHIDINEAE

FRAGILARIACEAE

FRAGILARIA Lyngbye
capucina Desm.—Lockton, Scarborough Mere (West); Thornton-le-Dale (W.W.).
var. **mesolepta** Ehr.—Lockton (West); Thornton-le-Dale (W.W.)
var. **lanceolata** Grun.—Thornton-le-Dale (W.W.).
harrisonii Smith, W.—Thornton-le-Dale (W.W.).
var. **dubia** Grun.—Thornton-le-Dale (W.W.).
construens (Ehr.) Grun.—Thornton-le-Dale (W.W.).
var. **venter** (Ehr.) Grun.—Thornton-le-Dale (W.W.).

pinnata Ehr.—Thornton-le-Dale (W.W.).
mutabilis (Smith, W.) Grun.—Scarborough (West).
virescens Ralfs—Hole of Horcum, Thornton-le-Dale (W.W.).
var. **capitata** Kr.—Thornton-le-Dale (W.W.).
var. **mesolepta** Rab.—Thornton-le-Dale (W.W). First British record.
striatula Lyngb.—Rock pools, Filey (G.N.).
brevistriata Grun.—Thornton-le-Dale (W.W.).
hyalina Kuetz.—Scarborough (G.N.).

SYNEDRA Ehrenberg
pulchella (Ralfs) Kuetz.—Hayburn Wyke (West).
var. **lanceolata** O'Meara (=**minutissima** Smith, W.)—Scarborough Mere, Hayburn Wyke, Scalby Beck, R. Derwent in Forge Valley (West).
ulna (Nitzsch) Ehr.—Peat deposit, Filey; Scalby Beck, R. Derwent in Forge Valley, Staindale (West); Thornton-le-Dale, Hole of Horcum (W.W.).
var. **oxyrhynchus** (Kuetz.) Hust.—Thornton-le-Dale (W.W.).
forma **contracta** Hust.—Thornton-le-Dale (W.W.). First British record.
var. **ramesi** (Her. et Per.) Hust.—Thornton-le-Dale (W.W.). First British record.
var. **danica** (Kuetz.) Grun.—Thornton-le-Dale (W.W.).
acus Kuetz., var. **radians** (Kuetz.) Hust.—Thornton-le-Dale (W.W.).
var. **delicatissima** (Smith, W.) Grun.—Scarborough (R.H.P.).
gaillonii (Bory) Ehr.—Flamborough, in dredgings (R.H.P.).
affinis (Kuetz.)—Filey, Flamborough (R.H.P.).
var. **fasciculata** (Kuetz.) Grun.—Filey (R.H.P.).

MERIDION Agardh
circulare Ag.—Thornton-le-Dale (W.W.).
var. **constrictum** (Ralfs) van Heurck—Thornton-le-Dale (W.W.).

DIATOMA de Candolle
vulgare Bory—Lockton, Hayburn Wyke, Scalby Beck (West); Thornton-le-Dale (W.W.).
var. **producta** Grun.—Thornton-le-Dale (W.W.).
var. **capitulata** Grun.—Thornton-le-Dale (W.W.).
var. **grandis** (Smith, W.) Grun.—Thornton-le-Dale (W.W.).
hiemale (Lyngb.) Heib.—Lockton, Scarborough (West).
elongatum Ag.—Thornton-le-Dale (W.W.).

TABELLARIA Ehrenberg
flocculosa (Roth) Kuetz.—Saltergate (G.N.); Scarborough (West); Thornton-le-Dale (W.W.).

GRAMMATOPHORA Ehrenberg
marina (Lyngb.) Kuetz.—Filey (G.N.).
var. **macilenta** (Smith, W.) Grun.—Filey, Flamborough (G.N.).

RHABDOMENA Kuetzing
arcuatum Kuetz.—Filey (G.N.).
minutum Kuetz.—Filey (G.N.).

LICHMOPHORA Agardh
paradoxa (Lyngb.) Ag.—Flamborough (G.N.).
communis (Heib.) Grun.—Filey Brigg, Flamborough (R.H.P.).
dalmatica (Kuetz.) Grun.—Flamborough (G.N.).
gracilis (Ehr.) Grun.—Rock pools, Filey (R.H.P.).
var. **anglica** Kuetz.—Filey Brigg, abundant (R.H.P.).

Sub-order RAPHIDIOIDINEAE
EUNOTIACEAE

EUNOTIA Ehrenberg
arcus Ehr.—Goathland (West); Thornton-le-Dale (W.W.).
var. **fallax** Hust.—Thornton-le-Dale (W.W.). First British record.
monodon Ehr.—Thornton-le-Dale (W.W.).
major (Smith, W.) Hust.—Seamer (West).
tenella (Grun.) Hust.—Thornton-le-Dale (W.W.).
gracilis (Ehr.) Rab.—Hole of Horcum (W.W.).
exigua (Bréb.) Grun.—Thornton-le-Dale (W.W.).
pectinalis (Kuetz.) Rab.—Beast Cliff, Staindale, Scarborough (West); Saltergate (G.N.); Thornton-le-Dale (W.W.).
var. **minor** (Kuetz.) Rab.—Thornton-le-Dale (W.W.).
var. **undulata** (Ralfs) Rab.—Near Scarborough, Goathland (West); Saltergate (G.N.).
lunaris (Ehr.) Grun.—Staindale (West); Thornton-le-Dale (W.W.).

Sub-order MONORAPHIDINEAE
ACHNANTHACEAE

ACHNANTHES Bory
affinis Grun.—Thornton-le-Dale (W.W.).
microcephala Kuetz.—Scarborough Mere (West); Flamborough (R.H.P.).
exilis Kuetz.—Hayburn Wyke, R. Derwent in Forge Valley, Beast Cliff (West).
lanceolata Bréb.—Thornton-le-Dale (W.W.).
EUCOCCONEIS Cleve
flexella (Kuetz.) Cleve—Thornton-le-Dale (W.W.); Staindale (West).
RHOICOSPHENIA Grunow
curvata (Kuetz.) Grun.—Hayburn Wyke, Scalby Beck (West); Thornton-le-Dale (W.W.).
var. **marina** (Smith, W.) Schult.—Flamborough (R.H.P.).
COCCONEIS Ehrenberg
pediculus Ehr.—Frequent, Hayburn Wyke, Scalby Beck (West); Thornton-le-Dale (W.W.).
placentula Ehr.—Seamer, R. Derwent in Forge Valley (West); Thornton-le-Dale (W.W.).
var. **euglypta** (Ehr.) Cleve—Thornton-le-Dale (W.W.).
scutellum Ehr.—Flamborough (G.N.); Filey (R.H.P.).
var. **stauroneiformis** Smith, W.—Flamborough (R.H.P.).
var. **parva** Grun.—Flamborough (F.W.M.).

Sub-order BIRAPHIDINEAE
NAVICULACEAE

MASTOGLOIA Thwaites
grevillei Smith, W.—Thornton-le-Dale (W.W.).
DIPLONEIS Ehrenberg
ovalis (Hilse) Cleve—Thornton-le-Dale (W.W.).
var. **oblongella** (Naeg.) Cleve—Thornton-le-Dale (W.W.).
elliptica (Kuetz.) Cleve—Thornton-le-Dale, Hole of Horcum (W.W.); Seamer, moist ground, White Nab, Beast Cliff, Staindale (West).
didyma (Ehr.) Cleve—Filey Brigg (R.H.P.).
AMPHIPLEURA Kuetzing
pellucida Kuetz.—Scarborough Mere (West); Hole of Horcum (W.W.).
FRUSTULIA Agardh
rhomboides (Ehr.) de Toni—Thornton-le-Dale (W.W.).
var. **saxonica** (Rab.) de Toni—Saltergate (G.N.); Thornton-le-Dale, Hole of Horcum (W.W.).
vulgaris Thwaites—Thornton-le-Dale (W.W.).
var. **capitata** Kr.—Thornton-le-Dale (W.W.). First British record.
PLEUROSIGMA Smith W.
strigosum Smith, W.—Flamborough (G.N.).
rigidum Smith, W.—Flamborough (G.N.).
decorum Smith, W.—Flamborough (G.N.).
affine Grun., var. **normanii** Ralfs—Filey Brigg (R.H.P.).
GYROSIGMA Hassall
acuminatum (Kuetz.) Rab.—Seamer, Scarborough, Cornelian Bay (West); Thornton-le-Dale (W.W.).
attenuatum (Kuetz.) Rab.—Thornton-le-Dale (W.W.).
kuetzingii (Grun.) Cleve—Thornton-le-Dale (W.W.).
spencerii (Smith, W.) Cleve—Seamer, Hayburn Wyke, R. Derwent in Forge Valley (West).
scalproides (Rab.) Cleve—Thornton-le-Dale (W.W.).
STAURONEIS Ehrenberg
phoenicenteron Ehr.—Near Scarborough, Seamer (West); Saltergate (G.N.); Thornton-le-Dale, Hole of Horcum (W.W.); Little Thornwick Bay (R.H.P.).
anceps Ehr.—R. Derwent in Forge Valley (West); Little Thornwick Bay (R.H.P.); Thornton-le-Dale (W.W.).
forma **gracilis** (Ehr.) Cleve—Thornton-le-Dale (W.W.).
forma **linearis** (Ehr.) Cleve—Thornton-le-Dale (W.W.).
var. **sibirica** Grun.—Hole of Horcum (W.W.).
acuta Smith, W.—Thornton-le-Dale (W.W.); Little Thornwick Bay (R.H.P.).
legumen Ehr.—Little Thornwick Bay (R.H.P.); Thornton-le-Dale (W.W.).
smithii Grun.—Little Thornwick Bay (R.H.P.); Thornton-le-Dale (W.W.).
var. **incisa** Pant.—Thornton-le-Dale (W.W.). First British record.

CALONEIS Cleve

alpestris (Grun.) Cleve—Thornton-le-Dale (W.W.).

amphisbaena (Bory) Cleve—Scarborough Mere, Seamer (West); Thornton-le-Dale (W.W.).

latiuscula (Kuetz.) Cleve—Thornton-le-Dale (W.W.).

var. **subholstei** Hust.—Thornton-le-Dale (W.W.). First British record.

silicula (Ehr.) Cleve—Hole of Horcum, Thornton-le-Dale (W.W.).

var. **trunculata** Grun.—Thornton-le-Dale (W.W.).

var. **gibberula** (Kuetz.) Grun.—Staindale, Hayburn Wyke (West); Thornton-le-Dale, Hole of Horcum (W.W.).

var. **tumida** Hust.—Thornton-le-Dale (W.W.). First British record.

schumanniana (Grun.) Cleve—Thornton-le-Dale (W.W.).

var. **biconstricta** Grun.—Thornton-le-Dale (W.W.). First British record.

liber (Smith, W.) Cleve—Filey Brigg (R.H.P.).

exilis (Kuetz.) Cleve—Cornelian Bay (West).

ANOMOEONEIS Pfitzer

sphaerophora (Kuetz.) Pfitz.—Thornton-le-Dale (W.W.).

serians (Bréb.) Cleve—Thornton-le-Dale (W.W.).

forma **thermalis** (Grun.) Hust.—Thornton-le-Dale (W.W.).

exilis (Kuetz.) Cleve—Cornelian Bay (West).

NEIDIUM Pfitzer

bisulcatum (Lag.) Cleve—Thornton-le-Dale (W.W.).

forma **undulatum** Muell., O.—Thornton-le-Dale (W.W.). First British record.

affine (Ehr.) Cleve—Common; Cornelian Bay (West); Thornton-le-Dale (W.W.).

var. **amphirhynchus** (Ehr.) Cleve—Seamer (West); Hole of Horcum, Thornton-le-Dale (W.W.).

iridis (Ehr.) Cleve—Hole of Horcum, Thornton-le-Dale (W.W.).

forma **vernale** Reich.—Thornton-le-Dale (W.W.).

var. **amphigomphus** (Ehr.) van Heurck—Near Scarborough (West); Hole of Horcum, Thornton-le-Dale (W.W.).

var. **ampliatum** (Ehr.) Cleve—Thornton-le-Dale (W.W.).

productum (Smith, W.) Cleve—Thornton-le-Dale (W.W.).

dubium (Ehr.) Cleve—Thornton-le-Dale (W.W.).

forma **constrictum** Hust.—Thornton-le-Dale (W.W.). First British record.

longiceps (Greg.) Ross (= **affine** var. **longiceps** (Greg.) Cleve)—Thornton-le-Dale (W.W.). First British record.

NAVICULA Bory

cuspidata Kuetz.—Seamer, Scarborough Mere (West); Thornton-le-Dale (W.W.).

var. **ambigua** (Ehr.) Cleve—Thornton-le-Dale (W.W.).

hustedtii Kr.—Thornton-le-Dale (W.W.). First British record.

binodis Ehr.—Thornton-le-Dale (W.W.).

bacillum Ehr.—Thornton-le-Dale (W.W.).

pupula Kuetz.—Thornton-le-Dale (W.W.).
var. **rectangularis** (Greg.) Grun.—Thornton-le-Dale (W.W.).
var. **capitata** Hust.—Thornton-le-Dale (W.W.).
var. **rostrata** Hust.—Thornton-le-Dale (W.W.). First British record.
protracta Grun.—Thornton-le-Dale (W.W.).
placenta Ehr.—Thornton-le-Dale (W.W.).
cryptocephala Kuetz.—Thornton-le-Dale (W.W.).
rhynchocephala Kuetz.—Hole of Horcum, Thornton-le-Dale (W.W.).
viridula Kuetz.—Hole of Horcum, Thornton-le-Dale (W.W.).
radiosa Kuetz.—Hole of Horcum, Thornton-le-Dale (W.W.); Scalby Beck, Scarborough, Hayburn Wyke, Staindale, R. Derwent in Forge Valley (West).
reinhardtii Grun.—Hole of Horcum, Thornton-le-Dale (W.W.).
forma **gracilior** Grun.—Thornton-le-Dale (W.W.). First British record.
dicephala (Ehr.) Smith, W.—Goathland (West); Thornton-le-Dale (W.W.).
placentula (Ehr.) Grun.—Thornton-le-Dale (W.W.).
forma **rostrata** Mayer, A.—Thornton-le-Dale (W.W.). First British record.
forma **latiuscula** (Grun.) Meist.—Thornton-le-Dale (W.W.). First British record.
exigua (Greg.) Muell., O.—Thornton-le-Dale (W.W.).
lanceolata (Ag.) Kuetz.—Thornton-le-Dale (W.W.).
oblonga Kuetz.—Seamer (West); Thornton-le-Dale (W.W.).
tuscula (Ehr.) Grun.—Thornton-le-Dale (W.W.).
pygmaea Kuetz.—Thornton-le-Dale (W.W.).
distans (Smith, W.) van Heurck—Flamborough, Filey Brigg (R.H.P.).
smithii Bréb.—Flamborough, Filey Brigg (R.H.P.); Hole of Horcum (W.W.).
lyra Ehr.—Flamborough, dredgings (R.H.P.).
gracilis Ehr.—Saltergate (G.N.); Hole of Horcum (W.W.).
tumida (Bréb.) Cleve—Seamer (West).
laevissima Kuetz.—Saltergate (West).
grevillei Ag.—Flamborough (R.H.P.).
directa Ralfs—Filey Brigg (R.H.P.).
inflexa Ralfs—Filey Brigg (R.H.P.).
palpebralis Bréb.—Filey Brigg (R.H.P.).
scopulorum Bréb.—Filey Brigg (R.H.P.).
ramosissimum (Ag.) Cleve—Filey Brigg (R.H.P.).

PINNULARIA Ehrenberg
nobilis Ehr.—Seamer (West).
hemiptera (Kuetz.) Cleve—Rocky stream, Saltergate (G.N.).
appendiculata (Ag.) Cleve—Near Scarborough (West); Thornton-le-Dale (W.W.).

subcapitata Greg.—Thornton-le-Dale (W.W.).
var. **hilseana** (Jan.) Muell., O.—Thornton-le-Dale (W.W.).
interrupta Smith, W.—Levisham (West); Thornton-le-Dale (W.W.).
forma **minutissima** Hust.—Thornton-le-Dale (W.W.). First British record.
mesolepta (Ehr.) Smith, W.—Near Scarborough (West); Saltergate (G.N.); Thornton-le-Dale (W.W.).
forma **angusta** Cleve—Thornton-le-Dale (W.W.). First British record.
globiceps Greg.—Thornton-le-Dale (W.W.).
microstauron (Ehr.) Cleve—Thornton-le-Dale (W.W.).
forma **biundulata** Muell., O.—Thornton-le-Dale (W.W.). First British record.
var. **brebissonii** (Kuetz.) Hust.—Lockton, Cleava Cliffs north of Scalby (West); Thornton-le-Dale (W.W.).
divergens Smith, W.—Seamer (West); Thornton-le-Dale (W.W.).
var. **elliptica** Grun.—Thornton-le-Dale (W.W.).
lata (Bréb.) Smith, W.—Moorland stream near Scarborough (West); Thornton-le-Dale (W.W.).
borealis Ehr.—Thornton-le-Dale (W.W.).
gibba Ehr.—Lockton (West); Saltergate (G.N.); Thornton-le-Dale (W.W.).
stomatophora Grun.—Thornton-le-Dale (W.W.).
acrosphaeria Bréb.—Peat deposit, Filey (West); Thornton-le-Dale (W.W.).
major (Kuetz.) Cleve—Seamer, Levisham (West); Hole of Horcum, Thornton-le-Dale (W.W.).
viridis (Nitzsch) Ehr.—Saltergate (G.N.); Hole of Horcum, Thornton-le-Dale (W.W.).
var. **sudetica** (Hilse) Hust.—Hole of Horcum, Thornton-le-Dale (W.W.).
nobilis Ehr.—Seamer (West); Thornton-le-Dale (W.W.).
tabellaria (Ehr.) Kuetz.—Lockton (West); Saltergate (G.N.).

TRACHYNEIS
aspera (Ehr.) Cleve—Filey Brigg (R.H.P.).

AMPHIPRORA (Ehrenberg) Cleve
paludosa Smith, W.—Filey Brigg (R.H.P.).

GOMPHONEMACEAE

GOMPHONEMA Agardh
acuminatum Ehr.—Seamer, Scarborough Mere, Staindale (West); Hole of Horcum, Thornton-le-Dale (W.W.).
var. **coronatum** (Ehr.) Smith, W.—Thornton-le-Dale (W.W.).
angustatum (Kuetz.) Rab.—Thornton-le-Dale (W.W.).
var. **productum** Grun.—Thornton-le-Dale (W.W.).
intricatum Kuetz.—Thornton-le-Dale (W.W.).
var. **vibrio** (Ehr.) Cleve—Thornton-le-Dale (W.W.).
lanceolatum Ehr.—Thornton-le-Dale (W.W.).

longiceps Ehr.—Thornton-le-Dale (W.W.). First British record.
var. **subclavatum** Grun.—Thornton-le-Dale (W.W.).
forma **gracile** Hust.—Thornton-le-Dale (W.W.). First British record.
constrictum Ehr.—Scarborough Mere, Scalby Beck (West).
var. **capitatum** (Ehr.) van Heurck—Seamer (West).
olivaceum (Lyngb.) Kuetz.—Scarborough Mere (West); Flamborough (R.H.P.); Thornton-le-Dale (W.W.).
parvulum Kuetz. var. **micropus** (Kuetz.) Cleve—Scarborough Mere, Cornelian Bay, Staindale (West).
gracile Ehr.—Hole of Horcum (W.W.).

CYMBELLACEAE

CYMBELLA Agardh
austriaca Grun.—Thornton-le-Dale (W.W.). First British record.
naviculiformis Auersw.—Thornton-le-Dale (W.W.).
amplicephala Naeg.—Thornton-le-Dale (W.W.).
ehrenbergii Kuetz.—Seamer, Scarborough Mere (West); Thornton-le-Dale (W.W.).
prostrata (Berkl.) Cleve—Thornton-le-Dale (W.W.).
gracilis (Rab.) Cleve—Thornton-le-Dale (W.W.).
affinis Kuetz.—Thornton-le-Dale (W.W.).
parva (Smith, W.) Cleve—Common; Staindale, Hayburn Wyke, (West), Thornton-le-Dale (W.W.).
cymbiformis (Kuetz.) van Heurck—Thornton-le-Dale (W.W.).
lanceolata (Ehr.) van Heurck—Staindale, Hayburn Wyke, Cleava Cliffs north of Scalby (West); Thornton-le-Dale (W.W.).
helvetica Kuetz.—Saltergate (G.N); Thornton-le-Dale (W.W.).
cistula (Hempr.) Grun.—Common; Staindale (West); Thornton-le-Dale (W.W.).
var. **maculata** (Kuetz.) van Heurck—Flamborough (R.H.P.); Hole of Horcum (W.W.).
aspera (Ehr.) Cleve—Thornton-le-Dale (W.W.).
cuspidata Kuetz.—Levisham (West); Saltergate (G.N.); Hole of Horcum (W.W.).
microcephala Grun.—Flamborough (G.N.); Hole of Horcum (W.W.).
gastroides Kuetz.—Hole of Horcum (W.W.).

AMPHORA Ehrenberg
ovalis Kuetz.—Seamer, Scarborough Mere, Staindale (West); Hole of Horcum, Thornton-le-Dale (W.W.).
forma **gracilis** (Ehr.) Cleve—Thornton-le-Dale (W.W.).

EPITHEMIACEAE

EPITHEMIA Brébisson
argus Kuetz.—Moist ground, White Nab (West); Thornton-le-Dale (W.W.).
var. **alpestris** (Grun.) Rab.—Staindale, Beast Cliff (West).
muelleri Fricke—Thornton-le-Dale (W.W.).

zebra (Ehr.) Kuetz.—Thornton-le-Dale (W.W.).
turgida (Ehr.) Kuetz.—Common; Levisham, Hayburn Wyke, Cleava Cliffs north of Scalby, on moist ground at White Nab (West); Hole of Horcum, Thornton-le-Dale (W.W.).
var. **granulata** (Ehr.) Kuetz.—Thornton-le-Dale (W.W.).
sorex Kuetz.—Thornton-le-Dale (W.W.).
westermanni Kuetz.—Staindale, Levisham (West).

RHOPALODIA Mueller, O.
gibba Kuetz.—Scarborough Mere, Staindale, Levisham, on moist ground at White Nab (with sporangial forms) (West).
var. **ventricosa** (Ehr.) Grun.—Lockton (West); Thornton-le-Dale (W.W.).

BACILLARIACEAE

HANTZSCHIA Grunow
amphioxys (Ehr.) Grun.—Scarborough Mere (West); Hole of Horcum, Thornton-le-Dale (W.W.).
var. **major** Grun.—Thornton-le-Dale (W.W.).
forma **capitata** Muell., O.—Thornton-le-Dale (W.W.).
virgata (Rop.) Grun.—Flamborough (G.N.).

NITZSCHIA Hassall
tryblionella Hantzsch—Thornton-le-Dale (W.W.).
var. **victoriae** Grun.—Thornton-le-Dale (W.W.).
var. **debilis** (Arn.) May., A.—Thornton-le-Dale (W.W.).
constricta (Greg.) Grun.—Filey Brigg (R.H.P.).
apiculata (Greg.) Grun.—Thornton-le-Dale (W.W.).
hungarica Grun.—Thornton-le-Dale (W.W.).
angustata (Smith, W.) Grun.—Thornton-le-Dale (W.W.).
var. **acuta** Grun.—Thornton-le-Dale (W.W.).
dubia Smith, W.—Hole of Horcum, Thornton-le-Dale (W.W.).
thermalis Kuetz.—Thornton-le-Dale (W.W.). First British record.
var. **minor** Hilse—Thornton-le-Dale (W.W.). First British record.
sinuata (Smith, W.) Grun.—Thornton-le-Dale (W.W.).
linearis Smith, W.—Hayburn Wyke (West); Thornton-le-Dale (W.W.).
recta Hantzsch—Thornton-le-Dale (W.W.).
dissipata (Kuetz.) Grun.—Seamer (West); Thornton-le-Dale (W.W.).
acuta Hantzsch—Thornton-le-Dale (W.W.).
gracilis Hantzsch—Thornton-le-Dale (W.W.).
palea (Kuetz.) Smith, W.—Thornton-le-Dale (W.W.).
sigmoidea (Ehr.) Smith, W.—Near Scarborough, Seamer (West); Hole of Horcum, Thornton-le-Dale (W.W.).
sigma (Kuetz.) Smith, W. var. **rigidula** Grun.—Filey Brigg (R.H.P.).
acicularis Smith, W.—Seamer, Scalby Beck (West); Thornton-le-Dale (W.W.).
denticula Grun.—Near Scarborough, Beast Cliff (West); Flamborough (R.H.P.).
insignis Greg.—Dredgings, Flamborough (G.N.).

angularis Smith, W.—Filey Brigg (R.H.P.).

Sub-order SURIRELLINEAE
SURIRELLACEAE

SURIRELLA Turpin

biseriata Bréb.—Scarborough Mere, Staindale (West); Hole of Horcum, Thornton-le-Dale (W.W.).
var. **bifrons** (Ehr.) Hust.—Thornton-le-Dale (W.W.).
var. **rostrata** Schulz.—Thornton-le-Dale. First British record.
linearis Smith, W.—Staindale (West); Thornton-le-Dale (W.W.).
var. **constricta** (Ehr.) Grun.—Thornton-le-Dale (W.W.).
var. **helvetica** (Brun.) Meist.—Thornton-le-Dale (W.W.).
birostrata Hust.—Thornton-le-Dale (W.W.).
angustata Kuetz.—Hole of Horcum, Thornton-le-Dale (W.W.); Flamborough (R.H.P.).
delicatissima Lew.—Thornton-le-Dale (W.W.).
robusta Ehr.—Thornton-le-Dale (W.W.).
var. **splendida** (Ehr.) van Heurck—Scarborough Mere (West).
ovata Kuetz.—Staindale (West); Thornton-le-Dale (W.W.).
var. **pinnata** (Smith, W.) van Heurck—Seamer, Scalby Beck (West).
var. **crumena** (Bréb.) van Heurck—Saltergate (G.N.); Hole of Horcum, Thornton-le-Dale (W.W.).
spiralis Kuetz.—Staindale (West); Hole of Horcum, Thornton-le-Dale (W.W.).
ovalis Bréb.—Seamer, Beast Cliff (West); Flamborough (R.H.P.).
angustata Kuetz.—Little Thornwick Bay (R.H.P.).

STENOPTEROBIA Brébisson

intermedia Lew.—Thornton-le-Dale (W.W.).

CYMATOPLEURA Smith, W.

elliptica (Bréb.) Smith, W.—Levisham (West).
solea (Bréb.) Smith, W.—Levisham (West); Thornton-le-Dale (W.W.).
var. **regula** (Ehr.) Grun.—Thornton-le-Dale (W.W.).
var. **apiculata** (Smith, W.) Ralfs—Thornton-le-Dale (W.W.).

CAMPYLODISCUS Ehrenberg

hodgsonii Smith, W.—Flamborough (R.H.P.).
noricus Ehr. var. **hibernicus** (Ehr.) Grun.—Little Thornwick Bay

INDEX OF GENERA.

Achnanthes	59	Cyclotella	57	Grammatophora	58	Pinnularia	61
Actinoptychus	57	Cymatopleura	66	Gyrosigma	60	Pleurosigma	60
Amphipleura	60	Cymbella	64	Hantzschia	65	Rhabdomena	58
Amphiprora	63	Diatoma	58	Hyalodiscus	57	Rhoicosphenia	59
Amphora	64	Diploneis	60	Lichmophora	59	Rhopalodia	65
Anomoeoneis	61	Epithemia	64	Mastogloia	60	Stauroneis	60
Auliscus	57	Eucocconeis	59	Melosira	56	Stenopterobia	66
Biddulphia	57	Eunotia	59	Meridion	58	Surirella	66
Caloneis	61	Eupodiscus	57	Navicula	61	Synedra	58
Campylodiscus	66	Fragilaria	57	Neidium	61	Tabellaria	59
Cocconeis	59	Frustulia	60	Nitzschia	65	Thalassionema	57
Coscinodiscus	57	Gomphonema	63			Trachyneis	63

MARINE ALGAE — SEAWEEDS

Dorothy Perkins

Introduction

Between Robin Hood's Bay and Flamborough Head are stretches of coast where seaweeds grow in abundance. Most seaweeds must have a firm substratum on which to anchor themselves ; they cannot grow on sand which blows before the wind and is churned up by the sea, nor on pebbles, for these roll with the ebb and flow of the tide. They favour a rocky shore, whether it be the shale of Robin Hood's Bay, the limestones and grits of Scarborough and Filey Brigg, or the chalk of Flamborough.

In this district the rocks have a gentle southward dip. Appearing each in turn with a steep northward slope and a gradual southward dip, successive strata have determined the contour of the coastline with its bays and headlands, and have determined too, to some extent, the distribution of its seaweeds.

At Robin Hood's Bay the shales run out from the shore in a series of rocky ledges or scars which slope gently inland. These, for the most part, are rough and uneven due to weathering, and so provide suitable anchorage for species like **Chondrus** and **Gigartina** which can withstand exposure. In the lower half of the intertidal zone the sea runs up between the scars forming shallow pools open to the sea. Here an abundance of algae—**Furcellaria, Halidrys, Rhodomela** and others—find shelter.

South of Ravenscar there are steep cliffs as far as Hayburn Wyke ; both here and at Cloughton Wyke one can get down to the shore, but the rocks at Scalby Ness provide a better hunting-ground for seaweeds. Scarborough North Bay is sandy, but there is a good stretch of rocky coast below the Spa, extending round White Nab and Cornelian Bay as far as Osgodby Nab. Not only does one see some fine rock-pools here but a walk from cliffs to sea at low water gives a good idea of algal zonation. From Red Nab to Filey Brigg, apart from Gristhorpe Bay (rocky), the shore is inaccessible.

Filey Brigg is a line of remarkable rocky ledges extending about half a mile seaward from Carr Nase and bounding Filey Bay on its north side. The top reef is skirted on its south side by masses of huge weathered boulders, and on its north side by a lower outer reef which is always submerged at its eastern end. The Brigg is one of the best collecting grounds along the coast.

South of Filey Bay the chalky ledges and boulders below Speeton cliffs provide anchorage for a few algae (e.g., **Porphyra, Enteromorpha, Fucus vesiculosus**), but beyond Speeton the sea washes the foot of the steep chalk cliffs as far as Thornwick Bay. There is not such variety of algae at Thornwick and the Landings as on other rocky parts of the coast, partly because the chalky surface is smoother and does not give such efficient anchorage, though **Alaria esculenta** has been found in deep water off Flamborough Head.

Filey Brigg will serve as an example of the way in which various factors affect algal growth. Below Carr Nase to the south (1 and 3 on the map), the Brigg is sheltered from the tidal wave which sweeps down the coast from the north ; nor is it much affected by the north-going tidal streams which here set eastward at a rate of only half a knot (though tidal streams are stronger in Scarborough Bay). The rocks are rough and support a dense algal growth. Channelled wrack grows on steep ledges and boulders near high water mark, knotted wrack and bladder wrack lower down and serrated wrack nearer low water mark. **Cladophora, Enteromorpha compressa, Porphyra** and **Ulva** are also common on the rocks. **Ulva lactuca, Enteromorpha intestinalis, Chondrus** and **Ceramium** occur in shallow pools.

Beyond Carr Nase both the upper reef and the northern outer reef are much pitted by wave action (2). Their vegetation is comparatively sparse, for with tremendous force breakers dash against the steep faces of these rocks, and in winter when strong N.W. gales are blowing and the tide is rising, the seas are still heavier. On the south side (3) however, the rocks are not so subject to surf action and northerly currents, and are well covered with **Fuci, Chondrus** and **Gigartina, Rhodymenia** and **Laurencia.** Towards the eastern end of the outer reef (4), where the rocks are lower and surf action much less strong, **Chondrus crispus** and **Gigartina** clothe the rocks, together with **Laurencia** and hundreds of tiny brown buttons like young mushrooms—developing **Himanthalia.** The **Dumontia incrassata** which grows here is curled and twisted by tidal currents, unlike that growing in sheltered pools.

Seaweeds found on exposed rocks are those which can withstand the effects of wind, rain, sunshine or frost when exposed at low water, or which are sheltered from drying winds and strong sunlight by overhanging **Fuci,** etc. Rock-pools, not subject to such desiccation, have their own distinctive flora. There are two types of rock-pool on Filey Brigg. On the gently-sloping rocky ledges between the two reefs are shallow, beautiful pools (5). Near high water mark these pools, though extremely cold on a winter's night, become very warm on a sunny day, and only those algae which can withstand such extremes of temperature can survive throughout the year ; nor must they be averse to strong light conditions. Here we find **Polysiphonia** spp., **Ceramium, Ulva** and **Enteromorpha, Halidrys siliquosa** and **Dumontia,** and the beautiful pink **Corallina.** Towards low water mark the pools form deep rocky basins and lie in the shade of almost perpendicular rock-faces, and here the growth is more varied and abundant (6). The rocky bottom is luxuriant with the growth of thong weed, tangles, rosy **Rhodymenia** and emerald-green **Ulva,** together with **Halidrys** and **Polysiphonia** spp. On the sides, sheltered by other weeds, one may sometimes find the beautiful **Delesseria sanguinea.** Occasionally **Bryopsis plumosa** or **Griffithsia flosculosa** may be found ; and **Membranoptera alata, Polysiphonia** spp. and **Ceramium** spp. are common. The narrow ledges of the steep rock-faces carry only small species such as **Laurencia, Lomentaria, Ceramium** and stunted specimens of **Rhodymenia palmata.**

MAP OF CARR NASE AND FILEY BRIGG

It is only beyond the Brigg, among the tangles of the rocky bottom, that we can obtain those beautiful red weeds of the sea by dredging from a boat.

For general arrangement I have followed Newton's "Handbook of British Seaweeds" (British Museum, 1928), the nomenclature having been brought up to date by Miss Dickinson of Kew.

Recorders' initials are in brackets following ecological notes :—

J.R.H.—J. R. Hulme	T.T.—T. Talbot
G.M.—G. Massee	A.G.T.—A. G. Theakston
D.P.—Miss D. Perkins	Nat.—The Naturalist
S.L.P.—S. L. Petty	H.W.M.—High Water Mark
L.S.—Miss L. Scott	L.W.M.—Low Water Mark

It is a great pleasure to acknowledge the help and advice received from Miss Dickinson of the Royal Botanic Gardens, Kew, and from Miss Lorna Scott of the University of Leeds.

MYXOPHYCEAE

COCCOGONALES

GLAEOCAPSA Kuetzing

crepidinum Thur.—Rocks near H.W.M., Scarborough (G.M.).

DERMOCARPA Crouan

prasina (Reinsch) Born et Thur.—Epiphytic on **Laurencia pinnatifida** on Filey Brigg (D.P.) ; Scarborough (G.M.).

schousboei Thur.—With **D. prasina** on Filey Brigg (D.P.) ; Scarborough (G.M.).

HORMOGONALES

SPIRULINA Turner

subsalsa Oer.—Mixed with other algae on Spa wall, Scarborough (G.M.).

OSCILLATORIA Gomont

subuliformis (Thwaites)Gom.—Rare ; Scalby Beck, in brackish pools (G.M.).

MICROCOLEUS Desmazières

chthonoplastes (Mert.) Thur.—Rocks of upper intertidal zone, Scarborough, Filey Brigg (G.M., D.P.).

CALOTHRIX Agardh, C.A.

confervicola (Roth) Ag.—Not uncommon on species of **Ceramium** (G.M.).

scopulorum (Web. et Mohr) Ag.—Forming slimy patches on rocks near H.W.M., Scarborough (G.M.).

ISACTIS Thuret
plana Thur.—On **Himanthalia lorea,** Scarborough (G.M.).
RIVULARIA Agardh, C. A.
atra Roth—Common on rocks of S. Bay, Scarborough (G.M.).

CHLOROPHYCEAE

PROTOCOCCALES

CHLOROCHYTRIUM Cohn
immersum Mass.—Scarborough (G.M.).

ULOTRICHALES

ULOTHRIX Kuetzing
flacca (Dillw.) Thur.—Epiphytic on other algae in shallow pools, Filey Brigg (D.P.) ; Robin Hood's Bay (L.S.).

ULVALES

ENTEROMORPHA Link
compressa (L.) Grev.—Common along coast on intertidal rocks.
intestinalis (L.) Link—Common in rock-pools and on rocks all along the coast.
minima Naeg.—On rocks and concrete tank-traps near H.W.M., Filey Bay (D.P.).
prolifera (Muell.) Ag., J.—Scarborough (J.R.H.).
ULVA Linnaeus
lactuca L. var. **latissima** (L.) DC.—SEA LETTUCE. Abundant on intertidal rocks and in rock-pools all along the coast.
linza L. var. **lanceolata** Kuetz.—Common in rock-pools of S. shore, Filey Brigg, and Flamborough. Summer.

SIPHONOCLADIALES

CLADOPHORA Kuetzing
arcta (Dillw.) Kuetz.—On rocks in S. Bay (G.M.) ; Robin Hood's Bay (L.S.) ; Flamborough (Nat., 1923).
fracta (Muell.) Kuetz. var. **flexuosa** Batt.—Rare ; Scarborough (A.G.T.).
var. **marina** Hauck.—Scalby Beck where it flows into the sea (G.M.).
glaucescens (Griff. ex Harv.) Harv.—Filey Brigg (D.P.).
gracilis (Griff. ex Harv.) Kuetz.—Robin Hood's Bay (L.S.).
lanosa (Roth) Kuetz. Scarborough (G.M.).
var. **uncialis** Thur.—Scarborough (G.M.).
rupestris (L.) Kuetz.—Common on intertidal rocks and in pools all along the coast (D.P.).
utriculosa Kuetz.—Scarborough (G.M.).
CHAETOMORPHA Kuetzing
aerea (Dillw.) Kuetz.—Sandy pools near H.W.M. on northern outer reef of Filey Brigg, but not in quantity (D.P.) ; Scarborough (G.M.)
melagonium (Web. et Mohr) Kuetz.—HOG'S BRISTLE. Occasionally in pools on northern side of outer reef of Filey Brigg (D.P.) ; Flamborough (D.P.) ; and Scarborough (G.M.).

RHIZOCLONIUM Kuetzing
implexum (Dillw.) Batt.—On sandy mud near H.W.M., Filey Bay (D.P.) : Robin Hood's Bay (L.S.).
riparium (Roth) Harv.—Robin Hood's Bay (Marine Station record).

SIPHONALES

BRYOPSIS Lamour
plumosa (Huds.) Ag.—Rare. On sub-littoral rocks, Cornelian Bay (G.M.) : on Spittal Rocks (1949) and on sides of deep rock-pools on Northern side of Filey Brigg (D.P.).
CODIUM Stackhouse
dichotomum (Huds.) Setch.—Sub-littoral rocks, Scarborough (G.M.) ; rocks at L.W.M., Filey Brigg (D.P.).

PHAEOPHYCEAE

ECTOCARPALES

ECTOCARPUS Lyngbye
confervoides (Roth) Le Jol.—Round Castle Foot (G.M.) ; Robin Hood's Bay (Marine Station record).
fasciculatus Harv.—Scarborough (G.M.) ; Flamborough (Nat., 1932).
tomentosus (Huds.) Lyngb.—North Bay (G.M.) ; Filey Brigg (D.P.).
PYLAIELLA Bory de Saint Vincent
littoralis (Lyngb.) Kjell. var **opposita** Kjell.—Common on intertidal rocks all along the coast.
ELACHISTEA Duby
flaccida (Dillw.) Ar.—Relatively common on **Halidrys** at Robin Hood's Bay (L.S.).
fucicola (Velley) Ar.—Robin Hood's Bay (L.S.) ; Scarborough (G.M.).
scutulata (Smith) Duby—Scarborough (G.M.).
LEATHESIA Gray, S. F.
difformis (L.) Ar.—Summer on **Corallina** at Robin Hood's Bay (L.S.) ; on rocks near L.W.M. fairly common on Filey Brigg but less common at Scarborough (G.M., D.P.).
MYRIACTULA Kuntze
pulvinata (Kuetz.) Kuntze—Epiphytic on fruiting branches of **Halidrys siliquosa**, Scarborough (G.M.).
CHORDARIA Agardh, C. A.
flagelliformis (Muell.) Ag.—Robin Hood's Bay (L.S.) : Scarborough (G.M.).
EUDESME Agardh, J. G.
virescens (Carm.) Ag., J.—Sand-covered rocks, Cornelian Bay (G.M.).
MESOGLOIA Agardh, C. A.
vermiculata (Smith) Le Jol.—In sheltered pools near L.W.M., on south side of Filey Brigg and at Thornwick Bay (D.P.) ; Scarborough (A.G.T., G.M.).

MYRIONEMA Greville

strangulans Grev.—Not uncommon on small algae on south side of Filey Brigg below Carr Nase (D.P.) ; Scarborough (G.M.).

var. **punctiforme** Holm. et Batt.—Filey Brigg, 1895 (E.M.H).

DESMARESTIA Lamour

aculeata (L.) Lam.—Scarborough (G.M.) ; Robin Hood's Bay, but not attached (L.S.).

viridis (Muell.) Lam.—On the scars just below the Spa, in pools near L.W.M., but not abundant (J.R.H.).

Both species were recorded from Filey Brigg in 1895.

DICTYOSIPHON Greville

foeniculaceus (Huds.) Grev.—South Bay (G.M.) : Robin Hood's Bay (L.S.).

ASPEROCOCCUS Lamour

fistulosus Hook.—On south side of Filey Brigg in shallow pools about half-tide level (D.P.) ; South Bay (G.M.).

MYRIOTRICHIA Harvey

filiformis Harv.—On small algae in pools of South Bay and Cornelian Bay (G.M.).

ILEA Fries

fascia (Muell.) Fr.—Winter, on rocks at L.W.M., Thornwick Bay (D.P.).

SCYTOSIPHON Agardh, C. A.

lomentaria (Lyngb.) Ag., J.—On shale around Stoupe Beck, Robin Hood's Bay (L.S.) ; Scarborough (G.M.) : in pools of northern outer reef, Filey Brigg (D.P.).

PUNCTARIA Greville

plantaginea (Roth) Grev.—On shale around Stoupe Beck, Robin Hood's Bay (L.S.) ; on rocks between the Spa and the Nab, and on sub-littoral rocks (G.M.).

SPHACELARIALES

SPHACELARIA Lyngbye

cirrhosa (Roth) Ag.—On small algae in tide-pools, Cornelian Bay and Filey Brigg (G.M., D.P.).

radicans (Dillw.) Ag.—On sand-covered rocks between the tide-marks, often with **Rhodochorton rothii,** Robin Hood's Bay (L.S.) ; Scarborough (G.M.).

CLADOSTEPHUS Agardh, J. G.

spongiosus (Lightf.) Ag.—Flamborough (Nat., 1923).

verticillatus (Lightf.) Ag.—Robin Hood's Bay (L.S.) ; top of outer reef, North Bay (G.M.) ; boulders at eastern end of Filey Brigg (D.P.).

LAMINARIALES

CHORDA Stackhouse

filum (L.) Lam.—BOOTLACE WEED.—Summer, on rocks at L.W.M., Filey Brigg and Scarborough (G.M.).

var. **subtomentosa** Ar.—Filey Brigg (D.P.).

LAMINARIA Lamour

cloustoni Edm.—Thornwick Bay, in pools at L.W.M. (D.P.) ; Robin Hood's Bay (Marine Station record).

digitata (L.) Lam.—OARWEED or TANGLES. Common all along the coast at L.W.M. and in the sea.

var. **stenophylla** Harv.—Distribution similar to **L. digitata,** common in this district.

saccharina (L.) Lam.—Common at L.W.M. in South Bay, but less common at Filey Brigg and Flamborough (D.P.) ; Robin Hood's Bay (L.S.).

var. **phyllitis** Le Jol.—More common than the type in this district (G.M., D.P.).

SACCORHIZA De la Pylaie

bulbosa (Huds.) De la Pyl.—Found washed up in North Bay (G.M.).

ALARIA Greville

esculenta (L.) Grev.—Ravenscar (L.S.) ; uncommon in deep pools on north side of Filey Brigg, and in deep water at Flamborough Head (D.P.).

DICTYOTALES

DICTYOTA Lamour

dichotoma (Huds.) Lam.—Scarborough (G.M.) ; at L.W.M. on northern side of Filey Brigg (D.P.).

FUCALES

FUCUS Decaisne et Thuret

ceranoides L.—Scarborough (J.R.H., A.G.T.).

serratus L.—TOOTHED or SERRATED WRACK. Abundant all along the coast on rocks between half-tide level and L.W.M.

spiralis L.—TWISTED WRACK. On rocks near H.W.M., forming a distinct belt below **Pelvetia.**

vesiculosus L.—BLADDER WRACK. Abundant all along the coast ; forms a wide belt which extends across the middle shore.

ASCOPHYLLUM Stackhouse

nodosum (L.) Le Jol.—KNOTTED WRACK. Abundant on sheltered rocks all along the coast, especially if large boulders are present. Usually intermixed with **F. vesiculosus.**

PELVETIA Decaisne et Thuret

canaliculata (L.) Dcne. et Thur.—CHANNELLED WRACK. Common on rocks and boulders at H.W.M. ; prefers exposed beaches, where it extends into the splash zone.

HIMANTHALIA Lyngbye

lorea (L.) Lyngb.—THONGWEED. Common along the coast on rocks near L.W.M. ; also occurs in deep pools below half-tide level (D.P.)

HALIDRYS Lyngbye

siliquosa (L.) Lyngb.—Fairly common along the coast in pools below half-tide level (D.P.).

var. **siliculosus** Stackh.—In rocky basins left by the tide, abundant at the Nab at L.W.M. (J.R.H.).

RHODOPHYCEAE

BANGIALES

BANGIA Lyngbye

fusco-purpurea (Dillw.) Lyngb.—Ravenscar (L.S.) ; stones and woodwork of South Pier (G.M.).

PORPHYRA Agardh, C. A.

leucosticta Thur.—Not common. North Bay, Scarborough (G.M.).

umbilicalis (L.) Kuetz.—RED LAVER. Abundant everywhere on intertidal rocks, stonework and woodwork.

var. **vulgaris** Ag.—Scarborough (J.R.H.).

ERYTHROTRICHIA Areschoug

carnea (Dillw.) Ag., J.—On small algae in tide-pools, Scarborough (G.M.) ; Filey Brigg (D.P.).

GELIDIALES

GELIDIUM Lamour

corneum (Huds.) Lam.—Scarborough (J.R.H.).

PTEROCLADIA Agardh, J. G.

capillacea (Gmel.) Born. et Thur.—Scarborough (Hudson).

CRYPTONEMIALES

GLOIOSIPHONIA Carmichael

capillaris (Huds.) Carm.—Rare in North Bay, not found attached (G.M.).

DUMONTIA Lamour

incrassata (Muell.) Lam.—Common at half-tide level in pools and long inlets open to the sea ; very common at Robin Hood's Bay (L.S.) ; and locally abundant on Filey Brigg (D.P.).

var. **crispata** Batt.—Common on outer reef of Filey Brigg and at Thornwick Bay where exposed to tidal currents (D.P.).

DILSEA Stackhouse

edulis Stackh.—Robin Hood's Bay, but not attached (L.S.) ; rock-pools south of Spa (J.R.H., 1896); Spittal Rocks, Filey Brigg (D.P.).

SCHIZYMENIA Agardh, J. G.

dubyi (Chauv.) Ag., J.—Scarborough (G.M.).

FURCELLARIA Lamour

fastigiata (L.) Lam.—Common at Robin Hood's Bay in inlets between the scars (L.S.) ; abundant in South Bay (G.M.) ; Filey Brigg and Thornwick Bay (D.P.).

POLYIDES Agardh, C. A.

rotundus (Gmel.) Grev.—Scarborough, Filey Brigg, Thornwick Bay (J.R.H., D.P.) ; Robin Hood's Bay (Marine Station Record).

PETROCELIS Agardh, J. G.

cruenta Ag., J.—On rocks in North Bay (G.M.).

PEYSSONNELIA Decaisne

rubra (Grev.) Ag., J.—Liver-coloured film on rocks, Scarborough (G.M.).

LITHOPHYLLUM Foslie
pustulatum (Lam.) Fosl.—Scarborough (G.M.).
incrustans Phil.—Filey Brigg and Robin Hood's Bay, common in pools (D.P., L.S.).
LITHOTHAMNION Foslie
lichenoides (Ellis et Soland) Fosl.—Flamborough (Nat.) ; Robin Hood's Bay (L.S.).
polymorphum (L.) Aresch.—Scarborough (G.M.) ; Robin Hood's Bay (L.S.).
CORALLINA Lamour
officinalis L.—Abundant everywhere in rock-pools.
squamata Ell.—Scarborough (S.L.P., 1901).

CERAMIALES

DELESSERIA Lamour
sanguinea (L.) Lam.—All along the coast in deep pools near L.W.M., sheltered by overhanging weeds ; never in quantity (D.P.) ; common on **Laminaria** stipes washed up from Robin Hood's Bay and Ravenscar (L.S.).
MEMBRANOPTERA Stackhouse
alata (Huds.) Stackh. ex Kyl.—Rocks and pools at L.W.M. and in the sea ; at the Nab (abundant), Filey Brigg (common on north side) and Thornwick Bay ; commonly washed up on **Laminaria** stipes (L.S., D.P.).
PANTONEURA Kylin
angustissima (Turn.) Kyl.—Common on stipes of **Laminaria** at Scarborough, Filey Brigg and Flamborough (G.M., D.P.).
HYPOGLOSSUM Kuetzing
woodwardii Kuetz.—North Bay and Nab, Scarborough (G.M.).
NITOPHYLLUM Greville
punctatum (Stackh.) Grev.—Robin Hood's Bay (Marine Station record.
PHYCODRYS Kuetzing
rubens (Huds.) Batt.—On rocks and **Laminaria** stipes in deep water, Robin Hood's Bay (L.S.) ; South Bay (G.M.) ; Flamborough (J.R.H.).
RHODOMELA Agardh, C. A.
lycopodioides (L.) Ag.—At L.W.M., often on **Laminaria** stipes, Filey Brigg (D.P.) ; and Scarborough (J.R.H.) ; Robin Hood's Bay (Marine Station record).
subfusca (Woodw.) Ag.—With **Halidrys** in inlets between scars at Robin Hood's Bay (L.S.) ; at L.W.M. on north side of Filey Brigg (D.P.).
ODONTHALIA Lyngbye
dentata (L.) Lyngb.—Robin Hood's Bay to Ravenscar, but not attached (L.S.) ; Scarborough (J.R.H.) ; extreme L.W.M. on north side of Filey Brigg (D.P.).
LAURENCIA Lamour
hybrida (DC.) Lenorm.—Common at Robin Hood's Bay (L.S.).

obtusa (Huds.) Lam.—Summer. Outer reef of Filey Brigg, north of Carr Nase (D.P.) ; Scarborough (G.M.).

pinnatifida (Gmel.) Lam.—Common all along the coast on intertidal rocks, especially steep rocky ledges near L.W.M. (D.P.).

var. **litoralis** Harv.—Flamborough (Nat., 1923).

var. **osmunda** Harv.—Gristhorpe (J.R.H.).

POLYSIPHONIA Greville

elongata (Huds.) Harv.—Rare in South Bay (A.G.T.) ; Robin Hood's Bay (L.S.).

fibrata (Dillw.) Harv.—Scarborough (G.M.).

lanosa (L.) Tand.—Common on **Ascophyllum nodosum** (D.P.).

macrocarpa Harv.—On rocks, south side of Filey Brigg (D.P.) ; Robin Hood's Bay (Marine Station record).

nigra (Huds.) Batt.—Eastern end of Filey Brigg at L.W.M. and below it, not common (D.P.) ; Scarborough (A.G.T.).

nigrescens (Smith) Grev.—Fairly common in shallow pools and inlets all along the coast (D.P.).

urceolata (Dillw.) Grev.—All along the coast, on rocks and **Laminaria** near L.W.M., though never in quantity (D.P.).

var. **formosa** Ag., J.—Scarborough (G.M.).

var. **patens** Ag., J.—South side of Filey Brigg at L.W.M. (D.P.).

violacea (Roth) Grev.—Common on **Laminaria** stipes at Robin Hood's Bay (L.S.) ; less common in pools on Filey Brigg (D.P.).

PTEROSIPHONIA Falkenberg

parasitica (Huds.) Falk.—Scarborough (A.G.T.).

BRONGNIARTELLA Bory

byssoides (Good et Woodw.) Schmitz.—Rare in South Bay (G.M.).

DASYA Agardh, C. A.

arbuscula (Dillw.) Ag.—Rare in South Bay and Cornelian Bay (J.R.H.).

HETEROSIPHONIA Montagne

plumosa (Ellis) Batt.—Rare in North Bay (G.M.) ; exposed on outer reef of Filey Brigg at very low tides (D.P.).

SPONDYLOTHAMNION Naegeli

multifidum (Huds.) Naeg.—Filey Brigg (Talbot, 1895).

PTILOTHAMNION Thuret

pluma (Dillw.) Thur.—On **Laminaria** and **Furcellaria**, Scarborough (G.M.).

GRIFFITHSIA Agardh, C. A.

flosculosa (Ellis) Batt.—Rare. Lining deep rock-pools near L.W.M. overhung by shading algae ; Scarborough, Filey Brigg (G.M., D.P.).

HALURUS Kuetzing

equisetifolius (Lightf.) Kuetz.—Scarborough (J.R.H.) ; north side of Filey Brigg (D.P.).

RHODOCHORTON Naegeli

floridulum (Dillw.) Naeg.—On sand-covered rocks on south side of Filey Brigg, below Carr Nase (D.P.) ; Scarborough (G.M.).

rothii (Turt.) Naeg.—Fairly common on sand-covered rocks near half-tide level, Robin Hood's Bay and Filey Brigg (L.S., D.P.).

CALLITHAMNION Lyngbye

arbuscula (Dillw.) Lyngb.—On mussel beds round North Cheek, Robin Hood's Bay (L.S.).

byssoides Arn.—Scarborough (G.M.).

dudresnayi Crouan—Washed up in Filey Bay, but not found attached (D.P.).

polyspermum Ag.—Scarborough (G.M.).

roseum (Roth) Harv.—Scarborough (G.M.) ; common at Robin Hood's Bay (L.S.).

tetragonum (With.) Ag.—Fairly common on Filey Brigg on **Laminaria** fronds (D.P.) ; Scarborough (G.M.).

var. **brachiatum** Ag.—Flamborough (Nat., 1923).

PLUMARIA Stackhouse

elegans (Bonnem) Schmitz—On steep rock faces on north side of Filey Brigg, near L.W.M. (D.P.) ; South Bay (J.R.H.) ; and Robin Hood's Bay (L.S.).

PTILOTA Agardh, C. A.

plumosa (L.) Ag.—Common on **Laminaria** stipes all along the coast (D.P.).

ANTITHAMNION Naegeli

cruciatum (Ag.) Naeg.—Robin Hood's Bay (L.S.).

plumula (Ellis) Thur—Rare in North Bay (A.G.T., G.M.).

CERAMIUM Lyngbye

acanthonotum Carm.—Not uncommon along the coast on steep, rough rocks near L.W.M. (D.P.).

arborescens Ag., J.—Thornwick Bay (D.P.).

botyrocarpum Griff. ex Harv.—Scarborough (G.M.).

ciliatum (Ellis) Ducl.—Rare at Scarborough (G.M.) ; and in pools on Filey Brigg (D.P.).

deslongchampsii Chauv.—Scarborough (G.M.).

diaphanum (Lightf.) Roth—Scarborough (G.M., A.G.T.) ; Flamborough (Nat., 1923).

echionotum Ag., J.—Scarborough (G.M.).

fastigiatum Harv.—Scarborough (G.M.).

rubrum (Huds.) Ag. var. **pedicellatum** Ag., J.—Common in rock-pools all along the coast.

var. **corymbiferum** Ag., J.—On **Corallina officinalis** in rock-pools, Filey Brigg and Thornwick Bay (D.P.).

tenuissimum (Lyngb.) Ag., J.—Scarborough (G.M., A.G.T.).

GIGARTINALES

CHONDRUS Stackhouse

crispus (L.) Stackh.—CARRAGHEEN or IRISH MOSS. Common all along the coast on rocks from half-tide level to L.W.M.

GIGARTINA Stackhouse

stellata (Stackh.) Batt.—Common all along the coast on exposed rocks near L.W.M.

PHYLLOPHORA Greville

epiphylla (Muell.) Batt.—On rocks at the Nab (J.R.H., A.G.T.).

membranifolia (Good. et Woodw.) Ag., J.—Rare in North Bay (J.R.H.).

GYMNOGONGRUS Martius

norvegicus (Gunn.) Ag., J.—Scarborough (G.M.).

AHNFELTIA Fries

plicata (Huds.) Fries—Robin Hood's Bay (L.S.) ; Scarborough (G.M.) ; Filey Brigg, north side (D.P.).

CALLOPHYLLIS Kuetzing

laciniata (Huds.) Kuetz.—In North and South Bays, but not in quantity (G.M., J.R.H.) ; Robin Hood's Bay (Marine Station record).

CYSTOCLONIUM Kuetzing

purpureum (Huds.) Batt.—Scarborough (G.M., J.R.H.) ; north side of Filey Brigg (D.P.).

CATENELLA Greville

repens (Lightf.) Batt.—Common on rocks at Ravenscar (L.S.).

RHODOPHYLLIS Kuetzing

bifida (Good. et Woodw.) Kuetz.—Scarborough (J.R.H.).

RHODYMENIALES

SPHAEROCOCCUS Stackhouse

coronopifolius (Good. et Woodw.) Ag.—Filey, 1895 (T.T.).

GRACILARIA Greville

confervoides (L.) Grev.—On rocks near L.W.M., Scarborough (J.R.H.).

CALLIBLEPHARIS Kuetzing

ciliata Kuetz.—Scarborough (J.R.H., G.M.).

lanceolata Batt.—Scarborough (G.M.).

RHODYMENIA Agardh, J. G.

palmata (L.) Grev.—DULSE. Common all along the coast near L.W.M., on rocks and attached to **Laminaria** stipes.

var. **marginifera** Harv.—Common in South Bay (J.R.H.).

palmetta Grev.—Near L.W.M. on rocks and **Laminaria** stipes, Scarborough, Filey Brigg, Flamborough (G.M., D.P.).

LOMENTARIA Lyngbye

articulata Lyngb.—All along the coast on rocks and algae between half-tide level and L.W.M., usually with **Laurencia** (D.P.).

clavellosa (Turn.) Gaill.—Scarborough (Kew record) ; north side of Filey Brigg (D.P.).

rosea (Harv.) Thur.—Scarborough (Kew record).

CHAMPIA Lamour

parvula (Ag.) Harv.—On small algae in pools near L.W.M., Filey Brigg (D.P.).

CHYLOCLADIA Greville

kaliformis (Good. et Woodw.) Grev.—Scarborough (A.G.T.).

ovata Batt.—Scarborough (G.M.).

PLOCAMIUM Lyngbye

coccineum (Huds.) Lyngb.—Robin Hood's Bay (L.S.), and Scarborough (G.M.) ; frequently washed up in Filey Bay (D.P.).

INDEX OF GENERA

Ahnfeltia 79
Alaria 74
Antithamnion 78
Ascophyllum 74
Asperococcus 73
Bangia 75
Brongniartella 77
Bryopsis 72
Calliblepharis 79
Callithamnion 78
Callophyllis 79
Calothrix 70
Catenella 79
Ceramium 78
Chaetomorpha 71
Champia 79
Chlorochytrium 71
Chondrus 78
Chorda 73
Chordaria 72
Chylocladia 79
Cladophora 71
Cladostephus 73
Codium 72
Corallina 76
Cystoclonium 79
Dasya 77
Delesseria 76
Dermocarpa 70
Desmarestia 73
Dictyosiphon 73
Dictyota 74
Dilsea 75
Dumontia 75
Ectocarpus 72
Elachistea 72
Enteromorpha 71
Erythrotrichia 75
Eudesme 72
Fucus 74
Furcellaria 75
Gelidium 75
Gigartina 78
Glaeocapsa 70
Gloiosiphonia 75
Gracilaria 79
Griffithsia 79
Gymnogongrus 79
Halidrys 74
Halurus 77
Heterosiphonia 77
Himanthalia 74
Hypoglossum 76
Ilea 73
Isactiis 71
Laminaria 74
Laurencia 76
Leathesia 72
Lithophyllum 76
Lithothamnion 76
Lomentaria 79
Membranoptera 76
Mesogloia 72
Microcoleus 70
Myriactula 72
Myrionema 73
Myriotrichia 73
Nitophyllum 76
Odonthalia 76
Oscillatoria 70
Pantoneura 76
Pelvetia 74
Petrocelis 75
Peyssonnelia 75
Phycodrys 76
Phyllophora 78
Plocamium 79
Plumaria 78
Polyides 75
Polysiphonia 77
Porphyra 75
Pterocladia 75
Pterosiphonia 77
Ptilota 78
Ptilothamnion 77
Punctaria 73
Pylaiella 72
Rhizoclonium 72
Rhodochorton 77
Rhodomela 76
Rhodophyllis 79
Rhodymenia 79
Rivularia 71
Saccorhiza 74
Schizymenia 75
Scytosiphon 73
Sphacelaria 73
Sphaerococcus 79
Spirulina 70
Spondylothamnion 77
Ulothrix 71
Ulva 71

FUNGI

CORRIGENDA

The Fungus nomenclature used in this book is that approved when the list was compiled in 1950 ; since then various adjustments have been made and the following emendations bring the nomenclature up-to-date (Dec. 1952).

p. 105 **Ophiostoma piceae** (Muench) Syd. Now **Ceratocystis piceae** (Muench) Bakski

p. 154 **Menispora tortuosa** (Corda) Peyr., should read **M. tortuosa** Corda.

p. 154 **Sarcopodium** Ehrenberg ex Wallroth should read **Sarcopodium** Ehrenberg ex Link

p. 154 **Sporocybe flexuosa** - On **Quercus** ; Howldale, 1947 (I.M.I. 13318)

p. 154 **Stachylidium cyclosporum** Grove is now **Verticillium cyclosporum**

p. 155 **Stilbum tomentosum** var. **ovalisporum** A. L. Sm. should read (Grove) Mason et Hughes
Tilachlidium in "Mason & Grainger".

p. 155 **Verticillium apicale** Berk. et. Br. is now included under **V. tenuissimum** Corda

p. 156 **Chaetopsis wauchii** Grev. is now included under **C. grisea** (Ehrenb. ex Fr.) Sacc.

p. 157 **Isaria umbrina** Pers. ex Wallr. - On **Hypoxylon coccineum** on **Fagus**

p. 157 **Periconia byssoides** Pers. ex Fr. should read **P. byssoides** pers. ex Schwein.

p. 158 The genus **Xylohypha** should read as follows :—
XYLOHYPHA (Fries) Mason, gen.nov. (**Hyphelia** Fries, sub-gen. **Xylohypha** Fries)
nigrescens (Pers. ex Fr.) Mason, comb.nov. (**Trichoderma nigrescens** Pers., **Torula ovalispora** Berk., **Torula pulveracea** Corda)

p. 159 **Phragmocephala cookei** Mason et Hughes, published in Nat., 1951, p. 98, for specimens recently referred to **Arthrobotryum atrum** Berk. et Br.

p. 160 **Helminthosporium apiculatum** Link ex Fr. - On re-examination the specimens recorded on Quercus were found to be on unidentified wood

p. 161 **Septocylindrum pallidum** Grove is now **Septonema pallidum** (Grove) Hughes

FUNGI

F. C. Rimington

FOREWORD

A. A. Pearson, F.L.S.

Those of us who study the fungi and find ourselves made responsible for naming them, know only too well the many pitfalls we are liable to meet and which we do our best to avoid—not always with success.

Our predecessors had the same problems and were faced with even greater uncertainties because the microscope had not come into general use ; the descriptions indeed were so incomplete that often it was impossible to determine a critical fungus with more than a vague hope that it represented the species originally named by its author.

The inevitable result was that the same fungus was given many different names by many different authors. A mycologist in America recently had to describe a tropical species of *Tricholoma* and found that it had been named and renamed in 30 different ways. We could doubtless find many such examples among European fungi.

The literature of the fungi is so vast that we can rarely be certain that we have traced a critical species down to the author who first described it. Some changes are therefore called for from time to time.

The Yorkshire records of fungi were put together by Mason and Grainger in a very useful volume published by the Yorkshire Naturalists' Union in 1937. Since then a good deal of sifting has been done. This has been taken into account in the present list which is designed to give an up-to-date picture of the fungi in a restricted area of Yorkshire.

Such lists are to be welcomed for various reasons. They are interesting in themselves, they are an incentive to the local naturalists and an opportunity to correct previous errors.

The Yorkshire mycologists of the last century found the north-east area very fruitful ground for collecting. It is not so good to-day, many of the woodlands having been denuded during the two wars when timber was badly needed. Fortunately there are still many spots to which the mycologist returns with pleasure, knowing that there is every chance of finding rare or unusual species. Doubtless there are some common species which have eluded the collectors and many uncommon ones which will be added to the list in future years.

This collecting business is fascinating but we must try to get to know our species thoroughly, acquire a microscopic eye, seeing each fungus inside and out. The technique is simple and we need not be frightened by the more elaborate taxonomic methods which some of the specialists adopt. The amateur has a large field open for research and we still have much to learn.

INTRODUCTION.

The Scarborough district is mycologically classic ground, for it includes Forge Valley and Raincliffe Wood. Here George Massee collected for many years, and the records published in Massee and Crossland's "Fungus-Flora of Yorkshire" (Trans. Y.N.U., 1905), were largely his work. These records include many species found for the first time in Britain, on some of which new species were founded. A considerable number of the illustrations in Cooke's "Illustrations of British Fungi" were drawn from these Scarborough specimens. It is unfortunate that Massee's records give no precise details of the collecting place and often no date.

George Edward Massee, born at Scampston in 1850, first collected at Castle Howard. He then moved to Scarborough, where he remained for 15 years, and for a time was honorary secretary of the Scarborough Field Naturalists' Society. At the Doncaster meeting of the Y.N.U. in 1891, Massee played a leading part in establishing the annual Y.N.U. Fungus Forays, and at the Selby foray in 1896, the British Mycological Sociey was formed with Massee as its first president.

Many other distinguished mycologists have collected in the Scarborough district—Charles Crossland, Carleton Rea, H. T. Soppitt, Alfred Clark, F. A. Mason, and more recently, A. A. Pearson, E. W. Mason, Prof. C. G. C. Chesters and others.

The Scarborough Field Naturalists' Society has been fortunate in its mycologists—G. Massee, T. B. Roe, A. E. Peck, Miss A. Hibbert-Ware, etc., and the resulting records are extensive. The present lists have been brought into line with modern nomenclature, and doubtful records and varieties of uncertain status have been omitted. The task would have been easier if a herbarium had been kept and the original specimens thus made available. This omission is now being rectified and it is hoped that in future specimens of all published records will be preserved. Where specimens are available, the herbarium concerned is indicated together with the accession number.

Much work remains to be done in the southern part of our area, particularly on the Wolds, where the only worker has been W. W. Strickland, who collected the fungi round Boynton between 1874 and 1882. His collection was presented to the British Museum.

In recent years the development of fungicides and the improvement in the means of applying them have resulted in certain fungoid plant diseases becoming far less prevalent. In particular the introduction of the organo-mercuric seed-dressings has decreased the incidence of such seed-borne diseases as Bunt or Stinking Smut of wheat (**Tilletia**), Leaf-Stripe of barley (**Helminthosporium**), and certain Foot-Rot diseases of oats and barley, to negligible proportions. A considerable amount of control of Rust (**Puccinia**) has been achieved through the breeding of resistant varieties of cereals, particularly wheat.

A profound change is being brought about in the fungi of our moorlands by the extensive afforestation. The fungus-flora of the original moorland, meagre almost to the point of non-existence,

does not obviously change when the ground is ploughed, despite the resulting aeration and the breaking of the moor-pan. For several years there is no general evidence of fungal growth, but after three or four years, when there is a tendency for the heather to re-invade the ploughed land, several pioneer species occur freely; **Laccaria laccata, Paxillus involutus** and **Thelephora terrestris.** These retain a footing until the trees kill out the heather by suppression. At this time there is a general influx of fungi, usually species of such genera as **Lactarius, Russula, Clitocybe, Tricholoma, Mycena, Boletus,** etc. It is significant that there are no signs of such proved mycorrhiza-formers as **Boletus luteus, B. elegans, B. badius, B. bovinus, Amanita muscaria. Lactarius deliciosus,** etc., until the trees are well established and the cover complete.

It is a duty and pleasure to acknowledge the help and advice from Mr. W. G. Bramley, Mr. E. W. Mason, Mr. A. A. Pearson, and in particular from Dr. R. W. G. Dennis, of the Kew Herbarium, without whose constant and generous help these lists would never have reached their final form.

The arrangement and nomenclature of the various sections are adapted from the following authorities, but the species within each genus have been re-arranged alphabetically for easy reference.

1. MYXOMYCETES : A. & G. Lister; " A Monograph of the Mycetozoa ", British Museum of Natural History, 1925, 3rd edition.
2. PHYCOMYCETES : Modified from H. M. Fitzpatrick; " The Lower Fungi—Phycomycetes ", 1930.
3. DISCOMYCETES : J. Ramsbottom; " List of British Species of Discomycetes, arranged according to Boudier's System : with key to Genera ". Trans. B.M.S., IV, pp. 343-381, 1914.
4. PYRENOMYCETES : G. R. Bisby and E. W. Mason; " List of Pyrenomycetes recorded for Britain ". Trans. B.M.S., XXIV, pp. 127-243, 1940.
5. USTILAGINALES : K. Sampson; " List of British Ustilaginales ". Trans. B.M.S., XXIV, pp. 294-311, 1940.
6. UREDINALES : W. B. Grove; " The British Rust Fungi ", 1913.
7. AGARICALES and BOLETI : A. A. Pearson and R. W. G. Dennis; " Revised List of British Agarics and Boleti ". Trans. B.M.S., XXXI, pp. 145-190, 1948.
8. OTHER BASIDIOMYCETES : C. Rea ; " British Basidiomycetes ", 1922.
9. COELOMYCETES : W. B. Grove; " British Stem and Leaf Fungi (Coelomycetes) ", 1935-38.
10. HYPHOMYCETES : E. M. Wakefield and G. R. Bisby; " List of Hyphomycetes recorded for Britain ". Trans. B.M.S., XXV, pp. 49-126, 1941; but with the nomenclature adjusted to that in current use in the herbarium of the Commonwealth Mycological Institute, Kew.

The sections have been arranged in a pseudo-evolutionary manner, commencing with the primitive Myxomycetes and Phycomycetes, and progressing to the higher Agarics and Gasteromycetes; with the Fungi Imperfecti as an appendix.

Hosts and substrates have been included where available in the records and where of interest.

W.G.B.	W. G. Bramley	T.P.	T. Petch
A.C.	A. Clark	C.R.	Carleton Rea
C.C.	C. Crossland	F.C.R.	F. C. Rimington
R.W.G.D.	R. W. G. Dennis	T.B.R.	T. B. Roe
A.H.W.	Alice Hibbert-Ware	H.T.S.	H. T. Soppitt
E.W.M.	E. W. Mason	W.W.S.	W. W. Strickland
F.A.M.	F. A. Mason	P.H.B.T.	P. H. B. Talbot
G.M.	George Massee	H.W.	H. Wager
A.A.P.	A. A. Pearson	E.M.W.	E. M. Wakefield
A.E.P.	A. E. Peck	J.W.	J. Webster

B.M.S.	British Mycological Sociey.
F.F.	Fungus Foray of the Y.N.U.
Grev.	" Grevillea ".
Hull	Herbarium of the University College, Hull.
I.M.I.	Herbarium of the Commonwealth Mycological Institute, Kew (formerly the Imperial M.I.).
M. & C.	Massee and Crossland's " Fungus-Flora of Yorkshire ", 1905.
Nat.	" The Naturalist ".
Nottm.	Herbarium of Nottingham University.
T.B.M.S.	Transactions of the B.M.S.
Y.N.U.	Yorkshire Naturalists' Union.
York	Herbarium of the Yorkshire Museum, York.

MYXOMYCETES

CERATIOMYXACEAE

CERATIOMYXA Schroeter

fruticulosa Macbr.—Forge Valley and Robin Hood's Bay (W.G.B., 1945-6).

PHYSARACEAE

BADHAMIA Berkeley

foliicola List.—Oliver's Mount (A.H.W., 1905-10).

macrocarpa Rost.—Scarborough on decaying fungi (G.M.).

panicea Rost.—Hackness on felled logs (A.H.W., 1905).

utricularis Berk.—Scarborough on moss, etc. (G.M.).

PHYSARUM Persoon
bitectum List.—Scarborough (A.H.W., 1908).
cinereum Pers.—Scarborough on leaves, etc. (G.M.).
contextum Pers.—Scarborough (A.H.W., 1906).
didermoides Rost.—Scarborough (M. & C.).
leucopus Link.—Scarborough on wood and moss (G.M.).
nutans Pers.—Forge Valley (W.G.B., 1945); Thornton-le-Dale (F.F., 1945).
var. **leucophaeum** List.—Not uncommon, especially the limeless, iridescent form (A.H.W., 1905).
sinuosum Weinm.—Scarborough (A.H.W., 1905).
vernum Somm.—Scarborough, " frequently found in November " (A.H.W.).
virescens Ditm.—Scarborough (M. & C.).
viride Pers.—Scarborough (G.M.).

FULIGO Haller
septica Gmel.—Frequent on sawdust, etc.

CRATERIUM Trentepohl
aureum Rost.—Oliver's Mount, frequent (A.H.W., 1905).
leucocephalum Ditm.—Scarborough on dead leaves (G.M., A.H.W., 1905).
minutum Fr.—Raincliffe Wood and Forge Valley (G.M., A.H.W., 1909).

LEOCARPUS Link
fragilis Rost.—Scarborough (G.M.); Thornton-le-Dale (F.F., 1945).

DIDERMA Persoon
radiatum List.—Locally common.
var. **umbilicatum** Meyl.—Boynton (W.W.S., Nat., July, 1889).
spumarioides Fr.—Scarborough on leaves, etc. (M. & C.).

DIACHAEA Fries
leucopoda Rost.—Locally common.

DIDYMIACEAE

DIDYMIUM Schrader
complanatum Rost.—Scarborough on leaves (M. & C.).
difforme Duby—Scarborough (M. & C.).
melanospermum Macbr.—Oliver's Mount (G.M., A.H.W., 1909).
nigripes Fr.—Scarborough (M. & C.).
var. **xanthopus** List.— Scarborough (M. & C.).
squamulosum Fr.—Not uncommon.

MUCILAGO Adanson
spongiosa Morg.—Locally common (M. & C., A.H.W.).

STEMONITACEAE

STEMONITIS Gleditsch
ferruginea Ehrenb.—Scarborough (M. & C.).
fusca Roth—Wykeham (F.F., 1945).
splendens Rost.—Scarborough (A.H.W., Nat., 1910, p. 147).

COMATRICHA Preuss
nigra Schroet.—Forge Valley, etc. (W.G.B. & F.F., 1945).
pulchella Rost.—Oliver's Mount (A.H.W., 1906).
typhoides Rost.—Scarborough (G.M., A.H.W., 1910).
ENERTHENEMA Bowman
papillatum Rost.—Oliver's Mount (A.H.W., 1906).
LAMPRODERMA Rostafinski
arcyrionema Rost.—Forge Valley (A.H.W., 1907).
scintillans Morg.—Scarborough (A.H.W., 1905).
violaceum Rost.—Scarborough (M. & C., A.H.W., 1909).

AMAUROCHAETACEAE

BREFELDIA Rostafinski
maxima (Fr.) Rost.—Boynton (W.W.S., Nat., July, 1889).

HETERODERMACEAE

LINDBLADIA Fries
effusa Rost.—Scarborough on the ground (M. & C.).
CRIBRARIA Persoon
argillacea Pers.—Scarborough (G.M., A.H.W., 1906).
microcarpa Pers.—Scarborough on pine-wood (G.M.).
piriformis Schrad.—Scarborough on pine-wood (G.M.).
tenella Schrad.—Scarborough (A.H.W., 1905).
vulgaris Schrad., var. **aurantiaca** Pers.—Scarborough (M. & C.).
DICTYDIUM Schrader
cancellatum Macbr.—Scarborough (M. & C.).

TUBULINACEAE

TUBIFERA Gmelin
ferruginosa Gmel.—Locally common (G.M., A.H.W.).

RETICULARIACEAE

DICTYDIAETHALIUM Rostafinski
plumbeum Rost.—Scarborough (M. & C.).
ENTERIDIUM Ehrenberg
olivaceum Ehrenb.—Scarborough (M. & C.).
rozeanum Wing.—Scarborough (M. & C.).
RETICULARIA Bulliard
lycoperdon Bull.—Common and generally distributed.

LYCOGALACEAE

LYCOGALA Adanson
epidendrum Fr.—Very common and widely distributed.

TRICHIACEAE

TRICHIA Haller
affinis de Bary—Wykeham and Kingthorpe (W.G.B., 1940 & 1946).
botrytis Pers.—Scarborough (M. & C.); Howldale (F.F., 1946).
var. **munda** List.—Harwood Dale (A.H.W., 1910).

contorta Rost.—Scarborough (M. & C.), Kingthorpe (W.G.B., 1938).
decipiens Macbr.—Scarborough (M. & C.); Forge Valley (W.G.B., 1945).
favoginea Pers.—Scarborough (M. & C.).
persimilis Karst.—Common.
scabra Rost.—Scarborough (G.M.); Kingthorpe (F.F., 1946).
varia Pers.—Numerous records.

OLIGONEMA Rostafinski
nitens Rost.—Scarborough (G.M.).

HEMITRICHIA Rostafinski
clavata Rost.—Scarborough (M. & C.); Howldale (F.F., 1946).
vesparium Macbr.—Scarborough (G.M.); Forge Valley, abundant after severe frosts (A.H.W., 1910).

ARCYRIACEAE

ARCYRIA Wiggers
cinerea Pers.—Scarborough (M. & C.).
denudata Wettst.—Forge Valley (W.G.B., 1945 & 1948).
ferruginea Saut.—Oliver's Mount, common (A.H.W.).
incarnata Pers.—Scarborough (G.M.); Kingthorpe (W.G.B., 1938).
nutans Grev.—Scarborough (M. & C.).
pomiformis (Leers) Rost.—Boynton (W.W.S., 1880).

PERICHAENA Fries
chrysosperma List.—Scarborough (M. & C.).
corticalis Rost.—Kingthorpe (F.F., 1946).
depressa Lib.—Filey (C.C., Nat., 1903, p. 248).

MARGARITACEAE

PROTOTRICHIA Rostafinski
metallica Mass.—Scarborough (G.M.).

PHYCOMYCETES

CHYTRIDIALES

PLASMODIOPHORACEAE

PLASMODIOPHORA Woronin
brassicae Woron.—Abundant.

SPONGOSPORA Brunchorst
subterranea (Wallr.) Lagarh.—Occasional at Scarborough.

SYNCHYTRIACEAE

SYNCHYTRIUM de Bary et Woronin
anemones de Bary et Woron.—Scarborough on living leaves of **Anemone nemorosa** (G.M.).
stellariae Fuckel—Scarborough on **Stellaria media** (G.M.).
taraxaci de Bary et Woron.—Scarborough on leaves and involucres of **Taraxacum** (G.M.).

RHIZIDIACEAE

POLYPHAGUS Nowakowski
euglenae Nowak.—Seamer Moor on **Euglena viridis** (M. & C.).

CLADOCHYTRIACEAE

PHYSODERMA Wallroth
menyanthis de Bary—Seamer on living leaves of **Comarum palustre** (G.M.); Throxenby on **Menyanthes trifoliata** (T.B.R., 1911).

SAPROLEGNIALES

SAPROLEGNIA Nees von Esenbeck
ferax Nees.—Scarborough on dead flies, etc. in water (M. & C.). A secondary invader in the destructive " Salmon Disease ".

PERONOSPORALES

ALBUGINACEAE

CYSTOPUS (Léveillé) de Bary
candidus (Pers.) de Bary—Common, particularly on **Capsella.**

PYTHIACEAE

PYTHIUM Pringsheim
de baryanum Hesse—Scarborough on seedling balsams (G.M.).

PHYTOPHTHORA de Bary
infestans (Mont.) de Bary—Abundant in most years.

PERONOSPORACEAE

PLASMOPARA Schroeter
nivea (Ung.) Schroet.—Scarborough (G.M.); Ellerburn (F.F., 1922); both on **Anthriscus sylvestris.**
pusilla (de Bary) Schroet.—Thornton-le-Dale on **Geranium sylvaticum** (F.F., 1945).
pygmaea (Ung.) Schroet.—Kingthorpe on **Anemone** (F.F., 1946).

BREMIA Regel

lactucae Reg.—Numerous records on **Lapsana, Lactuca muralis** and **L. sativa.**

PERONOSPORA Corda emend. Schroeter

alsinearum Casp.—Thornton-le-Dale on **Stellaria media** and **Spergula** (F.F., 1945).

alta Fuckel—Ellerburn on **Plantago major** (F.A.M., 1922).

calotheca de Bary—Robin Hood's Bay on **Asperula odorata** (F.A.M., Nat., 1933, p. 136).

chrysosplenii Fuckel—Robin Hood's Bay on **C. oppositifolium** (F.A.M., Nat., 1933, p. 136).

effusa (Grev.) Rabenh.—Ayton (G.M.); Thornton-le-Dale (F.F., 1945); both on **Chenopodium.**

ficariae Tul.—Scarborough (G.M.); Kingthorpe (F.F., 1945); both on **Ranunculus spp.**

grisea Ung.—Scarborough (G.M.); Ellerburn (F.F., 1945); both on **Veronica beccabunga.**

lamii Braun—Robin Hood's Bay on **Lamium** and **Mentha spp.** (F.A.M., Nat., 1933, p. 136).

parasitica (Pers.) Tul.—Scarborough on **Cheiranthus** (G.M.); Thornton-le-Dale on **Capsella** (F.F., 1945).

schleideni Ung.—Scarborough (F.C.R.); Kingthorpe (W.G.B.); both on **Allium cepa.**

trifoliorum de Bary—Scarborough on **Ononis** (G.M.).

viciae (Berk.) de Bary—Ellerburn (F.A.M., 1922).

violae de Bary—Ellerburn on **V. riviniana** (F.A.M., 1922).

MUCORALES

MUCORACEAE

MUCOR Micheli emend Link

mucedo (L.) Bref.—Common.

PHYCOMYCES Kunze et Schmidt

nitens (Agardh) Kunze—Scarborough on fat (G.M.).

SPINELLUS van Tieghem

fusiger (Link) van Tiegh.—Raincliffe Wood on **Mycena** (H.T.S., 1891); Kingthorpe (T.B.M.S., 1931).

SYZYGITES Ehrenberg

megalocarpus Ehrenb.—Scarborough on **Boletus luridus** and **Hygrophorus pratensis** (G.M.); Cloughton on agarics (H.T.S., 1891); Kingthorpe (T.B.M.S., 1931).

RHIZOPUS Ehrenberg

nigricans (Ehrenb.) Lind.—Scarborough on rotten leaves (G.M.).

PILOBOLACEAE

PILAIRA van Tieghem

anomala (Ces.) Schroet.—Scarborough on goose dung (G.M.).

PILOBOLUS Tode
crystallinus (Wigg.) Tode—Common on horse and cow dung.
roridus (Bolt.) Pers.—Scarborough on cow dung (G.M.).

THAMNIDIACEAE

THAMNIDIUM Link ex Wallroth
amoenum (Preuss.) Schroet.—Scarborough on rotten leaves (G.M.).

CHAETOCLADIACEAE

CHAETOCLADIUM Fresenius
jonesii (Berk. et Br.) Fres.—Scarborough on pig dung (G.M.).

ENTOMOPHTHORALES

EMPUSA Cohn
muscae Cohn—Common in August and September on **Musca domestica** and other Diptera (M. & C.).

ENTOMOPHTHORA Fresenius
coleopterorum Petch—Newton Dale on beetle (W.G.B., 1938).

PROTOMYCETALES

PROTOMYCES Unger
macrosporus Ung.—Scarborough on living petioles of **Aegopodium podagraria** (G.M.).
pachydermus Thuem—Scarborough on living petioles of **Taraxacum officinale** (G.M.).

PROTOMYCOPSIS Magnus
purpureo-tingens (Mass.) Ramsb.—Scarborough on cotyledons of **Helianthus** (G.M.).

Plate IV

THE MOREL (*Morchella vulgaris* (Pers.) Boud.)

Photograph : A. L. Peck

facing page 90

DISCOMYCETES

OPERCULEAE

MORCHELLACEAE

MORCHELLA Dillenius
conica Pers.—Scarborough (G.M.).
crassipes Krombh.—Scarborough Mere tip (A.E.P. & A.C., 1915).
vulgaris (Pers.) Boud.—Occasional in Yedmandale and Forge Valley.

MITROPHORA Léveillé
hybrida (Sow.) Boud.—Forge Valley (G.M.).

HELVELLACEAE

VERPA Swartz
digitaliformis Pers.—Forge Valley (G.M., A.E.P., 1934).

PHYSOMITRA Boudier
infula (Schaeff.) Boud.—Scarborough (G.M.).

HELVELLA Linnaeus
crispa (Scop.) Fr.—Although now locally not uncommon, apparently Massee never observed this species in the Scarborough district.
lacunosa Afz.—Harwood Dale (T.B.R., 1913); Raincliffe Wood (A.E.P., 1915-17).

LEPTOPODIA Boudier
elastica (Bull.) Boud.—Raincliffe Wood (G.M.).

PEZIZACEAE

CYATHIPODIA Boudier
corium (Web.) Boud.—Scarborough (G.M.).

ACETABULA Fuckel
leucomelas (Pers.) Boud.—Forge Valley (A.E.P., 1920).
vulgaris Fuckel—Scarborough (G.M., T.B.R., A.C.).

MACROPODIA Fuckel
macropus (Pers.) Fuckel—Staintondale (M. & C.); Kingthorpe (T.B.M.S., 1931).

RHIZINA Fries
inflata (Schaeff.) Karst.—Locally common in coniferous woods.

DISCIOTIS Boudier
venosa (Pers.) Boud.—Occasional in Forge Valley, etc.

ALEURIA Fries
ampliata (Pers.) Gill.—Scarborough (G.M.).
repanda (Pers.) Gill.—Hackness (F.C.R., 1945); Forge Valley (Hull, 19, 1946).
sepiatra (Cooke) Boud.—Forge Valley (C.C., 1914).
tectoria (Cooke) Boud.—Scarborough and Spiker's Hill on damp plaster (A.E.P., 1923).
vesiculosa (Bull.) Boud.—Common.

GALACTINIA Cooke
badia (Pers.) Boud.—Scarborough (G.M.).

lividula (Phill.) Boud.—Givendale (T.B.R., 1914).
saniosa (Schrad.) Sacc.—Scarborough (M. & C.); Thornton-le-Dale (F.F., 1945).
succosa (Berk.) Sacc.—Scarborough (G.M.); Raincliffe Wood (C.R. & A.E.P., 1918).

SARCOSPHAERA Auerswald
coronaria (Jacq.) Boud.—Scarborough under **Fagus** (G.M.).

PLICARIA Fuckel
persoonii (Crouan) Boud.—Scarborough (G.M.); Forge Valley (C.C. 1914).
radula (Berk. et Br.) Boud.—Scarborough (G.M.).

PACHYELLA Boudier
babingtonii (Berk.) Boud.—Scarborough (G.M.).

WYNNELLA Boudier
auricula (Schaeff.) Boud.—Scarborough (G.M.).

OTIDEA Persoon
alutacea (Pers.) Mass.—Scarborough (G.M.).
cochleata (L.) Fuckel—Scarborough (G.M.).
leporina (Batsch) Fuckel—Scarborough (G.M., A.E.P., 1912); Yedmandale (T.B.R., 1911).
onotica (Pers.) Fuckel—Scarborough (G.M.); Broxa, the colour variant, **O. cantharella** (F.C.R., 1949).

PUSTULARIA Fuckel
cupularis (L.) Fuckel—Kingthorpe (T.B.M.S., 1931).
ochracea Boud.—Scarborough under **Fagus** (G.M.).

PEZIZA Dillenius
aurantiaca Pers.—Not uncommon.
luteo-nitens Berk. et Br.—Scarborough (G.M.); Thornton-le-Dale (F.F., 1945).
polytrichi Schum.—Scarborough among moss (G.M.).
rhenana Fuckel—Raincliffe Wood (C.R. & A.E.P., 1918).
rutilans Fr.—Scarborough (G.M.).

SARCOSCYPHA Fries
coccinea (Jacq.) Fr.—Locally common around Scarborough, where it is collected and sold, mixed with moss, for decorative purposes.

PSEUDOPLECTANIA Fuckel
nigrella (Pers.) Fuckel—Scarborough (G.M.); Givendale (A.E.P., 1913.).

LACHNEA Fries
erinacea (Schwein.) Sacc.—Scarborough (G.M.).
hemisphaerica (Wigg.) Gill.—Raincliffe Wood (G.M.); Forge Valley (A.E.P., 1914).

SEPULTARIA Fries
sepulta (Fr.) Mass.—Scarborough (G.M.).

HUMARIACEAE

TRICHOPHAEA Boudier
albo-spadicea (Grev.) Boud.—Forge Valley on fern rhizomes (Hull, 25, 1946).

CILIARIA Quélet
crucipila (Cooke et Phill.) Boud.—Scarborough on cow dung (G.M.).
hirta (Schum.) Boud.—Thornton-le-Dale (F.F., 1945).
scutellata (L.) Quél.—Raincliffe Wood (T.B.R.); Hackness, found year after year in abundance on old saw-dust heap (F.C.R.).
setosa (Nees) Boud.—Scarborough (G.M.); Flotmanby Carr (A.E.P. & T.B.R., 1911).
trechispora (Berk. et Br.) Boud.—Scarborough (G.M., T.B.R., 1913).
umbrorum (Fr.) Boud.—Forge Valley (Hull, 22, 1946).
vitellina (Pers.) Boud.—Scarborough (G.M.).

CHEILYMENIA Boudier
coprinaria (Cooke) Boud.—Scarborough on cow dung (G.M., F.A.M.); Ellerburn on horse dung (Hull, 132, 1947).
dalmeniensis (Cooke) Boud.—Hackness on sawdust (F.C.R., 1945-48).
stercoria (Pers.) Boud.—Scarborough (G.M.).
subhirsuta (Schum.) Boud.—Scarborough (G.M.).
theleboloides (A. et S.) Boud.—Scarborough on spent hops (G.M.).

MELASTIZA Boudier
chateria (W.G.Sm.) Boud.—Scarborough on road sweepings (G.M., A.E.P., 1913, 1925).
miniata (Fuckel) Boud.—Thornton-le-Dale (F.F., 1945).

ANTHRACOBIA Boudier
melaloma (A. et S.) Boud.—Scarborough (G.M.).

PSEUDOMBROPHILA Boudier
tenuispora (Cooke et Mass.) Boud.—Scarborough (G.M.).

HUMARIA Fries
carbonigena (Phill.) Sacc.—Raincliffe Wood on charcoal bed (G.M.). Listed by Boudier among the " Doubtful Humariaceae ".
leucoloma (Hedw.) Sacc.—Scarborough among moss (G.M.).
pilifera (Cooke) Sacc.—Forge Valley (H.W., 1915).
semiimmersa (Karst.) Sacc.—Seamer Moor under firs (G.M.).

LAMPROSPORA de Notaris
miniata (Crouan) de Not.—Scarborough among moss (G.M.).
modesta (Karst.) Boud.—Raincliffe Wood on marshy soil (A.E.P., 1918).

COPROBIA Boudier
granulata (Bull.) Boud.—Very common on cow dung.

PULVINULA Boudier
constellatio (Cooke) Boud.—Scarborough (G.M.).

ASCOBOLACEAE

ASCOBOLUS Persoon
glaber Pers.—Scarborough on horse dung (M. & C.).
stercorarius (Bull.) Schroet.—Common on cow dung, less so on horse dung.
viridis Curr.—Scarborough on damp clay (M. & C.).

DASYOBOLUS Saccardo
brunneus (Cooke) Sacc.—Scarborough on cow dung (M. & C.).
immersus (Pers.) Sacc.—Scarborough on horse, cow and sheep dung (M. & C.).

SACCOBOLUS Boudier
kerverni (Crouan) Boud.—Scarborough on cow dung (M. & C.).
violascens Boud.—Scarborough on rabbit dung (M. & C.).

THECOTHEUS Boudier
pelletieri (Crouan) Boud.—Scarborough on horse dung (M. & C.).

ASCOPHANUS Boudier
argenteus (Curr.) Boud.—Scarborough on cow dung (M. & C.).
carneus (Pers.) Boud.—Common on cow, sheep, horse and rabbit dung (M. & C.) .
microsporus (Berk. et Br.) Phill.—Scarborough on cow dung (M. & C.).
misturae (Phill.) Boud.—Scarborough on road scrapings (G.M.).
salmonicolor (Berk. et Br.) Boud.—Seamer Moor on side of ditch (G.M.).
sexdecimsporus (Crouan) Boud.—Scarborough on cow dung; these specimens established the first British record (M. & C.).

LASIOBOLUS Saccardo
equinus (Muell.) Karst.—Very common on horse, cow and rabbit dung, and occasionally on dog dung (M. & C.).

ASCOZONUS Renny
argenteus (Berk. et Br.) Boud.—Scarborough on rabbit dung (M. & C.).

PYRONEMACEAE

PYRONEMA Carus
domesticum (Sow.) Sacc.—Scarborough on damp wall (G.M.).
omphalodes (Bull.) Fuckel.—Scarborough on burnt ground (G.M.).

EXOASCEAE

TAPHRINA Fries
aurea (Pers.) Fr.—Locally common on **Populus serotina.**

EXOASCUS Fuckel
deformans (Berk.) Fuckel.—Not uncommon on **Prunus persica** and **P. amygdalus.**
turgidus Sadeb.—Common on **Betula pendula** and **B. pubescens.**

INOPERCULEAE

GEOGLOSSACEAE

TRICHOGLOSSUM Boudier
hirsutum (Pers.) Boud.—Scarborough (G.M.).

GEOGLOSSUM Persoon
difforme Fr.—Scarborough (G.M.).
glutinosum Pers.—Scarborough (G.M.).
ophioglossoides (L.) Sacc.—Cloughton (G.M.); Raincliffe Wood (A.E.P., 1917); Thornton-le-Dale (F.F., 1945).

LEPTOGLOSSUM Cooke
tremellosum Cooke—Raincliffe Wood (G.M.).

MICROGLOSSUM Gillet
olivaceum (Pers.) Gill.—Scarborough among grass (G.M.).
viride (Pers.) Gill., as **Mitrula serpentina.**—Scarborough (G.M., A.E.P., 1918).

LEOTIACEAE

SPATHULARIA Persoon
clavata (Schaeff.) Sacc.—Scarborough (G.M.); Staxton Wold (A.E.P., 1914).

MITRULA Fries
cucullata (Batsch) Fr.—Scarborough on dead fir-leaves (G.M.).
phalloides (Bull.) Chev.— Scarborough, Goathland (M. & C.); Fylingdales, Cloughton and Helwath Beck, in quantity on submerged leaves (A.E.P., 1923).

LEOTIA Hill
atro-virens Pers.—Scarborough (G.M.).
lubrica (Scop.) Pers.—Not uncommon in woods.

CUDONIA Fries
circinans (Pers.) Fr., as **Vibrissea**—Scarborough in fir woods, often forming " fairy rings " (G.M.).

CUDONIELLA Saccardo
acicularis (Bull.) Schroet., as **Helotium**—Scarborough (M. & C.).

VIBRISSEA Fries
truncorum (A. et S.) Fr.—Scalby Beck (G.M.); Staintondale (M. & C.).

APOSTEMIDIUM Karsten
leptospora (Berk. et Br.) Boud.—Raincliffe Wood (F.F., 1915, H.W.).

OMBROPHILACEAE

OMBROPHILA Fries
alniella (Nyl.) Karst.—Scarborough (G.M.).
clavus (A. et S.) Cooke—Scarborough on dead leaves of **Sambucus** (G.M.); Raincliffe Wood (F.F., 1915).
faginea (Pers.) Boud.—Scarborough on beech mast (G.M.).
imberbis (Bull.) Boud.—Scarborough on **Alnus** (M. & C.).
rudis (Berk.) Phill.—Scarborough on gravel (M. & C.).

PACHYDISCA Boudier
immutabilis (Fuckel) Boud.—Scarborough on dead leaves of **Quercus** (M. & C.).

CALYCELLA Fries
citrina (Hedw.) Quél.—Common.
lenticularis (Bull.) Boud.—Scarborough (M. & C.).
pallescens (Pers.) Quél.—Scarborough (M. & C.).
sublenticularis (Fr.) Boud.—Ganton (T.B.R., 1913); Ayton Moor (A.E.P., 1913).

DISCINELLA Boudier
purpurascens (Pers.) Boud.—Scarborough (G.M.); Hackness Park (T.B.R., 1910).

BULGARIACEAE

CORYNE Tulasne
sarcoides (Jacq.) Tul.—Common.
urnalis (Nyl.) Sacc.—Scarborough (M. & C.).

BULGARIA Fries
inquinans (Pers.) Fr.—Common.

CALLORIACEAE

CORYNELLA Boudier
atro-virens (Pers.) Boud.—Scarborough on **Ulex** (M. & C.); Howldale (J.W., Hull, 124, 1947).

POLYDESMIA Boudier
pruinosa (Berk. et Br.) Boud.—Scarborough (M. & C.); Thornton-le-Dale on **Diatrypella quercina** (F.F., 1945); Kingthorpe on **Diatrype stigma** (F.F., 1946).

CALLORIA Fries
fusarioides (Berk.) Fr.—Common on dead stems of **Urtica.**

ORBILIA Fries
leucostigma Fr.—Common on dead wood.
luteo-rubella (Nyl.) Karst. — Scarborough on dead **Polyporus squamosus** (M. & C.).
vinosa (A. et S.) Karst.—Scarborough (M. & C.).
xanthostigma Fr.—Common on dead wood.

Species under Boudier's heading " Spp. of uncertain position ":
flexuosa Crossl.—Langdale End (F.F., 1897).
retrusa Phill. et Plowr.—Scarborough on dead leaves of **Larix** (M. & C.).

HYALINIA Boudier
dilutella (Fr.) Boud.—Filey on **Epilobium** (C.C., Nat., 1903, p. 250).
inflatula (Karst.) Boud.—Scarborough (M. & C.).

CIBORIACEAE

CIBORIA Fuckel
amentacea (Balb.) Fuckel—Forge Valley on **Alnus** (J.W., 1947).
sydowiana Rehm—Scarborough (M. & C.).

SCLEROTINIA Fuckel

candolleana (Lév.) Fuckel—Scarborough on dead leaves of **Quercus** (M. & C.).

curreyana (Berk.) Karst.—Not uncommon on **Juncus.**

fructigena Aderh. et Ruhl.—Scarborough (G.M.); Thornton-le-Dale on **Malus pumila** (F.F., 1945). Also in the imperfect state **Monilia fructigena** Pers. ex West., a common fruit mould.

laxa Aderh. et Ruhl.—Only in the imperfect state, **Monilia cinerea** Bon.—Scarborough (F.A.M., Nat., Sept., 1923).

libertiana Fuckel.—Scarborough on **Solanum tuberosum** (G.M.); Thornton-le-Dale (F.F., 1945).

tuberosa (Hedw.) Fuckel —Widespread on rhizomes of **Anemone nemorosa.**

STROMATINIA Boudier

pseudotuberosa (Rehm) Boud. — Raincliffe Wood on acorns (M. & C.).

PHIALEA Fries

echinophila (Bull.) Quél.—Scarborough on involucres of **Castanea sativa** (M. & C.).

firma (Pers.) Gill.—Oliver's Mount on dead **Quercus** (M. & C.); Cloughton (A.E.P., 1917).

CHLOROSPLENIUM Fries

aeruginosum (Oed.) de Not.—Records numerous, mostly on **Quercus.**

HELOTIUM Fries

cyathoideum (Bull.) Karst.—Common on dead herbaceous stems.

epiphyllum (Pers.) Fr.—Scarborough on dead leaves of **Quercus** (M. & C.).

fructigenum (Bull.) Fuckel—Scarborough on beech-mast (M. & C.); Thornton-le-Dale (F.F., 1945).

herbarum (Pers.) Fr.—Scarborough on dead stems of **Urtica** (M. & C.).

infarciens Ces. et de Not., as **Pachydisca laburni**—Scarborough on **Laburnum anagyroides** (M. & C).

lutescens (Hedw.) Fr.—Scarborough (M. & C.).

phyllophilum (Desm.) Karst.—Scarborough on dead leaves of **Fagus** (M. & C.).

scutula (Pers.) Karst.—Common on decaying herbaceous stems.

serotinum (Pers.) Fr.—Scarborough (M. & C.).

sublateritium Berk et. Br.—Scarborough on **Humulus lupulus** (M. & C.).

virgultorum (Wahl.) Karst.—Raincliffe Wood (T.B.R., 1911).

PSEUDOHELOTIUM Fuckel

pineti (Batsch ex Fr.) Fuckel, as **Belonidium jerdoni**—Scarborough on leaves of **Pinus sylvestris** (M. & C.).

STAMNARIA Fuckel

equiseti (Hoffm.) Sacc.—Raincliffe Wood on **Equisetum telmateia** (M. & C.).

CYATHICULA de Notaris

coronata (Bull.) de Not.—Scarborough on **Urtica** (M. & C.); Forge Valley (Hull, 46, 1946).

BELONIDIUM de Notaris

deparculum (Karst.) Mass.—Filey on dead **Filipendula ulmaria** (C.C., 1903).

TRICHOBELONIUM (Saccardo) Rehm

obscura Rehm., as **Echinella setulosa**—Scarborough on dead stems of **Calluna** (G.M.).

LACHNELLACEAE.

DASYSCYPHA Fries

acuum (A. et S.) Sacc.—Ayton Moor on pine needles (A.E.P., 1912).
bicolor (Bull.) Fuckel—Scarborough on dead leaves of **Corylus** (M. & C.), a doubtful record.
brevipila de Gal—Common on **Fagus.** Many of the earlier records of **D. nivea** and **D. virginea** probably refer to this species.
cerina (Pers.) Fuckel—Scarborough (G.M., 1881).
ciliaris (Schrad.) Sacc.—Scarborough on dead leaves of **Quercus** (G.M.).
clandestina (Bull.) Fuckel—Forge Valley on **Rubus idaeus** (G.M.).
diminuta (Rob.) Sacc.—Staintondale on **Juncus** (T.B.R., 1912).
fuscescens (Pers.) Rehm—Silpho on fallen leaves of **Quercus** (A.E.P., 1913).
nivea (Hedw. fil.) Sacc.—Records numerous.
pulverulenta (Lib.) Sacc.—Scarborough on pine needles (G.M.).
rhytismatis (Phill.) Sacc.—Scarborough (G.M.) .
virginea (Batsch) Fuckel—Records numerous.

ERINELLA Saccardo

apala (Berk. et Br.) Sacc.—Scarborough (G.M.).

LACHNELLA Fries

albo-testacea (Desm.) Quél.—Filey on grass stems (M. & C.).
corticalis (Pers.) Fr.—Scarborough on dead bark of **Populus serotina** (G.M.).
as **Dasyscypha canescens** Mass.—Scarborough (G.M.).
as **Echinella crosslandi** Mass.—Scarborough (G.M.).
leucophaea (Pers.) Boud.—Scarborough on dead **Arctium** (G.M.).
sulphurea (Pers.) Quél.—Not uncommon on dead **Arctium** and umbellifer stems.

TRICHOSCYPHA Boudier

calycina (Schum.) Boud.—Abundant on **Larix decidua,** also recorded on **L. leptolepis, Pinus sylvestris, P. strobus** and **Pseudotsuga douglasii.**

British records under the name **Dasyscypha calycina** embrace at least three species which appear very similar under a hand lens. In the Systema Mycologicum, Vol 2, p. 91, 1822, with which Discomycete nomenclature starts, Fries described **Peziza calycina** Schum. as occurring in two forms, only one of which was fully described and evidently regarded as the typical form. This common fungus on dead pine branches is accordingly that renamed by Boudier as **Trichoscypha calycina** and by Nannfeldt as **Trichoscyphella calycina.** It has small fusiform ascospores and is the fungus Cooke described as **Dasyscypha subtilissima.**

Fuckel however, adopted the name **Dasyscypha calycina** (Schum.) Fuckel for the very common fungus with large elliptical ascospores which occurs on dead branches of larch and this interpretation has been widely followed in Britain and America. It is however, clearly incorrect, as shown above, and actually there is no valid name for this abundant saprophytic species on larch.

The problem is complicated by the existence of a third fungus of this group which is actively parasitic and causes Larch Canker. The valid name for this species is **Trichoscyphella willkommii** (Hart.) Nannf.

resinaria (Phill.) Boud.—Scarborough on **Picea abies** (G.M.).

ARACHNOPEZIZA Fuckel

aurata Fuckel—Scarborough (G.M.).

HYALOSCYPHA Boudier

dematiicola (Berk. et Br.) Nannf. Conidial form only **(Haplographium bicolor** Grove)—Howldale on **Fagus,** 1947 (I.M.I., 13928a); Ellerburn on dead **Abies** leaves (Nottm., 1114).

dentata (Pers.) Boud.—Forge Valley (J.W., Hull, 125, 1947).

hyalina (Pers.) Boud.—Common.

punctiformis (Grev.) Boud. — Scarborough on dead leaves of **Quercus** (M. & C.).

punctoides (Karst.) Boud.—Filey on dead **Epilobium** (M. & C.).

MICROPODIA Boudier

oedema (Desm.) Boud.—Scarborough on **Phragmidium** on **Rubus fruticosus** (G.M.).

URCEOLELLA Boudier

fugiens (Phill.) Boud.—Filey (M. & C.); Robin Hood's Bay on **Juncus** (C.C., 1907).

melaxantha (Fr.) Boud.—Scarborough on **Fagus** (G.M.).

scrupulosa (Karst.) Boud.—Scarborough on dead **Crataegus** (G.M.).

TRICHOPEZIZA Fuckel

citricolor (Berk. et Br.) Sacc.—Langdale End (C.C., 1897). "There being no specimens of this species in Berkeley's Herbarium at Kew, the Scarborough specimens filled the vacancy and afforded an opportunity of drawing up a more complete diagnosis" (Nat., June, 1901).

eriobasis (Berk.) Boud.—Langton (G.M.).

MOLLISIACEAE

PYRENOPEZIZA Fuckel

carduorum Rehm—Robin Hood's Bay on **Cirsium arvense** (C.C., 1907).

maculans (Rehm) Boud., as **Mollisia**—Silpho Moor on **Nardus stricta** (T.B.R., Nat., 1914, p. 46), new to Britain.

rubi (Fr.) Rehm—Robin Hood's Bay on dead **Rubus** (C.C., 1907).

MOLLISIA Fries

atrata (Pers.) Karst.—Scarborough (M. & C.); Filey (F.A.M., 1931).

conigena (Pers.) Boud.—Scarborough (M. & C.).

cornea (Berk. et Br.) von Hoehn., as **Calloria**—Raincliffe Wood on **Carex pendula** (M. & C.).

cinerea (Batsch) Karst.—Abundant.

discolor (Mont. et Fr.) Phill.—Raincliffe Wood and Ganton (A.E.P., 1912-13).

fallax (Desm.) Gill.—Scarborough on fir cones (M. & C.).

juncina (Pers.) Rehm—Scarborough on **Juncus** (M. & C.).

lignicola Phill.—Scarborough (M. & C.); Ellerburn (F.F., 1946); Howldale (P.B.H.T., 1946).

polygoni (Lasch) Rehm, as **M. atrocinerea**—Not uncommon.

ventosa Karst.—Scarborough (M. & C.).

TAPESIA Fuckel

fusca (Pers.) Fuckel—Scarborough (G.M.); Hackness (Y.N.U. Excn., 1897); Thornton-le-Dale (F.C.R., 1946).

rosae (Pers.) Fuckel—Scarborough (G.M.).

sanguinea (Pers.) Fuckel—Scarborough (G.M.).

NIPTERA Fries

lacustris Fr.—Scarborough on **Glyceria maxima** (M. & C.).

punctum (Rehm) Sacc.—Broxa Moor on **Nardus stricta** (T.B.R. teste C.C., Nat., 1913, p. 175), new to Britain.

PATELLARIACEAE

PATINELLA Saccardo

pallida (Berk.) Sacc., as **Patellea**—Scarborough (M. & C.).

PLACOGRAPHA Th. Fries

flexella (Ach.) Th. Fr.—Scarborough on dead **Pinus sylvestris** (M. & C.).

HETEROSPHAERIA Greville

patella (Tode) Grev.—Scarborough on **Angelica sylvestris** (M. & C.); Thornton-le-Dale (F.C.R., 1946).

DURELLA Tulasne

atro-vinosa (Blox.) Sacc.—Scarborough (M. & C.).

LECANIDION Rabenhorst

maurum (Phill.) Sacc.—Scarborough (M. & C.).

SCUTULARIA Karsten

citrina (Chev.) Sacc.—Scarborough on dead **Rosa canina** (M. & C.).

DERMATEACEAE

VELUTARIA Fuckel

rufo-olivacea (A. et S.) Fuckel—Scarborough on **Fraxinus** (M. & C.); Ellerburn on **Fraxinus** (F.F., 1946); Hackness on **Fagus** (F.C.R., 1946 et seq.).

PEZICULA Tulasne

dryina (Cooke) Sacc.—Scarborough on **Quercus** (M. & C.).

rubi (Lib.) Niessl.—Scarborough on **Rubus** (M. & C.).
as **P. rhabarbarina** (Berk.) Tul.—Hackness on **Rubus** (F.C.R., 1945); these specimens are now in the Kew Herbarium.

DERMATEA Fries

cerasi (Pers.) de Not.—Scarborough on **Prunus laurocerasus** (M. & C.); Howldale on **P. avium** (F.F., 1946).

CENANGIUM Fries

abietis (Pers.) Duby—Scarborough on **Pinus sylvestris** (M. & C.).

prunastri (Pers.) Fr.—Scarborough on **Prunus communis** (M. & C.).

pulveraceum (A. et S.) Fr.—Scarborough on **Prunus communis** (M. & C.).

sarothamni Fuckel—Scarborough on dry branches of **Sarothamnus scoparius** (G.M.).

ENCOELIA Fries

furfuracea (Roth.) Karst.—Scarborough on **Corylus** (M. & C.).

TYMPANIS Tode

conspersa Fr.—Scarborough on **Populus** (M. & C.).

PHAEANGELLA Saccardo

empetri (Phill.) Boud.—Seamer Moor (T.B.R., 1911). The specimens were sent to Charles Crossland and by him to Dr. Boudier, who first named the species **Pseudophacidium smithianum** and then transferred it to **Phaeangella.** Later Phillip's old record of **Cenangium empetri** was noticed and Boudier made the necessary transfer. Thus the nomenclatorial history is :—

1. **Cenangium empetri** Phill., 1891.
2. **Pseudophacidium smithianum** Boud, 1909.
3. **Phaeangella smithiana** (Boud.) Boud., 1912.
4. **Phaeangella empetri** (Phil.) Boud., 1913.

SCLERODERRIS Fries

ribesia (Pers.) Karst.—Scarborough on living leaves of **Ribes sativum** (G.M.).

TROCHILA Fries

craterium (DC.) Fr.—Scarborough (M. & C.).

laurocerasi (Desm.) Fr. — Scarborough on **Prunus laurocerasus** (M. & C.).

STICTIDIACEAE

PROPOLIS Fries

faginea (Schrad.) Karst.—Scarborough (M. & C.); Kingthorpe on **Fagus** (F.F., 1946).

OCELLARIA Tulasne
punctiformis (Pers.) Sacc.—Scarborough on **Salix caprea** (M. & C.).
CRYPTODISCUS Corda
angulosus Karst.—Scarborough on **Salix caprea** (M. & C.).
pallidus (Pers.) Corda—Scarborough on **Fagus** (M. & C.).
STICTIS Persoon
annulata Cooke et Phill.—Scarborough on **Lonicera** (M. & C.).
radiata (L.) Pers.—Scarborough on **Fagus** (M. & C.).
SCHIZOXYLON Persoon
berkleyanum (Dur. et Lév.) Fuckel—Scarborough on **Artemisia vulgaris** (M. & C.).
NEMACYCLUS Fuckel
niveus (Pers.) Sacc.—Scarborough on dead leaves of **Pinus sylvestris** (M. & C.).

PHACIDIACEAE

CRYPTOMYCES Greville
maximus (Fr.) Rehm—Scarborough on living **Salix caprea** (M. & C.).
PHACIDIUM Fries
abietinum Kunze et Schm.—Scarborough on fallen leaves of **Larix** and **Pinus** (M. & C.).
infestans Karst.—Scarborough on living **Pinus sylvestris** (M. & C.). The first British record.
multivalve (DC.) Kunze et Schm.—Ellerburn on **Ilex** (F.A.M., 1922).
striatum Phill. et Plowr.—Scarborough on **Rubus** (M. & C.).
PSEUDOPEZIZA Fuckel
petiolaris (A. et S.) Mass.—Ellerburn on petioles of **Acer** (F.F., 1946).
ranunculi (Wallr.) Fuckel—Scarborough on **R. repens,** etc. (M. & C.); Thornton-le-Dale (F.F., 1945).
repanda (Fr.) Karst.—Thornton-le-Dale on **Sherardia** (W.G.B., York, 1945); Saltergate on **Galium saxatile** (Nottm., 1041).
ribis Kleb.—Thornton-le-Dale on **R. uva-crispa** (F.F., 1945).
sphaeroides (Pers.) Fuckel—Scarborough and Robin Hood's Bay on **Melandrium dioicum** (M. & C., C.C.). First and second British records (Nat., 1907, p. 254).
trifolii (Biv.-Bern) Fuckel—Scarborough on **T. repens** (M. & C.); Robin Hood's Bay on **T. hybridum** (W.G.B., 1946).
STEGIA Fries
ilicis Fr.—Records numerous.
SCHIZOTHYRIUM Desmazières
aquilinum (Schum.) Rehm—Scarborough on **Pteridium aquilinum** (M. & C.).
ptarmicae Desm.—Seamer Moor on living **Achillea ptarmica** (M. & C.); Filey (F.A.M., 1931).

COCCOMYCES de Notaris
coronatus (Schum.) de Not.—Scarborough on **Quercus** (M. & C.).
dentatus (Kunze et Schm.) Sacc.—Scarborough on **Quercus** (M. & C.).

COLPOMA Wallroth
quercinum (Pers.) Wallr.—Scarborough on **Quercus** (M. & C.); Harwood Dale (Nottm., 1330).

RHYTISMA Fries
acerinum (Pers.) Fr.—Abundant on **Acer pseudoplatanus,** less common on **A. campestre.**
punctatum (Pers.)Fr. —Scarborough (G.M.); Raincliffe Wood (A.E.P.); Hackness (F.F., 1925); all on **Acer pseudoplatanus.**
salicinum (Pers.) Fr.—Scarborough on living **Salix** (G.M.).

PYRENOMYCETES

PERISPORIALES

EUROTIACEAE

EUROTIUM Link ex Fries
lateritium Mont.—On stale bread; Scarborough (G.M.).

ERYSIPHACEAE

ERYSIPHE Hedwig fils ex Fries
cichoracearum DC.—On **Arctium,** etc.; Thornton-le-Dale (F.F., 1945).
galeopsidis DC.—On **Stachys;** Thornton-le-Dale (F.F., 1945).
graminis DC.—Not uncommon on **Triticum, Dactylis,** etc.
polygoni DC., as **E. communis**—Fairly common on many hosts.

MICROSPHAERA Léveillé
berberidis (DC.) Lév.—On **B. vulgaris** ; Scarborough (G.M.).
grossulariae (Wallr.) Lév.—On **Ribes uva-crispa;** Scalby (G.M.); Thornton-le-Dale (F.F., 1945).

PODOSPHAERA Kunze ex Léveillé
oxyacanthae (DC.) de Bary—On **Crataegus;** Scarborough (G.M.).
var. **tridactyla** (Wallr.) Salm.—On **Prunus padus;** Scarborough (G.M.).
leucotricha (Ell. et Ev.) Salm.—On apples; Scarborough (T.B.R., 1916).

SPHAEROTHECA Léveillé
humuli (DC.) Burr.—Numerous records.
pannosa (Wallr.) Lév.—Common in the district, although there are specific records only for the conidial state, **Oidium leucoconium.**

UNCINULA Léveillé
aceris (DC.) Sacc.—Thornton-le-Dale (F.F., 1945).
salicis (DC.) Wint., as **U. aduncta**—On **Salix;** Ayton (G.M.).

PERISPORIACEAE

PERISPORIUM Fries emend. Corda
vulgare Corda—On sacking; Forge Valley, 1947 (I.M.I., 13767a).

CAPNODIACEAE

CAPNODIUM Montagne
salicinum Mont.—On **Salix;** Scarborough (G.M.).
tiliae Sacc.—On **Tilia;** Scalby (G.M.); in the absence of specimens, this must be considered a doubtful record.

SPHAERIALES

SPHAERIACEAE — ALLANTOSPORAE

CRYPTOSPHAERIA Greville
eunomia (Fr.) Fuckel—On **Fraxinus;** Kingthorpe, 1930 (I.M.I., 1432, 14319); Thornton-le-Dale, 1947 (I.M.I., 14521); Pickering, 1947 (I.M.I., 14104).
populina (Pers.) Sacc.—On **Populus;** Pickering, 1947 (I.M.I., 14451).

DIATRYPE Fries
bullata (Hoffm. ex Fr.) Fr.—On **Salix;** Ellerburn (Nottm., 1069).
disciformis (Hoffm. ex Fr.) Fr.—Common, especially on **Fagus.**
stigma (Hoffm. ex Fr.) Fr.—Abundant.

DIATRYPELLA (Cesati et de Notaris) Saccardo
aspera (Fr.) Nits.—On **Fagus;** Boynton (W.W.S., Nat., July, 1889).
favacea (Fr.) Ces. et de Not.—On **Fagus;** Kingthorpe, 1930 (I.M.I., 14538); Forge Valley, 1947 (I.M.I., 14103).
quercina (Pers.) Cooke—Many records on **Quercus.**
tocciaeana de Not.—On **Alnus;** Forge Valley (W.G.B., 1947).
verruciformis (Ehrenb. ex Fr.) Nits.—Numerous records, possibly a form of **D. favacea.**

EUTYPA Tulasne
acharii Tul.—On **Fagus;** Scarborough (G.M.).
aspera (Nits.) Fuckel—On **Fagus;** Scarborough (G.M.).
flavovirens (Pers. ex Fr.) Tul.—Many records on wood and bark.
lata (Pers. ex Fr.) Tul.—On **Hedera;** Scarborough (G.M.).
spinosa (Pers. ex Fr.) Tul.—On **Fraxinus ;** Scarborough (G.M.).

EUTYPELLA (Nitschke) Saccardo
prunastri (Pers. ex Fr.) Sacc.—Numerous records on **Prunus spinosa.**
sorbi (Schm. ex Fr.) Sacc.—Locally common on **Sorbus aucuparia** in woods near Thornton-le-Dale (I.M.I., 14726, 1344, 4940, etc.).
stellulata (Fr.) Sacc.—On **Ulmus;** Kingthorpe, 1930 (I.M.I., 14731); Forge Valley, 1945 (I.M.I., 1385); Thornton-le-Dale, 1947 (I.M.I., 14261). On **Acer;** Scarborough (G.M.).

NITSCHKIA Otth
cupularis (Pers. ex Fr.) Karst.—On **Fraxinus;** Howldale (F.F., 1947).

PERONEUTYPA Berlese
heteracantha (Sacc.) Berl.—On **Acer;** Forge Valley, 1946 (I.M.I., 32397). On **Tilia;** Forge Valley, 1946 (I.M.I., 8346), 1947 (I.M.I., 14466).

QUATERNARIA Tulasne
dissepta (Fr.) Tul.—On **Ulmus;** Kingthorpe (F.F., 1946).
quaternata (Pers. ex Fr.) Schroet.—On **Fagus;** Howldale, 1947 (I.M.I., 14259).

VALSA Fries
ambiens (Pers. ex Fr.) Fr.—Numerous records.
ceratophora Tul.—On **Quercus;** Scarborough (G.M.).
leiphaemioides Berk et Curt.—On **Quercus;** Raincliffe Wood (G.M.); as this is a North American species, the record must be considered doubtful.

SPHAERIACEAE — HYALOSPORAE

BOTRYOSPHAERIA Cesati et de Notaris
hoffmanni von Hoehn.—On **Fagus;** Howldale, 1947 (I.M.I., 14454, 14459). Pycnidia (**Fusicoccum macrosporum** Sacc. et Bri.) were grown from ascospores for the first time, from I.M.I., 9911 (E.W.M., 1947).

CERATOSTOMELLA Saccardo
rostrata (Fr.) Sacc.—Scarborough (G.M.).
vestita Sacc.—On **Quercus;** Kingthorpe (F.F., 1945).

CRYPTOSPORELLA Saccardo
hypodermia (Fr.) Sacc.—On **Ulmus;** Forge Valley, 1947 (I.M.I., 14488, Hull, 114).

DITOPELLA de Notaris
ditopa (Fr.) Schroet.—On **Alnus;** Forge Valley, 1947 (I.M.I., 13828).

GNOMONIELLA Saccardo
avellanae (Schm. ex Fr.) Sacc.—On living **Corylus;** Scarborough (G.M.).
coryli (Batsch ex Fr.) Sacc.—On living **Corylus;** Scarborough (G.M.)
tubiformis (Tode ex Fr.) Sacc.—On **Alnus** leaves; Scarborough (G.M.).
vulgaris (Ces. et de Not.) Sacc.—On **Corylus;** Scarborough (G.M.).

OPHIOSTOMA Sydow
piceae (Muench.) Syd.—On conifer; Thornton-le-Dale, 1947 (I.M.I., 1395a).

PHYSALOSPORA Niessl
mutila Stev., N.E.—On **Ulmus;** Forge Valley, 1945 (I.M.I., 1386).

TRICHOSPHAERIA Fuckel
myriocarpa (Fr.) Pet. et Syd.—Scarborough (G.M.). On **Ulmus;** Kingthorpe, 1930, as **T. minima** (I.M.I., 5244).

TYMPANOPSIS Starback
euomphala (Berk. et Curt.) Sacc.—On **Fraxinus;** Kingthorpe, 1945 (I.M.I., 1355a).

SPHAERIACEAE — PHAEOSPORAE

ANTHOSTOMA Nitschke
gastrinum (Fr.) Sacc.—On **Ulmus;** Kingthorpe, 1945 (I.M.I., 1350).
melanotes (Berk. et Br.) Sacc.—On **Ulmus;** Ellerburn (Nottm. 1346).
microsporum Karst.—On **Alnus;** Forge Valley, 1945 (I.M.I., 1381). Not previously recorded for England; compared with Karsten's original material from Finland.
turgidum (Pers. ex Fr.) Nits.—Numerous records on **Fagus.**

BOMBARDIA Fries
fasciculata Fr.—Scarborough (G.M.). On **Fraxinus;** Kingthorpe, 1930 (I.M.I., 15157).

CHAETOMIUM Kunze ex Fries
chartarum Ehrenb. ex Fr.—On damp paper; Scarborough (G.M.). this is probably a synonym of **C. globosum** Kunze ex Fr.
elatum Kunze et Schm. ex Fr.—On grass; Scarborough (G.M.). On wheat straw; Thornton-le-Dale (F.F., 1946). On sacking; Forge Valley, 1947 (I.M.I., 13767c).

DALDINIA Cesati et de Notaris
concentrica (Bolt. ex Fr.) Ces. et de Not.—Common, usually on **Fraxinus.**

HYPOXYLON Bulliard ex Fries
fragiforme (Pers. ex Fr.) Kickx (= **coccineum** Bull.)—Common on **Fagus.**
fuscum (Pers. ex Fr.) Fr.—Numerous records on **Corylus.** On **Alnus;** Forge Valley, 1946 (I.M.I., 7021).
multiforme (Fr.) Fr.—On **Betula;** Scarborough (G.M.). On **Alnus;** Thornton-le-Dale (F.F., 1945-46-47).
rubiginosum (Pers. ex Fr.) Fr.—On **Fraxinus;** Forge Valley, 1947 (I.M.I., 13808). On **Fagus;** Kingthorpe (F.F., 1946).
as **atropurpureum** Fr.—Robin Hood's Bay (C.C., 1907). Bisby and Mason say that all British specimens under this name are **H. rubiginosum.**
semi-immersum Nits.—On **Quercus;** Howldale, 1947 (I.M.I., 14479); Kingthorpe (F.F., 1946).
serpens (Pers. ex Fr.) Fr.—On dead leaves; Scarborough (G.M.). On **Betula;** Forge Valley, 1947 (I.M.I., 13827a, 13833a). On **Ulmus;** Forge Valley, etc. (F.F., 1945-47).

NUMMULARIA Tulasne
bulliardi Tul.—On **Fagus;** Scarborough (G.M.).
lutea (A. et S. ex Fr.) Nits.—On **Buxus;** Kingthorpe, 1945 (I.M.I., 1363).

PORONIA Willdenow ex Fries
punctata (L. ex Fr.) Fr.—On horse dung; Scarborough (G.M.)

ROSELLINIA de Notaris

aquila (Fr.) de Not.—On **Cornus;** Kingthorpe, 1946 (I.M.I., 4931). On **Fraxinus;** Kingthorpe, 1930 (I.M.I., 13351). On **Ulmus;** Kingthorpe, 1930 (I.M.I., 13373). On **Acer;** Howldale (Nottm., 1196).

ligniaria (Grev.) Nits.—On **Fagus;** Kingthorpe, 1946 (I.M.I., 4929); Howldale (Nottm., 1159).

mammiformis (Pers. ex Fr.) Ces. et de Not.—Scarborough (G.M.). On wood; Thornton-le-Dale (F.F., 1945).

thelena (Fr.) Rabenh.—Scarborough (G.M.).

velutina Fuckel—On **Fagus;** Kingthorpe (F.F., 1946); Howldale (Nottm., 1159).

SORDARIA Cesati et de Notaris

coprophila (Fr.) Ces. et de Not.—On horse and cow dung; Scarborough (G.M.).

THAMNOMYCES Ehrenberg ex Fries

hippotrichoides (Sow.) Ehrenb.—On coconut fibre; Scarborough (G.M.).

USTULINA Tulasne

deusta (Hoffm. ex Fr.) Pet. (=**U. vulgaris** Tul.)—Scarborough (G.M.). On **Fagus;** Kingthorpe (F.F., 1946).

XYLARIA Hill ex Greville

carpophila (Pers. ex Fr.) Fr.—Raincliffe Wood (G.M.). On beech-mast; Thornton-le-Dale (F.F., 1946).

corniformis Fr. Hackness (A.E.P., 1915); Raincliffe Wood (F.F., 1915. Now considered a doubtful species.

filiformis (A. et S. ex Fr.) Fr.—On dead leaves; Scarborough (G.M.).

hypoxylon (L. ex Fr.) Grev.—Very common on old stumps.

longipes Nits.—On **Acer;** Kingthorpe (W.G.B.); Forge Valley (F.F., 1944).

polymorpha (Pers. ex Fr.) Grev.—Not uncommon on stumps.

vaporaria Berk. Scarborough, in cucumber frame (G.M.).

SPHAERIACEAE—HYALODIDYMAE

BERTIA de Notaris

moriformis (Tode ex Fr.) de Not. Numerous records, especially on **Sambucus.**

CALYCULOSPHAERIA Fitzpatrick

tristis (Fuckel) Fitzp.—On **Acer;** Forge Valley, 1947 (I.M.I., 34199). On **Crataegus** and **Ulmus;** Thornton-le-Dale (F.F., 1945-46).

COLEROA (Fries) Rabenhorst

chaetomium (Kunze ex Fr.) Rabenh. On **Rubus;** Forge Valley (W.G.B., 1947).

DIAPORTHE Nitschke

crataegi (Curr.) Nits.—On **Crataegus;** Scarborough (G.M.).

decedens (Fr.) Fuckel—On **Corylus;** Thornton-le-Dale (F.F., 1945).

eres Nits.—On **Fraxinus** ; Kingthorpe, 1930, as **D. controversa** (I.M.I., 15857). On **Hedera;** Thornton-le-Dale (F.F., 1946).

leiphaemia (Fr.) Sacc.—Many records on **Quercus.**
lirella (Fr.) Nits. On **Filipendula ulmaria;** Scarborough (G.M.).
pardalota (Mont.) Nits. On **Ilex;** Howldale (W.G.B., 1947). On dead herbaceous stems; Scarborough, as **D. striaeformis** (G.M.).
pustulata (Desm.) Sacc.—On **Acer;** Kingthorpe, 1930, as **D. niessli** (I.M.I., 15814), Forge Valley (W.G.B., 1945).
medusaea Nits.—On **Laburnum anagyroides ;** Scarborough, as **D. rudis** (G.M.).
sarothamni (Auersw.) Nits.—On **Sarothamnus;** Scarborough(G.M.).

DIDYMELLA Saccardo
planiuscula (Berk. et Br.) Sacc.—Scarborough (G.M.).
tosta (Berk. et Br.) Sacc.—On **Epilobium;** Scarborough (G.M.), Ellerburn (F.F., 1946).

DIDYMELLINA von Hoehnel
dianthi Burt., C.C.—On cultivated pinks; Scarborough, the conidial state only, **Heterosporium echinulatum** (M. & C.).

GNOMONIA Cesati et de Notaris
errabunda (Rob. in Desm.) Auersw.—On **Fagus** leaves; Ellers Wood (Nottm., 1043).
erythrostoma (Pers. ex. Fr.) Auersw. On **Prunus cerasus;** Seamer (Y.N.U. Excn., 1922).
inclinata (Desm.) Auersw. On **Acer** petioles; Ellers Wood (Nottm., 1067).
rostellata (Fr.) Bref.—On **Rubus;** Scarborough (G.M.).
setacea (Pers. ex Fr.) Ces. et de Not. Scarborough (G.M.).

HERCOSPORA Preuss
tiliae (Pers. ex Fr.) Fr. emend. Tul. On **Tilia;** Scarborough (G.M.). Forge Valley, 1945 (W.G.B., York).

MELANCONIS Tulasne
alni Tul. On **Alnus;** Scarborough (G.M.), Wykeham (W.G.B., 1945).
stilbostoma (Fr.) Tul. On **Betula;** Dalby Dale (F.F., 1945); Howldale (Nottm., 1327).
thelebola (Fr.) Sacc. On **Alnus;** Ellerburn (Nottm., 1036).

MELANOPSAMMA Niessl
pomiformis (Pers. ex. Fr.) Sacc. On **Fraxinus;** Raincliffe Wood, 1944 (I.M.I., 556).

MELANOPSAMMELLA von Hoehnel
inaequalis (Grove) von Hoehn. On **Betula;** Forge Valley, 1947 (I.M.I., 14110c). On **Fraxinus ;** Thornton-le-Dale (I.M.I., 13812).

MYCOSPHAERELLA Johanson
brassicicola (Duby) Oud. On **Capsella;** Scarborough (G.M.).
fragariae (Tul.) Lind. On **Fragaria;** Thornton-le-Dale (F.F., 1945).
hedericola (Desm.) Lind. On **Hedera;** Scarborough (G.M.).
isariophora (Desm.) Johans. On **Stellaria media;** Scarborough (G.M.).
pteridis (Desm.) Schroet. On **Pteridium aquilinum;** Scarborough (G.M.).
punctiformis (Pers. ex Fr.) Starb. On **Rumex;** Scarborough (G.M.).

VENTURIA de Notaris
inaequalis (Cooke) Wint. emend. Aderh. Thornton-le-Dale (F.F., 1945).
myrtilli Cooke.—On **Vaccinium;** Scarborough (G.M.).

SPHAERIACEAE—PHAEODIDYMAE

DIDYMOSPHAERIA Fuckel
epidermidis (Fr.) Fuckel.—On **Epilobium;** Kingthorpe (F.F., 1946).
OTTHIA Nitschke
pruni Fuckel—On **Prunus communis;** Scarborough (G.M.).
RHYNCHOSTOMA Karsten
apiculata (Curr.) Wint. Scarborough (G.M.).
VALSARIA Cesati et de Notaris
cincta (Curr.) Sacc.—On **Fagus;** Scarborough (G.M.).

SPHAERIACEAE—HYALOPHRAGMIAE

CALOSPORA Nitschke
platanoides (Pers.) Niessl—On **Acer;** Forge Valley, 1947 (I.M.I., 14026); Howldale, 1947 (I.M.I., 13822a).
CERATOSPHAERIA Niessl
ordinata (Fr.) Kirschst.—On **Quercus;** Scarborough (G.M.).
HYPOSPILA Fries
bifrons (DC. ex Fr.) Sacc.—On dead **Quercus** leaves; Scarborough (G.M.).
LASIOSPHAERIA Cesati et de Notaris
hirsuta (Fr.) Ces. et de Not.—On **Salix caprea;** Scarborough (G.M.). On **Sorbus;** Howldale, 1946 (I.M.I., 4935).
ovina (Pers. ex Fr.) Ces. et de Not.—Scarborough (G.M.). On **Fraxinus;** Kingthorpe, 1930 (I.M.I., 13618), (F.F., 1945-46).
spermoides (Hoffm. ex. Fr.) Ces. et de Not.—Numerous records.
strigosa (A. et S. ex Fr.) Sacc.—On **Fagus;** Kingthorpe, 1946 (I.M.I., 4898). On **Sorbus;** Howldale, 1947 (I.M.I., 13839), Nottm., 1176). On **Ulmus;** Howldale, 1946 (I.M.I., 4936, 4939).
MASSARINA Saccardo
alni (Otth) Sacc.—On **Alnus;** Ellerburn (Nottm., 1316).
eburnea (Tul.) Sacc.—On **Fagus;** Thornton-le-Dale, 1946 (I.M.I., 5601).
METASPHAERIA Saccardo
complanata (Tode ex Fr.) Sacc.—Scarborough (G.M.); Filey (M. & C.).
ZIGNOELLA Saccardo
macrasca Sacc.—On **Ulmus;** Scarborough (G.M.).
pulviuscula (Curr.) Sacc.—On **Fagus;** Howldale (Nottm., 1148); Kingthorpe, 1930 (I.M.I., 5356). On **Fraxinus;** Kingthorpe, 1930 (I.M.I., 5350).

SPHAERIACEAE—PHAEOPHRAGMIAE

CHAETOSPHAERIA Tulasne

innumera (Berk. et Br.) Tul.—On **Sorbus;** Howldale, 1946 (I.M.I., 4975c.).

phaeostroma (Dur. et Mont.) Fuckel—Numerous records on **Acer, Fagus,** etc., usually associated with **Diatrype stigma** or **Eutypa flavovirens.**

CLYPEOSPHAERIA Fuckel

notarisii Fuckel—On **Rosa;** Kingthorpe (F.F., 1946).

LEPTOSPHAERIA Cesati et de Notaris

acuta (Hoffm. ex Fr.) Karst.—Very common on **Urtica.**

culmifraga (Fr.) Ces. et de Not.—Filey (F.A.M., 1931), no host stated.

derasa (Berk. et Br.) Thuem.—On **Senecio;** Kingthorpe (F.F., 1946).

dolioloides (Auersw.) Karst.—Filey (F.A.M., Nat., 1931, p. 360).

doliolum (Pers. ex Fr.) de Not.—On **Carduus;** Scarborough (G.M.); Kingthorpe (F.F., 1946). On **Centaurea;** Ellerburn (Nottm., 1046).

fuscella (Berk. et Br.) Ces. et de Not.—On **Ulex;** Robin Hood's Bay (C.C., Nat., 1907, p. 254).

lunariae (Berk. et Br.) Sacc.—On dry **Lunaria** pods; Scarborough (M. & C.).

pellita (Rabenh. et Klotz.) Sacc.—Scarborough (G.M.).

rusci (Wallr.) Sacc.—On **Ruscus aculeatus;** Scarborough (W.G.B., 1943).

MASSARIA de Notaris

argus (Berk. et Br.) Fres.—On **Betula;** Ellerswood (Nottm., 1324).

inquinans (Tode ex Fr.) Fr.—On **Acer;** Scarborough (G.M.).

MELANOMMA Nitschke ex Fuckel

pulvis-pyrius (Pers. ex. Fr.) Fuckel—Numerous records.

subdispersum Karst.—On **Betula;** Forge Valley, 1947 (I.M.I., 13831, etc.). On **Sorbus;** Howldale, 1946 (I.M.I., 14490). Conidia (**Helminthosporium longipilum** Corda) grown from ascospores by S. J. Hughes.

PSEUDOVALSA Cesati et de Notaris

aucta (Berk. et Br.) Sacc.—On **Alnus;** Ellerburn (Nottm., 1205-6).

lanciformis (Fr.) Ces. et de Not.—On **Betula;** Scarborough (G.M.); Dalby Dale (F.F., 1945); Ellerburn (Nottm., 1306-7).

longipes (Tul.) Sacc.—Scarborough (G.M.).

SPORORMIA de Notaris

intermedia Auersw.—On rabbit dung; Scarborough (G.M.).

TREMATOSPHAERIA Fuckel

pertusa (Pers. ex Fr.) Fuckel.—Scarborough (G.M.).

SPHAERIACEAE—DICTYOSPORAE

BERLESIELLA Saccardo

nigerrima (Blox. ex Curr.) Sacc.—On **Diatrype stigma** on **Acer;** Forge Valley, 1946 (I.M.I., 6843b), 1947 (I.M.I., 13966a), Howldale, 1947 (I.M.I., 13987). On **D. stigma** on **Corylus;** Howldale, 1947, (I.M.I., 13986).

CAPRONIA Saccardo

sexdecemspora (Cooke) Sacc.—On **Fagus;** Scarborough (G.M.).

CUCURBITARIA S. F. Gray ex Greville

aspegrenii Ces. et de Not.—On **Prunus;** Scarborough (G.M.). On **Mahonia;** Kingthorpe (F.F., 1946).

berberidis (Pers. ex Fr.) S. F. Gray.—On **Berberis;** Ayton (G.M.).

laburni (Pers. ex Fr.) de Not.—On **Cytisus;** Scarborough (G.M.).

spartii (Nees in Fr.) Ces. et de Not.—On **Sarothamnus;** Scarborough (G.M.).

FENESTELLA Tulasne

vestita (Fr.) Sacc.—On **Fagus;** Scarborough (G.M.).

PLEOMASSARIA Spegazzini

siparia (Berk. et Br.) Sacc.—On **Betula;** Staindale (Nottm., 1325-26).

PLEOSPORA Rabenhorst

euonymi Fuckel—On fallen leaves of **Euonymus;** Spa Gardens, Scarborough (T.B.R., 1913), first British record.

herbarum (Pers. ex Fr.) Rabenh. Numerous records on many hosts.

meliloti Rabenh.—On dead **Melilotus;** Scarborough (G.M.).

pentamera Karst.—On **Holcus;** Filey (M. & C.).

scrophulariae (Desm.) von Hoenh.—On old capsules of **Rhinanthus cristagalli;** South Cliff, Scarborough (T.B.R., Nat., 1914, p. 149). as **vulgaris** Niessl—On **Daucus carota;** Scarborough (G.M.).

TEICHOSPORA Fuckel

obducens (Fr.) Fuckel—On **Fraxinus;** Howldale (Nottm., 1158).

SPHAERIACEAE—SCOLECOSPORAE

CRYPTOSPORA Tulasne

corylina (Tul.) Fuckel—On **Corylus;** Scarborough (G.M.).

suffusa (Fr.) Tul.—On **Alnus;** Scarborough (G.M.), Ellerburn, 1946 (Nottm., 1199, 1204-7-8).

OPHIOBOLUS Riess

acuminatus (Sow. ex Fr.) Duby—On **Urtica;** Scarborough (G.M.). On **Cirsium;** Kingthorpe (F.F., 1946), Ellerdale (Nottm., 1098-9).

rubellus (Pers. ex Fr.) Sacc.—On **Urtica;** Scarborough (M. & C.). On **Angelica;** Whisperdales (T.B.R., 1912).

SILLIA Karsten

ferruginea (Pers. ex Fr.) Karst.—On **Corylus;** Kingthorpe (W.G.B., 1938), Forge Valley (F.F., 1947).

HYPOCREALES

NECTRIACEAE

APIOCREA Sydow

chrysosperma (Tul.) Syd. (= **Sepedonium chrysospermum** Link ex Fr.). Common in the conidial form on boleti and agarics.

BYSSONECTRIA Karsten

lateritia (Fr.) Petch—On **Lactarius deliciosus;** Scarborough (G.M.).

DIALONECTRIA (Saccardo) Cooke

peziza (Tode ex Fr.) Cooke—On **Acer;** Scarborough (G.M.), Thornton-le-Dale (F.F., 1946).

sanguinea (Bolt. ex Fr.) Cooke—On **Hypoxylon;** Scarborough (G.M.). On **Diatrype stigma** and **Anthostoma** on **Fagus** and **Sorbus;** Thornton-le-Dale (F.F., 1946-7).

wegeliana (Rehm) Petch—On **Diaporthe;** Raincliffe Wood (F.F., 1947).

GIBBERELLA Saccardo

cyanogena (Desm.) Sacc.—On **Urtica;** Thornton-le-Dale (F.F., 1945).

pulicaris (Fr.) Sacc.—On **Sambucus;** Scarborough (G.M.).

HYPOMYCES (Fries) Tulasne

aurantius (Pers. ex Fr.) Tul. (= **Diplocladium penicillioides Sacc.**). On various agarics and polypores; Scarborough (M. & C.). On **Alnus;** Forge Valley, 1946 (I.M.I., 7487). On **Sorbus;** Forge Valley, 1947 (I.M.I., 13941).

rosellus (A. et S. ex Fr.) Tul.—On **Stereum;** Scarborough (G.M.).

HYPONECTRIA Saccardo

buxi (Desm.) Sacc.—On **Buxus;** Cloughton (M. & C.).

LASIONECTRIA (Saccardo) Cooke

flavida (Corda) Cooke—There is a Massee specimen in the B.M. Herbarium labelled "Scarborough" (T.P., Nat., 1937, p. 281).

NECTRIA Fries

aquifolii (Fr.) Berk.—On dead **Ilex;** Scarborough (G.M.). On living **Ilex;** Raincliffe Wood (T.B.R., 1912).

cinnabarina (Tode ex Fr.) Fr.—Abundant ; also frequently recorded in the conidial state, **Tubercularia vulgaris.**

coccinea (Pers. ex Fr.) Fr.—On **Fagus;** Scarborough (G.M.), Kingthorpe (F.F., 1946), Ellerburn (Nottm., 1337).

coryli Fuckel—On **Salix,** Ellerburn (F.F., 1946). Our record of **N. cucurbitula** (G.M., 1881), probably refers to this species.

inventa Peth.—Only in the conidial state, **Acrostalagmus cinnabarinus.** on umbelliferous stems; Thornton-le-Dale (F.F., 1945).

mammoidea Phill. et Plowr.—On **Ulex;** Scarborough (G.M., 1881).

punicea (Kunze et Schm. ex Fr.) Fr.—On **Fagus;** Kingthorpe (F.F., 1946), Howldale, 1947 (I.M.I., 14108).

sinopica (Fr.) Fr.—On **Hedera;** Kingthorpe (F.F., 1946); Ellerburn (Nottm., 1068, etc.).

NECTRIOPSIS Maire

aureonitens (Tul.) Maire (=**Gliocladium penicilliodes** Corda).—On **Stereum;** Thornton-le-Dale, 1945 (I.M.I., 134).

PROTOCREA Petch

farinosa (Berk. et Br.) Petch—Scarborough (G.M.). No specimens are available and as other determinations as this species by Massee about the same date were incorrect, the record is doubtful (T.P., Nat., 1937, p. 283).

OPHIONECTRIA Saccardo

cerea (Berk et Curt.) Ell. et Ev. (=**Helicosporium vegetum** Nees). On **Fagus;** Howldale, 1947 (I.M.I., 13929b). On **Fraxinus;** Howldale, 1947 (I.M.I., 14024a).

PSEUDONECTRIA Seaver

rousseliana (Mont.) Woll.—Massee's specimen in the B.M. Herbarium is labelled "Scarborough" (T.P., Nat., 1937, p. 279).

HYPOCREACEAE

CLAVICEPS Tulasne

purpurea (Fr.) Tul.—Locally abundant in some years.

CORDYCEPS (Fries) Link

capitata (Holmsk. ex Fr.) Link—Yedmandale, host not established (F.F., 1915, H.W.).

militaris (L. ex Fr.) Link—On pupa; Wykeham Moor (F.C.R., 1946).

ophioglossoides (Ehrh. ex Fr.) Link—On **Elaphomyces muricatus** and **E. granulatus;** Raincliffe Wood (G.M., C.R., 1918).

EPICHLOE (Fries) Tulasne

typhina (Pers. ex Fr.) Tul.—Numerous records, mostly on **Holcus.**

HYPOCREA Fries

rufa (Pers. ex Fr.) Fr.—Common on wood (M. & C.). In conidial state, **Trichoderma lignorum,** Forge Valley (W.G.B., 1945).

pulvinata Fuckel—Not uncommon on **Polyporus betulinus.**

POLYSTIGMA de Candolle ex Chevallier

rubrum (Pers. ex Fr.) Chev.—On **Prunus;** Scarborough (G.M.).

LOPHIOSTOMA (Fries) Cesati et de Notaris

caulium (Fr.) Ces. et de Not.—On **Epilobium;** Filey (M. & C.).

macrostoma (Tode ex Fr.) de Not.—On **Ilex;** Scarborough (G.M.).

LOPHIOTREMA Saccardo

hederae (Fuckel) Sacc.—On **Hedera;** Scarborough (G.M.).

DOTHIDEALES

DOTHIDELLA Spegazzini

trifolii Bayl., Ell. et Stansf.—Scarborough (G.M.). Frequently recorded in the conidial state, **Polythrincium trifolii.**

ENDODOTHELLA Theissen et Sydow

junci (Fr.) Theiss. et Syd.—Scarborough (G.M.). On **J. effusus;** Filey (T.B.R., 1911); Robin Hood's Bay (W.G.B., 1946).

PHYLLACHORA Nitschke

graminis (Pers. ex Fr.) Fuckel—On **Dactylis glomerata;** Scalby (T.B.R., 1911). On **Melica uniflora** and **Agropyron caninum,** Hackness (T.B.R., 1912).

heraclei (Fr.) Fuckel—On living **Heracleum;** Scarborough (G.M.).

RHOPOGRAPHUS Nitschke

filicinus (Fr.) Fuckel, as **Phyllachora pteridis.**—Many records.

SYSTREMMA Theissen et Sydow

ulmi (Duv. ex Fr.) Theiss. et Syd.—On living **Ulmus;** Scarborough (G.M.).

MICROTHYRIALES

STIGMATEA Fries

ostruthii (Fr.) Oud.—On living **Angelica;** Scarborough (G.M.).

robertiana (Fr.) Fr.—Scarborough (G.M.).

HYSTERIALES

ACROSPERMUM Tode ex Fries

compressum Tode ex Fr.—On **Angelica** and **Heracleum;** Raincliffe Wood (G.M. & T.B.R., 1912). On **Urtica;** Forge Valley, 1947 (I.M.I., 15322).

AULOGRAPHUM Libert

vagum Desm.—On dead **Ilex** leaves; Scarborough (G.M.).

DICHAENA Fries

faginea (Pers. ex Fr.) Fr.—On living **Fagus** bark; Scarborough (G.M.).

quercina (Pers. ex Fr.) Fr.—On living **Quercus** bark; Scarborough (G.M.).

FARLOWIELLA Saccardo

carmichaeliana (Berk.) Sacc. (=**Monotospora megalospora** Berk. et Br., **M. pumila** (Mass.) Sacc.).—On **Fagus;** Howldale, 1947 (I.M.I., 13815b). On **Sorbus;** Howldale, 1946 (I.M.I., 4975b), 1947 (I.M.I., 13817c).

GLONIOPSIS de Notaris

levantica Rehm (= **G. curvata** (Fr.) Sacc.).—Numerous records on **Rubus** and **Rosa.**

GLONIUM Muehlenberg ex Fries

lineare (Fr.) de Not.—On **Fagus** ; Scarborough (G.M.).

HYPODERMA de Candolle ex de Notaris

commune (Fr.) Duby—On **Ranunculus flammula;** Scarborough Mere (G.M.).

conigenum (Pers. ex Fr.) Sacc.—On cones of **Pinus sylvestris;** Silpho and Broxa (T.B.R., 1912).

virgultorum DC. ex Sacc.—On **Rubus;** Scarborough (G.M.).

HYSTERIUM Tode ex Fries

pulicare Pers. ex Fr.—On **Hedera;** Raincliffe Wood (G.M.); Thornton-le-Dale (F.F., 1946).

angustatum (A. et S. ex Fr.) Chev.—On **Rhododendron;** Forge Valley, 1946 (I.M.I., 7750a).

HYSTEROGRAPHIUM Corda

fraxini (Pers. ex Fr.) de Not.—Filey (T.B.R., 1914). Probably our record of **H. elongatum** is this species, as Bisby (Trans. B.M.S. 27 p. 27) finds almost all British records of **H. elongatum** erroneous.

LOPHODERMIUM Chevallier

arundinaceum (Schrad. ex Fr.) Chev.—On **Phalaris** and **Bromus ramosus;** Scarborough and Filey (M. & C.).

hysterioides (Pers.) Sacc.—On dead **Crataegus** leaves; Scarborough (G.M.).

melaleucum (Fr.) de Not.—On **Vaccinium;** Scarborough, 1913 (T.B.R. teste C.C.).

pinastri (Schrad. ex Fr.) Chev.—Not uncommon on **Pinus** leaves.

rhododendri Ces.—On fallen **Rhododendron** leaves; Raincliffe Wood (T.B.R., 1913).

USTILAGINALES

USTILAGINACEAE

CINTRACTIA Cornu

caricis (Pers.) Magn.—Scarborough (M. & C.).

USTILAGO (Persoon) Roussel

avenae (Pers.) Jens.—Scarborough (M. & C.); Robin Hood's Bay (W.G.B.).

hordei (Pers.) Lagerh.—Not uncommon.

kuehneana Wolff—Robin Hood's Bay on **Rumex acetosa** (W.G.B., 1946).

longissima (Sow. ex Schlect.) Mey.—Seamer Carr on **Glyceria maxima** and **G. fluitans** (M. & C.).

perennans Rostr.—Thornton-le-Dale on **Arrhenatherum elatius** (F.F., 1945).

scabiosae (Sow.) Wint.—Scarborough on **Knautia arvensis** (M. & C.).

striaeformis (Westend.) Niessl—Raincliffe Wood and Beedale on **Holcus** (W.G.B., 1942 and 1945).

tritici (Pers.) Rostr.—Occasional.

violacea (Pers.) Rouss.—Scarborough on **Silene cucubalus** and common on the anthers of **Melandrium dioicum.**

TILLETIACEAE

ENTYLOMA de Bary

microsporum (Ung.) Schroet.—Kingthorpe on **Ranunculus spp.** (T.B.M.S., 1931).

MELANOTAENIUM de Bary

endogenum (Ung.) de Bary—Scarborough on **Galium verum** (M. & C.).

TILLETIA Tulasne

caries (DC.) Tul.—Occasional on cultivated **Triticum spp.**

UROCYSTIS Rabenhorst

anemones (Pers.) Wint.—Thornton-le-Dale on **Ranunculus repens** (F.F., 1946), Kingthorpe on **Anemone** (F.F., 1945).

violae (Sow.) Fisch. et Waldh.—Scarborough on **Viola reichenbachiana** (M. & C.); Kingthorpe on **V. riviniana** (W.G.B., 1938).

UREDINALES

MELAMPSORACEAE

MILESINA Magnus

blechni Syd.—Kingthorpe (T.B.M.S., 1931).

THECOPSORA Magnus

galii de Toni—Thornton-le-Dale, II on **Sherardia arvensis** (W.G.B., 1945).

vacciniorum (DC.) Karst.—Thornton-le-Dale on **V. myrtillus** (F.F., 1945).

MELAMPSORELLA Schroeter

cerastii (Pers.) Schroet.—Scarborough on **C. arvense** (M. & C.).

PUCCINIASTRUM Otth

agrimoniae (Schw.) Tranzsch.—Thornton-le-Dale (F.F., 1945).

pustulatum (Pers.) Diet. (= **P. abieti-chamaenerii** Kleb.)—Thornton-le-Dale on **Chamaenerion angustifolium** (F.F., 1946).

pyrolae (Mart.) Schroet.—Silpho Moor on **Pyrola minor** (T.B.R., 1911).

MELAMPSORIDIUM Klebahn

betulinum (Pers.) Kleb.—Wykeham (F.F., 1945).

COLEOSPORIUM Léveillé

campanulae (Pers.) Lév.—Scarborough on **C. rotundifolia** (M. & C.); Thornton-le-Dale (F.F., 1945).

euphrasiae (Schum.) Wint.—Scarborough on **Odontites rubra** (M. & C.).

senecionis (Pers.) Fr.—II and III common on **Senecio spp.**, all the year round.

petasitis Lév.—Common on **Petasites.**

sonchi (Pers.) Lév.—Scarborough, II and III on **Sonchus arvensis** (M. & C.); Thornton-le-Dale (F.F., 1945).

tussilaginis (Schum.) Lév.—Common on **T. farfara** (M. & C.).

MELAMPSORA Castagne

euphorbiae Cast.—Robin Hood's Bay (F.A.M., 1933).

larici-populina Kleb.—Thornton-le-Dale on **Populus serotina** (F.F., 1945).

lini (Ehr.) Lév.—Scarborough on **Linum catharticum** (M. & C.).

orchidi-repentis Kleb.—Scarborough, I on **Listera cordata** and **Orchis latifolia** (M. & C.).

The Willow Rusts in our district have not been worked out and appear in our records only under the collective species :—

"**farinosa** Pers."—Scarborough on **S. caprea** (M. & C.).

"**epitea** Kunze et Schm."—Scarborough on **S. viminalis** (M. & C.).

PUCCINIACEAE

OCHROPSORA Dietel

sorbi Diet.—Kingthorpe, I on **Anemone nemorosa** (F.A.M., Nat., Sept., 1929).

TRANZSCHELIA Arthur

fusca Diet.—Fairly common on **A. nemorosa** (M. & C.).

pruni-spinosae (Pers.) Diet.—Dalby Dale on **Prunus domestica** and **P. spinosa** (F.F., 1945).

KUEHNEOLA Magnus

albida (Kuehn.) Magn.—Forge Valley, probably not uncommon (W.G.B., 1946).

tormentilla (Fuckel) Arth. (= **Frommea obtusa** (Str.) Arth.).—Oliver's Mount on **Potentilla erecta** (M. & C.).

PHRAGMIDIUM Link

fragariastri (DC.) Schroet.—Scarborough (M. & C.); Robin Hood's Bay (W.G.B., 1946). both on **Potentilla sterilis.**

mucronatum (Pers.) Schlecht.—Common on wild and cultivated roses : more frequent as I & II than III (M. & C.).

rubi (Pers.) Wint.—Thornton-le-Dale on **R. fruticosus** (F.F., 1945), Robin Hood's Bay, II on **Rubus spp.** (W.G.B., 1946).

rubi-idaei (DC.) Karst.—Scarborough on **R. idaeus** (M. & C.).

sanguisorbae (DC.) Schroet.—Thornton-le-Dale, I & III (F.F., 1945-46).

violaceum (Schultz) Wint.—Ellerburn, etc., I, II, III on **Rubus fruticosus** (F.F., 1945-46).

XENODOCHUS Schlechtendal

carbonarius Schlecht.—Seamer Carr on **Sanguisorba officinalis** (M. & C.).

TRIPHRAGMIUM Link

ulmariae (Schum.) Wint.—Seamer Carr on **Filipendula ulmaria** (M. & C.); Ellerburn (F.A.M., Nat., July, 1922).

GYMNOSPORANGIUM Hedwig fils

clavariaeforme (Jacq.) DC.—Scarborough, I on **Crataegus,** II on **Juniperus** (M. & C.).

sabinae (Dicks.) Wint.—Scalby, III on **Juniperus sabina** (M. & C.).

UROMYCES Link

acetosae Schroet.—Thornton-le-Dale on **Rumex acetosella** (F.F., 1945).

alchemillae (Pers.) Lév.—Common on **A. vulgaris** (M. & C.).

anthyllidis (Grev.) Schroet.—Scarborough, II on **A. vulneraria** (T.B.R., 1912).

dactylidis Otth—Thornton-le-Dale (F.F., 1945).

dianthi (Pers.) Niessl—Hackness Hall greenhouses on **D. caryophyllus** (T.B.R., 1914).

fabae (Pers.) de Bary—Everley Hotel garden on **Vicia faba** (W.G.B.); other records probably refer to **U. pisi.**

ficariae (Schum.) Lév.—Kingthorpe, III (F.F., 1946).

flectens Lag.—Thornton-le-Dale on **Trifolium repens** (M. & C.).

genista-tinctoriae (Pers.) Wint.—Thornton-le-Dale on **Laburnum anagyroides** (F.F., 1945) ; new British host.

geranii Otth et Wart.—Thornton-le-Dale on **G. pratense** (F.F., 1945).

junci Tul.—Pickering (F.A.M., Nat., 1929, p. 313).

loti Blytt.—Raincliffe Wood on **L. corniculatus** (T.B.R., Nat., 1912, p. 88); new to Britain; Dalby Dale (F.F., 1945).

pisi (Pers.) Wint.—Scarborough, II on **P. sativum,** Thornton-le-Dale on **Lathyrus pratensis** (F.F., 1945).

poae Rab.—Numerous records; OI on **Ranunculus spp.,** III on **Poa spp.**

polygoni-avicularis Ramsb.—Scarborough on **P. aviculare** (M. & C.). Thornton-le-Dale (F.F., 1945).

rumicis (Schum.) Wint.—Scarborough on **R. obtusifolius** (M. & C.); Thornton-le-Dale on **R. crispus** (F.F., 1945).

scillarum (Grev.) Wint.—Scarborough on **Scilla non-scripta** (M. & C.); Kingthorpe, III (F.F., 1946).

striatus Schroet.—Castle Hill, Scarborough, II, III on **Medicago arabica** (W.G.B., York, Nat., 1943, p. 119).

trifolii (Hedw. f.) Lév.—Scarborough on **T. pratense** (M. & C.).

valerianae (Schum.) Fuckel—Filey on **Valeriana spp.** (M. & C.).

PUCCINIA Persoon

acetosae (Schum.) Koern.—Robin Hood's Bay on **Rumex acetosa** (W.G.B., 1946).

adoxae Hedw. f.—Scarborough on **A. moschatellina** (M. & C.).

albescens Plowr.—Scarborough on **A. moschatellina** (M. & C.).

anomala Rost.—Thornton-le-Dale on **Hordeum spp.** (F.F., 1945).

annularis (Strauss) Schlecht.—Thornton-le-Dale on **Teucrium scorodonia** (F.F., 1945).

arrhenatheri Erickss.—Robin Hood's Bay on **A. elatius** (W.G.B., 1946).

asperulae-odoratae Wurth.—Scarborough on **Asperula** (M. & C.).

baryi (Br.) Wint.—Thornton-le-Dale, II & III on **Brachypodium sylvaticum** (F.F., 1945-46).

betonicae DC.—Common on **Stachys officinalis** (M. & C.).

bromina Erikss.—Staxton and Scarborough Mere, II on **B. sterilis** (W.G.B., Nat., 1943, p. 119).

calthae Link—Scarborough on **C. palustris** (M. & C.). Throxenby Mere, infected with **Darluca filum;** coll. T.B.R., seen by W. B. Grove (C.C., Nat., 1912, p. 91).

carduorum Jacky—Staxton, II & III on **C. nutans** (W.G.B., Nat., 1943, p. 119).

caricis (Schum.) Reb.—Common; I on **Urtica,** III on **Carex** (M. & C.).

celakovskyana Bub.—Thornton-le-Dale on **Galium cruciata** (F F., 1945).

centaureae DC.—Thornton-le-Dale on **C. nigra** (F.F., 1945).

chaerophylli Purt.—Thornton-le-Dale on **Myrrhis odorata** (F.F., 1945); Howldale, OI on **Anthriscus** (F.F., 1946); Robin Hood's Bay, II & III on **Myrrhis** (W.G.B.).

chondrillae Cord.—Thornton-le-Dale on **Lactuca muralis** (F.F., 1945).

chrysanthemi Roze—Once common, but the only recent record is from Newby, II in greenhouse (F.C.R., 1947).

chrysosplenii Grev.—Scarborough on **C. alternifolium** (A.E.P., 1923).

circaeae Pers.—Forge Valley on **C. lutetiana** (M. & C.).

cirsii-lanceolati Schroet.—Thornton-le-Dale (F.F., 1945).

conii Fuckel—Scarborough on **C. maculatum** (M. & C.).

coronata Cord.—Thornton-le-Dale on **Lolium perenne, Agrostis stolonifera, Agropyron repens** and **Arrhenatherum** (F.F., 1945).

crepidis Schroet.—Staxton, II & III on **C. virens** (W.G.B., Nat., 1943, p. 119).

dioicae Magn.—Scarborough, I on **Cirsium palustre** (M. & C.).

dispersa Erikss. et Henn.—Scarborough, I on **Anchusa officinalis** (M. & C.).

epilobii DC.—Hole of Horcum on **E. palustre** (W.G.B., 1938).

festucae Plowr.—Staintondale, I on **Lonicera periclymenum** (T.B.R., 1911). Staxton, OI on **Lonicera,** III on **Festuca ovina** (W.G.B., 1945).

glomerata Grev.—Scarborough, III on **Senecio jacobaea** (M. & C.).

glumarum (Schm.) Erikss. et Henn.—Scarborough, II & III on **Agropyron repens** (M. & C.); Scarborough Castle Hill, II & III on **Hordeum murinum** (W.G.B., Nat., 1943, p. 119).

graminis Pers.—Scarborough and Thornton-le-Dale, III on cultivated **Triticum spp.** and **Agropyron** (F.F., 1945-46); Robin Hood's Bay, OI on **Berberis** (W.G.B.). We have no records of the generally more common **P. triticina.**

heraclei Grev.—Flamborough (C.C., Nat., 1906, p. 261); Newbridge Quarry, Pickering (W.G.B., Nat., 1938, p. 244).

hieracii (Schum.) Mart.—Pickering and Staxton, II & III on **H. pilosella,** II on **H. boreale** (W.G.B.).

holcina Erikss.—Kingthorpe, II & III on **Holcus mollis** and **H. lanatus** (F.F., 1945-46).

hydrocotyles (Link) Cooke—Seamer Carr on **H. vulgaris** (M. & C., "Very rare").

hypochoeridis Oud.—Robin Hood's Bay, II & III on **H. radicata** (W.G.B., 1946).

iridis (DC.) Wallr.—Scarborough on cultivated iris (T.B.R., 1916).
lapsanae Fuckel—Common on **L. communis** (M. & C.).
leontodontis Jacky—Thornton-le-Dale on **L. hispidus** (F.F., 1945).
lychnidearum Link—Scarborough (M. & C.); Thornton-le-Dale (F.A.M., 1922, F.F., 1945).
malvacearum Mont.—Thornton-le-Dale on **Althaea rosea** (F.F., 1945); probably not uncommon and M. & C. (1905) says "Common throughout the county ".
major Diet.—Frequent on **Crepis paludosa** (W.G.B.).
menthae Pers.—Common on **Mentha spp.,** and on **Clinopodium vulgare** (M. & C.).
mirabilissima Peck (= **Cumminsiella sanguinea** (Peck) Arth.)—Scarborough Mere (W.G.B., 1943); Thornton-le-Dale, II & III on **Mahonia** (F.F., 1946).
moliniae Tul.—Seamer Moor on **M. caerulea** (M. & C.).
oblongata (Link) Wint.—Robin Hood's Bay, II on **Luzula sylvatica** (W.G.B., 1946).
obscura Schroet.—Thornton-le-Dale on **Luzula sylvatica** (F.F., (1945).
obtegens (Link) Tul.—Common on **Cirsium arvense** (M. & C.).
persistens Plowr.—Rillington, I on **Thalictrum flavum** (Wm. Falconer, 1932).
phragmitis (Schum.) Koern.—Seamer, I on **Rumex spp.,** II & III on **Phragmites communis** (M. & C.); Scarborough Mere, OI on **Rumex spp.,** II & III on **Phragmites** (W.G.B., Nat., 1943, p. 120).
poarum Niels.—Very common; I on **Tussilago,** III on **Poa spp.**
polygoni-convolvuli DC.—Thornton-le-Dale on **P. convolvulus** (F.F., 1945).
primulae Duby—Robin Hood's Bay, OI on **P. vulgaris** (F.A.M., Nat., 1933, p. 136); Haugh Rigg, Pickering, OI (W.G.B., Nat., 1938, p. 244).
pulverulenta Grev.—Scarborough, OI on **Epilobium hirsutum** and **E. palustre** (F.F., 1946).
saniculae Grev.—Numerous records; O, I, II, III on **S. europaea.**
sessilis Schneid.—Forge Valley on **Phalaris** (F.F., 1945).
silenes Schroet.—Scarborough on **S. cucubalus** (M. & C.).
smyrnii Cord.—Scarborough Castle Hill on **S. olusatrum** (M. & C.); still there, 1943 (W.G.B.).
sonchi Rob.—Thornton-le-Dale on **S. arvensis** and **S. oleraceus** (F.F., 1945).
taraxaci Plowr.—Thornton-le-Dale on **T. officinale** (F.F., 1945).
thalictri Chev.—Seamer Carr on **T. flavum** (M. & C.).
tragopogi Cord.—Kingthorpe, I on **T. pratensis** (F.A.M., 1929).
triseti Erikss.—Robin Hood's Bay, II & III on **T. flavescens** (W.G.B., 1946).
tumida Grev.—Kingthorpe, III on **Conopodium majus** (W.G.B., 1947).
valantiae Pers.—Thornton-le-Dale on **Galium cruciata** (F.F., 1945).

variabilis Grev.—Scarborough (M. & C.); Ellerburn, OI (F.F., 1946), both on **Taraxacum.**
veronicae Schroet.—Thornton-le-Dale on **V. montana** (F.F., 1945).
vincae (DC.) Berk.—Scarborough on **V. minor** (M. & C.).
violae DC.—Common on **Viola spp.**
zopfii Wint.— In a note in C. Crossland's interleaved copy of M. & C., it is stated that specimens collected at Throxenby by W.W.S. and now in the B.M. under the name of **P. calthae,** have been determined by Dr. J. Ramsbottom as **P. zopfii.**

AURICULARIALES

AURICULARIA Bulliard
mesenterica (Dicks. ex Fr.) Fr.—Scarborough (G.M.).
auricula-Judae (L. ex Pers.) Schroet.—Abundant on **Sambucus;** also recorded on **Ulmus, Salix,** and **Acer** (A.E.P.), on **Fagus** (F.C.R.), on **Berberis** at Boynton (F.A.M.); while the record on **Alnus** from Flotmanby in 1920 was said by Carleton Rea to be the first ever brought to his notice.

STILBUM (Tode) Juel
vulgare (Tode) Juel—Scarborough (G.M.).

TREMELLALES

TREMELLA (Dillenius) Fries
albida (Huds.) Fr.—Cloughton (G.M.); Raincliffe Wood (T.B.R., 1911).
fimbriata (Pers.) Fr.—Scarborough (G.M., 1881).
foliacea (Pers.) Fr.—Hackness (H.W. & F.A.M., 1925); Forge Valley on **Betula** (F.C.R., 1946).
frondosa Fr.—Scarborough (G.M.).
lutescens Pers.—Scarborough (G.M.); Yedmandale (A.E.P., 1912).
mesenterica (Retz.) Fr.—Common, often on **Fagus.**
moriformis Berk.—Scarborough (G.M.).
tubercularia Berk.—Scarborough on **Quercus** (G.M., 1881).
virescens (Schum.) Qúel.—Scarborough on **Ulex** (G.M.).

EXIDIA Fries
glandulosa (Bull.) Fr.—Not uncommon, usually on **Quercus.**
intumescens (Sm.) Rea—Scarborough on **Fagus** (G.M.); Stone Haggs on **Quercus** (T.B.R., 1915). A form of **E. glandulosa** according to Bourdot and Galzin.
nucleata (Schwein.) Rea—Forge Valley (F.F., 1944); Wykeham (W.G.B., 1945); Kingthorpe (F.F., 1946).
recisa (Ditm.) Fr.—Scarborough on **Salix** (G.M.).
saccharina Fr.—Scarborough on **Pinus** (G.M.).
var. **foliacea** (Bref.) Bres.—Scarborough on **Pinus** (G.M.).
thuretiana (Lév.) Fr.—Howldale (F.F., 1946); same place (P.H.T.B., 1947).

TREMELLODON Persoon

gelatinosum (Scop.) Pers.—Although not previously recorded from Yorkshire before the foray at Beedale in 1915, this fungus is now not uncommon on sawdust and conifer stumps.

SEBACINA Tulasne

calcea (Pers.) Bres.—Scarborough (G.M., 1881).

incrustans (Pers.) Tul., as **Soppittiella sebacea**—Scarborough (G.M., 1881).

EICHLERIELLA Bresadola

spinulosa (Berk. et Curt.) Burt.—Forge Valley (F.F., 1944).

TULASNELLALES

TULASNELLA Schroeter

violea (Quél.) Bourd. et Galz.—Howldale on **Fagus** (P.H.B.T., 1947); Raincliffe Wood (W.G.B., 1947).

CALOCERALES

DACROMYCES Nees

chrysocomus (Bull.) Tul.—Scarborough (G.M., Nat., July, 1881).

deliquescens Bull. ex Duby—Abundant.

(Oidial stage = **D. stillatus** Nees ex **Fr.**—Common on **Pinus**).

CALOCERA Fries

cornea Batsch ex Fr.—Not uncommon on **Quercus.**

stricta Fr.—Yedmandale (A.C., 1912).

viscosa Pers. ex Fr.—Common on coniferous stumps.

APHYLLOPHORALES

POLYPORACEAE

POLYPORUS (Micheli) Fries

adiposus Berk. et Br.—Scarborough (G.M.); Raincliffe Wood (F.C.R., 1945 et seq.).

adustus (Willd.) Fr.—Scarborough (G.M.); Hackness (F.C.R., 1945 et seq.).

amorphus Fr., as **P. armeniacus**—Scarborough (G.M.); Boynton (W.W.S., 1880).

betulinus (Bull.) Fr.—Abundant.

brumalis (Pers.) Fr.—Raincliffe Wood (T.B.R., 1912); Ellerburn (F.A.M., 1922); Kingthorpe (F.F., 1946).

caesius (Schrad.) Fr.—Not uncommon.

chioneus Fr.—Not uncommon.

dryadeus (Pers.) Fr.—Scarborough on **Quercus** (G.M.).

fragilis Fr.—Scarborough (G.M.); Forge Valley (F.F., 1915).

frondosus (Fl. Dan.) Fr.—Hackness (F.F., 1925).

fumosus (Pers.) Fr.—Scarborough (G.M.); Flotmanby (A.E.P., 1920).
as **P. alligatus** Fr.—Scarborough (A.E.P. & A.C., 1910).
as **P. salignus** Fr.—Scarborough on **Salix** (F.F., 1915).
as **Daedalea saligna** Fr.—Scarborough (G.M., A.C., A.E.P.).
giganteus (Pers.) Fr.—Frequent on **Fagus** and **Ulmus.**
hispidus Fr.—Locally common on **Fraxinus.**
intybaceus Fr.—Scarborough (G.M.).
lentus Berk.—Scarborough (A.E.P., 1911, A.C., 1923).
melanopus (Swartz) Fr.—Yedmandale and Raincliffe Wood (A.E.P., 1914).
nummularius (Bull.) Qúel.—Kingthorpe (T.B.M.S., 1931).
perennis (L.) Fr.—Flixton and Raincliffe Wood (A.E.P., 1911-12).
picipes Fr.—Locally common on **Salix.**
radiatus (Sow.) Fr.—Not uncommon on **Alnus.**
schweinitzii Fr.—Scarborough (G.M.).
squamosus (Huds.) Fr.—Common on **Fagus** and **Fraxinus.**
as **P. rostkovii** Fr.—Cayton and Hackness on **Sambucus** (A.E.P.).
stipticus (Pers.) Fr.—Forge Valley and Thornton-le-Dale (F.F., 1945).
sulphureus (Bull.) Fr.—Not uncommon on **Quercus.**
tephroleucus Fr.—Thornton-le-Dale on **Salix** (F.C.R., 1945).
varius Fr.—Not uncommon.
wynnei Berk. et Br.—Kingthorpe (T.B.M.S., 1931).

FOMES Fries
annosus Fr.—Common in most pine woods.
conchatus (Pers.) Fr.—Scarborough on **Salix** (G.M.).
as **F. salicinus** (Pers.) Fr.—Ellerburn (F.A.M., 1922).
connatus Fr.—Scarborough (G.M.); Allerston (A.E.P., 1914).
ferruginosus (Schrad.) Mass.—Not uncommon on **Crataegus.**
igniarius (L.) Fr.—Occasional on **Salix.**
var. **nigricans** (Fr.) Lloyd—Ellerburn on **Alnus** (F.A.M., 1922).
fomentarius (Fr.) Kickx—Numerous records on various hosts, but as this fungus is not now considered to occur south of Perth, they probably refer to **Ganoderma applanatum.** Many specimens, definitely identifiable as **F. fomentarius,** were found, on Betula and detached, under post-glacial peat at Star Carr, Seamer, associated with a Mesolithic lake-dwelling. They were remarkably well preserved but contained no spores. (Proc. Prehist. Soc., 1950, p. 123).
pomaceus (Pers.) Big. et Guill.—Not uncommon on **Crataegus, Pyrus** and **Prunus.**
ribis (Schum.) Fr.—Scarborough on **Ribes uva-crispa** (G.M.).
ulmarius (Sow.) Fr.—Scarborough on **Ulmus** (G.M.).

GANODERMA (Karsten) Patouillard
applanatum (Pers.) Pat.—Not uncommon on **Fagus,** etc. Formerly erroneously recorded as **Fomes fomentarius.**
var. **laccatum** (Kalchbr.) Rea—Flotmanby on **Alnus** (A.E.P. **teste** G.M., 1911), first British record.

lucidum (Leyss.) Karst.—Scarborough (G.M.); Forge Valley (F.F., 1944).

PORIA (Persoon) Fries

blepharistoma Berk. et Br.—Scarborough (G.M.).
hibernica Berk. et Br.—Scarborough on dead pine wood (G.M.).
laestadii Fr. et Berk.—Scarborough in green-house (G.M.).
medulla-panis (Pers.) Fr.—Scarborough (G.M.); Beedale and Raincliffe Wood (A.E.P., 1911-12); Forge Valley (F.F., 1915).
mollusca (Pers.) Fr.—Scarborough (G.M.); Beedale (A.E.P., 1929).
nitida (Pers.) Fr.—Scarborough (G.M.).
obducens (Pers.) Fr.—Staxton on **Crataegus** (T.B.R., 1913).
purpurea Fr.—Scarborough (G.M.).
sanguinolenta (A. et S.) Fr.—Scarborough (G.M.); Forge Valley (F.F., 1915 & 1944).
terrestris (DC.) Fr.—Scarborough (G.M.).
vaporaria (Pers.) Fr.—Scarborough (G.M.); Ayton (A.E.P., 1910).
versipora (Pers.) Baxt., as **Irpex obliquus**—Very common.
violacea (A. et S.) Fr.—Scarborough (G.M.).
viridans Berk.—Scarborough (G.M.).
vitrea (Pers.) Fr.—Scarborough (G.M.).
vulgaris Fr.—Scarborough (G.M.); Flixton (A.E.P., 1910).

POLYSTICTACEAE

POLYSTICTUS Fries

abietinus (Dicks.) Fr.—Common.
hirsutus (Wulf.) Fr.—Scarborough (G.M.); Seamer on **Fraxinus** (A.E.P.); Raincliffe Wood (F.C.R., 1945 et seq.).
versicolor (L.) Fr.—Abundant.

TRAMETES Fries

gibbosa (Pers.) Fr.—Yedmandale (F.C.R., 1945).
mollis (Somm.) Fr.—Not uncommon on **Fagus** and **Prunus.**
serpens Fr.—Scarborough on **Quercus** (G.M.).
suaveolens (L.) Fr.—Ganton on **Salix** (G.M.).

DAEDALEA (Persoon) Fries

biennis (Bull.) Quél.—Scarborough (G.M.); Kingthorpe (F.F., 1945).
quercina (L.) Fr.—Not uncommon on **Quercus.**
unicolor (Bull.) Fr.—Seamer and Ganton (A.E.P., 1910, A.C. 1914).

MERULIACEAE

MERULIUS Fries

corium Fr.—Folkton (T.B.R., 1914); Howldale on **Fraxinus** (F.F., 1946).
fugax Fr.—Scarborough (G.M.).
lacrymans (Wulf.) Fr.—Abundant.
rufus (Pers.) Fr.—Thornton-le-Dale (F.F., 1945).
serpens (Tode) Fr.—Scarborough (G.M.); Forge Valley (F.F., 1944).

tremellosus (Schrad.) Fr.—Cloughton (T.B.R. & A.C., 1913); Kingthorpe (T.B.M.S., 1931).

PHLEBIA Fries

merismoides Fr.—Not uncommon.
as **P. radiata** Fr.—Not uncommon on **Sambucus.**

CONIOPHORA (de Candolle) Persoon

arida Fr.—Scarborough (G.M.).
membranacea (DC.) Mass.—Scarborough (G.M.).
puteana (Schum.) Karst.—Kingthorpe (F.A.M., 1929); Hackness (F.C.R., 1945).
sulphurea (Fr.) Mass.—Scarborough (G.M.).

FISTULINACEAE

FISTULINA (Bulliard) Fries

hepatica (Huds.) Fr.—Occasional on **Quercus.**

HYDNACEAE

HYDNUM (Linnaeus) Fries

aurantiacum (A. et S.) Fr.—Forge Valley (F.F., 1915).
auriscalpium (L.) Fr.—Not uncommon on fir-cones.
diversidens Fr.—Scarborough on **Fagus** (G.M.).
ferrugineum Fr.—Boynton (W.W.S., Nat., June, 1889).
imbricatum (L.) Fr.—Seamer (G.M.).
repandum (L.) Fr.—Locally common.
zonatum (Batsch) Fr.—Boynton (W.W.S., Nat., June, 1889).

MYCOLEPTODON Patouillard

fimbriatum (Pers.) Bourd. et Galz.—Locally common.

RADULUM Fries

molare Fr.—Boynton (W.W.S., Nat., June, 1889).
orbiculare Fr.—Yedmandale (T.B.R., 1911).
quercinum Fr.—Scarborough (G.M.); Goathland (T.B.M.S., 1931).

ACIA Karsten

fusco-atra (Fr.) Pat.—Scarborough (G.M.).
uda (Fr.) Bourd. et Galz.—Kingthorpe (W.G.B., 1938, P.H.B.T., 1947).

GRANDINIA (Fries) Patouillard

brinkmannii (Bres.) Bourd. et Galz.—Howldale (F.F., 1946).
farinacea (Pers.) Bourd. et Galz.—Not uncommon.
granulosa Fr.—Scarborough (G.M., F.F., 1915).
helvetica (Pers.) Fr.—Kingthorpe (T.B.M.S., 1931).

ODONTIA (Persoon) Patouillard

arguta (Fr.) Quél.—Scarborough (G.M.).
crustosa (Pers.) Quél.—Scarborough (G.M.).
stipata (Fr.) Quél.—Scarborough (F.F., 1915).

CALDESIELLA Saccardo

crinalis (Fr.) Bourd. et Galz.—Scarborough (G.M.); Kingthorpe (F.A.M., Nat., Sept., 1929).
viridis (A. et S.) Pat.—Scarborough (G.M.).

THELEPHORA Ehrhart ex Fries (= **PHYLACTERIA** (Persoon) Pat.)
anthocephala (Bull.) Fr.—Scarborough (G.M.); Raincliffe Wood (A.E.P., 1917).
caryophyllea (Schaeff.) Fr.—Raincliffe Wood (G.M.).
clavularis Fr.—Scarborough (A.E.P., 1933).
mollissima (Pers.) Fr.—Scarborough (G.M.).
palmata (Scop.) Fr.—Boynton (W.W.S., Nat., June, 1889).
terrestris (Ehrh.) Fr.—Frequent in pine woods, and a pioneer species when the moors are planted with conifers.

TOMENTELLA Patouillard (= **HYPOCHNUS** (Fries) Karst.)
crustacea (Schum.) Karst.—Scarborough (G.M.).
ferruginea (Pers.) Fr.—Kingthorpe (F.F., 1930 & 1946).
fumosus Fr.—Scarborough and Filey (G.M.); Goathland (T.B.M.S., 1931).
fusca (Pers.) Fr.—Thornton-le-Dale (F.F., 1930 & 1945).
umbrina (Fr.) Quél.—Kingthorpe (T.B.M.S., 1931).

THELEPHORACEAE

STEREUM (Persoon) Massee
hirsutum (Willd.) Fr.—Abundant.
ochroleucum Fr.—Scarborough on **Aesculus** (G.M.).
purpureum (Pers.) Fr.—Common.
rugosum (Pers.) Fr.—Not uncommon.
sanguinolentum (A. et S.) Fr.—Not uncommon.
sowerbeii (Berk. et Br.) Mass.—Scarborough (G.M.).
spadiceum Fr.—Common on dead branches.

HYMENOCHAETE Léveillé
corrugata (Fr.) Lév.—Scarborough (G.M.); Howldale on **Corylus** (F.C.R., 1946).
rubiginosa (Dicks.) Lév.—Frequent.
tabacina (Sow.) Lév.—Scarborough on **Ulmus** (G.M.).

ALEURODISCUS Rabenhorst
acerinus (Pers.) von Hoehn. et Litsch.—Scarborough on **Acer campestris** (G.M.).

CORTICIUM Persoon
arachnoideum Berk.—Forge Valley on **Quercus** (W.G.B., 1947).
caeruleum (Schrad.) Fr.—Scarborough (M. & C.).
comedens (Nees) Fr.—Frequent on **Corylus** and **Fagus.**
confine Bourd. et Galz.—Forge Valley on **Corylus** (F.F., 1945).
confluens Fr.—Scarborough (G.M.); Howldale on **Corylus** (F.F., 1945).
fuciforme (Berk.) Wakef.—Beckhole in sterile condition (T.B.M.S., 1931).
laetum Karst.—Forge Valley on mud (P.H.B.T., 1947), new to Britain.
laeve (Pers.) Quél.—Kingthorpe (F.F., 1946).
lividum (Pers.) Fr.—Scarborough (G.M.).

pelliculare Karst.—Kingthorpe (F.F., 1945).
populinum (Somm.) Fr.—Scarborough on **Populus** (G.M.).
roseum (Pers.) Fr.—Scarborough (G.M.).
sambuci (Pers.) Fr.—Common.
subcoronatum von Hoehn. et Litsch.—Forge Valley (F.F., 1944). Conidial form (**Monilia candicans** Sacc.), Forge Valley, 1947 (Hull, 118).
subcostatum (Karst.) Bourd. et Galz.—Scarborough (G.M.).
vagum Berk. et Curt.—Ellerburn (F.F., 1946).

sub-genus **GLOEOCYSTIDIUM** Karsten
albostramineum (Bres.) Bourd. et Galz.—Kingthorpe on **Fagus** (F.F., 1946).
lactescens Berk.—Ellerburn (F.F., 1946).
porosum Berk. et Curt.—Scarborough (G.M.); Kingthorpe (F.F., 1930 & 1946).
praetermissum (Karst.) Bres.—Howldale (F.F., 1946).

CRISTELLA Patouillard
cristata (Pers.) Pat.—Kingthorpe (T.B.M.S., 1931).

PENIOPHORA Cooke
aegerita von Hoehn.—Only in the imperfect state (**Aegerita candida**) Ellerburn (F.A.M., Nat., Sept., 1922).
byssoidea (Pers.) von Hoehn. et Litsch.—Scarborough (G.M.); Kingthorpe (T.B.M.S., 1931).
caesia (Bres.) Bourd. et Galz.—Kingthorpe (F.F., 1945); Forge Valley on **Fraxinus** (P.H.B.T., 1947).
cinerea (Fr.) Cooke—Common.
cremea Bres.—Kingthorpe (F.F., 1946).
gigantea (Fr.) Mass.—Scarborough on **Larix** (G.M.); Thornton-le-Dale (F.F., 1945).
glebulosa (Fr.) Bres.—Howldale (F.F., 1946).
hydnoides Cooke et Mass.—Scarborough (G.M.); Howldale (F.F., 1946).
incarnata (Pers.) Cooke—Locally common.
leprosa Bourd. et Galz.—Howldale on **Fagus** (P.H.B.T., 1947).
pallidula Bres. ex Bourd. et Galz.—Howldale (F.F., 1946).
quercina (Pers.) Cooke—Not uncommon.
sanguinea (Fr.) Bres.—Scarborough (G.M.).
setigera (Fr.) Bres.—Scarborough (G.M.); Forge Valley (F.F., 1944).
subalutacea (Karst.) von Hoehn. et Litsch.—Forge Valley (F.F., 1944); Kingthorpe (F.F., 1946).
velutina (DC.) Cooke—Not uncommon.
violaceo-livida (Somm.) Bres. ex Bourd. et Galz.—Seamer on **Sambucus** (A.E.P., 1925).

CYPHELLACEAE

CYPHELLA Fries
alboviolascens (A. et S.) Karst.—Scarborough (G.M.).
capula (Holmsk.) Fr.—Not uncommon.

muscigena (Pers.) Fr.—Scarborough (G.M.).
pimii Phill.—Oliver's Mount (T.B.R., 1913).
villosa (Pers.) Karst.—Scarborough on **Sonchus oleraceus** (G.M.).

SOLENIA (Hoffmann) Fries
anomala (Pers.) Fr.—Not uncommon on **Alnus** and **Fagus.**
fasciculata Pers.—Scarborough (G.M.).
maxima Mass.—Scarborough (G.M.).

PHAEOCYPHELLA Patouillard
galeata (Schum.) Bres.—Scarborough on **Hypnum scorpioides** (G.M.).

CLAVARIACEAE

CLAVARIA (Vaillant) Fries
abietina (Pers.) Fr.—Not uncommon in pine woods.
acuta (Sow.) Fr.—Forge Valley (A.E.P., 1920).
argillacea (Pers.) Fr.—Cockmoor among moss (F.A.M., 1934).
cinerea (Bull.) Fr.—Not uncommon.
corniculata (Schaeff.) Fr.—Occasional in pastures.
var. **pratensis** (Fr.) Cott. et Wakef.—Scarborough (G.M.).
contorta (Holmsk.) Fr.—Scarborough (G.M.).
cristata (Holmsk.) Fr.—Not uncommon in woods.
flaccida Fr.—Scarborough (G.M.); Beedale (A.E.P., 1912).
flava (Schaeff.) Fr.—Massee's record of **C. aurea** probably refers to this species, as his other collections have been proved to do (R.W.G.D.).
formosa (Pers.) Fr.—Scarborough (G.M.).
fragilis (Holmsk.) Fr.—Scarborough (G.M.).
fumosa (Pers.) Fr.—Scarborough (G.M.); Goathland (T.B.M.S., 1931).
fusiformis (Sow.) Fr.—Forge Valley and Hackness (A.E.P., 1915 & 1925).
inaequalis (Muell.)Quél.—Scarborough (G.M.); Thornton-le-Dale (F.F., 1945).
juncea (A. et S.) Fr.—Scarborough on dead leaves (G.M.).
rugosa (Bull.) Fr.—Locally common.
straminea Cott.—Throxenby Mere (A.C., 1914).
umbrinella Sacc.—Boynton (W.W.S., 1888); Thornton-le-Dale (F.F., 1945).
vermicularis Fr.—Not uncommon in pastures.

TYPHULA (Persoon) Fries
erythropus (Bolt.) Fr.—Raincliffe Wood and Oliver's Mount (T.B.R., 1912-15).
filiformis (Bull.) Fr.—Scarborough on dead leaves (G.M.).
grevillei Fr.—Oliver's Mount on dead grass culms (T.B.R., 1912).
gyrans (Batsch) Fr.—Scarborough on grass stems (G.M.).

PISTILLARIA Fries
culmigena Mont. et Fr.—Scarborough on grass stems (G.M.).
micans (Pers.) Fr.—Scarborough on **Carduus** (G.M.).

quisquiliaris Fr.—Occasional on **Pteridium** (T.B.R., A.E.P., etc.).
uncialis (Grev.) Cost. et Duf.—Scarborough (G.M.).

EXOBASIDIALES

EXOBASIDIUM Woronin

vaccinii (Fuckel) Woron.—Goathland on **V. myrtillus** (T.B.M.S., 1931).

AGARICALES

AMANITA (Persoon) Fries

citrina (Schaeff.) Roques—Not uncommon in mixed woods.
excelsa Fr.—Beedale (G.M., A.E.P., 1929).
as **spissa** Fr.—Occasional in mixed woods, Cloughton, Forge Valley, etc.
gemmata (Fr.) Gill., as **A. junquillea**—Flixton Carr plantation (A.E.P., 1912).
muscaria (L.) Fr.—Not uncommon in birch and fir woods.
pantherina (DC.) Fr.—Not uncommon in open woods, frequent at Cloughton, including the white form.
phalloides (Vaill.) Fr.—Yedmandale (A.E.P., 1911, "in quantity"), now found only very occasionally (F.C.R.).
porphyria (A. et S.) Fr.—Hackness (F.F., 1925).
rubescens (Pers.) Fr.—Generally distributed and common.
solitaria (Bull.) Fr.—Irton and Beedale, etc. (A.E.P.).
virosa Fr.—Scarborough (G.M.); Beedale (A.E.P., 1910).

AMANITOPSIS Roze

fulva (Grev.) Rea—Widely distributed and not uncommon.
vaginata (Bull.) Roze—Widely distributed and not uncommon.

LEPIOTA Fries

acutesquamosa (Weinm.) Fr.—Widely distributed and not uncommon.
amianthina (Scop.) Fr.—Goathland (T.B.M.S., 1931).
bucknallii Berk. et Br.—Kingthorpe (T.B.M.S., 1931); Hackness (F.F., 1944).
carcharias (Pers.) Fr.—Yedmandale (G.M. & A.E.P.); Thornton-le-Dale (F.F., 1945); Wintringham (F.C.R., 1947).
castanea Quél.—Hackness (F.F., 1944).
cepaestipes (Sow.) Fr.—Scarborough in conservatory (G.M.).
clypeolaria (Bull.) Fr.—Flixton Carr plantation (A.E.P., 1910-11); Forge Valley (F.F., 1944).
cristata (A. et S.) Fr.—Widely distributed and not uncommon.
delicata Fr.—Yedmandale (T.B.R., 1911).
erminea Fr.—Ganton, in quantity (A.E.P., 1912).
excoriata (Schaeff.) Fr.—Scarborough (G.M.).

felina (Pers.) Fr.—Scarborough (G.M., Cooke's Illust. pl 943a was drawn from these specimens); Ings Plantation (F.F., 1915).
gracilenta (Krombh.) Fr.—Occasional; Ayton, Willerby, etc. (A.E.P.).
granulosa (Batsch) Fr. sensu Lange—Occasional in upland woods; Cloughton, Scampston, Wykeham Moor, etc. (A.E.P., F.C.R.).
guttata (Pers.) Fr.—Beedale (F.F., 1944).
haematosperma (Bull.) Boud.—Hackness (F.F., 1944).
hispida (Lasch) Fr.—Hackness, 1 specimen only (F.F., 1925).
naucina Fr.—Scarborough (G.M., A.E.P., 1920).
nigromarginata Mass.—Scarborough (G.M., 1885. Journ. Bot. XLI, p. 385), new to Britain.
parvannulata (Lasch) Fr.—Scarborough (F.F., 1944).
procera (Scop.) Fr.—Widely distributed and common.
rhacodes (Vitt.) Fr.—Widely distributed and not uncommon.
serena Fr. sensu Kuehn.—Seamer Quarry Plantation (A.E.P. teste A.C., 1913).
sistrata Fr.—Raincliffe Wood (C.R., & A.E.P.) ; Forge Valley and Thornton-le-Dale (F.F., 1944-45).

ARMILLARIA Fries
mellea (Vahl.) Fr.—Abundant in woods, particularly Raincliffe. var. **minor** Barl. is recorded (A.E.P., 1925).
mucida (Schrad.) Fr.—Raincliffe Wood (G.M.).

TRICHOLOMA Fries
acerbum (Bull.) Fr.—Irton Moor (T.B.R., 1912).
aggregatum (Schaeff.) Secr.—Scarborough, Valley Park and Oliver's Mount (A.E.P., 1910-14).
albo-brunneum (Pers.) Fr.—Scampston (G.M.); Raincliffe Wood (A.E.P., 1911-17); Wintringham (F.C.R., 1947).
album (Schaeff.) Fr.—Ganton Pheasant Covert (A.E.P., 1920); Kingthorpe (T.B.M.S., 1931).
atro-squamosum (Chev.) Sacc.—Raincliffe Wood (A.E.P., 1915); Wintringham (F.C.R., 1946).
carneum (Bull.) Fr.—Scarborough (G.M. & T.B.R.); Forge Valley (F.F., 1944).
cartilagineum Fr. non Bull.—Oliver's Mount (C.R., 1918).
cinerascens (Bull.) Fr. as **Clitocybe fumosa**—Oliver's Mount (A.E.P., 1920).
cuneifolium Fr.—Hackness (H.W., 1925); Forge Valley (F.F., 1944).
fallax Peck—Scarborough in fir wood (G.M., Cooke's Illust. pl. 1151a was drawn from these specimens). The only European record of this North American species and probably erroneous.
flavo-virens Fr.—Scarborough (G.M.).
grammopodium (Bull.) Fr.—Raincliffe Wood (G.M., A.E.P.); Staxton Wold (A.C., 1914).
ionides (Bull.) Fr.—Hackness (F.F., 1914).
imbricatum Fr.—Not uncommon, Cloughton, Wykeham, etc. (F.C.R.).

immundum Berk.—Raincliffe Wood (C.R., 1918); Forge Valley (A.E.P., 1920).
inamoenum Fr.—Kingthorpe (T.B.M.S., 1931).
irinum Fr.—Scarborough (G.M., 1879).
loricatum Fr.—Thornton-le-Dale (F.F., 1945).
melaleucum (Pers.) Fr.—Scarborough Mere (A.C., 1914); Kingthorpe (T.B.M.S., 1931).
nudum Fr.—Not uncommon in Raincliffe and other woods.
orirubens Quél.—Scarborough (G.M.).
panaeolum Fr.—Cockmoor Hall (A.E.P., 1929); Forge Valley and Thornton-le-Dale (F.F., 1944-45).
personatum Fr.—Common in pastures.
psammopus (Kalch.) Fr.—Hackness (F.F., 1944).
ramentaceum (Bull.) Quél.—Scarborough (G.M.).
resplendens Fr.—Scarborough (G.M.); Seamer (A.C., 1913).
rutilans (Schaeff.) Fr.—Common on conifer stumps.
var. **variegatum** (Scop.) Fr.—Scarborough (G.M., A.C.).
saponaceum Fr.—Scarborough (G.M.); Seamer (A.C., 1912).
scalpturatum Fr.—Seamer Quarry Plantations (A.E.P., 1912).
as **argyraceum** (Bull.) Fr.—Numerous records.
sejunctum (Sow.) Fr.—Scarborough (G.M.); Raincliffe Wood (F.C.R., 1946).
semitale (Fr.) Rick.—Oliver's Mount (A.E.P., 1910).
sordidum Fr.—Yedmandale (A.E.P., 1911); Thornton-le-Dale (F.F., 1945).
spermaticum Fr.—Scarborough in fir wood (G.M.).
sulphureum (Bull.) Fr.—Scarborough (G.M.).
var. **bufonium** (Pers.) Fr.—Scarborough (G.M.).
terreum Fr.—Common in coniferous and beech woods.
truncatum (Schaeff.) Quél.—Scarborough (G.M.).
ustale Fr.—Cockmoor Hall (A.C., 1924).
vaccinum (Pers.) Fr.—Scarborough (A.E.P., 1910-11, "in vast quantity"), not recorded since 1914.
virgatum Fr.—Scarborough (G.M.); Kingthorpe (T.B.M.S., 1931).

CLITOCYBE Fries
amara Fr.—Occasional; Willerby, Scampston, Ayton, etc. (A.E.P.).
angustissima (Lasch) Fr.—Forge Valley (A.E.P., 1927).
aurantiaca (Wulf.) Stud.—Locally common; Cloughton, Irton Moor, etc.
brumalis Fr.—Cloughton (H.T.S., A.E.P.); Raincliffe Wood (A.E.P., 1915).
candicans (Pers.) Fr.—Common in mixed woods.
cerussata Fr.—Ganton (G.M., F.F., 1915).
clavipes (Pers.) Fr.—Raincliffe Wood (C.R., 1918); Cloughton (F.C.R., 1945).
cyathiformis (Bull.) Fr.—Not uncommon; Hackness, Wintringham, etc.
dealbata (Sow.) Fr.—Staxton Wood (A.E.P., 1910).

ditopus Fr.—Ganton (G.M.); Thornton-le-Dale (F.F., 1930 & 1945).
flaccida (Sow.) Fr.—Beedale (A.E.P., 1912); Forge Valley (F.F., 1944); Raincliffe Wood (F.C.R., 1945).
fragrans (Sow.) Fr.—Common in woods and in poor mossy pastures.
geotropa (Bull.) Fr.—Flixton Carr Plantation (A.C., 1910); Hackness (A.E.P., 1910).
gigantea (Sow.) Fr.—Langdale End and Beedale (A.E.P.); Hay Brow (F.C.R.).
gilva (Pers.) Fr.—Not uncommon in conifer woods.
incilis Fr.—Kingthorpe (T.B.M.S., 1931).
infundibuliformis (Schaeff.) Fr.—Widely distributed and common.
metachroa Fr.—Scarborough (G.M.).
nebularis (Batsch) Fr.—Widely distributed and common.
phyllophila Fr.—Seamer Quarry Plantation (C.C., 1910); Scampston (A.C., 1914).
pithyophila Fr.—Scarborough (G.M. & A.C.); Seamer Quarry Plantation (C.C., 1910).
rivulosa (Pers.) Fr.—Forge Valley (F.F., 1944).
tuba Fr.—Scarborough (G.M.).
vibecina Fr.—Kingthorpe (T.B.M.S., 1931); Forge Valley (F.F., 1944).

LACCARIA Berkeley et Broome

amethystina (Vaill.) Cooke—Widely distributed and not uncommon.
bella (Pers.) Cooke—Raincliffe Wood (G.M., A.E.P.); Hackness (F.F., 1925).
laccata (Scop.) Cooke—Abundant. The first and chief pioneer species when the moors are planted with conifers.
tortilis (Bolt.) Cooke—Kingthorpe (T.B.M.S., 1931).

MYCENA Fries

acicula (Schaeff.) Fr.—Not uncommon in woods and hedgerows.
adonis (Bull.) Fr.—Seamer Carr Plantation (A.E.P., 1912); Wintringham (F.C.R., 1945).
aetites Fr.—Ganton Pheasant Covert (A.E.P., 1920).
alcalina Fr.—Massee records this species as "Frequent at Scarborough", but it has not been recorded since his day.
amicta Fr.—Scarborough (G.M.); Ganton (A.E.P., 1913).
ammoniaca Fr.—Spital Corner (A.E.P.); Forge Valley and Thornton-le-Dale (F.F., 1944-45).
atrocyanea (Batsch) Fr.—Scarborough (G.M.); Cloughton (H.T.S., 1892).
avenacea Fr.—Hackness (F.F., 1925).
capillaris (Schum.) Fr.—Filey (G.M.); Forge Valley (A.C., F.F., 1944).
corticola (Pers.) Fr.—Scarborough (G.M.).
debilis Fr.—Hackness (A.C., 1924).
elegans Fr.—Forge Valley (C.R., 1918).
epipterygia (Scop.) Fr.—Widely distributed and not uncommon.
flavo-alba Fr.—Scarborough (G.M.); Forge Valley (F.F., 1944).

filopes (Bull.) Fr. non Kuehn.—Forge Valley (G.M., F.F., 1944).
galericulata (Scop.) Fr.—Common on or near dead stumps.
galopus (Pers.) Fr.—Widely distributed and common.
gypsea Fr.—Scarborough (G.M.); the first British record; Cooke's Illust. pl. 952 was drawn from these specimens. Forge Valley (F.F., 1915); Lockton (A.C., 1924).
haematopus (Pers.) Fr.—Not uncommon on decaying stumps.
inclinata Fr.—Raincliffe Wood and Hackness (A.E.P.); Kingthorpe (T.B.M.S., 1931).
lactea (Pers.) Fr.—Cloughton (H.T.S., 1892).
metata Fr.—Irton Moor and Yedmandale (A.E.P.); Forge Valley (F.F., 1944); Thornton-le-Dale (F.F., 1945).
pelianthina Fr.— Scarborough (G.M.); Kingthorpe (F.F., 1945).
pelliculosa Fr.—Occasional on the edge of the moors, Cloughton, Bickley, etc.
polyadelpha (Lasch ex Fr.) Kuehn.—Irton Moor (T.B.R., 1913).
polygramma (Bull.) Fr.—Not uncommon; Hackness, Forge Valley, etc.
pseudo-pura Cooke—Scarborough (G.M.); Staxton Wold (A.E.P., 1913).
pura (Pers.) Fr.—Common in all woods.
rorida (Scop.) Fr.— Seamer Quarry Plantation and Forge Valley (A.E.P.).
rosella Fr.—Boynton (W.W.S., 1889); Scarborough (G.M.).
rubro-marginata Fr.—Irton Moor, Cloughton, Flixton Carr (A.E.P.).
sanguinolenta (A. et S.) Fr.—Very common in almost any damp wood.
speirea Fr.—Forge Valley (F.F., 1944).
stylobates (Pers.) Fr.—Not uncommon in damp places.
tenerrima Berk.—Boynton (W.W.S., 1880) ; Raincliffe Wood (C.R. & T.B.R.).
vitilis Fr. non Kuehn.—Flixton Carr Plantation and Forge Valley (A.E.P.); Thornton-le-Dale (F.F., 1945).

COLLYBIA Fries

ambusta Fr.—Scarborough (G.M.); Seamer Plantation (A.C., 1923).
atrata Fr.—Scarborough (G.M.); Hole of Horcum (W.G.B., 1938).
butyracea (Bull.) Fr.—Widely distributed and common.
cirrata (Schum.) Fr.—Scarborough (G.M., 1880-81).
clusilus Fr.—Harwood Dale in swamp (G.M., 1904); Foulsyke (A.E.P., 1914).
distorta Fr.—Scarborough (G.M., A.E.P., 1912).
fusipes (Bull.) Berk.—Hackness and Yedmandale (T.B.R., A.E.P.).
inolens Fr.—Scampston (A.E.P., 1914).
maculata (A. et S.) Fr.—Not uncommon in conifer woods.
nitellina Fr.—Black Rigg Plantation (T.B.R., 1911); Beedale (A.E.P., 1911).
nummularia Fr.—Cloughton Wood (A.C., 1923).
platyphylla (Pers.) Fr.—Frequent in woods.

radicata (Rehl) Berk.—Frequent in woods.
rancida Fr.—Forge Valley and Thornton-le-Dale (F.F., 1944-45).
succinea Fr.—Scarborough (G.M.).
thelephora Cooke et Mass.—This species was founded on specimens growing in the bog near Scarborough race-course, and they are shown on pl. 1167 of Cooke's Illust. Cayton Wood (A.E.P., 1910).
tuberosa (Bull.) Fr.—Cloughton Wood (F.C.R., 1945).
velutipes (Curt.) Fr.—Common, chiefly in winter. Gathered and eaten at Seamer (A.E.P., 1910).

MARASMIUS Fries
acervatus (Fr.) Pears. et Denn.—Cloughton and Forge Valley (F.F., 1944).
androsaceus (L.) Fr.—Common on fallen leaves, etc.
cauticinalis (With.) Fr.—Scarborough (G.M., 1881).
ceratopus (Pers.) Quél.—Scarborough (G.M.).
as **cohaerens** (A. et S.) Cooke—Kingthorpe in abundance under **Fagus** (T.B.M.S., 1931).
confluens (Pers.) Karst.—Widely distributed and common.
dryophilus (Bull.) Karst.—Common in woods.
esculentus (Wulf. ex Fr.) Karst.—Scarborough (G.M.).
epiphyllus (Pers.) Fr.—Scarborough (G.M., 1881); Seamer (A.E.P., 1911).
foetidus (Sow.) Fr.—Cloughton (G.M., 1892); Forge Valley (F.F., 1944).
fusco-purpureus (Pers.) Fr.—Forge Valley (A.E.P., 1927).
hudsonii (Pers.) Fr.—Raincliffe Wood (T.B.R., A.E.P., 1911-14).
impudicus Fr.—Thornton-le-Dale (F.F., 1945).
myosurus (Wulf. ex Fr.) Karst., as **Collybia conigena**—Knapton and Ebberston plantations (A.E.P., 1927).
oreades (Bolt.) Fr.—Common in pastures.
peronatus (Bolt.) Fr.—Widely distributed in woods and not uncommon.
prasiosmus Fr.—Scarborough (G.M.).
ramealis (Bull.) Fr.—Widely distributed and common.
rotula (Scop.) Fr.—Widely distributed and common.
scorodonius Fr.—Scarborough (G.M.).
undatus Berk.—Cockmoor Hall (A.E.P., 1929); Forge Valley (F.F., 1944).
vaillantii (Pers.) Fr.—Raincliffe Wood (A.C., 1910 & 1924); Lockton (A.E.P., 1924).
wynnei Berk. et Br.—Kingthorpe, abundant under **Fagus** (T.B.M.S., 1931).

CRINIPELLIS Patouillard
stipitarius (Fr.) Pat.—Irton Moor (A.E.P., 1913).

OMPHALIA Fries
atropuncta (Pers.) Fr.—Kingthorpe (T.B.M.S., 1931).
brownii (Berk. et Br.) Favre—Boynton (W.W.S., 1889).
campanella (Batsch) Fr.—Scarborough (G.M.).

demissa Fr.—Langdale End (T.B.R., 1912).
fibula (Bull.) Fr.—Widely distributed and not uncommon among mosses.
gracillima Weinm.—Raincliffe Wood (C.R., 1918).
hepatica (Batsch) Fr.—Scarborough (G.M., 1901).
hydrogramma (Bull.) Fr.—Scarborough (G.M.); Silpho Moor (F.C.R., 1945).
muralis (Sow.) Fr.—Scarborough (G.M.); Staintondale (A.E.P., 1919).
oniscus Fr.—Scarborough (G.M., 1882).
postii Fr.—Scarborough (G.M.).
pyxidata (Bull.) Fr.—Scarborough (G.M.).
sphagnicola Berk.—Harwood Dale (C.C., 1904).
stellata Fr.—Scarborough (G.M., 1881).
telamatiaea Berk. et Cooke—Scarborough among sphagnum (G.M.).
umbellifera (L.) Fr.—Langdale End (T.B.R.); Forge Valley A.E.P.); Thornton-le-Dale (F.F., 1945).
wynniae (Berk. et Br.) Quél.—Scarborough (G.M.); Boynton Pond Wood (W.W.S., 1880).

PLEUROTUS Fries
applicatus (Batsch) Fr.—Boynton Pond Wood (W.W.S., 1880); Scarborough (G.M., 1879).
chioneus (Pers.) Fr.—Scarborough (G.M.).
cyphelliformis Berk.—Irton Moor (C.C., 1912).
dryinus (Pers.), Fr.—Brompton on **Ulmus** (A.E.P., 1910).
mitis (Pers.) Berk.—Scarborough (G.M.); Boynton (W.W.S., 1885).
ostreatus (Jacq.) Fr.—Not uncommon; usually on **Ulmus** or **Fagus;** Willerby on **Sambucus** (A.E.P., 1910).
var. **salignus** (Pers.) Fr.—Forge Valley (F.F., 1915).
petaloides (Bull.) Fr.—Forge Valley and Cloughton, in abundance on sawdust (A.E.P., F.C.R.).
reniformis Fr.—Seamer (A.E.P., 1912).
septicus Fr.—Widely distributed in woods and not uncommon.
serotinus (Schrad.) Fr.—Flotmanby (A.E.P., 1920); Raincliffe Wood (F.C.R., 1945 et seq.).
tremulus (Schaeff.) Fr.—Raincliffe Wood (C.R., 1918); Hackness (A.C., 1924); Thornton-le-Dale (F.C.R., 1945).
ulmarius (Bull.) Fr.—Cayton (A.E.P.); Raincliffe Wood (F.C.R.).

PANUS Fries
stipticus Karst.—Massee, 1905, says this species is common at Scarborough on decaying trunks, but it has been recorded only once since that date, at Kingthorpe (T.B.M.S., 1931).
torulosus (Pers.) Fr.—Forge Valley on sawdust (A.E.P.); Hackness (T.B.R.); Wykeham (W.G.B.).

LENTINUS Fries
cochleatus (Pers.) Fr.—Beedale (F.F., 1915); Raincliffe Wood (T.B.R., 1915).
lepideus Fr.—Occasional on cut timber.

SCHIZOPHYLLUM Fries

commune Fr.—Scarborough (G.M.); Hackness on **Fraxinus** (F.C.R., 1946).

NYCTALIS Fries

asterophora Fr.—Scarborough (G.M.); Hackness (T.B.R., 1911).

parasitica (Bull.) Fr.—Not uncommon on **Russula spp.**

HYGROPHORUS Fries

agathosmus Fr.—Ebberston (A.E.P., 1927).

calyptraeformis Berk.—Raincliffe Wood (G.M., A.E.P., 1911-15).

ceraceus (Wulf.) Fr.—Forge Valley and Thornton-le-Dale (F.F., 1944-45).

cerasinus Berk.—Cloughton (A.E.P., 1910); Scampston (T.B.R., 1913); Silpho Moor (A.E.P., 1927).

chlorophanus Fr.—Not uncommon in pastures.

coccineus (Schaeff.) Fr.—Common in pastures.

colemannianus Blox.—Cockmoor Hall (A.E.P., 1929).

conicus Fr.—Common in pastures.

cossus (Sow.) Fr.—Scarborough (G.M.).

eburneus (Bull.) Fr.—Not uncommon in woods and pastures.

fornicatus Fr.—Yedmandale and Cockmoor Hall (A.E.P., 1917 & 1929).

hypothejus Fr.—Common near conifers.

intermedius Pass.—Irton (A.E.P., 1910); Thornton-le-Dale (F.F., 1946).

lacmus Fr.—Forge Valley (F.F., 1944).

laetus (Pers.) Fr.—Cockmoor Hall (A.E.P., 1918); Thornton-le-Dale (F.F., 1945).

metapodius Fr.—Thornton-le-Dale (F.F., 1945).

miniatus Fr.—Massee, 1905, says this species is common on moist banks at Scarborough, but it has been recorded only once since that date, at Goathland (T.B.M.S., 1931).

nemoreus (Lasch) Fr.—Cloughton Wyke (A.E.P., 1909); Raincliffe Wood (F.C.R., 1946).

nigrescens Quél.—Thornton-le-Dale (F.F., 1930 & 1945).

nitratus (Pers.) Fr.—Beedale, Hackness, Yedmandale, etc. (A.E.P.).

niveus (Scop.) Fr.—Common in pastures.

obrusseus Fr.—Hackness (F.F., 1915 & 1925).

olivaceo-albus Fr.—Racecourse Plantation (G.M. & A.E.P., Dec., 1910, " in quantity ").

ovinus (Bull.) Fr.—Hutton Buscel (A.E.P., 1914); Scarborough (F.F., 1915).

pratensis (Pers.) Fr.—Common in pastures.

psittacinus (Schaeff.) Fr.—Common in pastures.

puniceus Fr.—Common in pastures, occasional in woods.

reai Maire—Kingthorpe (T.B.M.S., 1931); Robin Hood's Bay (W.G.B., 1946).

russo-coriaceus Berk. et Mill.—Boynton (W.W.S., 1880); Scarborough (G.M.).

russula (Schaeff.) Quél., as **Tricholoma frumentaceum**—Robin Hood's Bay (F.F., 1894).
turundus Fr.—Staxton (A.C., 1914); Hackness (F.F., 1925).
unguinosus Fr.—Cloughton (T.B.R., 1915); Ayton (A.E.P., 1920); Hackness (F.F., 1925).
virgineus (Wulf.) Fr.—Common in pastures.
vitellinus Fr.—Scarborough (G.M.).

LACTARIUS Fries

aspideus Fr.—Scarborough (G.M.); these specimens formed the first British record and pl. 1083 of Cooke's Illust. was drawn from them.
aurantiacus (Fl. Dan.) Fr.—Scarborough among moss (G.M.).
blennius Fr.—Common in and near woods.
camphoratus (Bull.) Fr.—Scarborough (G.M.); Flask Inn (A.E.P., 1925).
chrysorheus Fr.—Scarborough (G.M.); Goathland (T.B.M.S., 1931); Forge Valley (F.F., 1944).
cilicioides Fr.—Scarborough (G.M.).
cimicarius (Batsch.) Cooke—Scarborough (G.M.); Forge Valley (F.F., 1944).
cyathula (Fr.) Rick.—Forge Valley (F.F., 1944).
deliciosus (L.) Fr.—Not uncommon near conifers.
flexuosus Fr.—Hackness (F.F., 1925); Cloughton (F.C.R., 1946).
fuliginosus Fr.—Raincliffe Wood (C.R., 1918); Forge Valley (F.F., 1944).
glycyosmus Fr.—Ganton Pheasant Covert (A.E.P.); Hackness and Forge Valley (F.F., 1915, 1925, 1944).
helvus Fr.—Scarborough (G.M.).
hysginus Fr.—Hackness (F.F., 1925).
insulsus Fr.—Scarborough (G.M. & F.F., 1915).
lignyotus (Lindb.) Fr.—Scarborough (G.M.); Lockton (A.E.P., 1924).
mammosus Fr.—Scarborough (G.M., 1888).
mitissimus Fr.—Scarborough (G.M. & C.R.); Forge Valley (F.F., 1944).
obnubilus (Lasch) Fr.—Raincliffe Wood (G.M., C.R., 1918).
pallidus (Pers.) Fr.—Scarborough (G.M.).
picinus Fr.—Scarborough (G.M.); Hackness (F.F., 1925).
piperatus (Scop.) Fr.—Hackness (F.F., 1925).
plumbeus Fr.—Common in mixed woods.
pubescens Fr.—Scarborough (G.M.).
pyrogalus (Bull.) Fr.—Widely distributed and common.
rufus (Scop.) Fr.— Abundant in conifer woods.
scrobiculatus (Scop.) Fr.—Ings Plantation (F.F., 1915).
subdulcis (Pers.) Fr.—Common in mixed woods.
serifluus (DC.) Fr.—Raincliffe Wood (G.M., 1881, & C.R., 1918); Goathland (T.B.M.S., 1931).
trivialis Fr.—Scarborough (G.M.).
torminosus Fr.—Raincliffe Wood (G.M., A.E.P.); Hackness (T.B.R.)

uvidus Fr.—Kingthorpe (T.B.M.S., 1931).
vellereus Fr.—Beedale (A.E.P., 1910); Goathland (T.B.M.S., 1931).
vietus Fr.—Scarborough (F.F., 1915); Goathland (T.B.M.S., 1931).
volemus Fr.—Scarborough (G.M.).
zonarius (Bull.) Fr.—Hackness (F.F., 1925).

RUSSULA Fries

adusta Fr.—Hackness (A.C., F.F., 1915); Raincliffe Wood (F.C.R., 1946).
aeruginea Lindb.—Yedmandale (A.E.P., 1911).
alutacea (Pers.) Fr.—Scarborough (G.M.); Hackness (F.F., 1925).
atro-purpurea Kromb.—Not uncommon in mixed woods.
var. **depallens** (Cooke) Maire—Cloughton (A.E.P., 1913); Raincliffe Wood (A.E.P., 1915).
azurea Bres.—Scarborough (G.M.).
caerulea Cooke—Yedmandale (F.F., 1915 & A.E.P., 1925).
cyanoxantha (Schaeff.) Fr.—Very common in moist mixed woods.
decolorans Fr.—Scarborough (G.M.).
delica Fr.—Irton Moor (T.B.R.); Thornton-le-Dale (F.F., 1945).
densifolia (Secr.) Gill.—Scarborough (G.M.); the first British record was founded on these specimens, and pl. 1017 of Cooke's Illust. was drawn from them.
drimeia Cooke—Common in conifer woods.
emetica (Schaeff.) Fr.—Common in beech woods.
fallax (Fr.) Cooke—Scarborough (G.M.).
fellea Fr.—Not uncommon under beeches.
foetens Fr.—Scarborough (G.M.); Hackness (A.C., F.F., 1925).
fragilis Fr.—Not uncommon in moist woods.
grisea (Pers. ex Secr.) Fr.—Beedale (F.F., 1944).
heterophylla Fr.—Hackness (G.M., F.F., 1925).
integra (L.) Fr.—Scarborough (G.M.).
lepida Fr.—Irton Moor (A.E.P., F.F., 1915); Raincliffe Wood (C.R., 1918).
lutea Fr.—Flixton Carr Plantation (A.E.P., 1927); Harwood Dale A.E.P., 1929).
form **luteorosella** Britz.—Silpho Moor under conifers (F.C.R., 1948).
mustelina Fr.—Goathland (T.B.M.S., 1931).
nauseosa (Pers.) Fr.—Scarborough (G.M.); Flixton Carr (A.E.P., 1927).
nigricans Fr.—Common in mixed woods.
nitida (Pers.) Fr.—Scarborough (G.M.).
ochroleuca Fr.—Common in beech and conifer woods.
puellaris Fr.—Raincliffe Wood (A.E.P., 1915 & F.F., 1944).
queletii Fr.—Ellerburn (F.C.R., 1945).
rubra (Kromb.) Bres.—Scarborough (G.M., F.F., 1915); Hackness (A.C., 1924); Cloughton (F.C.R., 1945-46).
sanguinea (Bull.) Fr.—Ebberston (A.E.P., 1927); Lockton (A.C., 1924).

venosa Vel.—Forge Valley (F.F., 1924).
vesca Fr.—Irton (A.C. & F.F., 1915); Wykeham (A.E.P., 1931).
virescens (Schaeff.) Fr.—Massee, 1895, says this species is frequent at Scarborough, but there was no further record until 1948 at Cloughton (W.G.B. & F.C.R.).
xerampelina Fr.—Scarborough (G.M.); Hackness (F.F., 1925).

CANTHARELLUS Adanson
cibarius Fr.—Not uncommon in woods, especially beech.
friesii Quél.—Scarborough (F.F., 1915).
tubaeformis (Bull.) Fr.—Boynton (W.W.S., 1880); Raincliffe Wood (A.E.P., 1917).

LEPTOTUS Karsten em. Maire
lobatus (Pers.) Karst., as **Cantharellus**—Scarborough (G.M.); Ellerburn in damp alder wood (F.A.M., 1922).
muscigenus (Bull.) Maire, as **Cantharellus**—Scarborough on the larger mosses (G.M.).
retirugis (Bull.) Karst., as **Cantharellus**—Scarborough (G.M.).

CRATERELLUS Fries
cornucopioides (L.) Fr.—Not uncommon in woods.

VOLVARIA Fries
bombycina (Pers.) Fr.—Scarborough on decayed wood (G.M.).
pusilla (Pers.) Fr., as **V. temperata**—Scarborough in conservatory (G.M.).
speciosa Fr.—Seamer, Hackness & Wykeham on rubbish heaps (A.E.P., F.C.R.).
var. **gloiocephala** (DC.) Kon. et Maubl.—Robin Hood's Bay (G.M.); Scarborough (T.B.R., A.C., F.C.R.).
taylori Berk.—Allerston (A.E.P., 1920).

PLUTEUS Fries
cervinus (Schaeff.) Fr.—Common, particularly on old sawdust.
var. **patricius** (Schulz.) Fr.—Forge Valley on sawdust (A.E.P., 1927).
chrysophaeus (Schaeff.) Fr.—Boynton (W.W.S., 1880); Thornton-le-Dale (G.M.).
leoninus (Schaeff.) Fr.—Scarborough (G.M.).
nanus (Pers.) Fr.—Ganton (A.E.P., 1910); Hackness on sawdust (F.C.R., 1946).
var. **lutescens** Fr.—Forge Valley and Hackness (A.E.P., F.C.R.).
pellitus (Pers.) Fr.—Scarborough (G.M.).
phlebophorus (Ditm.) Fr.—Scarborough (G.M.).
salicinus (Pers.) Fr.—Hackness (F.F., 1925); Kingthorpe (T.B.M.S., 1931).
semi-bulbosus (Lasch) Fr.—Scarborough (G.M.).
violarius Mass.—The species was established on specimens found at Scarborough (G.M.); it has not been found since first collected.

PLUTEOLUS Fries
aleuriatus Fr. var. **reticulatus** (Pers. ex Fr.) Lange—Scarborough (G.M.).

CLITOPILUS Fries

cretatus Berk. et Br.—Scarborough (G.M.).

prunulus (Scop.) Fr.—Frequent among grass in open woods.

RIPARTITES Karsten

tricholoma (A. et S.) Karst.—Forge Valley (F.F., 1945); Thornton-le-Dale (F.F., 1946).

ENTOLOMA Fries

ameides Berk. et Br.—Cloughton Newlands (A.E.P., 1920).

bloxami Berk. et Br.—Scarborough (G.M.); Fylingdales (A.E.P., 1927).

clypeatum (L.) Fr.—Scarborough, Seamer, Irton, etc. (A.E.P., 1910).

costatum Fr.—Massee, 1905, says this species is frequent in pastures and moist woods at Scarborough, but it has not been recorded since his time.

lividum (Bull.) Fr.—Scarborough (G.M., A.E.P., 1914); Irton and Suffield (A.C., 1914).

nidorosum Fr.—Scarborough (G.M.); Cloughton (A.E.P., 1920).

nigrocinnamomeum Kalch.—Scarborough (G.M.); first British record, and pl. 1153 of Cooke's Illust. was drawn from these specimens.

porphyrophaeum Fr.—Common in meadows; was erroneously recorded at **E. jubatum** prior to 1945.

prunuloides Fr.—Irton Moor and Hackness (A.E.P. & A.C.).

rhodopolium Fr.—Forge Valley (F.F., 1944).

sericeum (Bull.) Fr.—Widely distributed and not uncommon.

speculum (Fr.) Quél.—Scarborough (F.F., 1915).

LEPTONIA Fries

aethiops Fr.—Scarborough (F.F., 1915).

asprella Fr.—Scarborough (G.M. & F.F., 1915).

euchroa (Pers.) Fr.—Scarborough (G.M.).

formosa Fr. var. **suavis** (Lasch) Fr.—Scarborough among **Equisetum** (G.M.); first British record, and pl. 448 of Cooke's Illust. was drawn from these specimens.

incana Fr.—Beedale and Staxton (A.E.P., 1910) ; Boynton (W.W.S., 1880).

lampropus Fr.—Not uncommon in hillside pastures.

lappula Fr.—Scarborough among beech leaves (G.M.).

placida Fr.—Scarborough (G.M.).

serrulata Fr.—Scarborough (G.M.).

sericella (Fr.) Quél., as **Entoloma**—Not uncommon on grassy banks in woods.

var. **decurrens** Boud.—Cloughton (A.C.); Yedmandale (T.B.R., 1911).

NOLANEA Fries

cetrata (Fr.) Schroet.—Forge Valley (F.F., 1944); Thornton-le-Dale (F.F., 1945).

icterina Fr., as **Leptonia chloropolia**—Scarborough (G.M.).
juncea Fr.—Cloughton among sphagnum (A.E.P., 1929).
mammosa (L.) Fr.—Cloughton (A.C., 1910).
papillata Bres.—Langdale End (A.E.P., 1927); Forge Valley and Thornton-le-Dale (F.F., 1944-45).
staurospora Bres.—Common almost everywhere.

ECCILIA Fries
cancrina Fr.—Scarborough (G.M.).
nigrella (Pers.) Fr.—Staxton (A.C., 1915), now considered a decurrent form of **Leptonia serrulata.**

CLAUDOPUS W. G. Smith em. Patouillard
depluens (Batsch) Fr.—Scarborough among moss (G.M.).

PHOLIOTA Fries
adiposa Fr.—Hackness (F.F., 1925).
aegerita Brig.—Hackness on **Sambucus** (T.B.R., 1913).
aurea (Matt.) Fr.—Raincliffe Wood (A.E.P., 1911).
aurivella (Batsch) Fr.—Thornton-le-Dale (F.F., 1945).
dura (Bolt.) Fr.—Not uncommon in fields and gardens.
erebia Fr.—Not uncommon in woods and pastures.
flammans Fr.—Raincliffe Wood (G.M.); Kingthorpe (T.B.M.S., 1931).
marginata (Batsch) Fr.—Raincliffe Wood (G.M., C.R., 1918); Givendale (A.E.P., 1919); Hackness on sawdust (F.C.R., 1945).
mutabilis (Schaeff.) Fr.—Widely distributed and not uncommon.
mycenoides Fr.—Harwood Dale (G.M., 1904).
praecox (Pers.) Fr.—Raincliffe Wood (A.C., 1910); Harwood Dale (A.E.P., 1912).
pumila Fr.—Beedale on sawdust (A.E.P., 1929).
radicosa (Bull.) Fr.—Scarborough (G.M.); Kingthorpe and Goathland (T.B.M.S., 1931).
spectabilis Fr.—Cloughton (T.B.R.); Allerston (A.E.P., 1920); Raincliffe Wood (F.C.R., 1946).
squarrosa (Mull.) Fr.—Common on or near stumps, chiefly ash.
togularis (Bull.) Fr. non Rick.—Forge Valley, etc. (A.E.P., 1910); Hackness (F.F., 1944 & F.C.R., 1946).

HEBELOMA Fries
crustuliniforme (Bull.) Fr.—Scarborough, frequent (G.M.); Staxton (A.E.P., 1910); Forge Valley (F.F., 1944).
elatum (Batsch) Fr.—Scarborough (G.M.).
fastibile (Pers.) Fr.—Not uncommon in mixed woods.
longicaudum (Pers.) Fr.—Scarborough (G.M., A.E.P., 1912).
mesophaeum (Pers.) Fr.—Forge Valley (F.F., 1944); Thornton-le-Dale (F.F., 1945).
sacchariolens Quél.—Ganton (A.C., 1915); Yedmandale (A.E.P., 1915).
sinapizans (Paul.) Fr.—Ganton and Staxton (A.E.P., 1910); Wykeham Abbey (A.E.P., 1927).
versipelle Fr.—Scarborough (G.M.)

FLAMMULA Fries

alnicola Fr.—Occasional in woods.
apicrea Fr.—Scarborough (G.M.); Cloughton (A.E.P., 1913).
carbonaria Fr.—Scarborough, frequent (G.M.); Silpho Moor (F.C.R., 1945).
flavida (Schaeff.) Fr.—Scarborough (G.M.).
gummosa (Lasch) Quél.—Hackness (F.C.R., 1945).
hybrida Fr.—Scarborough (G.M.), first British record.
lenta (Pers.) Fr., as **F. glutinosum**—Seamer (F.F., 1915); Allerston (A.E.P., 1919); Thornton-le-Dale (F.F., 1945).
ochrochlora Fr.—Scarborough (G.M., " Grevillea ", XIV, p. 37), first British record; Rillington (A.C., 1914).
picrea Fr.—Cockmoor Hall (A.E.P., 1929).
sapinea Fr.—Common on dead trunks and stumps.
scamba (Fr.) Sacc.—Irton Moor (T.B.R., 1914).
spumosa Fr.—Scarborough (G.M.).

NAUCORIA Fries

cerodes Fr.—Scarborough on burnt soil (G.M.).
cucumis (Pers.) Fr.—Not uncommon in damp woods.
erinacea Fr.—Scarborough, rare (G.M.).
escharoides Fr.—Forge Valley (F.F., 1944); Thornton-le-Dale (F.F., 1945).
myosotis Fr.—Scarborough among sphagnum (G.M., " Grevillea ", XIII, p. 59), first British record; Cloughton (A.E.P., 1929).
pediades Fr.—Scarborough (G.M.).
semi-orbicularis (Bull.) Fr.—Scarborough (G.M.).
sideroides (Bull.) Fr.—Scarborough (G.M.); Flotmanby (T.B.R., 1911).
temulenta Fr.—Scarborough (G.M.); Cloughton (A.C., 1910).

TUBARIA Gillet

furfuracea (Pers.) Gill.—Not uncommon.
inquilina (Fr.) Gill.—Scarborough (G.M.); Hackness (F.C.R., 1945).
paludosa (Fr.) Karst.—Scarborough (G.M.).
stagnina (Fr.) Gill.—Scarborough in sphagnum swamp (G.M. & A.E.P., 1929).

GALERA Fries

antipus (Lasch) Fr.—Scarborough (G.M.) ; Thornton-le-Dale (F.F. 1945).
campanulata Mass.—Scarborough (G.M.).
hypnorum (Batsch) Fr.—Hackness (G.M., F.F., 1925); Thornton-le-Dale (F.F., 1946).
lactea Lange—Scarborough (G.M., F.F., 1915).
mniophila (Lasch) Fr.—Scarborough (G.M., A.E.P., 1910); Goathland (T.B.M.S., 1931).
pygmaeo-affinis Fr.—Cayton (A.E.P., 1910).
rubiginosa (Pers.) Fr.—Seamer (A.E.P., 1912 & 1927).
siliginea Fr.—Scarborough (G.M.).
tenera (Schaeff.) Fr.—Common in woods, pastures, etc.

CREPIDOTUS Fries

applanatus (Pers.) Fr.—Rillington (A.C., 1914).
calolepis Fr.—Seamer (A.E.P., 1925).
mollis (Schaeff.) Fr.—Common on stumps, sawdust, etc.
variabilis (Pers.) Fr., as **Claudopus**—Scarborough (G.M.); Raincliffe Wood (F.C.R., 1945).

BOLBITIUS Fries

fragilis (L.) Fr.—Not uncommon on roadsides, etc.
titubans (Bull.) Fr.—Scarborough (G.M.).
vitellinus (Pers.) Fr.—Scarborough on dung (G.M.); Forge Valley and Thornton-le-Dale (F.F., 1944-45).

CORTINARIUS Fries

Section **MYXACIUM** Fr.

collinitus (Pers.) Fr.—Scarborough (G.M., F.F., 1944).
delibutus Fr.—Scarborough (F.F., 1915); Goathland (T.B.M.S., 1931).
elatior Fr.—Not uncommon in mixed woods.
mucosus (Bull.) Fr.—Kingthorpe (T.B.M.S., 1931).

Section **PHLEGMACIUM** Fr.

atro-virens (Kalch.) Fr.—Scarborough (G.M., " Grevillea ", XV, p. 66), first British record.
cristallinus Fr.—Forge Valley (F.F., 1944).
cyanopus (Secr.) Fr.—Scarborough (G.M.).
fulgens (A. et S.) Fr.—Flamborough (G.M.); Forge Valley (F.F., 1944).
glaucopus (Schaeff.) Fr.—Scarborough (G.M.).
infractus (Pers.) Fr.—Ellerburn (F.C.R., 1945).
largus Fr.—Scarborough (G.M.).
porphyropus (A. et S.) Fr.—Scarborough in mixed wood (G.M.).
purpurascens Fr.—Forge Valley (G.M., F.F., 1944).
rufo-olivaceus (Pers.) Fr.—Forge Valley (F.F., 1944).
sebaceus Fr.—Cloughton and Beedale (A.E.P., 1910-14).
varius (Schaeff.) Fr.—Scarborough (G.M.); Ellerburn (F.C.R., 1946).

Section **INOLOMA** Fr.

albo-violaceus (Pers.) Fr.—Scarborough (G.M.).
argentatus (Pers.) Fr.—Hackness (F.A.M., 1925).
bolaris (Pers.) Fr.—Scarborough in beech-wood (G.M.).
bulliardii (Pers.) Fr.—Cockmoor Hall (A.E.P., 1924).
pholideus Fr.—Ganton (G.M.); Hackness on sawdust (F.C.R., 1946).
violaceus Fr.—Scarborough (G.M., F.F., 1915).

Section **DERMOCYBE** Fr.

anomalus Fr.—Forge Valley and Thornton-le-Dale (F.F., 1944-45).
caninus Fr.—Forge Valley (G.M., F.F., 1944).
azureus Fr.—Scarborough (G.M.).
cinnabarinus Fr.—Thornton-le-Dale (F.F., 1945).

cinnamomeus Fr.—Not uncommon in mixed woods.
lepidopus Cooke—Yedmandale (G.M., A.E.P., 1917).
ochroleucus (Schaeff.) Fr.—Scarborough, Ganton, Filey (G.M.).
sanguineus (Wulf.) Fr.—Cloughton (T.B.R.); Forge Valley (F.F., 1915, 1944).
semi-sanguineus Gill.—Forge Valley (A.E.P., F.F., 1944); Silpho Moor (F.C.R., 1946).
uliginosus Berk.—Cloughton Duchy Wood (A.E.P., 1929).

Section **TELAMONIA** Fr.

armillatus Fr.—Hackness (G.M., F.F., 1925).
bivelus Fr.—Scarborough (G.M.).
brunneo-fulvus Fr.—Scarborough (G.M.).
brunneus (Pers.) Fr.—Scarborough (G.M.).
bulbosus (Sow.) Fr.—Scarborough among moss (G.M.).
callisteus Fr.—Scarborough in pine wood (G.M., A.E.P., 1912).
evernius Fr.—Scarborough in damp pine wood (G.M.).
glandicolor Fr.—Forge Valley (F.F., 1944).
hemitrichus (Pers.) Fr.—Scarborough (G.M.).
hinnuleus Fr.—Scarborough (G.M.); Irton Moor (C.C., A.C., 1910).
iliopodius (Bull.) Fr.—Scarborough (G.M., A.C., 1911).
penicillatus Fr.—Scarborough in pine wood (G.M.).
paleaceus Fr.—Ganton (G.M.); Scarborough (F.F., 1915).
rigidus (Scop.) Fr.—Cockmoor Hall (A.E.P., 1920); Raincliffe Wood (F.C.R., 1946).
torvus Fr. non Quél.—Scarborough (G.M.) ; Kingthorpe (T.B.M.S., 1931).

Section **HYDROCYBE** Fr.

acutus (Pers.) Fr.—Seamer Quarry Plantation (G.M., A.E.P., 1913); Goathland (T.B.M.S., 1931).
castaneus (Bull.) Fr.—Scarborough and Ganton (G.M.); Goathland (T.B.M.S., 1931).
decipiens (Pers.) Fr.—Scarborough (G.M.); Forge Valley (F.F., 1944).
duracinus Fr.—Goathland (T.B.M.S., 1931).
erythrinus Fr.—Hackness (G.M., F.F., 1925).
fasciatus Fr.—Scarborough (G.M.); Troutsdale (A.E.P., 1932).
firmus Fr.—Scarborough in mixed wood (G.M.).
krombholzii Fr.—Scarborough among moss (G.M., " Grevillea ". XV, p. 66), first British record.
leucopus (Bull.) Fr.—Forge Valley (G.M., F.F., 1944-45).
obtusus Fr.—Goathland (T.B.M.S., 1931).
rigens Fr.—Scarborough (G.M.).
saturninus Fr.—Scarborough (G.M.).
tortuosus Fr.—Scarborough (G.M.).
uraceus Fr.—Forge Valley (F.F., 1944).

INOCYBE Fries

asterospora Quél.—Not uncommon in open woods.

auricoma (Batsch) Fr.—Forge Valley (F.F., 1944); Thornton-le-Dale (F.F., 1945).
cincinnata Fr.—Raincliffe Wood (G.M., C.R.); Cloughton (A.E.P., 1929); Thornton-le-Dale (F.F., 1945).
descissa Fr.—Forge Valley (F.F., 1944).
dulcamara (A. et S.) Fr.—Scarborough (G.M.).
eutheles Berk. et Br.—Seamer Quarry Plantation (A.E.P., 1912); Thornton-le-Dale (F.F., 1930 & 1945).
fastigiata (Schaeff.) Fr.—Forge Valley (G.M., F.F., 1944); Flixton Carr (A.E.P., 1910).
flocculosa Berk.—Ayton Road Plantation (A.E.P., 1911-12).
geophylla (Sow.) Fr.—Not uncommon in woods and under trees.
var. **lilacina** Fr.—Hackness (F.F., 1925); Thornton-le-Dale (F.C.R., 1945-46).
godeyi Gill.—Thornton-le-Dale (F.F., 1945); Beedale, etc. (A.E.P., 1922).
hystrix Fr.—Scarborough in beech wood (G.M., F.F., 1915); Goathland (T.B.M.S., 1931).
lanuginosa (Bull.) Fr.—Hackness (F.F., 1925-44); Wykeham (F.C.R., 1945).
maculata Boud.—Forge Valley (F.F., 1944).
mutica Fr. sensu Cooke—Hackness (F.F., 1925).
obscura (Pers.) Fr.—Oliver's Mount (A.E.P.); Forge Valley (F.F., 1944).
perbrevis Fr. sensu Cooke—Scarborough (G.M., " Grevillea ", XIII, p. 90), first British record. Cooke's Illust., pl. 519.
posterula (Britz.) Lange—Goathland (T.B.M.S., 1931).
pyriodora (Pers.) Fr.—Raincliffe Wood (G.M., C.R.); Forge Valley (F.F., 1944); Hackness (F.C.R., 1946).
var. **incarnata** (Bres.) Maire—Scarborough (G.M.).
rhodiola Bres.—Forge Valley (A.E.P. teste A.C., 1914), first Yorkshire and second British record).
scabella Fr. sensu Cooke—Fylingdales (T.B.R., 1914).

PAXILLUS Fries
atrotomentosus (Batsch) Fr.—Pickering (G.M.); Cloughton (F.C.R., 1946).
involutus (Batsch) Fr.—Very common in woods, especially conifer.
panuoides Fr.—Ganton and Seamer (A.E.P., 1913); Cloughton on sawdust (F.C.R., 1946).

STROPHARIA Fries
aeruginosa (Curt.) Fr.—Common in moist shady woods.
albo-cyanea (Desm.) Fr.—Scarborough (G.M.); Ellerburn (F.F., 1945).
coronilla (Bull.) Fr.—Scarborough (G.M., A.E.P., 1915); Forge Valley (F.F., 1944); Ellerburn (F.F., 1945).
hornemannii Fr.—Raincliffe Wood (G.M.).
hypsipus Fr. sensu Lange—Scarborough (G.M.); Kingthorpe (T.B.M.S., 1931).

inuncta Fr.—Scarborough (G.M., A.E.P., 1914).
merdaria Fr.—Scarborough (G.M.).
semi-globata (Batsch) Fr.—Common on dung.
squamosa (Pers.) Fr.—Not uncommon in woods.
var. **thrausta** Kalch.—Forge Valley, etc. (A.E.P., T.B.R.).

HYPHOLOMA Fries

candolleanum Fr.—Raincliffe Wood and Hackness (G.M., A.E.P., 1925).
capnoides Fr.—Not uncommon on conifer stumps.
dispersum Fr.—Scarborough (G.M.).
fasciculare (Huds.) Fr.—Widely distributed and very common.
hydrophilum (Bull.) Fr.—Not uncommon on stumps and sawdust.
lacrymabundum Fr. non Bull.—Scarborough (G.M., A.E.P.).
leucotephrum Berk. et Br.—Beedale and Yedmandale (A.E.P., 1912-33).
pyrotrichum (Holmsk.) Fr.—Raincliffe Wood (G.M., C.R., F.F., 1944).
radicosum Lange—Kingthorpe (T.B.M.S., 1931).
sublateritium Fr.—Not uncommon in woods, etc.
velutinum (Pers.) Fr.—Widely distributed and not uncommon.

PSILOCYBE Fries

bullacea (Bull.) Fr.—Scarborough (G.M.).
cernua (Vahl) Fr.—Irton (A.E.P., 1914); Hackness (F.C.R., 1946).
clivensis Berk. et Br.—Scarborough (G.M.).
coprophila (Bull.) Fr.—Hackness (G.M., F.C.R., 1945).
ericaea (Pers.) Fr.—Scarborough (G.M.); Flixton Carr (A.E.P., 1927).
foenisecii (Pers.) Fr.—Not uncommon on lawns, pastures, etc.
physaloides (Bull.) Lasch—Goathland (T.B.M.S.,1931).
sarcocephala Fr.—Forge Valley and Yedmandale (G.M., A.E.P., 1927); Kingthorpe (T.B.M.S., 1931).
semi-lanceata Fr.—Scarborough (G.M.).
var. **caerulescens** Cooke—Raincliffe Wood (A.E.P., 1910).
spadicea Fr.—Scarborough and Cloughton (G.M., A.C., A.E.P.).
sub-ericaea Fr.—Forge Valley (A.E.P., 1927, F.F., 1945).
uda (Pers.) Fr.—Raincliffe Wood (G.M., A.E.P.); Thornton-le-Dale (F.F., 1930 & 1945).

PSATHYRELLA Fries

atomata Fr.—Not uncommon among grass in open woods.
bifrons (Berk.) Smith, A. H.—Scarborough, rare (G.M.).
conopilea Fr.—Not uncommon among grass in rich soil.
crenata Lasch—Scarborough (G.M., A.E.P., 1915).
disseminata (Pers.) Fr.—Widely distributed and not uncommon.
fibrillosa (Pers. ex Fr.) Pears. et Denn.—Scarborough (G.M.); Goathland (T.B.M.S., 1931).
gracilis Fr.—Raincliffe Wood (A.E.P., C.R., 1918); Thornton-le-Dale (F.F., 1945).

var. **corrugis** (Pers.) Lange—Scarborough (G.M., A.E.P., 1911).
var. **vinosa** (Corda) Pears. et Denn.—Langdale End (A.E.P., 1927).
obtusata (Fr. sensu Lange) Smith, A. H.—Oliver's Mount (A.E.P., 1912).
pennata (Fr.) Pears. et Denn.—Spital Corner (A.E.P., 1927).
prona Fr.—Scarborough (G.M.); Seamer Carr (A.E.P., 1912).
semi-vestita (Berk.) Smith, A. H.—Massee, 1905, says this species is frequent in the Scarborough district, but it has not been recorded since.
spadicea-grisea (Schaeff. ex Fr.) Smith, A. H.—Raincliffe Wood (A.E.P., A.C., & F.F., 1944).
subatrata (Batsch) Fr.—Scarborough (G.M., F.C.R., 1946).

PANAEOLUS Fries
acuminatus (Schaeff.) Fr.—Thornton-le-Dale (F.F., 1945).
campanulatus (L.) Fr.—Widely distributed on dung.
var. **sphinctrinus** (Fr.) Bres.—Forge Valley (F.F., 1944-45).
fimicola Fr.—Scarborough (G.M., A.E.P., 1910).
papilionaceus (Bull.) Fr.—Forge Valley (G.M., & F.F., 1944).
retirugis Fr.—Hackness (G.M., A.E.P., 1911).
subbalteatus Berk. et Br.—Seamer (A.E.P., 1927).

ANELLARIA Karsten
fimiputris (Fr.) Karst.—Scarborough (G.M., A.E.P., 1912).
semi-ovata (Sow. ex Fr.) Pears et Denn.—Very common on dung in moist pastures.

PSALLIOTA Fries
arvensis (Schaeff.) Fr.—Common in pastures, etc.
augusta Fr.—Locally not uncommon; occasionally abundant.
campestris (L.) Fr.—Common in pastures.
comtula Fr.—Scarborough (G.M.); Wintringham (A.E.P., 1920).
elvensis Berk. et Br.—Raincliffe Wood, etc. (A.E.P., 1912); Scampston (F.C.R., 1946).
haemorrhoidaria Karst.—Seamer Carr (G.M., A.E.P.); Raincliffe Wood (C.R., 1918); Forge Valley (F.F., 1944).
hortensis Cooke—Scarborough (G.M., F.F., 1915).
russiophylla (Lasch) Fr.—Raincliffe Wood (C.R., 1918).
silvatica (Schaeff.) Fr.—Not uncommon in woods.
silvicola (Vitt.) Sacc.—Not uncommon in woods.
villatica Brond. sensu Bres.—Seamer, Staxton, etc. (A.E.P.); Thornton-le-Dale (F.F., 1945).
xanthoderma Gen.—Brompton Dale (A.E.P., 1927); Kingthorpe (T.B.M.S., 1931); Forge Valley (F.F., 1944).
var. **obscurata** Maire—Ayton (A.A.P., F.F., 1944), first British record.

COPRINUS Fries
atramentarius (Bull.) Fr.—Common about old stumps.
cinereus (Schaeff.) Fr.—Raincliffe Wood (A.E.P.); Hackness (F.F., 1925); Thornton-le-Dale (F.F., 1945).

comatus (Fl. Dan.) Fr.—Common.
domesticus (Pers.) Fr.—Scarborough (G.M., A.E.P., 1912).
ephemerus (Bull.) Fr.—Massee (1905) says, "Frequent on dung-hills", but recorded only at the 1915 F.F.
fuscescens (Schaeff.) Fr.—Scarborough (F.F., 1915).
lagopus Fr.—Forge Valley (G.M., F.F., 1944); Kingthorpe T.B.M.S., 1931).
micaceus (Bull.) Fr.—Very common about old stumps.
niveus (Pers.) Fr.—Not uncommon on horse dung.
ovatus (Schaeff.) Fr.—Scarborough (G.M.).
picaceus (Bull.) Fr.—Hackness (G.M., A.E.P., 1910); Raincliffe Wood (F.C.R., 1947).
plicatilis (Curt.) Fr.—Numerous records.
radians (Desm.) Fr.—Scarborough on damp wall (G.M.).
radiatus (Bolt.) Fr.—Massee (1905) says, "Very common on horse dung", but recorded only once since, Filey (Nat., Oct., 1922).
stercorarius (Bull.) Fr.—Scarborough (G.M.).
sterquilinus Fr.—Scarborough (G.M.).

GOMPHIDIUS Fries
glutinosus (Schaeff.) Fr.—Scarborough (G.M.).
gracilis Berk. et Br.—Irton Moor (C.C., 1910); Raincliffe Wood (G.M. & A.E.P., 1910); Wykeham (F.C.R., 1946).
maculatus (Scop.) Fr.—Scarborough (G.M.).
roseus Fr.—Irton Moor (A.C., 1910); Thornton-le-Dale (F.F., 1945).
rutilus (Schaeff.) Fr.—Numerous records.

BOLETALES

PORPHYRELLUS Gilbert
porphyrosporus (Fr.) Gilb.—Pickering (G.M., 1892); Beedale (A.C., 1911).

GYROPORUS Quélet
castaneus (Bull.) Quél., as **Boletus fulvidus**—Scarborough (G.M.); Hackness (F.F., 1925).

PHYLLOPORUS Quélet
rhodoxanthus (Schwein.) Bres. (= **Paxillus paradoxus**)—Scarborough (G.M.), first British record, see Cooke's plate 884; Beedale (T.B.R., 1911).

BOLETUS Dillenius ex Fries
appendiculatus (Schaeff.) Fr., as the pale form of **B. aestivalis**—Beedale (A.E.P., 1910).
badius Fr.—Common in woods.
bovinus (L.) Fr.—Common near pines.
chrysenteron (Bull.) Fr.—Common in mixed woods.
cramesinus Secr.—Forge Valley (G.M.).

duriusculus Schulz—Scarborough (G.M.) ; Goathland (T.B.M.S., 1931).
edulis (Bull.) Fr.—Common in woods, particularly beech.
elegans (Schum.) Fr.—Common in larch woods.
erythropus Fr. non Pers.—Thornton-le-Dale (F.F., 1945).
felleus (Bull.) Fr.—Scarborough (G.M.); Beedale (A.E.P., 1910).
flavidus Fr.—Seamer Moor (G.M., F.F., 1915); Hackness (A.E.P., 1910).
fragrans Vitt.—Raincliffe Wood (T.B.R., 1911).
granulatus (L.) Fr.—Irton (G.M., A.E.P., 1910); Scampston (F.C.R., 1946).
impolitus Fr.—Scarborough (G.M., F.F., 1915).
luridus (Schaeff.) Fr.—Widely distributed and not uncommon.
luteus (L.) Fr.—Not uncommon about conifers.
parasiticus (Bull.) Fr.—Scarborough on **Scleroderma verrucosum** (G.M.).
piperatus (L.) Fr.—Not uncommon in woods, etc.
rubinus Smith, W. G.—Scarborough (G.M.).
satanus Lenz—Raincliffe Wood (G.M.).
scaber (Bull.) Krombh.—Locally not uncommon.
subtomentosus (Schaeff.) Fr.—Not uncommon in mixed woods.
sulphureus Fr.—Hackness (G.M., 1897).
tridentinus Bres.—Scarborough (G.M.); Wintringham (F.C.R., 1946).
variegatus (Swartz) Fr.—Not uncommon in conifer woods and among heather.
versipellis Fr.—Scarborough (G.M.); Wykeham Moor (F.C.R., 1946).
viscidus (L.) Fr.—Not uncommon under larch.

GASTEROMYCETALES

PHALLACEAE

MUTINUS Fries
caninus (Huds. ex Fr.) Fr.—Numerous records.

PHALLUS (Micheli) Persoon
impudicus L. ex Pers.—Common, especially in coniferous woods.
var. **togatus** (Kalchbr.) Cost. et Duf.—Beedale, not uncommon (F.F., 1915).

LYCOPERDACEAE

LYCOPERDON (Tournefort) Persoon
caelatum Bull. ex Fr.—Frequent.
depressum Bon.—Forge Valley (F.F., 1944).
echinatum Pers.—Scarborough (G.M.); Silpho Moor, not uncommon (F.C.R.).

giganteum Batsch ex Pers.—Not uncommon; a specimen found in 1934 was 16 ins. high and 60 ins. in circumference.
molle Pers.—Forge Valley (F.F., 1915).
perlatum Pers. (= **L. gemmatum**)—Locally common.
polymorphum Vitt.—Levisham, on cinders of railway track (A.E.P. & F.A.M., 1929); Ayton, in pasture (A.E.P., 1920).

BOVISTA (Dillenius) Morgan
nigrescens Pers.—Occasional.
plumbea Pers.—Suffield (T.B.R., 1913); Forge Valley (F.F., 1944).

GEASTER (Micheli) Fries
rufescens Pers.—Boynton (W.W.S., Nat., July, 1889).

NIDULARIACEAE

NIDULARIA (Fries) Tulasne
pisiformis (Roth) Tul.—Scarborough on rotten leaves (G.M.).

CRUCIBULUM Tulasne
vulgare Tul.—Locally abundant on twigs, sacking, etc.

CYATHUS Haller
olla Pers.—Scarborough on manure (T.B.R., 1912); Hackness on sawdust (F.C.R., 1945).
striatus Pers.—Scarborough (G.M.); Raincliffe Wood (T.B.R., 1910); Seamer (A.E.P., 1925).

SCLERODERMATACEAE

MELANOGASTER Corda
variegatus (Vitt.) Tul.—Scarborough under beech (G.M.).
ambiguus (Vitt.) Tul.—Boynton (W.W.S., Nat., July, 1889).

SCLERODERMA Persoon
aurantium Pers.—Raincliffe Wood (A.E.P., 1910); Thornton-le-Dale (F.F., 1945).
cepa Vaill. ex Pers.—Thornton-le-Dale (F.C.R., 1945).
geaster Fr.—Scarborough (G.M.).
verrucosum Vaill. ex Pers.—Scarborough (G.M.); Thornton-le-Dale (F.F., 1945).

CALOSTOMATACEAE

ASTRAEUS Morgan
hygrometricus (Pers.) Morg.—Seamer Quarry Plantation (A.E.P., 1910-13); Staxton Brow (A.E.P., 1915).

SPHAEROBOLACEAE

SPHAEROBOLUS Tode ex Persoon
stellatus Tode ex Pers.—Common on sawdust, etc.

A COMMON PUFFBALL (*Lycoperdon perlatum* Pers.)

Photograph : A F Peck

facing page 150

COELOMYCETES

SPHAEROPSIDALES

SPHAERIOIDACEAE

PHYLLOSTICTA Persoon ex Desmazières

berberidis Rabenh.—Scarborough on **B. vulgaris** (M. & C.).
hedericola Dur. et Mont.—Ellerburn on **Hedera** (F.A.M., 1922).
lappae Sacc.—Scarborough on **Arctium** (M. & C.).
lauri West.—Scarborough on **Laurus nobilis** leaves (G.M.).
rosae Rob. et Desm.—Scarborough on **Rosa canina** leaves (G.M.), a doubtful record, cf. Grove, I, p. 42.

PHOMA Fries emend. Desmazières

acicola (Lèv.) Sacc.—Howldale on **Pinus** leaves (W.G.B., 1947).
acuta (Berk.) Fuckel—Seamer on dead **Urtica** stems (A.E.P., 1925).
araucariae Trav.—Fylingdale Hall on **A. imbricata** (T.B.R., 1913).
complanata (Tode ex Fr.) Desm.—Kingthorpe, etc., on dead umbelliferous stems (F.F., 1946); Ellerburn on **Angelica** (Nottm., 1214-5).
herbarum West.—A collective species reported on many hosts and in many localities.
lingam (Tode ex Fr.) Desm.—Scarborough on old cabbage stems (G.M.).
macrocapsa Trail—Ellerburn on old **Mercurialis** stems (F.F., 1946).
nebulosa (Pers. ex Fr.) Berk.—Scarborough on dead **Urtica** stems (G.M.).
samararum Desm.—Common on fruits (samaras) of **Fraxinus** (G.M.).
urticae Sch. et Sacc.—Kingthorpe on **Urtica** (F.F., 1946).

NEOTTIOSPORA Desemazières

caricum Desm.—Scarborough on **Carex rostrata** (G.M.).

APOSPHAERIA Berkeley

fibricola (Berk.) Sacc.—Scarborough on wood (G.M.).

SCLEROPHOMA von Hoehnel

pithyophila von Hoehn.—Ellerburn on **Abies** leaves (Nottm., 1106).

SPHAERONAEMA Fries

aemulans Berk. et Br.—Scarborough on dead wood (G.M.).
subulatum Tode ex Fr.—Scarborough on **Russula nigricans** (G.M.). Although recorded as **Eleutheromyces subulatus,** Petch (T.B.M.S., 26, p. 561), found all accessible British collections under that name to be pycnidial and so referable to **Sphaeronaema.** The Scarborough collection has not been preserved, but we are referring it to **Sphaeronaema** in the meantime.

PHOMOPSIS Saccardo

asteriscus (Berk.) Grove.—Scarborough on dead **Heracleum sphondylium** (G.M.).
crustosa (Bomm., Rouss et Sacc.) Trav.—Robin Hood's Bay on **Ilex** (W.G.B., York, 1946).

scobina (Cooke) von Hoehn.—Scarborough on **Fraxinus** leaves (G.M.).
velata (Sacc.) von Hoehn.—Scarborough on **Tilia** (G.M.).

CYTOSPORA Ehrenberg ex Fries
foliicola Lib.—Scarborough on **Escallonia** (W.G.B., 1945).
laurocerasi Fuckel—Scarborough on **P. laurocerasus** (W.G.B., York, 1945).
nivea Fuckel—Scarborough on **Populus serotina** (G.M.).
rosarum Grev.—Scarborough on **Rosa canina** (G.M.).

CEUTHOSPORA Fries
laurocerasi Grove—Scarborough on **P. laurocerasus** (G.M., 1881).

DARLUCA Castagne
filum (Biv. et Bern.) Cast.—Throxenby Mere on sori of **Puccinia calthae** (T.B.R., 1911); Thornton-le-Dale (F.F., 1945).

STAGONOSPORA Saccardo
macropus (Berk. et Br.) Sacc.—Scarborough on **Carex** (M. & C.).

SEPTORIA Saccardo
hederae Desm.—Ellerburn on **Hedera** (F.A.M., 1922).
apii (Br. et Cav.) Chest.—Scarborough on **Apium** (T.B.R., 1916).
rubi West.—Scarborough on **R. fruticosus** (G.M.).
virgaureae Desm.—Scarborough on **Solidago virgaurea** (M. & C.).

DILOPHOSPORA Desmazières
alopecuri (Fr.) Fr.—Robin Hood's Bay on **Holcus** (W.G.B., 1946).

SPHAEROPSIS Saccardo
malorum Peck—Thornton-le-Dale (F.A.M., 1922), possibly an error for **S. malorum** Berk.

DIPLODIA Fries
hederae Fuckel—Scarborough on **Hedera** (G.M.).
herbarum (Corda) Lév.—Scarborough on **Urtica** (G.M., 1881).
ligustri West.—Scarborough on **L. vulgare** (G.M.).
malorum Fuckel—Scarborough on fallen apples (G.M.).
taxi (Sow. ex Fr.) de Not.—Scarborough on **T. baccata** (G.M.).
tiliae Fuckel—Scarborough on **Tilia** twigs (G.M.).

EXCIPULACEAE

DINEMASPORIUM Léveillé
graminum Lév.—Scarborough on grass (G.M.).

EXCIPULA Fries
petiolicola Fuckel—Scarborough on petioles of **Tilia**; considered by Grove to be a doubtful record.

LEPTOSTROMATACEAE

THYRIOSTROMA Diedecke
spiraeae (Fr.) Died.—Scarborough on dead **Filipendula ulmaria** (G.M., 1881).

LEPTOSTROMA Fries
spiraeinum Vest.—Ellerburn on **Filipendula ulmaria** (Nottm., 1102).

MELANCONIALES

HYALOSPERMAE

COLLETOTRICHUM Corda

[**lycopersici** Chest.—Whitby on potato haulms (F.F., 1900), first European record.]

lindemuthianum (Sacc. et Magn.) Bri. et Cav.—Occasionally a destructive parasite on runner beans.

MYXOSPORIUM Link

croceum Pers. ex Link—Scarborough on **Fagus** (G.M., 1881).

ACTINONEMA Fries

rosae (Lib.) Fr.—Not uncommon on cultivated and wild roses.

MARSSONINA Magnus

populi (Lib.) Magn.—Scarborough on living **Populus** leaves (M. & C.).

PHAEOSPERMAE

MELANCONIUM Link

bicolor Nees ex Link—Scarborough on **Corylus** bark (G.M.).

STILBOSPORA Persoon ex Link

macrosperma Pers.—Scarborough on **Quercus** (M. & C.).

CORYNEUM Nees ex Link

compactum Berk. et Br.—Scarborough on **Ulmus** (G.M.).

kunzei Corda—Scarborough on **Quercus** (G.M.).

ASTEROSPORIUM Kunze ex Wallroth

hoffmanni Kunze—Scarborough (G.M., 1881); Thornton-le-Dale and Forge Valley (F.F., 1946), all on **Fagus.**

STEGANOSPORIUM Corda

cellulosum Corda—Scarborough on **Tilia** bark (M. & C.).

pyriforme (Hoffm. ex Fr.) Corda—Thornton-le-Dale on **Acer** (F.F., 1945).

HYPHOMYCETES

GLOIOSPORAE — AMEROSPORAE

ACROSTALAGMUS Corda

cinnabarinus Corda—See **Nectria inventa.**

AMBLYOSPORIUM Fresenius

botrytis Fres., as **Rhinotrichum aureum**—On old agarics ; Scarborough (G.M.).

CEPHALOSPORIUM Corda

acremonium Corda—On stems of **Rubus, Heracleum,** etc.; Scarborough (G.M.). On dead **Abies** leaves; Ellerburn (Nottm., 1114).

CORETHROPSIS Corda

epimyces Mass.—On old **Mycena;** Scarborough (G.M.).

paradoxa Corda—On old shoe; Scarborough (G.M.).

GLIOCLADIUM Corda

album (Preuss) Petch—On **Badhamia;** Howldale, 1947 (I.M.I., 14007).

penicillioides Corda—See **Nectriopsis aureonitens.**

GLIOMASTIX Guéguen

luzulae (Fuckel) Mason comb. nov. (= **Torula luzulae** Fuckel, **Fusidium viride** Grove)—On **Petasites;** Forge Valley, 1945 (I.M.I., 1537), 1946 (I.M.I., 7032).

GONYTRICHUM Nees ex Wallroth

caesium Nees ex Wallr.—See **Melanopsammella inaequalis.**

GRAPHIUM Corda

glaucocephalum (Corda) Sacc.—Boynton (W.W.S., Nat., July, 1889).

subulatum (Nees ex Fr.) Sacc.—On old wood; Scarborough (M. & C.).

rigidum (Pers. ex Fr.) Sacc.—Boynton (W.W.S., Nat., July, 1889).

HAPLOGRAPHIUM Berkeley et Broome

bicolor Grove (= **H. delicatum** Berk. et Br.)—See **Hyaloscypha dematiicola.**

MENISPORA Persoon ex Chevallier

ciliata Corda—On **Betula;** Forge Valley, 1946 (I.M.I., 7330). On **Quercus;** Forge Valley, 1947 (I.M.I., 14484). On **Rosa;** Forge Valley, 1948 (Hull, 591).

tortuosa (Corda) Peyr.—On **Fagus;** Kingthorpe, 1946 (I.M.I., 31305); Howldale, 1947 (I.M.I., 13929a, Hull, 117). On **Fraxinus;** Kingthorpe, 1945 (I.M.I., 1358). On wood; Howldale, 1947 (I.M.I., 14485).

OOSPORA Wallroth

candidula Sacc.—On **Nectria cinnabarina** on **Ulmus;** Forge Valley, 1945 (I.M.I., 1384).

SARCOPODIUM Ehrenberg ex Wallroth

circinatum Ehrenb. ex Fr. (= **Volutella gilva** (Pers. ex Fr.) Sacc.) —On **Arctium;** Howldale, 1946 (I.M.I., 4903).

SPOROCYBE Fries emend. Bonorden

flexuosa (Mass.) Mason—On **Betula;** Forge Valley, 1946 (I.M.I., 7278), 1947 (I.M.I., 14011, 13831c). On **Quercus;** Howldale, 1946 (I.M.I., 4975a), 1947 (I.M.I., 13818). On **Sorbus;** Howldale, 1947 (I.M.I., 13817a).

STACHYLIDIUM Link ex Fries

bicolor Link ex Fr.—On **Heracleum;** Forge Valley, 1945 (I.M.I., 1375a), 1946 (I.M.I., 7335, Hull 33). On **Petasites;** Dalby Dale, 1945 (I.M.I., 1372). On **Pteris;** Forge Valley, 1946 (I.M.I., 6850). On **Betula;** Howldale (Nottm., 1128).

cyclosporum Grove—On **Betula;** Forge Valley, 1947 (Hull, 109). On **Sambucus;** Howldale, 1947 (I.M.I., 14487). On wood; Forge Valley, 1947 (I.M.I., 14020).

STILBUM Tode ex Fries

erythrocephalum Ditm. ex Fr.—On dung; Scarborough (Grev., 1888, p. 9).

fimetarium (Pers. ex Fr.) Berk. et Br.—On dung; Scarborough (Grev., 1888, p. 9).

pellucidum Schrad. ex Fr.—Scarborough (A.E.P., 1923), no host stated.

tomentosum Schrad. ex Fr. var. **ovalisporum** A. L. Sm. (= **Tilachlidium**)—On **Trichia;** Howldale, 1947 (I.M.I., 14029); Scarborough (G.M.).

TRICHODERMA Persoon ex Fries

viride Pers. ex Fr.—See **Hypocrea rufa.**

TUBERCULARIA Tode ex Fries

vulgaris Tode ex Fr.—See **Nectria cinnabarina.**

VERTICILLIUM Nees ex Wallroth

apicale Berk. et Br. (= **Verticicladium**)—On **Fagus;** Howldale, 1947 (I.M.I., 13928b, 14456, 13904a).

epimyces Berk. et Br.—On decaying fungi; Scarborough (G.M.).

VOLUTELLA Tode ex Fries

ciliata Fr.—On rotten leaves; Scarborough (G.M.).

GLOIOSPORAE — ENDOSPORAE

SPORENDONEMA Desmazières ex Fries

casei Desm. ex Fr.—On cheese; Scarborough (G.M.).

SPOROSCHISMA Berkeley et Broome

juvenile Boud.—On **Fagus;** Howldale, 1947 (I.M.I., 13815a). On **Sorbus;** Howldale, 1946 (I.M.I., 4943b, Hull, 434), 1947 (I.M.I., 13816a).

mirabile Berk. et Br.—On **Sorbus;** Howldale, 1946 (I.M.I., 4908), 1947 (I.M.I., 14486). On **Fraxinus;** Ellerburn (Nottm., 1105).

THIELAVIOPSIS Went

basicola (Berk. et Br.) Ferr.—On **Blysmus compressus** (G.M.).

GLOIOSPORAE—PHRAGMOSPORAE

FUSARIUM Link ex Fries

caeruleum (Lib.) Sacc.—Common on stored potatoes.

heterosporum Nees ex Fr.—On **Poa annua** and **Arrhenatherum elatius;** Wykeham (F.F., 1945).

merismoides Corda—On **Beta vulgaris;** Scarborough (M. & C.).

MASTIGOSPORIUM Riess

rubricosum (Dearn. et Barth.) Sprague, R.—recorded incorrectly as **M. album** Reiss—On **Dactylis** ; Thornton-le-Dale (F.F., 1945).

MICROCERA Desmazières

coccophila Desm.—On **Chionaspis salicis** on **Salix;** Scarborough (G.M.). Petch (T.B.M.S., XVII, p. 177), considers this record doubtful.

GLOIOSPORAE — SPEIROSPORAE

CHEIROMYCELLA von Hoehnel

gyrosa (Cooke et Mass.) Mason et Hughes comb. nov. (= **Torula gyrosa** Cooke et Mass.)—On conifer; Howldale, 1947 (I.M.I., 14017).

XEROSPORAE — AMEROSPORAE

AEGERITA Persoon ex Fries

candida Pers. ex Fr.—See **Peniophora candida.**

ARTHRINIUM Kunze ex Fries

sporophleum Kunze ex Fr.—On **Carex hirta;** Ellerburn (Nottm., 1095).

ASPERGILLUS Micheli ex Fries

candidus Link ex Fr.—Scarborough (G.M.).

BOTRYOSPORIUM Corda

pulchrum Corda—On **Urtica;** Kingthorpe, 1945 (I.M.I., 1359).

BOTRYTIS Persoon ex Fries

argillacea Cooke—On **Fagus;** Kingthorpe, 1946 (I.M.I., 4926, 4910). On **Hypoxylon coccineum** on **Fagus;** Howldale, 1947 (I.M.I., 19713).

cinerea Pers. ex. Fr.—On **Pinus;** Kingthorpe, 1946 (I.M.I., 4929). On inside of bark; Howldale, 1947 (I.M.I., 14519).

CHAETOPSIS Greville ex Corda

wauchii Grev. (Auct. as **C. grisea** (Ehrenb. ex Fr.) Sacc.)—On **Fagus;** Howldale, 1947 (I.M.I., 14461, 13928, 13929). On **Fraxinus;** Forge Valley, 1947 (I.M.I., 14460), Howldale, 1947 (I.M.I., 14024b, Hull, 122). On **Ulmus;** Thornton-le-Dale, 1946 (I.M.I., 4901).

CYLINDRIUM Bonorden

flavovirens (Ditm. ex Fr.) Bon.—On dead **Quercus** leaves; Scarborough (G.M.).

GEOTRICHUM Link ex Saccardo

candidum Link ex Sacc.—On damp paper; Scarborough Museum (T.B.R., 1914).

GONATOBOTRYS Corda

simplex Corda—On old perithecia of **Valsa** on **Crataegus;** Scarborough (G.M.).

HAPLARIA Link ex Chevallier

grisea Link ex Chev.—On rotten wood; Thornton-le-Dale, 1946 (I.M.I., 5099).

HYMENOSTILBE Petch
muscaria Petch—On flies; Goathland (T.P., T.B.M.S., XVII, p. 176).

ISARIA Persoon ex Fries
albida (Fr.) Sacc.—On rotten wood; Scarborough (G.M.).
farinosa Fr.—Common on dead pupae of various insects, especially those buried under dead leaves.
intricata Fr.—On dead **Stereum;** Scarborough (G.M.).
umbrina Pers. ex Wallr.—On **Fagus;** Howldale, 1947 (I.M.I., 14105).

MONILIA Persoon ex Fries
candicans Sacc.—See **Corticium subcoronatum.**
cinerea Bon.—See **Sclerotinia laxa.**
fructigena Pers. ex West.—See **Sclerotinia fructigena.**

MONOTOSPORA Saccardo
megalospora Berk. et Br.—On **Taxus;** Scarborough (G.M.).
pumila (Mass.) Sacc.—See **Farlowiella carmichaeliana.**

NEMATOGONIUM Desmazières
aurantiacum Desm.—On bark; Boynton (W.W.S., Nat., July, 1889).

OIDIUM Link ex Fries
aureum Link ex Fr. (= **Monilia aurea** Gmel.)—On **Fagus;** Thornton-le-Dale, 1945 (I.M.I., 1371). On **Fraxinus;** Kingthorpe, 1946 (I.M.I., 4916). On **Quercus;** Kingthorpe, 1946 (I.M.I., 4921). On **Sorbus;** Howldale, 1946 (I.M.I., 4919).

OVULARIA Saccardo
bistortae (Fuckel) Sacc.—Thornton-le-Dale (F.F., 1945).
obliqua (Cooke) Oud.—On **Rumex;** Kingthorpe, 1946 (I.M.I., 5059).

PERICONIA Bonorden
byssoides Pers. ex Fr. (= **P. pycnospora** Fres.)—On **Aesculus;** Kingthorpe, 1946 (I.M.I., 9725). On **Convolvulus;** Thornton-le-Dale, 1946 (I.M.I., 9728). On **Petasites;** Forge Valley, 1946 (I.M.I., 6987). On **Urtica;** Thornton-le-Dale, 1946 (I.M.I., 9724).
curta (Berk.) Mason et Ellis, M. B. comb. nov. (= **Cephalotrichum curtum** Berk.)—On **Juncus;** Kingthorpe, 1946 (I.M.I., 9756).
nigrella (Berk.) Sacc.—Boynton (W.W.S., Nat., July, 1889).

PHAEOISARIA von Hoehnel
clavulata (Grove) Mason et Hughes comb. nov. (= **Pachnocybe clavulata** Grove)—On wood; Kingthorpe, 1945 (I.M.I., 1535).
cornui (Bain.) Mason—On **Sambucus;** Thornton-le-Dale, 1946 (I.M.I., 4914), 1947 (I.M.I., 14517).

RHINOTRICHUM Corda
repens Preuss—On rotten wood; Scarborough (G.M.), a presumed synonym of **Acladium conspersum** Link (**Oidium conspersum** (Link) Lind.).

RHOPALOMYCES Corda
candidus Berk. et Br.—On rotten leaves; Scarborough (G.M.).

SEPEDONIUM Link ex Fries
chrysospermum Fr.—See **Apiocrea chrysosperma.**
STYSANUS Corda
stemonites (Pers. ex Fr.) Corda—On dead leaves; Scarborough (G.M.).
TORULA Persoon ex Fries
gyrosa Cooke et Mass.—See **Cheiromycella gyrosa.**
herbarum Link ex Fr.—Numerous records on many hosts.
hysterioides Corda—See **Cryptocoryneum condensatum.**
ovalispora Berk.—Numerous records on many hosts.
pulveracea Corda—On dead wood; Scarborough (G.M.).
TRICHOSPORIUM Fries
fuscum (Link ex Wallr.) Sacc.—Filey (T.B.R., Nat., 1914, p. 253).
inosculans (Berk.) Sacc.—On dead **Thelephora;** Scarborough (G.M.).
XYLOHYPHA (Fries) Mason comb. nov.
nigrescens (Pers. ex Fr.) Mason—On **Fraxinus;** Ellers Wood (Nottm., 1070).
ZYGODESMUS Corda
fuscus Corda—On rotten wood; Scarborough (G.M.).

XEROSPORAE — DIDYMOSPORAE

ARTHROBOTRYS Corda
rosea Mass.—On rotten wood; Scarborough (G.M.).
BISPORA Corda
antennata (Pers. ex Fr.) Mason comb. nov. (= **Torula antennata** Pers., **B. monilioides** Corda)—On rotten wood; Scarborough (G.M.).
CLADOSPORIUM Link ex Fries
epiphyllum Nees ex Fr.—On leaves; Scarborough (G.M.), probably **C. herbarum.**
herbarum Link ex Fr.—A very common mould.
DIPLOCLADIUM Bonorden
penicillioides Sacc.—See **Hypomyces aurantius.**
DIPLORHINOTRICHUM von Hoehnel
candidulum von Hoehn.—On **Fraxinus;** Howldale, 1947 (I.M.I., 13926). On **Sorbus;** Howldale, 1947 (I.M.I., 13817b).
POLYTHRINCIUM Kunze et Schmidt ex Fries
trifolii Kunze ex Fr.—See **Dothidella trifolii.**
TRICHOTHECIUM Link ex Fries
roseum Link ex Fr.—Numerous records.

XEROSPORAE — PHRAGMOSPORAE

ACROTHECIUM Corda
delicatulum Berk. et Br.—On **Acer;** Forge Valley, 1947 (I.M.I., 14013). On **Fraxinus;** Thornton-le-Dale, 1947 (I.M.I., 14016a).

PHRAGMOCEPHALA Mason et Hughes

cookei Mas. et Hughes (=**Arthrobotryum atrum** Berk. et Br.)—On **Filipendula ulmariae**; Forge Valley, 1946 (I.M.I., 7049). On wood (**Alnus**) ; Forge Valley, 1947 (I.M.I., 14480).

BACTRIDIUM Kunze ex Fries

flavum Kunze ex Fr.—On **Sorbus**; Howldale, 1947 (Hull, 134).

BACTRODESMIUM Cooke

abruptum (Berk. et Br.) Mason et Hughes comb. nov. (= **Clasterosporium abruptum** (Berk. et Br.) Sacc.)—On **Acer**; Forge Valley, 1946 (I.M.I., 6843a).

fasciculare (Corda) Mason et Hughes comb. nov. (=**Clasterosporium fasciculare** (Corda) Sacc.)—On **Fraxinus**; Howldale, 1947 (I.M.I., 14014).

BRACHYSPORIUM Saccardo

apicale (Berk. et Br.) Sacc.—On **Fraxinus**; Howldale, 1947 (I.M.I., 13918a).

bloxami (Cooke) Sacc.—On **Betula**; Forge Valley, 1947 (I.M.I., 13827b). On **Fraxinus**; Howldale (F.F., 1947).

hyalospermum (Corda) Sacc.—See **Helminthosporium hyalospermum.**

obovatum (Berk.) Sacc.—On **Sambucus**; Thornton-le-Dale, 1947 (I.M.I., 14473). On **Fraxinus**; Forge Valley (F.F., 1947), Oliver's Mount, 1948 (Hull, 547).

oosporum (Corda) Sacc.—On **Lonicera**; Boynton, 1880 (W.W.S.). A doubtful record, as the only British material seen under this name is conidial **Chaetosphaeria phaeostroma** (E.W.M.).

CERCOSPORA Fresenius

mercurialis Pass.—On **Mercurialis**; Thornton-le-Dale, 1946 (I.M.I., 9756), Scarborough (G.M.).

CLASTEROSPORIUM Schweinitz

abruptum (Berk. et Br.) Sacc.—See **Bactrodesmium abruptum.**

fasciculare (Corda) Sacc.—See Bactrodesmium fasciculare.

opacum (Corda) Sacc.—On **Fraxinus**; Kingthorpe, 1945 (I.M.I., 1355b), Howldale, 1947 (I.M.I., 14486). The material is the same as British material previously referred to this name and is a **Bactrodesmium** (E.W.M.).

DENDRYPHION Wallroth

comosum Wallr. (= **D. curtum** Berk. et Br.)—On **Sambucus**; Kingthorpe, 1945 (I.M.I., 1352). On **Urtica**; Scarborough (G.M.), Thornton-le-Dale, 1946 (I.M.I., 4909, 4925).

griseum Berk. et Br.—On **Urtica**; Thornton-le-Dale, 1946 (I.M.I., 4911), Howldale, 1947 (I.M.I., 13813).

laxum Berk. et Br. (= **D. rhopaloides** (Fres.) Berl.)—On **Acer**; Thornton-le-Dale, 1945 (I.M.I., 1374). On **Arctium**; Thornton-le-Dale, 1946 (I.M.I., 4902). On sacking; Forge Valley, 1947 (I.M.I., 13767b).

EXOSPORIUM Link ex Wallroth

hysterioides (Corda) von Hoehn.—See **Cryptocoryneum condensatum.**

tiliae (Link ex Wallr.) Fr.—On **Tilia;** Forge Valley, 1946 (I.M.I., 6787), 1947 (I.M.I., 13763).

HELMINTHOSPORIUM Link ex Fries

apiculatum Corda—On **Fagus;** Kingthorpe, 1930 (I.M.I., 695), 1946 (I.M.I., 4891). On **Quercus;** Howldale, 1946 (I.M.I., 4895), Kingthorpe, 1946 (I.M.I., 4952). On **Sorbus;** Howldale, 1946 (I.M.I., 4897, 4896, 17485, 17486; Hull, 126). On **Ulmus;** (Nottm., 1186). On wood; Kingthorpe, 1945 (I.M.I., 1357), 1946 (I.M.I., 4890), Howldale, 1947 (I.M.I., 14025b).
At the 1945-46 F.F., **H. apiculatum** was included with **H. simplex** as **H. fusisporium.**

folliculatum Corda—On rotten wood; Scarborough (G.M.). British collections previously referred to this species are **Dendryphion laxum** (E.W.M.).

hyalospermum Corda (= **Brachysporium hyalospermum** (Corda) Sacc.)—On **Betula;** Forge Valley, 1947 (I.M.I., 13832b).

longipilum Corda—See **Melanomma subdispersum.**

rhopaloides Fres.—See **Dendryphion laxum.**

simplex Kunze ex Fr.—On **Acer;** Forge Valley, 1946 (I.M.I., 7044). On **Corylus;** Forge Valley, 1945 (I.M.I., 1376), Howldale, 1947 (I.M.I., 14881). On **Crataegus;** Kingthorpe, 1945 (I.M.I., 1353). On **Fagus;** Howldale, 1946 (I.M.I., 4893), Kingthorpe, 1946 (I.M.I., 4889). On **Fraxinus;** Kingthorpe, 1946 (I.M.I., 4888), Howldale, 1947 (I.M.I., 14015, 13819, 14481, Hull, 130). On **Quercus;** Howldale, 1946 (I.M.I., 4894). On **Ulnus;** Howldale, 1947 (I.M.I., 14006). On **Tilia;** Forge Valley, 1947 (Hull, 112). Was recorded as **H. fusisporium** at the F.F., 1945-46.

turbinatum Berk. et Br.—See **Podoconis turbinata.**

velutinum Link ex Fr.—Numerous records on many hosts; also recorded as **H. macrocarpum.**

DACTYLOSPORIUM Harz

macropus (Corda) Harz (=**Helminthosporium tingens** Cooke)—On **Acer** ; Forge Valley, 1946 (I.M.I., 7014a, Nat., 1952, p. 64).

HETEROSPORIUM Klotzsch ex Cooke

echinulatum (Berk.) Cooke—See **Didymellina dianthi.**

MUCROSPORIUM Preuss

sphaerocephalum (Berk.) Sacc.—On dead wood; Scarborough (G.M.).

PODOCONIS Boedijn

turbinata (Berk. et Br.) Mason et Hughes comb. nov. (= **Helminthosporium turbinatum** Berk. et Br.)—On **Sambucus;** Howldale, 1947 (I.M.I., 13809).

RAMULARIA (Unger) Corda
armoraciae Fuckel—On living leaves of **Cochlearia;** Scarborough (G.M.).
hellebori Fuckel—On **H. viridis;** Ayton (G.M.).
lychnicola Cooke—On living **Lychnis** leaves; Scarborough (G.M.).
primulae Thuem—On **Primula;** Filey (T.B.R., Nat., 1914, p. 253).
urticae Ces.—On **Urtica;** Thornton-le-Dale, 1946 (I.M.I., 4900).

SEPTOCYLINDRIUM Bonorden
pallidum Grove—On **Diatrype stigma** on **Acer;** Forge Valley, 1947 (I.M.I., 13966c), Thornton-le-Dale, 1947 (I.M.I., 13789). On **Fraxinus;** Thornton-le-Dale, 1947 (I.M.I., 14016b).

XEROSPORAE — SPEIROSPORAE

CRYPTOCORYNEUM Fuckel
condensatum (Wallr.) Mason et Hughes comb. nov. (= **Hormiscium condensatum** Wallr., **Torula hysterioides** Corda, **Exosporium hysterioides** (Corda) von Hoehn., **Cryptocoryneum hysterioides** (Corda) Peyr.)—On **Betula;** Howldale 1947 (I.M.I., 14023). On **Fraxinus;** Forge Valley, 1947 (I.M.I., 14008); Howldale, 1947 (I.M.I., 13906). On **Sorbus;** Howldale, 1947 (I.M.I., 13834).

SPEIRA Corda
toruloides Corda (=**Dictyosporium toruloides** (Corda) Guég.)—On **Acer;** Howldale, 1947 (I.M.I., 14012). On **Betula;** Forge Valley, 1947 (I.M.I., 13832d). On **Fagus;** Howldale, 1947 (I.M.I., 14465).

XEROSPORAE — DICTYOSPORAE

CONIOSPORIUM Link
paradoxum (Corda) Mason et Hughes (= **Sporodesmium paradoxum** Corda)—On **Betula;** Forge Valley, 1947 (I.M.I., 14515b).

CONIOTHECIUM Corda
betulinum Corda—On **Betula;** Thornton-le-Dale (F.F., 1945).

EPICOCCUM Link ex Wallroth
herbarum Corda—On dead leaves; Scarborough (G.M.).
neglectum Desm.—On reeds and grasses; Scarborough (G.M.).
purpurascens Ehrenb. ex Wallr.—On conifer; Dalby Dale, 1945, (I.M.I., 1395b).
These three names probably refer to a single plurivorous species.

SPORODESMIUM Link ex Fries
paradoxum Corda—See **Coniosporium paradoxum.**

XEROSPORAE — HELICOSPORAE

HELICODENDRON Peyronel
tubulosum (Riess) Lind.—On rotten wood; Scarborough (G.M.).

HELICOSPORIUM Nees ex Fries
vegetum Nees ex Fr.—See **Ophionectria cerea.**

XEROSPORAE — STAUROSPORAE

TRIPOSPORIUM Corda

elegans Corda—On **Fagus;** Robin Hood's Bay (C.C., 1907), Howldale, 1947 (I.M.I., 13904b, 14477). On **Quercus;** Howldale (Nottm., 1193, 1194). On **Epilobium;** Forge Valley (Hull, 612).

AQUATIC HYPHOMYCETES — WATER MOULDS

At the joint foray of the B.M.S. and the Y.N.U. in September, 1946, the following water moulds were collected by Prof. C. T. Ingold in Forge Valley :—

Clavariopsis aquatica de Wild.
Lemonniera aquatica de Wild.
Tetrachaetum elegans Ing.
Flagellospora curvula Ing.
Lunulospora curvula Ing.
Tetracladium marchalianum de Wild.

MYCELIA STERILIA

OZONIUM Link ex Fries

auricomum Link ex Wallr.—Scarborough, etc. (F.C.R.).

RHIZOCTONIA de Candolle ex Fries.

crocorum DC. ex Fr.—**See Helicobasidium purpureum.**

In mycology comparatively few English names are used, but the following list of generally accepted trivial names may be of interest to the general botanist and may help in the interpretation of the records :—

BEEFSTEAK FUNGUS—Fistulina hepatica.
BLEWIT—Tricholoma personatum.
BLUSHER—Amanita rubescens.
CANDLE-SNUFF FUNGUS—Xylaria hypoxylon.
CHANTERELLE—Cantharellus cibarius.
DEATH CAP—Amanita phalloides.
DRYADS' SADDLE—Polyporus squamosus.
DRY ROT—Merulius lacrymans.
ERGOT—Claviceps purpurea.
FAIRY RING CHAMPIGNON—Marasmius oreades.
FLY AGARIC—Amanita muscaria.
GRISETTE—Amanitopsis vaginata.
HONEY FUNGUS—Armillaria mellea.
HORN OF PLENTY—Craterellus cornucopioides.
INK CAP—Coprinus atramentarius.

JEW'S EAR—Auricularia auricula-Judae.
LAWYER'S WIG—Coprinus comatus.
MOREL—Morchella esculenta.
MUSHROOM, FIELD—Psalliota campestris.
,, CULTIVATED—Psalliota hortensis.
,, HORSE—Psalliota arvensis.
,, WOOD—Psalliota silvicola.
OYSTER MUSHROOM—Pleurotus ostreatus.
PARASOL—Lepiota procera.
PUFF-BALL, GIANT—Lycoperdon giganteum.
ST. GEORGE'S MUSHROOM—Tricholoma gambosum.
SHAGGY CAP—Coprinus comatus.
STINKHORN—Phallus impudicus.
SULPHUR-TUFT—Hypholoma fasciculare.
TRUFFLE—Tuber spp.
VELVET STEM—Collybia velutipes.
WITCHES' BUTTER—Exidia glandulosa.
,, BROOMS—Exoascus turgidus.

INDEX OF GENERA.

Acetabula 91
Acia 125
Acrospermum 114
Acrostalagmus 153
Acrothecium 158
Actinonema 153
Aegerita 156
Aleuria 91
Aleurodiscus 126
Amanita 129
Amanitopsis 129
Amblyosporium 153
Anellaria 147
Anthostoma 106
Anthracobia 93
Apiocrea 112
Aposphaeria 151
Apostemidium 95
Arachnopeziza 99
Arcyria 87
Armillaria 130
Arthrinium 156
Arthrobotrys 158
Arthrobotryum 159
Ascobolus 94
Ascophanus 94
Ascozonus 94
Aspergillus 156
Asterosporium 153
Astraeus 150
Aulographum 114
Auricularia 121
Bactridium 159
Bactrodesmium 159
Badhamia 84
Belonidium 98
Berlesiella 111
Bertia 107
Bispora 158
Bolbitius 143
Boletus 148
Bombardia 106
Botryosphaeria 105
Botryosporium 156
Botrytis 156
Bovista 150
Brachysporium 159
Brefeldia 86
Bremia 89
Bulgaria 96
Byssonectria 112
Caldesiella 125
Calloria 96
Calocera 122
Calospora 109
Calycella 96
Calyculosphaeria 107
Cantharellus 139
Capnodium 104
Capronia 111
Cenangium 101
Cephalosporium 153
Ceratiomyxa 84
Ceratosphaeria 109
Ceratostomella 105
Cercospora 159
Ceuthospora 152
Chaetocladium 90
Chaetomium 106
Chaetopsis 156
Chaetosphaeria 110
Cheilymenia 93
Cheiromycella 156
Chlorosplenium 97
Ciboria 96
Ciliaria 93
Cintractia 115
Cladosporium 158
Clasterosporium 159
Claudopus 141
Clavaria 125
Clavariopsis 162
Claviceps 113
Clitocybe 131
Clitopilus 140
Clypeosphaeria 110
Coccomyces 103
Coleosporium 116
Coleroa 107
Colletotrichum 153
Collybia 133
Colpoma 103

Comatricha 86
Coniophora 125
Coniosporium 161
Coniothecium 161
Coprinus 147
Coprobia 93
Cordyceps 113
Corethropsis 154
Corticium 126
Cortinarius 143
Coryne 96
Corynella 96
Coryneum 153
Craterellus 139
Craterium 85
Crepidotus 143
Cribraria 86
Crinipellis 134
Cristella 127
Crucibulum 150
Cryptocoryneum 161
Cryptodiscus 102
Cryptomyces 102
Cryptosphaeria 104
Cryptospora 111
Cryptosporella 105
Cucurbitaria 111
Cudonia 95
Cudoniella 95
Cyathicula 98
Cyathipodia 91
Cyathus 150
Cylindrium 156
Cyphella 127
Cystopus 88
Cytospora 152
Dacryomyces 122
Dactylosporium 160
Daedalea 124
Daldinia 106
Darluca 152
Dasyobolus 94
Dasyscypha 98
Dendryphion 159
Dermatea 101
Dermocybe 143
Diachaea 85
Dialonectria 112
Diaporthe 107
Diatrype 104
Diatrypella 104
Dichaena 114
Dictydiaethalium 86
Dictydium 86
Dictyosporium 161
Diderma 85
Didymella 108
Didymellina 108
Didymium 85
Didymosphaeria 109
Dilophospora 152
Dinemasporium 152
Diplocladium 158
Diplodia 152
Diplorhinotrichum 158
Discinella 96
Disciotis 91
Ditopella 105
Dothidella 113
Durella 100
Eccilia 141
Eichleriella 122
Empusa 90
Encoelia 101
Endodothella 113
Enerthenema 86
Enteridium 86
Entoloma 140
Entomophthora 90
Entyloma 115
Epichloe 113
Epicoccum 161
Erinella 98
Erysiphe 103
Eurotium 103
Eutypa 104
Eutypella 104
Excipula 152
Exidia 121
Exoascus 94
Exobasidium 129
Exosporium 160
Farlowiella 114
Fenestella 111
Fistulina 125
Flagellospora 162
Flammula 142
Fomes 123
Frommea 117
Fuligo 85
Fusarium 155
Galactinia 91
Galera 142
Ganoderma 123
Geaster 150
Geoglossum 95
Geotrichum 156
Gibberella 112
Gliocladium 154
Gliomastix 154
Gloeocystidium 127
Gloniopsis 114
Glonium 114
Gnomonia 108
Gnomoniella 105
Gomphidius 148
Gonatobotrys 156
Gonytrichum 154
Grandinia 125
Graphium 154
Gymnosporangium 117
Gyroporus 148
Haplaria 156
Haplographium 154
Hebeloma 141
Helicodendron 161
Helicosporium 161
Helminthosporium 160
Helotium 97
Helvella 91
Hemitrichia 87
Hercospora 108
Heterosphaeria 100
Heterosporium 160
Humaria 93
Hyalinia 96
Hyaloscypha 99
Hydnum 125
Hydrocybe 144
Hygrophorus 136
Hymenochaete 126
Hymenostilbe 157
Hypholoma 146
Hypochnus 126
Hypocrea 113
Hypoderma 114
Hypomyces 112
Hyponectria 112
Hypospila 109
Hypoxylon 106
Hysterium 114
Hysterographium 115
Inocybe 144
Inoloma 143
Isaria 157
Kuehneola 117
Laccaria 132
Lachnea 92
Lachnella 98
Lactarius 137
Lamproderma 86
Lamprospora 93
Lasiobolus 94
Lasionectria 112
Lasiosphaeria 109
Lecanidion 100
Lemonniera 162
Lentinus 135

Leocarpus 85
Leotia 95
Lepiota 129
Leptoglossum 95
Leptonia 140
Leptopodia 91
Leptosphaeria 110
Leptostroma 152
Leptotus 139
Lindbladia 86
Lophiostoma 113
Lophiotrema 113
Lophodermium 115
Lunulospora 162
Lycogala 86
Lycoperdon 149
Macropodia 91
Marasmius 134
Marssonina 153
Massaria 110
Massarina 109
Mastigosporium 155
Melampsora 117
Melampsorella 116
Melampsoridium 116
Melancomium 153
Melanconis 108
Melanogaster 150
Melanomma 110
Melanopsamma 108
Melanopsammella 108
Melanotaenium 115
Melastiza 93
Menispora 154
Merulius 124
Metasphaeria 109
Microcera 156
Microglossum 95
Micropodia 99
Microsphaeria 103
Milesina 116
Mitrophora 91
Mitrula 95
Mollisia 100
Monilia 157
Monotospora 157
Morchella 91
Mucilago 85
Mucor 89
Mucrosporium 160
Mutinus 149
Mycena 132
Mycoleptodon 125
Mycosphaerella 108
Myxacium 143
Myxosporium 153
Naucoria 142
Nectria 112
Nectriopsis 113
Nemacyclus 102
Nematogonium 157
Neottiospora 151
Nidularia 150
Niptera 100
Nitschkia 105
Nolanea 140
Nummularia 106
Nyctalis 136
Ocellaria 102
Ochropsora 117
Odontia 125
Oidium 157
Oligonema 87
Ombrophila 95
Omphalia 134
Oospora 154
Ophiobolus 111
Ophionectria 113
Ophiostoma 105
Orbilia 96
Otidea 92
Otthia 109
Ovularia 157
Ozonium 162
Pachydisca 96
Pachyella 92
Panaeolus 147
Panus 135
Patinella 100
Paxillus 145
Peniophora 127
Perichaena 87
Periconia 157
Perisporium 104
Peroneutypa 105
Peronospora 89
Pezicula 101
Peziza 92
Phacidium 102
Phaeangella 101
Phaeocyphella 128
Phaeoisaria 157
Phallus 149
Phialea 97
Phlebia 125
Phlegmacium 143
Pholiota 141
Phoma 151
Phomopsis 151
Phragmidium 117
Phragmocephala 159
Phycomyces 89
Phylacteria 126
Phyllachora 114
Phylloporus 148
Phyllosticta 151
Physalospora 105
Physarum 85
Physoderma 88
Physomitra 91
Phytophthora 88
Pilaira 89
Pilobolus 90
Pistillaria 128
Placographa 100
Plasmodiophora 88
Plasmopara 88
Pleomassaria 111
Pleospora 111
Pleurotus 135
Plicaria 92
Pluteolus 139
Pluteus 139
Podoconis 160
Podosphaeria 103
Polydesmia 96
Polyphagus 88
Polyporus 122
Polystictus 124
Polystigma 113
Polythrincium 158
Poria 124
Poronia 106
Porphyrellus 148
Propolis 101
Protocrea 113
Protomyces 90
Protomycopsis 90
Prototrichia 87
Psalliota 147
Psathyrella 146
Pseudohelotium 97
Pseudombrophila 93
Pseudonectria 113
Pseudopeziza 102
Pseudoplectania 92
Pseudovalsa 110
Psilocybe 146
Puccinia 118
Pucciniastrum 116
Pulvinula 93
Pustularia 92
Pyrenopeziza 100
Pyronema 94
Pythium 88
Quaternaria 105
Radulum 125
Ramularia 161
Reticularia 86
Rhinotrichum 157
Rhizina 91
Rhizoctonia 162
Rhizopus 89

Rhynchostoma 109
Rhopalomyces 157
Rhopographus 114
Rhytisma 103
Ripartites 140
Rosellinia 107
Russula 138
Saccobolus 94
Saprolegnia 88
Sarcopodium 154
Sarcoscypha 92
Sarcosphaera 92
Schizophyllum 136
Schizothyrium 102
Schizoxylon 102
Scleroderma 150
Scleroderris 101
Sclerophoma 151
Sclerotinia 97
Scutularia 100
Sebacina 122
Sepedonium 158
Septocylindrium 161
Septoria 152
Sepultaria 92
Sillia 111
Solenia 128
Sordaria 107
Spathularia 95
Speira 161
Sphaerobolus 150
Sphaeronaema 151
Sphaeropsis 152
Sphaerotheca 103
Spinellus 89
Spongospora 88
Sporendonema 155
Sporocybe 154
Sporodesmium 161
Sporormia 110
Sporoschisma 155
Stachylidium 154
Stagonospora 152
Stamnaria 97
Steganosporium 153
Stegia 102
Stemonitis 85
Stereum 126
Stictis 102
Stigmatea 114
Stilbospora 153
Stilbum 121, 155
Stromatinia 97
Stropharia 145
Stysanus 158
Synchytrium 88
Systremma 114
Syzygites 89
Tapesia 100
Taphrina 94
Teichospora 111
Telamonia 144
Tetrachactum 162
Tetracladium 162
Thamnidium 90
Thamnomyces 107
Thecopsora 116
Thecotheus 94
Thelephora 126
Thielaviopsis 155
Thyriostroma 152
Tilachlidium 155
Tilletia 116
Tomentella 126
Torula 158
Trametes 124
Tranzschelia 117
Trematosphaeria 110
Tremella 121
Tremellodon 122
Trichia 86
Trichobelonium 98
Trichoderma 155
Trichoglossum 95
Tricholoma 130
Trichopeziza 99
Trichophaea 93
Trichoscypha 98
Trichosphaeria 105
Trichosporium 158
Trichothecium 158
Triphragmium 117
Triposporium 162
Trochila 101
Tubaria 142
Tuberculariа 155
Tubifera 86
Tulasnella 122
Tympanis 101
Tympanopsis 106
Typhula 128
Uncinula 104
Urceolella 99
Urocystis 116
Uromyces 118
Ustilago 115
Ustulina 107
Valsa 105
Valsaria 109
Velutaria 101
Venturia 109
Verpa 91
Verticicladium 155
Verticillium 155
Vibrissea 95
Volutella 155
Volvaria 139
Wynnella 92
Xenodochus 117
Xylaria 107
Xylohypha 158
Zignoella 109
Zygodesmus 158

LICHENS

F. C. Rimington

INTRODUCTION

W. Watson, D.Sc.

The area investigated is situated in the botanical vice-county 62. This vice-county was well worked by W. Mudd, whose "Manual of British Lichens" was published in 1861, but most of his work was done in the northern parts of V.C. 62 and apparently he did little or no collecting in our area. Some lichens have been collected since Mudd's work was published, by J. G. Baker, S. Hailstone, E. M. Holmes, T. Hebden and H. Britten, but mostly from the area north of Whitby. The most important collecting in our area was done during this century by W. E. L. Wattam. In 1927 I did some collecting in the Pickering district, whilst H. H. Knight and F. A. Sowter in more recent years also examined lichens in the vice-county, but the Scarborough area was not intensely worked for lichens until F. C. Rimington collected them during the last year or so and sent them to me for definite determination. His work revealed some peculiarities in the distribution of these plants and it was surprising to find a fair amount of evidence of injury by smoke. Many lichens are susceptible to smoke-contamination and in the neighbourhood of a large town entirely disappear or become rare or depauperate. The occurrence of the var. **dissipata** of **Lecanora albescens** was particularly suggestive as this occurs only where smoke contaminates the air. The rarity or absence of many other lichens supported this theory of smoke-contamination though it was unexpected as Scarborough cannot be considered an industrial centre.

The coast rocks show little evidence of the zonation of lichens which is often shown on many coasts, and this is presumably due to their instability though no doubt many characteristic crustaceous lichens have been overlooked.

Among notable absentees from the list are **Diploschistes scruposus, Thelotrema lepadinum, Phlyctis agelaea, Bacidia phacodes, Cladonia rangiformis, Calicium hyperellum, Acrocordia gemmata,** and **Arthopyrenia punctiformis.** Some of these were probably seen by me near Pickering, but no records of plants previously recorded from V.C. 62 were kept, and no specimens of them were seen in the material sent to me for identification. One plant. **Acarospora amphibola** had not previously been recorded for Britain.

The method of citation of the authority, in which the abbreviation of the surname is placed first, is not in accordance with my usual practice, nor with that of botanists generally, it is due to an editorial decision.

PREFACE

Although so little work has been done here on this group of plants, the Scarborough district appears to be a promising one for lichen collection. It possesses habitats for most of the ecological communities into which lichen growth can conveniently be divided : rock exposures and stone walls, some siliceous but mostly calcareous, a rocky sea-coast, peaty moorlands and much old woodland.

Probably the best places to study the saxicolous lichens of our area are in the disused oolitic limestone quarries of the Suffield district and along the calcareous sandstone walls near Cloughton and Harwood Dale, particularly those walls bordering the roads. Roadsides are always favoured by lichens and regular tar-spraying does not seem to have any noticeable deleterious effect on the vigour of their growth. No authoritative information exists of the state of the roadside lichens in this area before the advent of tar-spraying, but it is not easy to visualise them as having been then more numerous than they are now.

Higher up on the moors where many of the walls are almost entirely of the siliceous sandstone called "Moor Grit," the lichen flora is scanty, with **Acarospora fuscata** often the dominant species, accompanied by **Lecidea macrocarpa.**

On the walls in the oolitic limestone areas the following characteristic lichens are found : **Lecanora atra, L. campestris, L. gangaleoides, L. albescens, Ochrolechia parella** (often very large), **Aspicilia calcarea, Biatora immersa, Placodium callopismum, Caloplaca citrina, Protoblastenia rupestris** and **Verrucaria nigrescens.**

On the more sheltered walls **Parmelia saxatilis, P. fuliginosa, Platysma glaucum, Physcia hispida, P. caesia** and, near the farms, **Xanthoria parietina** flourish.

Some of the old quarry faces in the Suffield area have an almost continuous mosaic of **Protoblastenia rupestris, Verrucaria integra, V. nigrescens, Placodium murorum** and **Biatora immersa.**

Many of the older trees in Raincliffe Wood and in the hedge-rows carry an extensive lichen flora, **Pertusaria pertusa, P. amara** (both sometimes of very large size, several feet across), **Evernia prunastri, Ramalina farinacea, Parmelia saxatilis, P. fuliginosa, Hypogymnia physodes, Buellia myriocarpa,** etc. The bark of the younger trees, particularly of ash, frequently shows considerable growth of **Lecanora chlarona, Lecidea parasema** and various corticolous species of the **Opegraphaceae.**

On the moors, **Cladonia pyxidata, C. coccifera, C. macilenta, C. impexa,** and **C. sylvatica** are widespread and quite common, but the only abundant lichen is **Biatora granulosa** which occurs in enormous quantities on the wet peat of Ravenscar and Fylingdales Moor.

Of the marine Verrucarias, **V. maura** is abundant, while **V. mucosa** and **V. microspora** are frequent between the tide marks, but other lichens in this specialised habitat are not so obvious ; **Lichina confinis, Lecanora prosechoidiza, L. helicopsis, Rhizocarpon confervoides** and **Ramalina scopulorum** may be found regularly at or above H.W.M.

The nomenclature and classification are those used in W. Watson's "The Lichens of Yorkshire" (Trans. Y.N.U., Part 37, 1946), emended by the author. Where the name used differs from that given in A. L. Smith's "British Lichens" (Brit. Mus. Nat. Hist., 1918, 1926), the latter name is given in brackets.

All the lichens recorded by F. C. Rimington have been determined or confirmed by Dr. W. Watson. They were collected during the years 1949-51 and are preserved in the recorder's herbarium.

Grateful thanks are due to Dr. W. Watson for his constant help and advice, without which the list in its present form would not have been possible : to Mr. W. E. L. Wattam for permission to use his many records and for a great deal of information concerning the lichens of our area, also to Mr. F. A. Sowter for many helpful suggestions.

Abbreviations :

J.G.B.—J. G. Baker
H.B.—H. Britten fils
S.H.—S. Hailstone
H.W.M.—High Water Mark
E.M.H.—E. M. Holmes
H.H.K.—H. H. Knight
L.Y.—"Lichens of Yorkshire" (W. Watson, D.Sc.)
F.C.R.—F. C. Rimington
F.A.S.—F. A. Sowter
W.W.—W. Watson
W.E.L.W.—W. E. L. Wattam
Y.N.U.—Yorkshire Naturalists' Uuion

Species marked with an asterisk are not to be found in "The Lichens of Yorkshire," as at that time (1946), they had not been recorded for the county.

LICHENES

PARMELIALES

USNEACEAE

USNEA Dillenius

florida (L.) Web.—On trees, Cross Cliff (W.E.L.W.).

comosa (Ach.) Roehl., subsp. **sordidula** Mot.—On Scots Pine, Staindale (W.E.L.W.) ; on oak, etc., Seamer Moor (F.C.R.).

subsp. **similis** Mot.—Forge Valley (F.A.S.).

distincta Mot.—Helwath Beck (F.C.R.).

***fulvoreagens** (Ras.) Mot.—On oak, etc., Raincliffe Wood (F.C.R.).

ALECTORIA Acharius

jubata (L.) Ach.—Goathland (H.H.K.) ; among moss, Raincliffe Wood (F.C.R.).

EVERNIA Acharius

prunastri (L.) Ach.—Common on tree trunks, widely distributed.

furfuracea (L.) Mann.—Not uncommon on tree trunks and walls.

form **ceratea** (Ach.) Cromb.—Ellerburn (W.E.L.W.).

form **scobicina** (Ach.) Nyl.—Cloughton Quarry (F.C.R.).

PARMELIACEAE

PARMELIA Acharius

trichotera Hue (**P. perlata** (Huds.) auct. plur.)—Not uncommon on trunks of old trees and occasionally on rocks.

caperata (L.) Ach.—On oak, Hackness (F.C.R.).

saxatilis (L.) Ach.—Abundant on rocks and trees, very widely distributed.

form **furfuracea** Schaer.—Commonly found with the type.

omphalodes (L.) Ach.—On rocks, Burniston, Levisham (W.E.L.W.).

sulcata Tayl.—On tree trunks and walls, Pickering, Goathland, etc. (W.E.L.W.) ; Burniston, Cloughton (F.C.R.).

subaurifera Nyl.—On pine, Helwath Beck (F.C.R.) ; Forge Valley (F.A.S.).

fuliginosa Nyl.—Common on rocks and trees.

var. **laetevirens** (Flot.) Kickx.—Commonly found with the type.

conspersa (Ehrh.) Ach.—On trees, Thornton-le-Dale, Pickering, etc. (W.E.L.W.).

*form **isidiata** (Anzi) Leight.—Helwath Beck (F.C.R.).

***laevigata** (Sm.) Ach. var. **dissecta** Oliv.—On soil, Helwath Beck (F.C.R.).

dubia (Wulf.) Schaer.—Forge Valley (F.C.R.).

***reticulata** Tayl. (**P. cetrata** Ach.) —Raincliffe Wood (F.C.R.).

HYPOGYMNIA Nylander

physodes (L.) Wats. (sub-genus of **Parmelia**)—Abundant, even near towns.

form **labrosa** (Ach.) Wats.—Commonly found with the type.

var. **platyphylla** (Ach.) Wats.—Pickering, etc. (W.W.) ; Suffield (F.C.R.).

CETRARIA Acharius

islandica (L.) Ach.—Seamer Moor (J.G.B.).

prolixa (Ach.) Carr.—On boulder, Harwood Dale (F.C.R.).

aculeata (Schreb.) Fr.—Not uncommon among heather on the moors.

PLATYSMA Nylander

glaucum (L.) Nyl. (**Cetraria**)—Common on trees and walls, particularly on high ground.

chlorophyllum (Humb.) Wats. (**Cetraria**)—On oak, Hayburn Wyke (F.C.R.).

LECANORACEAE

SQUAMARIA de Candolle

cartilaginea (Lightf.) Sm., A. L. (**Lecanora**)—On stone wall, Pickering (W.E.L.W.).

muralis (Schreb.) Elenk. (**Lecanora**)—Not uncommon on stone walls and widely distributed.

var. **diffracta** (Ach.) Poetsch.—On moorland boulder, Bickley (F.C.R.).

gelida (L.) Hook. (**Lecanora**)—On siliceous rock, Ravenscar (F.C.R.).

LECANORA Acharius

albescens (Hoffm.) Floerk. (**L. galactina** Ach.)—Common on walls and rocks, both inland and on the coast.
var. **dissipata** (Nyl.)—Occasionally found with the type (W.E.L.W.)
var. **dispersa** (Pers.) Arn.—Pickering (W.W.) ; Hayburn Wyke (F.C.R.).
hageni Ach.—On oaks, Ellerburn, Levisham (W.E.L.W.) ; on palings, Harwood Dale (F.C.R.).
umbrina (Ehrh.) Massal.—Cornelian Bay (F.C.R.).
crenulata (Dicks.) Hook.—On walls and rocks, Thornton-le-Dale (W.E.L.W.) ; Pickering (W.W.) ; Ravenscar (F.C.R.).
badia (Pers.) Ach.—Not uncommon on rocks and walls.
var. **cinerascens** Nyl.—Occasionally found with the type.
subfusca (L.) Ach.—Scarborough (F.C.R.).
allophana (Ach.) Roehl. (**L. subfusca** var. **allophana** Ach.)—On trees, Hackness, Cumboots (F.C.R.).
chlarona (Ach.) Nyl. (**L. subfusca** var. **chlarona** Ach.)—Quite common on the smooth bark of trees.
rugosa (Pers.) Nyl.—On ash, etc., Ramsdale (W.E.L.W.) ; Cloughton, Troutsdale, Hutton Buscel (F.C.R.).
coilocarpa (Ach.) Nyl.—On rocks and walls, Goathland (H.H.K.) ; Hackness, Langdale End, etc. (F.C.R.).
gangaleoides Nyl.—On stone walls, Burniston, Harwood Dale, etc. (F.C.R.).
form **glebulosa** Harm. Harwood Dale (F.C.R.).
intumescens (Reb.) Koerb.—On the smooth bark of trees, Hackness, Helwath Beck (F.C.R.).
campestris (Schaer.) Hue—Common on rocks and walls.
pallida (Schreb.) Schaer.—On beech, Ellerburn, Levisham (W.E.L.W.).
rupicola (L.) Zahlbr. (**L. sordida** Fr., Th.)—On calcareous grit, Levisham (W.E.L.W.) ; on siliceous rock, Burniston, Cloughton (F.C.R.).
atra (Huds.) Ach.—Common, mostly on stone walls.
sulphurea (Hoffm.) Ach.—On stone wall, Hole of Horcum (W.E.L.W.) ; Cumboots (F.C.R.).
polytropa (Ehrh.) Schaer.—Common on rocks, mostly in upland districts.
form **efflorescens** Cromb.—Pickering (W.E.L.W.).
varia (Ehrh.) Ach.—Occasional, Hayburn Wyke, etc., (F.C.R.), there are many records but probably most of them refer to **L. conizaeoides**, which was formerly included in **L. varia.**
conizaea (Ach.) Nyl. (**L. farinaria** Borr.)—On old palings, etc. Bempton, Pickering (W.E.L.W.) ; Scalby (F.C.R.).
conizaeoides Cromb. (**L. farinaria** var. **conizaeoides** Sm., A. L.)—Abundant on old palings and trees, even in built-up areas.
expallens (Pers.) Ach.—On palings, Harwood Dale (F.C.R.).

symmicta Ach.—On old palings, Thornton-le-Dale, Hole of Horcum (W.E.L.W.) ; Suffield (F.C.R.).

symmictera Nyl.—On trees, Pickering (W.E.L.W.) ; Hackness, Suffield, Lindhead (F.C.R.).

saligna (Schrad.) Zahlbr. (**L. effusa** Ach.)—Pickering (W.W.).

***prosechoidiza** Nyl. (**Lecania**)—Although very few stations are given for this species in A. L. Smith's "British Lichens," and none at all in W. Watson's "Lichens of Yorkshire," it is not uncommon near H.W.M. in Cornelian Bay, Hayburn Wyke, Burniston Wyke, etc.

***helicopsis** (Wahl.) Ach. (**Lecania prosechoides** (Nyl.) Oliv.)—Not uncommon near H.W.M., Cornelian Bay, Cayton Bay, etc.

*form **aeruginosus** (Wedd.) Magn.—Mowthorpe Sluice (F.C.R.).

***atriseda** (Fr.) Nyl.—Silpho Moor (F.C.R.). A. L. Smith in "British Lichens" says this species is always associated with **Rhizocarpon geographicum** in a state of "antagonistic symbiosis," but the plant recorded above had no such association.

OCHROLECHIA Massalonga

tartarea (L.) Massal.—Occasional ; Forge Valley on oak (F.C.R.).

parella (L.) Massal. (**Lecanora**)—Common on rocks and stone walls, often reaching a large size.

ASPICILIA Massalonga

cinerea (Ach.) Koerb. (**Lecanora**)—On stone walls, Hole of Horcum, Goathland (W.E.L.W.).

calcarea (L.) Koerb. (**Lecanora**)—Common on limestone walls, etc.

var. **contorta** (Hoffm.) Mudd—Harwood Dale, Yedmandale, etc. (F.C.R.).

lacustris (With.) Fr., Th. (**Lecanora**)—On rocks in stream, Hayburn Wyke (F.C.R.).

LECIDEACEAE

PSORA Haller

ostreata Hoffm. (**Lecidea**)—On sandstone, Seamer Moor (F.C.R.).

BIATORA Fries

lucida (Ach.) Fr. (**Lecidea**)—On stone walls, Pickering (W.E.L.W.).

coarctata (Sm.) Fr., Th. (**Lecidea**)—Not uncommon on stone walls and rocks.

var. **elachista** (Ach) Fr., Th.—Occasionally with the type (W.E.L.W.).

var. **glebulosa** (Sm.) Arn.—Goathland (H.H.K.).

quernea (Dicks.) Fr. (**Lecidea**)—On old oaks, Ellerburn (W.E.L.W.).

flexuosa Fr. (**Lecidea**)—On old palings, Hole of Horcum (W.E.L.W.).

granulosa (Ehrh.) Massal. (**Lecidea**)—Common, often abundant, on peat.

var. **escharoides** (Ehrh.) Rehm—Not uncommon with the type.

uliginosa (Schrad.) Fr. (**Lecidea**)—On peat, Staindale, Hole of Horcum, Levisham (W.E.L.W.).

var. **fuliginea** (Ach.) Fr.—On wood, Pickering (W.W.).

bauschiana Koerb. (**Lecidea**)—On siliceous rock, Bickley (F.C.R.).

fuscorubens Nyl. (**Lecidea**)—On calcareous rock, Pickering (W.W.) ; Hayburn Wyke (F.C.R.). On siliceous rock, Staintondale (F.C.R.).

immersa (Web.) Syd. (**Lecidea**)—On limestone, Pickering (W.W.) ; Suffield (F.C.R.).

LECIDEA Acharius

protrusa Schaer.—Not uncommon on stone walls and rocks.

parasema Ach.—Common on tree trunks and old palings.

*form **atrorubens** B. de Lesd.—Hayburn Wyke (F.C.R.).

latypea Ach.—On siliceous rock, Hackness (F.C.R.).

*form **continuior** Nyl.—Hackness (F.C.R.).

goniophila (Floerke) Schaer.—On siliceous boulder, Cumboots (F.C.R.).

leucophaea (Floerke) Nyl.—Ravenscar (F.C.R.).

lithophila Ach.—On sandstone, Ravenscar (W.E.L.W.) ; Burniston, Hayburn Wyke, etc. (F.C.R.).

plana (Lahm.) Nyl.—Goathland (H.H.K.).

cyathoides Ach. (**L. rivulosa** Ach.)—Not uncommon on siliceous rocks.

macrocarpa (DC.) Fr., Th. (**L. contigua** Fr.)—Common on siliceous rocks and boulders.

var. **platycarpa** (Ach.) Fr.—Not uncommon with the type, particularly near water.

var. **flavicunda** (Ach.) Nyl.—On grit boulder, Bickley (F.C.R.).

tumida Massal. (**L. sorediza** Nyl.)—Hayburn Wyke beach (F.C.R.).

crustulata (Ach.) Koerb.—On siliceous rocks, Cumboots, Bloody Beck, Cornelian Bay, Cayton Bay (F.C.R.).

var. **meiospora** Oliv.—Hayburn Wyke (F.C.R.).

cinereoatra Ach. Cloughton (F.C.R.).

form **subinnata** Vain.—Hayburn Wyke beach (F.C.R.).

confluens (Web.) Ach.—On stone walls, Bridestones, Ravenscar, Hole of Horcum, etc. (W.E.L.W.).

sublatypea Leight.—On siliceous rock, Langdale End (F.C.R.).

MYCOBLASTUS Norman

sanguinarius (L.) Norm. (**Lecidea**)—Not uncommon on stone walls, etc.

PERTUSARIACEAE

PERTUSARIA de Candolle

globulifera (Turn.) Nyl.—On old oaks, Ellerburn, Levisham, Langdale End (W.E.L.W.).

lactea (L.) Nyl.—On old oaks, Ellerburn, Langdale End (W.E.L.W.).

amara (Ach.) Nyl. (**P. faginea** Leight.)—On trunks of old trees, mostly oaks, common and widely distributed ; abundant in Forge Valley and Raincliffe Wood.

var. **flotowiana** (Floerke) Erichs.—Occasional on stone walls, Burniston, Harwood Dale, etc. (F.C.R.).

pertusa (L.) Tuck.—Common and widely distributed ; abundant in Forge Valley and Raincliffe Wood.

corallina (L.) Fr., Th. (**P. dealbata** Cromb.)—On sandstone, Levisham (W.E.L.W.) ; Goathland (H.H.K.). Most British records of this species are unreliable (W.W., L.Y., p. 21).
dealbescens Erichs. (incl. in **P. dealbata** Cromb.)—On siliceous boulder, Cayton Bay (F.C.R.).
leioplaca (Ach.) Schaer.—On ash, Cumboots (F.C.R.).
wulfenii DC.—On trees, Levisham, Hole of Horcum (W.E.L.W.).
*__henrici__ (Harm.) Erichs.—On stone wall, Burniston (F.C.R.).
*var. **granosa** Erichs.—On elm, Hutton Buscel (F.C.R.).
*__leucosora__ Nyl.—On limestone, Hackness (F.C.R.).
*__inopinata__ Erichs.—On siliceous rock, Staintondale (F.C.R.).

ACAROSPORACEAE

ACAROSPORA Massalonga
smaragdula (Wahl.) Massal.—On rocks and walls, Ellerburn, Ravenscar, Pickering (W.E.L.W.).
fuscata (Schrad.) Fr., Th.—Common on rocks and particularly on stone walls on the moors.
[**veronensis** Massal. (**A. discreta** Fr., Th.)—Saltwick Bay (H.B.).]
*__opaca__ Magn.—On stone in stream, Helwath Beck (F.C.R.).
*__amphibola__ Wedd. sec. Magn.—On siliceous boulder, H.W.M. Cayton Bay, 1950, first British record ; det. Herr Magnusson of Gotenburg (F.C.R.).

RAMALINACEAE

RAMALINA Acharius
calicaris (L.) Fr.—Yedmandale (F.C.R.).
farinacea (L.) Ach.—Common on old trees.
form **multifida** Ach.—Pickering (W.W.).
fraxinea (L.) Ach.—Probably not uncommon but no specific records (L.Y., p. 23).
var. **calicariformis** Nyl.—Hackness (F.C.R.).
fastigiata (Pers.) Ach.—Only the small form (**f. minutula** Ach.) has been recorded, Pickering (W.W.) ; Lindhead (F.C.R.).
scopulorum (Retz.) Nyl. (**R. siliquosa** Sm.,A.L.)—Ravenscar W.E.L.W.) ; Harwood Dale (F.C.R.).
cuspidata (Ach.) Nyl. (incl. in **R. siliquosa**)—Ravenscar (F.C.R.).
subfarinacea Nyl.—Not uncommon at H.W.M., Ravenscar (F.C.R.).

LECANIACEAE

LECANIA Massalonga
erysibe (Ach.) Mudd—On boulders, Cornelian Bay, Cayton Bay, Hayburn Wyke, etc. (F.C.R.).
*form **nigrata** Nyl.—On wall, Cumboots (F.C.R.).
*var. **sincerior** (Nyl.) de Lesd.—Cloughton Wyke (F.C.R.).
BIATORINA Massalonga
graniformis (Hag.) Sm., A. L.—On ash, Troutsdale (F.C.R.).
griffithii (Sm.) Massal.—On ash, Cumboots, Ravenscar (F.C.R.).
lenticularis (Ach.) Koerb.—On rocks, Hackness, Hayburn Wyke (F.C.R.).

form **nigricans** (Ach.) Koerb.—On limestone, Hutton Buscel, Staintondale (F.C.R.).

CATILLARIA Fries, Theodore

chalybeia (Borr.) Massal.—On siliceous rock, Harwood Dale (F.C.R.).

grossa (Pers.) Blomb. (**Biatorina premnea** Sm., A. L.)—On pine, Hayburn Wyke ; on ash, Forge Valley (F.C.R.).

BACIDIACEAE

TONINIA Fries, Theodore

aromatica (Sm.) Massal. (**Bilimbia**)—Cloughton Wyke (F.C.R.).

BILIMBIA de Notaris

sabuletorum (Floerke) Arn.—On soil on wall, Langdale End (F.C.R.).

*spododes (Nyl.) B. de Lesd. (**B. nitschkeana** Lahm)—Rare ; Scarborough on elder (F.C.R.).

BACIDIA de Notaris

umbrina (Ach.) Branth. et Rostr.—On siliceous rock, Hayburn Wyke, Fylingdales (F.C.R.).

HAEMATOMMA Massalonga

coccineum (Dicks.) Koerb.—On grit boulders, Staindale (W.E.L.W.).

ventosum (Ach.) Koerb.—On siliceous rocks, Goathland (W.E.L.W.).

LECANACTIS Eschweiler

abietina (Ach.) Koerb.—On oak, Ravenscar (F.C.R.).

TELOSCHISTACEAE

XANTHORIA Fries, Theodore

parietina (L.) Fr., Th.—Common, often abundant, widely distributed.

form **cinerascens** Leight.—Pickering, (W.W.) ; Hackness (F.C.R.).

var. **aureola** (Ach.) Fr., Th.—Pickering (W.W.).

polycarpa (Ehrh.) Oliv.—On ash, Thornton-le-Dale (F.C.R.).

lychnea (Ach.) Fr., Th.—Pickering (W.W.) ; Cornelian Bay, Hackness, etc. (F.C.R.).

CALOPLACACEAE

PLACODIUM de Candolle

murorum (Hoffm.) DC.—On calcareous rocks, Pickering (W.W.) ; Suffield, Yedmandale (F.C.R.).

var. **pusillum** (Massal.) Flag.—Suffield (F.C.R.).

callopismum (Ach.) Mer.—Common, locally abundant, on stone walls, etc.

var. **brevilobatum** (Nyl.) Sm., A. L.—Pickering (W.W.) ; Filey Brigg (F.C.R.).

var. **plicatum** (Wedd.) Leight. (**P. flavescens** Sm., A. L.)—Frequently found with the type (W.E.L.W.) ; Ravenscar (F.C.R.).

lobulatum (Floerke) Flag.—Not common ; Ravenscar (F.C.R.).

*form **subeffiguratum** (Wedd.) Wats.—with the type (F.C.R.).

CALOPLACA Fries, Theodore (**CALLOPISMA** in L.Y.)

citrina (Hoffm.) Fr., Th. (**Placodium**)—Common on limestone, widespread.

var. **flavocitrina** Nyl.—Scarborough (F.C.R.).

aurantiaca (Lightf.) Fr., Th. (**Placodium**)—On ash, Levisham (W.E.L.W.) ; Pickering (W.W.) ; on palings, Hutton Buscel (F.C.R.).

ferruginea (Huds.) Fr., Th. var. **festiva** (Ach.) Mudd (**Placodium**)—On rocks and stone walls, Burniston, Hayburn Wyke, etc. (F.C.R.).

vitellinula (Nyl.) Oliv. (**Placodium**)—On limestone, Thornton-le-Dale (W.E.L.W.).

epixantha (Ach.) Oliv. (**Candelariella**)—On trees, Hole of Horcum (W.E.L.W.). On rocks, Filey Brigg, Suffield, Cumboots (F.C.R.).

***crenulatella** (Nyl.) Fr., Th. (**Placodium**)—Above H.W.M., Hayburn Wyke, 1950 (F.C.R.) ; very few British records.

***viridirufa** (Ach.) Zahlbr. (**Placodium fuscoatrum** Sm., A. L.)—Rare Ravenscar on siliceous rock (F.C.R.).

PROTOBLASTENIA (Zahlbruckner) Steiner

rupestris (Scop.) Zahlbr.—On limestone, Hackness, Suffield, etc. (F.C.R.).

CANDELARIELLA Mueller-Argau

vitellina (Ehrh.) Muell.-Arg.—Common on rocks, old palings, etc.

PHYSCIACEAE

ANAPTYCHIA Massalonga

ciliaris (L.) Massal. (**Physcia**)—Hutton Buscel (F.C.R.).

var. **melanosticta** (Ach.) Boist.—On calcareous rock, Langdale End (F.C.R.).

PHYSCIA Schreber

fusca (Huds.) Sm., A. L.—Occasional on stone walls, Burniston, Cloughton, etc. (F.C.R.).

pulverulenta (Schreb.) Nyl.—Not uncommon, Pickering ; on oak, Hackness ; on limestone, Hutton Buscel (F.C.R.).

form **subvenusta** (Nyl.) Oliv.—Pickering (W.W.).

*var. **leucoleiptes** Tuck.—On oak, Hackness (F.C.R.).

grisea (Lam.) Zahlbr.—Not uncommon on oak, Hackness ; on limestone, Hutton Buscel (F.C.R.).

stellaris (L.) Nyl.—On apple tree, Hole of Horcum (W.E.L.W.) ; on pine, Hackness (F.C.R.).

aipolia (Ach.) Nyl.—On ash, Hutton Buscel, Troutsdale (F.C.R.).

var. **cercidia** (Ach.) Fr., Th.—On oak and ash, Troutsdale, Hackness (F.C.R.).

hispida (Schreb.) Frege—There are numerous records for the aggregate species, the common form is the plant with the convex laciniae (**P. tenella** Scop.). The plant with flatter thalli (**P. leptalea** DC.). Pickering (W.W.). The form with well-hooded ascending and strongly sorediate laciniae (**P. ascendens** Bitt.), Cloughton, Troutsdale, etc. (F.C.R.).

caesia (Hoffm.) Nyl.—Not uncommon on walls, boulders, etc.
orbicularis (Neck.) D.T. et S.—On palings, Lowdales (F.C.R.).
virella (Ach.) Lynge—Pickering (W.W.) ; on oaks, Hackness, Troutsdale (F.C.R.).
sciastra (Ach.) Du Rietz (**P. lithotea** Nyl.)—On boulder, Hackness (F.C.R.).
elaeina (Wahl.) Sm., A. L.—On oak, Hayburn Wyke (F.C.R.).

RINODINA Gray, S. F.
sophodes (Ach.) Fr., Th.—On ash, Langdale End (W.E.L.W.).
exigua (Ach.) Gray—On pine, Hackness (F.C.R.).
demissa (Koerb.) Arn.—Pickering (W.W.) ; Yedmandale (F.C.R.).
*__umbrinofusca__ (Nyl.) Oliv.—On siliceous rock at H.W.M., Ravenscar (F.C.R.) ; very few British records.

DIPLOICIA Massalonga
canescens (Dicks.) Massal. (**Buellia**)—Locally common on walls and trees, Hutton Buscel, Burniston, etc.

BUELLIA de Notaris
spuria (Schaer.) Koerb.—On limestone, Hutton Buscel (F.C.R.).
myriocarpa (DC.) de Not.—Common on the bark of trees.
disciformis (Fr.) Mudd—On ash, Hackness (F.C.R.).

RHIZOCARPON Ramond
alboatrum (Hoffm.) Fr., Th.—Not uncommon on trees and palings.
var. **epipolium** (Ach.) Sm., A. L.—Filey Brigg, Cayton Bay (F.C.R.).
geographicum (L.) DC.—This plant, so abundant in some parts of the country, is only occasionally found in east Yorkshire.
viridiatrum (Floerke) Koerb.—Bridestones, Thornton-le-Dale (W.E. L.W.).
calcareum (Weis.) Fr., Th.—Harwood Dale, Hackness (F.C.R.).
confervoides DC.—Not uncommon on siliceous rocks, particularly near the sea. Probably better under **R. reductum** Fr., Th., as the name **confervoides** may be considered a nomen vagum.
obscuratum (Ach.) Massal.—Bridestones, Thornton-le-Dale, etc. W.E.L.W.).

GYROPHORACEAE

GYROPHORA Acharius
polyphylla (L.) Hook.—On boulders, Bridestones, Ravenscar (W.E.L.W.).

THELOTREMACEAE

THELOTREMA Acharius
lepadinum Ach.—On ash, Langdale End (F.C.R.).

CLADONIALES

CLADONIACEAE

CLADONIA Hill
sylvatica (L.) Hoffm.—Not uncommon among heather on most of the moors.

impexa Harm. (incl. with **C. sylvatica**)—On alder, Helwath Beck (F.C.R.).
form **pumila** (Ach.) Rabh. (**C. alpestris** f. **pumila** Sm., A. L.)—On turf, Hackness (F.C.R.).
form **laxiuscula** (Del.) Sands.—On moorland boulder, Bloody Beck (F.C.R.).
uncialis (L.) Web.—Not uncommon among mosses on the wetter moors.
foliacea (Huds.) Schaer.—In dry sandy places, South Cheek, Ravenscar (W.E.L.W.).
pyxidata (L.) Hoffm.—Common and widely distributed on the moors.
var. **chlorophaea** Floerke—Frequently found with the type.
var. **pocilla** (Ach.) Fr.—Langdale End (W.E.L.W.).
fimbriata (L.) Fr.—Common on moss-covered stumps, etc.
form **integra** (Wallr.)—Pickering (W.W.).
var. **subulata** (L.) Wain.—Hackness (F.C.R.).
ochrochlora Floerke—On peaty soil, Ravenscar (F.C.R.).
lepidota Nyl., form **hypophylla** (Nyl.) Wain.—Scarborough Moors (W.E.L.W.).
cervicornis (Ach.) Schaer.—On the ground, Pexton Moor, Levisham, Hole of Horcum (W.E.L.W.).
gracilis (L.) Willd.—form **chordalis** Floerke may be taken as the type, Ramsdale, Hole of Horcum, etc. (W.E.L.W.) ; Pickering (W.W.).
form **subulata** Hag.—Co-extensive with the type (L.Y., p. 39).
cornuta (L.) Schaer.—Scarborough Moors (W.E.L.W.).
crispata (Ach.) Flot.—Pickering (W.W.).
furcata (Huds.) Schrad.—Not uncommon on the moors.
squamosa (Scop.) Hoffm.—On the ground among mosses, Ellerburn, Levisham, Hole of Horcum (W.E.L.W.).
form **muricella** (Del.) Wain.—Pickering (W.W.).
subsquamosa Nyl.—Among heather, Harwood Dale (F.C.R.).
caespiticia (Pers.) Floerke—Fylingdales Moor (W.E.L.W.).
digitata (L.) Schaer.—On peat, Levisham, Hole of Horcum (W.E.L.W.) ; Hackness (F.C.R.).
form **cephalotes** Ach.—On old stump, Seamer Moor (F.C.R.).
coccifera (L.) Willd.—Common and widely distributed on the moors.
form **coronata** Del. Pickering (W.W.).
macilenta Hoffm.—Common on moss-covered stumps, widely distributed.
polydactyla Floerke (**C. flabelliformis** Wain.)—Among moss on the the ground, Raincliffe Wood (F.C.R.).
bacillaris Nyl.—On peat, Levisham, Staindale (W.E.L.W.).
floerkeana (Fr.) Somm.—On peat, Levisham, Staindale (W.E.L.W.) ; Hackness, Silpho Moor (F.C.R.).
var. **carcata** (Nyl.) Wain.—Common on the moors.
*var. **intermedia** Hepp.—Seamer Moor (F.C.R.).

PYCNOTHELIA Leighton
papillaria (Ehrh.) Duf. (**Cladonia**)—On peat, Levisham, Staindale (W.E.L.W.).

BAEOMYCES Persoon
rufus (Huds.) DC.—On grit blocks, Levisham, Staindale (W.E.L.W.). Goathland (H.H.K.) ; Pickering (W.W.).
var. **subsquamulosus** Nyl.—Goathland (W.E.L.W.).

STEREOCAULONACEAE

STEREOCAULON Scherber
coralloides Fr.—Langdale End (F.C.R.).
denudatum Floerke—Ravenscar (F.C.R.).

ECTOLECHIALES

GYALECTACEAE

PETRACTIS Fries
clausa (Hoffm.) Kremp. (**Gyalecta exanthematica** Fr.)—Pickering (W.W.).

GYALECTA Acharius
jenensis (Batsch.) Zahlbr. (**G. cupularis** Schaer.)—On damp stones, Ramsdale, Levisham (W.E.L.W.).

COENOGONIUM Ehrenberg
ebeneum (Dillw.) Sm., A. L.—On shaded rocks, Mallyan Spout, Goathland (W.E.L.W.).

RACODIUM Persoon
rupestre Pers.—On shaded moorland rocks, Bloody Beck, common (F.C.R.).

CHRYSOTHRICACEAE

CROCYNIA Massalonga
lanuginosa (Ach.) Hue—On moss, Burniston, Hayburn Wyke, etc. (F.C.R.).
flava Hue—The sterile plant is quite common in the interstices of the bark of old oaks and ash, Raincliffe Wood, Hayburn Wyke, etc.
*__libricola__ B. de Lesd.—On alder, Seamer Moor (F.C.R.).
*__aeruginosa__ (Schaer.) Hue—On ash, Yedmandale (F.C.R.).

PELTIGERALES

STICTACEAE

STICTINA Nylander
fuliginosa (Dicks.) Nyl. (**Sticta**)—Among moss, Forge Valley, Hackness (F.C.R).

LOBARINA Nylander
scrobiculata (Scop.) Nyl. (**Lobaria**)—On ash, Hayburn Wyke (F.C.R.).

LOBARIA Schreber
laciniata (Huds.) Wain.—On oak, Forge Valley (F.C.R.).
laetevirens (Lightf.) Zahlbr.—On oak, Hackness, Forge Valley (F.C.R.).

PELTIGERACEAE

PELTIGERA Willdenow
canina (L.) Willd.—Not uncommon on the ground and on stones.
rufescens (Weis.) Hoffm.—Among ground mosses, Ravenscar, Pickering, etc. (W.E.L.W., F.C.R.).
var. **praetextata** (Floerke) Nyl.—Goathland (W.E.L.W.).
polydactyla (Neck.) Hoffm.—On old wall, Raincliffe Wood (F.C.R.).

SOLORINA Acharius
saccata (L.) Ach.—On peat, Staindale (W.E.L.W.).

PANNARIACEAE

PANNARIA Mudd
rubiginosa (Thunb.) Del.—On stone walls, Thornton-le-Dale (W.E.L.W.) ; Langdale End (F.C.R.).

PLACYNTHIUM Gray, S. F.
nigrum (Huds.) Gray—On limestone, Hutton Buscel, Staintondale (F.C.R.).

COLLEMALES

COLLEMACEAE

LEPTOGIUM Gray, S. F.
sinuatum (Huds.) Massal., var. **scotinum** (Ach.) Koerb.—On calcareous stones in stream, Ellerburn (W.E.L.W.).
lacerum (Lil.) Gray—Pickering (W.W.).
subtile (Schrad.) Nyl.—Pickering, fruiting (W.W.).
schraderi (Bernh.) Nyl.—On wall, Yedmandale (F.C.R.).
turgidum (Ach.) Cromb.—Near Scarborough (S.H., L.Y., p. 47).

SYNECHOBLASTUS Trevisan
nigrescens (Huds.) Anzi—On old ash, Helwath Beck (F.C.R.).
form **furfuraceus** Schaer.—Hackness (F.C.R.).

COLLEMA Hill
furvum Ach.—On calcareous stones in stream, Staindale (W.E.L.W.).
pulposum (Bernh.) Ach.—Not uncommon on limestone walls.
crispum Ach.—Pickering Castle (W.E.L.W.).
granuliferum Nyl.—On calcareous rock, Langdale End (F.C.R.).
cheileum Ach.—Not uncommon on the mortar of old walls.
form **nudum** (Schaer.) Leight.—Pickering (W.W.).

LICHINACEAE

LICHINA Agardh
*__confinis__ (Ach.) Ag.—Only local along the coast, there is a fairly well-defined zone at Filey Brigg and it is not uncommon at Ravenscar. **L. pygmaea,** so common on most of the rocky coasts of Britain, has not been recorded.

PYRENOPSIDACEAE

PSOROTICHIA Massalonga
lugubris (Massal.) Arn.—Mowthorpe Bridge (F.C.R.).

GRAPHIDALES

ARTHONIACEAE

ARTHONIA Acharius

lurida Ach.—On beech, Ellerburn (W.E.L.W.).

OPEGRAPHACEAE

OPEGRAPHA Humboldt

atra Pers.—Not uncommon on the bark of trees.

var. **denigrata** (Ach.) Schaer.—On young ash, Cayton, Hackness (F.C.R.).

var. **arthonoidea** Leight.—On ash, Cayton Bay (F.C.R.).

saxicola Ach.—On calcareous rocks, Burniston, Hayburn Wyke, Cornelian Bay (F.C.R.).

var. **decandollei** Stiz.—Not uncommon on calcareous rocks, Helwath Beck, Cumboots, Suffield, etc.

calcarea Turn.—On limestone, Suffield (F.C.R.).

form **heteromorpha** (Stiz.) Sm., A. L.—On siliceous rock, Cloughton Wyke (F.C.R.).

confluens Stiz.—Pickering (W.W.); Helwath Beck, Cumboots (F.C.R.).

varia Pers.—On beech, Ellerburn, Levisham (W.E.L.W.).

vulgata Ach.—On ash, Ramsdale (W.E.L.W.); Lindhead, etc. (F.C.R.). On holly, Hackness (F.C.R.).

subsiderella Nyl. (**O. vulgata** var. **siderella**)—On ash, Cumboots (F.C.R.)

GRAPHIS Adanson

elegans (Borr.) Ach.—On holly, Bloody Beck, with the type were found form **stellata** Leight. and form **parallela** (Schaer.) Leight. (F.C.R.).

scripta (L.) Ach.—On holly, Hayburn Wyke (F.C.R.).

GRAPHINA Mueller-Argau

anguina (Mont.) Muell.-Arg.—On holly, Hayburn Wyke (F.C.R.).

CONIOCARPALES

SPHAEROPHORACEAE

SPHAEROPHORUS Persoon

globosus (Huds.) Wain.—On grit boulders, Staindale, Ravenscar (W.E.L.W.).

PYRENOCARPALES

VERRUCARIACEAE

VERRUCARIA Persoon

maura Wahl.—Common all along the coast.

mucosa Wahl.—Not uncommon between tide marks, Cornelian Bay, Hayburn Wyke, etc. (F.C.R.).

microspora Nyl.—Not uncommon near H.W.M., Cornelian Bay, Hayburn Wyke (F.C.R.).

var. **laetevirens** Wedd.—Cayton Bay (F.C.R.).

claeomelaena Massal.—W. E. L. Wattam's record of **V. hydrela** from stones in a stream at Ellerburn is probably referable here (W.W., L.Y., p. 56).

margacea Wahl.—On stones in stream, Thornton-le-Dale (W.E.L.W.).
viridula (Schrad.) Ach.—On stone wall, Pickering (W.E.L.W.).
nigrescens Pers.—Common on stone walls.
glaucina (Ach.) Hepp.—Pickering (W.W.) ; Hutton Buscel, etc. (F.C.R.).
maculiformis Kremp.—On calcareous rock, Suffield (F.C.R.).
mutabilis Borr.—On siliceous rock, Langdale End (F.C.R.).
muralis Ach.—Not uncommon on stone walls, mortar, etc.
var. **submuralis** (Nyl.) Oliv., form **minor** B. de Lesd.—Suffield (F.C.R.).
rupestris Schrad.—On chalk cliff, Bempton (W.E.L.W.) ; Pickering (W.W.).
var. **subalbicans** (Leight.) Mudd—Pickering (W.W.).
integra (Nyl.) Carr.—Locally common on limestone, mortar, etc., Helwath Beck, Suffield, Pickering.
calciseda DC. emend, Stein—On chalk cliff, Bempton (W.E.L.W.) ; may be **V. sphinctrina** (Duf.) Nyl. (W.W.).

THELIDIACEAE

NORMANDINA Nylander
pulchella (Borr.) Cromb.—Occasional among moss, Hayburn Wyke, Hackness (F.C.R.)

THELIDIUM Massalonga
immersum (Leight.) Mudd—On limestone, Yedmandale (F.C.R.).
incavatum (Nyl.) Mudd (**T. auruntii,** wrongly)—On limestone, Hutton Buscel (F.C.R.).

ARTHOPYRENIACEAE

ARTHOPYRENIA Massalonga
analepta (Ach.) Massal.—On young ash, Hackness (F.C.R.).
sublitoralis (Leight.) Arn. (**A. litoralis** B. de Lesd.)—On shells, Robin Hood's Bay (E.M.H.).
foveolata Sm., A. L.—On shells, Robin Hood's Bay (E.M.H.). This species is better included in the preceding, as many intermediates occur (W.W., L.Y., p. 60).

PORINACEAE

PORINA Acharius
carpinea (Pers.) Zahlbr.—Pickering (W.W.).
chlorotica (Ach.) Muell.-Arg.—Pickering (W.W.) ; Yedmandale (F.C.R.).
olivacea (Pers.) Sm., A. L.—On alder, Forge Valley (F.C.R.).

PYRENULACEAE

PYRENULA Acharius
nitida (Weig.) Ach.—On ash, Hackness (F.C.R.).

INCERTAE SEDIS

Botrydina vulgaris Bréb.—Pickering (W.W.).

INDEX OF GENERA.

Acarospora	174	Graphis	181	Platysma	170
Alectoria	169	Gyalecta	179	Porina	182
Anaptychia	176	Gyrophora	177	Protoblastenia	176
Arthonia	181	Haematomma	175	Psora	172
Arthopyrenia	182	Hypogymnia	170	Psorotichia	180
Aspicilia	172	Lecanactis	175	Pycnothelia	179
Bacidia	175	Lecania	174	Pyrenula	182
Baeomyces	179	Lecanora	171	Racodium	179
Biatora	172	Lecidea	173	Ramalina	174
Biatorina	174	Leptogium	180	Rhizocarpon	177
Bilimbia	175	Lichina	180	Rinodina	177
Botrydina	182	Lobaria	179	Solorina	180
Buellia	177	Lobarina	179	Sphaerophorus	181
Callopisma	176	Mycoblastus	173	Squamaria	170
Caloplaca	176	Normandina	182	Stereocaulon	179
Candelariella	176	Ochrolechia	172	Stictina	179
Catillaria	175	Opegrapha	181	Synechoblastus	180
Cetraria	170	Pannaria	180	Thelidium	182
Cladonia	177	Parmelia	170	Thelotrema	177
Coenogonium	179	Peltigera	180	Toninia	175
Collema	180	Pertusaria	173	Usnea	169
Crocynia	179	Petractis	179	Verrucaria	181
Diploicia	177	Physcia	176	Xanthoria	175
Evernia	169	Placodium	175		
Graphina	181	Placynthium	180		

HEPATICAE - LIVERWORTS

Joyce Robertson

The arrangement of species follows that used in " The Student's Handbook of British Hepatics ", S. M. MacVicar, 1926, with the nomenclature brought up to date by Mr. E. C. Wallace, who has given us most useful help with the classification and nomenclature.

Abbreviations :—

B.B.S. Rep.—British Bryological Society's Report.
B.N.Y.—North Riding Flora, J. G. Baker (2nd. Edn.).
Ing. Herb.—Ingham Herbarium.
J. Bot.—Journal of Botany.
Nat.—The Naturalist.
Y.N.U. Trans.—Yorkshire Naturalists' Union Transactions.

W.H.B.—W. H. Bellerby
H.B.—H. Britten, Fil.
W.I.—W. Ingham
R.A.L.—R. A. Leefe
R.L.—R. Lewis
F.C.R.—F. C. Rimington
J.R.—J. Robertson
M.B.S.—M. B. Slater
R.S.—R. Spruce
G.W.—G. Webster

Order MARCHANTIALES

CONOCEPHALUM Weber
conicum (L.) Dum.—Fairly common; Danes Dyke (R.S.); Scalby Beck, 1920 (W.H.B.); Derwent Banks, 1950 (J.R.).

LUNULARIA Adanson
cruciata (L.) Dum.—Locally abundant; Hackness, 1947 (R.A.L.).

PREISSIA Corda
quadrata (Scop.) Nees—Goathland and Saltergate Becks (B.N.Y.); Mallyan Spout, Goathland (W.I.).

MARCHANTIA Linnaeus
polymorpha L.—Common.

Order JUNGERMANNIALES

RICCARDIA Gray, S. F.
multifida (L.) Gray, S. F.—Forge Valley, Robin Hood's Bay (B.N.Y.).
sinuata (Dicks.) Trev.—Not common; Robin Hood's Bay (Nat., 1888, p. 240); Forge Valley, 1947 (R.A.L.).
latifrons Lindb.—Mallyan Spout (Ing. Herb.); Filey (Nat., 1903, p. 248).
pinguis (L.) Gray, S. F.—Saltergate Beck, abundant (B.N.Y.).

METZGERIA Raddi

furcata (L.) Dum.—Common on trees, Danes Dyke (R.S.); Beedale (Nat., 1901, p. 298); Forge Valley, 1950 (J.R.).

pubescens Raddi—Goathland Beck (B.N.Y.).

PALLAVICINIA Gray, S. F.

lyellii (Hook.) Gray, S. F.—Rare; Saltergate Beck (B.N.Y.).

PELLIA Raddi

epiphylla (L.) Corda—Very common.

fabbroniana Raddi—By streams; Goathland, Scarborough South Cliff, Robin Hood's Bay (B.N.Y.); Forge Valley, 1950 (J.R.).

BLASIA Linnaeus

pusilla L.—Thornton-le-Dale (Nat. ,1922, p. 292); Filey (J. Bot., 1903, p. 126).

FOSSOMBRONIA Raddi

pusilla (L.) Dum.—Near Scarborough, 1895 (G.W.).

MARSUPELLA Dumortier

emarginata (Ehrh.) Dum.—Goathland, abundant (B.N.Y.).

aquatica (Lind.) Schiffn.—Goathland (B.N.Y.).

NARDIA Gray, S. F.

compressa (Hook.) Gray, S. F.—Goathland (B.N.Y.).

scalaris (Schrad.) Gray, S. F.—Seamer Moor, Goathland (B.N.Y.); Levisham, 1934 (H.B.).

geoscypha (De Not.) Lindb.—Scarborough (Y.N.U. Trans., 1946).

PLECTOCOLEA Mitten

obovata (Nees) Mitt.—Saltergate (B.N.Y.); Robin Hood's Bay (Nat., 1889, p. 231); Mallyan Spout (Ing. Herb.).

hyalina (Lyell) Mitt.—Hayburn Wyke (Y.N.U. Circ.); Mallyan Spout (B.N.Y.); Newton Dale (Nat., 1895, p. 210).

SOLENOSTOMA Mitten

pumilum (With.) Mull., K.—Goathland (B.N.Y.).

triste (Nees) Mull., K.—Saltergate Beck, Robin Hood's Bay (B.N.Y.); Hayburn Wyke (Nat., 1891, p. 290).

crenulatum (Sm.) Mitt.—Goathland (B.N.Y.); Hayburn Wyke (Nat., 1891, p. 290).

sphaerocarpum (Hook.) Steph.—Goathland, Saltergate (B.N.Y.).

GYMNOCOLEA Dumortier

inflata (Huds.) Dum.—Mallyan Spout, Seamer Moor (B.N.Y.); Robin Hood's Bay (Nat., 1889, p. 231).

LEIOCOLEA (Mull., K.) Buch

turbinata (Raddi)—Filey (Nat., 1903, p. 248).

LOPHOZIA Dumortier

ventricosa (Dicks.) Dum.—Thornton-le-Dale (Nat., 1922, p. 192); Newton Dale (Nat., 1895, p. 210).

porphyroleuca (Nees) Schiffn.—Hayburn Wyke (B.N.Y.).

excisa (Dicks.) Dum.—Hayburn Wyke (Nat., 1891, p. 290); Troutsdale, 1852 (M.B.S.).
incisa (Schrad.) Dum.—Mallyan Spout (B.N.Y.).
floerkei (Web. et Mohr) Schiffn.—Hole of Horcum, 1934 (H.B.).
attenuata (Mart.) Dum.—Saltergate Beck, Blueberry Gill, Goathland (B.N.Y.).
barbata (Schmid.) Dum.—Saltergate Beck (B.N.Y.).
quinquedentata (Huds.) Cogn.—Mallyan Spout and Blueberry Gill, Goathland (B.N.Y.).

TRITOMARIA Schiffner
exsectiformis (Breidl.) Schiffn.—Goathland, Ravenscar (Nat., 1924, p. 277).

SPHENOLOBUS (Lindberg) Stephani
minutus (Crantz) Steph.—Goathland (B.N.Y.).

PLAGIOCHILA Dumortier
asplenioides (L.) Dum.—Common.
var. **major** Nees—Frequent (J.R.).

PEDINOPHYLLUM Lindberg
interruptum (Nees) Pears.—Rare; Goathland (B.N.Y.).

MYLIA Gray, S. F.
taylori (Hook.) Gray, S. F.—Robin Hood's Bay (Nat., 1924, p. 276); Goathland (Ing. Herb.).
anomala (Hook.) Gray, S. F.—Goathland (B.N.Y.).

LOPHOCOLEA Dumortier
bidentata (L.) Dum.—One of our commonest hepatics.
cuspidata (Nees) Limpr.—Hackness (B.N.Y.); Robin Hood's Bay (Nat., 1889, p. 231); Thornton-le-Dale (Nat., 1922, p. 292).
heterophylla (Schrad.) Dum.—Many records.

CHILOSCYPHUS Corda
polyanthus (L.) Corda—Frequent by clear streams and springs. Mallyan Spout (Nat., 1903, p. 302), Ellerbeck (Ing. Herb.).

HARPANTHUS Nees von Essenbeck
scutatus (Web. et Mohr) Spruce—Rare ; Goathland (Nat., 1903, p. 302).

CEPHALOZIA Dumortier
bicuspidata (L.) Dum.—Seamer Moor, Goathland (B.N.Y.).
connivens (Dicks.) Lindb.—Robin Hood's Bay (Nat., 1924, p. 277); Goathland Moor (J. Bot., 1925, p. 129).
media Lindb.—Goathland (B.N.Y.); Harwood Dale (Nat., 1904, p. 186).
macrostachya Kaal—Rare; Robin Hood's Bay moors (Nat., 1924, p. 277).
catenulata (Hub.) Spruce—Goathland (B.N.Y.).

CLADOPODIELLA Buch
fluitans (Nees) Joerg.—Goathland (B.N.Y.); Harwood Dale (Nat.. 1904, p. 186).

NOWELLIA Mitten
curvifolia (Dicks.) Mitt.—Goathland, Hackness (B.N.Y.); Harwood Dale (Nat., 1904, p. 186).

CEPHALOZIELLA (Spruce) Schiffner
starkei (Funck.) Schiffn.—Ravenscar, 1934 (H.B.).
hampeana (Nees) Schiffn.—Robin Hood's Bay (Nat., 1924, p. 277).

HYGROBIELLA Spruce
laxifolia (Hook.) Spruce—Goathland (B.N.Y.).

ODONTOSCHISMA Dumortier
sphagni (Dicks.) Dum.—Fen Bog, Goathland (Ing. Herb.).
denudatum (Nees) Dum.—Goathland (B.N.Y.).

CALYPOGEIA Raddi
trichomanis (L.) Corda—Frequent; Filey (Nat., 1903, p. 248); Raincliffe Wood, 1950 (R.L.).
fissa Raddi—Falling Foss (Ing. Herb.).
submersa (Arnell.) Warnst.—Rare; Newton Dale (Nat., 1903, p. 291).
arguta Nees et Mont.—Scarborough, Goathland, Newton Dale (B.N.Y.) ; Ravenscar (Nat., 1924, p. 277); Forge Valley, 1950 (J.R.).

BAZZANIA Gray, S. F.
trilobata (L.) Gray, S.F.—Newton Dale, Goathland (B.N.Y.).

LEPIDOZIA Dumortier
reptans (L.) Dum.—Frequent in shady woods on heaths and on stones among moss; Hole of Horcum, 1934 (H.B.); Forge Valley, 1950 (J.R.).

MICROLEPIDOZIA (Spruce) Joergensen
setacea (Web.) Joerg.—Goathland, Saltergate (B.N.Y.).
trichoclados (Mull., K.) Joerg.—Goathland (B.N.Y.).

BLEPHAROSTOMA Dumortier
trichophyllum (L.) Dum.—Goathland Beck, 1884 (R.S., B.N.Y.).

PTILIDIUM Nees von Essenbeck
ciliare (L.) Hampe—Saltergate Beck, Seamer Moor (B.N.Y.).

TRICHOCOLEA Dumortier
tomentella (Ehrh.) Dum.—Saltergate (B.N.Y.).

DIPLOPHYLLUM Dumortier
albicans (L.) Dum.—Very common and variable.

SCAPANIA Dumortier
compacta (Roth) Dum.—Ravenscar (Ing. Herb.), MacVicar gave doubtful assent.
aequiloba (Schwaegr.) Dum.—Rare; Newton Dale (B.N.Y.).
gracilis (Lindb.) Kaal—Goathland (B.N.Y.).
nemorosa (L.) Dum.—Pickering (Nat., 1922, p. 292).
undulata (L.) Dum.—Saltergate Beck, Newton Dale (B.N.Y.).

dentata Dum.—Hayburn Wyke (Y.N.U. Circ. 92); Robin Hood's Bay (Nat., 1889, p. 239); Goathland (Nat., 1903, p. 302); Thornton-le-Dale (Nat., 1932, p. 292).
uliginosa (Swartz) Dum.—Saltergate Beck (B.N.Y.).
irrigua (Nees) Dum.—Saltergate Beck (B.N.Y.); Thornton-le-Dale (Nat., 1922, p. 292).
curta (Mart.) Dum.—Saltergate Beck (B.N.Y.); Levisham, 1934 (H.B.).
umbrosa (Schrad.) Dum.—Newton Dale, Goathland, Staintondale (B.N.Y.) ; Raincliffe Wood, 1950 (R.L.).

RADULA Dumortier
complanata (L.) Dum.—Newton Dale (Nat., 1895, p. 210); Robin Hood's Bay (Nat., 1888, p. 240).

PORELLA Linnaeus
platyphylla (L.) Lindb.—Newton Dale, Scarborough Castle Hill (B.N.Y.); Forge Valley, 1949 (J.R.).

LEJEUNEA Libert
patens Lindb.—Saltergate Beck (B.N.Y.); **L. cavifolia** (Ehrh.) Lindb. probably occurs but has been overlooked.

MICROLEJEUNEA (Spruce) Stephani
ulicina (Tayl.) Evans—Saltergate Beck (B.N.Y.).

FRULLANIA Raddi
tamarisci (L.) Dum.—Thornton-le-Dale (Nat., 1922, p. 292); Forge Valley, 1950 (F.C.R.); Ravenscar, 1934 (H.B.); Newton Dale (Nat., 1895, p. 210).
dilatata (L.) Dum.—Hayburn Wyke (Nat., 1891, p. 290); Filey (Nat., 1903, p. 248); Helwath Beck, 1949 (F.C.R.).

Order ANTHOCEROTALES

ANTHOCEROS Linnaeus
punctatus L.—Rare or overlooked; Saltergate (Nat., 1922, p. 292).

INDEX OF GENERA.

Anthoceros	188	Frullania	188	Metzgeria	185	Porella	188
Bazzania	187	Gymnocolea	185	Microlejeunea	188	Preissia	184
Blasia	185	Harpanthus	186	Microlepidozia	187	Ptilidium	187
Blepharostoma	187	Hygrobiella	187	Mylia	186	Radula	188
Calypogeia	187	Leiocolea	185	Nardia	185	Riccardia	184
Cephalozia	186	Lejeunea	188	Nowellia	187	Scapania	187
Cephaloziella	187	Lepidozia	187	Odontoschisma	187	Solenostoma	185
Chiloscyphus	186	Lophocolea	186	Pallavicinia	185	Sphenolobus	186
Cladopodiella	186	Lophozia	185	Pedinophyllum	186	Trichocolea	187
Conocephalum	184	Lunularia	184	Pellia	185	Tritomaria	186
Diplophyllum	187	Marchantia	184	Plagiochila	186		
Fossombronia	185	Marsupella	185	Plectocolea	185		

MUSCI - MOSSES

Joyce Robertson.

In 1895 D. W. Bevan made the first moss record for the Scarborough Field Naturalists' Society. Since that time intermittent recording has resulted in a list of some 300 species and varieties, about half the British total. The reason the proportion is not higher is partly due to the sandy and therefore porous nature of a large part of our moorlands, the dry nature of our chalk wolds, a low rainfall because of our position on the East coast with resultant dryness of the atmosphere, and the prevalence in the Spring of drying Easterly and North-Easterly winds.

The moorland hills can be divided into two types in that the ecological distribution of their mosses, particularly the sphagna, is quite different.

On the one hand are the tabular hills, producing as a result of their geological structure, frequent springs on their sides. Because of the Southerly dip of the rock strata these springs occur much nearer the hill-tops on the steep Northern side than on the usually more gentle incline to the South, and it is here, where the heat of the sun is rarely destructive, that great pendulous masses of Sphagnum, notably **S. nemoreum,** are found. On the summit of such hills however, Sphagnum is not nearly so common, being found in any quantity only in some artificially dug trench or pond, and on this dry leached surface we find **Polytrichum piliferum** and **P. juniperinum** well represented, frequently most spectacular with their erect mass of hooded sporophytes. The more robust **Polytrichum commune** is abundant in damper situations, commonly in moist hollows on the higher reaches of the hillsides.

Lower down, where scattered conifers and birches are able to obtain a footing in the deeper soil, the denizens of moister, more acid soils appear, such as **Pleurozium schreberi, Plagiothecium undulatum, Dicranum majus,** and **Leucobryum glaucum. Leucobryum** is also common amongst Sphagnum on the lower heathland, where the water-content is adequate, forming mounds ranging from a few inches to one-and-a-half feet in height. Richard Spruce, observing the rate of growth in this species, found that only the very smallest increase in size could be noted in seven years. If this is the case, some of the larger mounds must be of a considerable age.

If, however, dense coniferous woods are planted on these slopes (as is commonly being done by the Forestry Commission), the vast majority of the mosses are destroyed, except on their outskirts, where a few species such as **Plagiothecium denticulatum** persist. The striking bareness of the ground under evergreen conifers can be due only to a combination of adverse soil conditions (excessive acidity from the decaying leaves and possibly drainage effected by root growth), and lack of direct light throughout the year. It is interesting to compare an evergreen pine or spruce wood with a wood of the deciduous larch. Larch needles produce a much less acid humus than pine, and in addition, these trees are bare

at the time of peak vegetative activity in the moss world. Thus it is quite common to find mosses distributed throughout a whole larch wood, although not nearly as thickly as in a broad-leaved deciduous wood, and I have found a frequenter of rich humus, such as **Mnium undulatum,** together with **Rhytidiadelphus squarrosus,** in considerable quantity in such habitats, though these specimens did not attain the same robust appearance as they might have done in a more favourable environment.

Further to the North, on the Fylingdales Moors, we have the other type of hill, often reaching a higher altitude, but with a gently rounded contour. Here varieties of **Sphagnum nemoreum, papillosum, recurvum** and **plumulosum** are abundant and cover large areas of the moist sloping hillsides, as seen typically south of Goathland and on May Moss. The dry crowns of such hills support for the most part heather and lichens with an occasional patch of one of the genus **Polytrichum,** and, where the heather has been burnt, the quickly-spreading **Funaria hygrometrica** and **Campylopus fragilis.**

Some of our rarer species have been recorded in this region of peaty, water-logged soil, including **Hypnum imponens, Sphagnum holtii** (a first record for Yorkshire), **S. auriculatum and S. bavaricum,** both discovered in this area for the first time in Britain.

Peat beds are widespread over the moors, some being of considerable depth and great age. The sterile quality of this material, due (in peat of sphagnum origin) to the presence of tannin and gallic acid, is well illustrated at Harwood Dale, where excavations in old peat beds have revealed the preserved stumps of very ancient trees, probably the victims of some local subsidence.

This range of hills is intersected, particularly to the South, by deep valleys of erosion as seen in Forge Valley and Troutsdale, through which run streams originating in peat bogs on the moorlands and augmented by springs draining the tabular hills. These valleys support deciduous woods producing rich humus conditions, dear to such species as **Mnium undulatum and Atrichum undulatum.** Here too are found arboreal types such as **Ulota crispa, Orthotrichum diaphanum, O. lyellii** and **Homalia trichomanoides.** In the higher reaches of the woods where the soil is drier and peaty, **Tetraphis pellucida, Isothecium myosuroides, Eurhynchium striatum** and **Rhytidiadelphus loreus** are frequent.

The streams contain their own particular aquatic species, usually firmly rooted between the cracks of the rocky bed, and in some species such as **Fontinalis antipyretica** I have measured stems three and a half feet long. Such lengths would be a disadvantage in the higher reaches of the becks, as these are usually shallow, rocky and turbulent, and the few moss specimens I have encountered have been very short in comparison ; **Fontinalis squamosa** is more likely in such a habitat. Other aquatic species include the many varieties of **Drepanocladus aduncus** and **D. fluitans,** commonly found in bogs (the latter particularly on peaty soil), **Dichodontium pellucidum, Dicranella squarrosa, Acrocladium cordifolium, Brachythecium rivulare** (partially or fully submerged) and **Hyocomium flagellare.**

These streams are frequently bordered by rocks of a calcareous nature, many of them dripping continuously with water seeping down from the surrounding land. This is yet another environment with its due complement of limestone-frequenting mosses, among which can be found **Eucladium verticillatum, Barbula tophacea, Cratoneuron commutatum** (occasionally with lime-incrusted stems), **C. filicinum** and **Ctenidium molluscum.**

As we travel further south we leave the moorland with its sharply incised valleys, and enter the Vale of Pickering. The subsoil here is clay, sometimes intermixed with pockets of sand, especially near the coast, with a superficial layer of peat in most places. This area produces such species as **Fissidens incurvus, F. taxifolius** and **Bryum pallens.**

A characteristic feature of the North Riding is its stone walls of oolitic rock (being predominantly limestone) and frequently mud-capped. Here we find representatives of the **Pottiaceae, Grimmia pulvinata, G. apocarpa, Bryum capillare** which is very common, and **Ceratodon purpureus** var. **conicus.** These all prefer to grow on the mud capping of the wall or perhaps in small, dust-filled niches near the top, whilst down at the bottom, particularly if the wall abuts on to a concrete or hard pavement, **Bryum argenteum,** with its silvery imbricated leaves, often together with **Ceratodon purpureus,** is usually to be seen, finding a seemingly precarious foot-hold in the accumulated silt and dust.

The southern boundary of the Vale of Pickering is formed by chalk wolds, running out to sea at Flamborough Head, on which can be found the rare species **Seligeria calcarea** and **S. paucifolia.**

On the coast the only specifically maritime species we have found are **Pottia heimii** and **Grimmia maritima.** the latter being found on rocks at sea level.

A further genus which is worthy of mention, if only because of its unusual habitat, is **Splachnum,** which grows on the excrement of cattle. **S.ampullaceum,** found in the Vale of Pickering, grows on comparatively low ground, whereas **S. ovatum** prefers a more mountainous environment and has been found on Saltergate Moor, an increase of altitude of some six hundred feet.

Despite the limitations imposed upon our moss flora by our geological and geographical position, it will be seen that all but three of the orders are represented in our area. Of these three the **Andreaeaceae** are not likely to occur as we do not possess any extensive siliceous or quartzose formations (superficially at any rate), on which they are generally found, and, like the **Timmiaceae,** another order not represented, they usually inhabit more mountainous regions. **Schistostega pennata,** the only species of its order, is usually found in holes in sandy hedge-banks, and it is possible that it may exist on some of the impure forms of sandstone that occur in the district, although it has not so far been recorded.

I should like to acknowledge most gratefully the willing and authoritative help I have received in compiling the following list from Mr. C. A. Cheetham, Mr. A. Thompson, and Mr. H. Walsh, all of the

Yorkshire Naturalists' Union ; and also the guidance and advice on classification and nomenclature received from Mr. E. C. Wallace of the British Bryological Society.

Abbreviations :

B.N.Y.—Baker's "North Yorkshire" (2nd ed.).
Y.N.U. Excn.—Yorkshire Naturalists' Union Excursion.
Nat.—"The Naturalist."
M.E.C.—Moss Exchange Club.
B.B.S. Rep.—British Bryological Society's Report.
V.C.H.—Victoria County History.
Ing. Herb.—Ingham Herbarium.
Jour. Bot.—Journal of Botany.

J.G.B.—J. G. Baker
W.B.—W. Bellerby
F.B.—F. Bentham
D.W.B.—D. W. Bevan
Braithw.—Dr. Braithwaite
H.I.T.B.—H. I. T. Bruce
C.A.Ch.—C. A. Cheetham
C.A.Coop.— C. A. Cooper
E.C.H.—E. C. Horrell
G.F.H.—G. F. Horsley
W.I.—W. Ingham
B.K.—B. King
G.M.—G. Massee
J.R.—J. Roberston
T.B.R.—T. B. Roe
M.S.—M. Slater
A.T.—A. Thompson
J.A.W.—J. A. Wheldon
C.H.W.—C. H. Wilson

The classification and nomenclature followed are those of the "Annotated List of British Mosses," by P. W. Richards and E. C. Wallace (Trans. B.B.S., Vol. I, pt. 4, pp. I—XXXI, 1950).

SPHAGNALES

SPHAGNUM Linnaeus

S. INOPHLOEA (Russow) Andrews
palustre L.—Frequent in the Saltergate area and on the Whitby moors.
centrale Jens., C.—Fen Bog (A.T.).
magellanicum Brid.—Rare, Fen Bog (W.I., E.C.H.).
papillosum Lindb.—Goathland (B.N.Y.).

S. LITOPHLOEA (Russow) Andrews
compactum DC.—Harwood Dale (W.I.) ; near Flask Inn (E.C.H.).
var. **imbricatum** Warnst.—Frequent on the moors.
var. **squarrosum** Russ.—Seamer Moor and Goathland (B.N.Y.).
var. **subsquarrosum** Warnst.—Sleights Moor (A.T.).
teres (Schimp.) Angstr., var. **imbricatum** Warnst.—Not common ; East Saltergate Bog, Goathland (B.N.Y.) ; Ellerbeck (W.I.).
squarrosum Pers ex Crome—Goathland (B.N.Y.).
recurvum Beauv., P.—Saltergate (B.N.Y.) ; Harwood Dale, Ravenscar (E.C.H.).
var. **majus** Angst.—Common.

var. **parvulum** Warnst.—Ellerbeck, Goathland Moor, Fen Bog (W.I.).

var. **robustum** Breidl.—Goathland (W.B.) ; Ravenscar (W.I.) ; Ellerbeck and Blakey Topping (A.T.).

amblyphyllum Russ.—Abundant south of Goathland, partly submerged (B.N.Y.).

var. **macrophyllum** Warnst.—Fylingdales Moor (A.T.).

var. **mesophyllum** Warnst.—Fen Bog (W.I.) ; near Ellerbeck (A.T.).

var. **parvifolium** Warnst.—Very rare ; Ellerbeck, 1917 (W.I.).

pulchrum (Lindb.) Warnst.—Near Goathland (B.N.Y.) ; Fen Bog (W.I.).

tenellum Pers.—Fen Bog. Harwood Dale, Ravenscar (W.I.) ; Newtondale (Barnes & Slater).

cuspidatum Ehrh. ex Hoffm., var. **falcatum** Russ.—Lilla Cross (E.C.H.) ; Ravenscar (W.I.) ; Ellerbeck (A.T.).

var. **plumosum** Bryol.—germ.—Staintondale, Robin Hood's Bay (W.B.) ; Fylingdales Moor (A.T.).

var. **serratum** Lesq. et James—Robin Hood's Bay (W.B.).

fallax Klinggr., var **plumosum** Warnst.—Goathland Moor (A.T.).

var. **schultzii** Warnst.—Near West Beck, Goathland (A.T.).

contortum Schultz—Goathland (B.N.Y.).

subsecundum Nees—Not common ; near Goathland, Seamer Moor (B.N.Y.).

var. **intermedium** Warnst.—Hole of Horcum and Fylingdales Moor (A.T.) ; Ellerbeck (G.F.H.).

a. **inundatum** (Russ.) Jens., C., emend. Aberg.—Goathland Moor (W.B.).

var. **densum** Sherr.—Ellerbeck (A.T.).

var. **lancifolium** Warnst.—Ellerbeck (A.T.).

var. **robustum** Sherr.—Fen Bog and Fylingdales Moor (A.T.).

b. **bavaricum** (Wanst.) Aberg.—Ellerbeck, 1907, First British record (W.B., conf. Dr. Warnstorf).

c. **auriculatum** (Schimp.) Lindb. emend. Aberg.—South of Goathland (W.I.).

var. **laxifolium** Warnst.—Fen Bog (W.I.) ; Ellerbeck (G.F.H.).

var. **ovatum** Warnst.—Goathland, Falling Foss, Ravenscar (W.I.) ; Ellerbeck (G.F.H.)

var. **submersum** Warnst.—Fylingdales Moor (A.T.).

var. **tenellum** Warnst.—Above Ravenscar (W.I.), First British record.

d. **crassicladum** Warnst.—Goathland Moor (W.B.) ; Ellerbeck (G.F.H.).

var. **diversifolium** Warnst.—Goathland and Falling Foss (W.I.).

var. **intermedium** Warnst.—Goathland (W.I.).

var. **magnifolium** Warnst.—Staintondale and Goathland (W.B.) ; Fylingdales Moor (A.T.).

e. **obesum** Warnst., var. **canovirens** Warnst.—Fylingdales Moor (A.T.).
f. **holtii** Warnst.—Rare ; only record for Yorkshire, Blakey Topping, 1948 (A.T.).
fimbriatum Wils., var. **laxifolium** Warnst.—Ellerbeck (A.T.).
var. **robustum** Braithw.—Ellerbeck (W.B.) ; Falling Foss and Saltergate Beck (W.I.).
var. **tenue** Grav.—Saltergate Beck (B.N.Y.) ; Falling Foss (W.B.).
var. **validius** Card., forma **compactum** Warnst.—Saltergate Beck (E.C.H.).
girgensohnii Russ.—Uncommon ; Saltergate Beck (B.N.Y.) ; Ringing Keld Bog (E.C.H., W.B.).
russowii Warnst.—Saltergate Beck (Anderson).
var. **girgensohnoides** Russ—Blueberry Hill, Goathland (Slater & Beesley).
warnstorfianum Du Rietz—Goathland Moor and Fen Bog (A.T.).
rubellum Wils.—Fen Bog, Saltergate, Fylingdales Moor (A.T.).
nemoreum Scop. (=**S. acutifolium Ehrh.**)—Abundant on the Goathland Moors.
quinquefarium (Lindb.) Warnst.—Cross Cliff, Beedale, Ellerbeck (W.I.).
plumulosum Roell—Common on the moors near Goathland and Saltergate Beck.
molle Sull.—Not common ; Darnholme, Goathland and Wheeldale Beck (B.N.Y.).
var. **molluscoides** Muell.. C.—Falling Foss and Ellerbeck (W.I.) ; Fylingdales Moor (A.T.).

BRYALES

POLYTRICHACEAE

ATRICHUM Beauvois, P.

undulatum (Hedw.) Beauv., P.—Common in woodland.

POLYTRICHUM Hedwig

nanum Hedw.—Not common; Scalby Moor (B.N.Y.).
aloides Hedw.—Fairly common in dry places on peat; Tar Beck, Ravenscar (F.B.); Broxa (T.B.R., J.R., 1950).
alpinum Hedw.—Saltergate (B.N.Y.).
piliferum Hedw.—Fairly common ; Dalby Warren, Seamer Moor (B.K., J.R., 1950).
juniperinum Hedw.—Common on the moors.
gracile Smith—Newton Dale (B.N.Y.) ; Givendale (B.K.).
formosum Hedw.—Fairly frequent in dry places ; Willerby Carrs (T.B.R.) ; Hackness (B.N.Y.) ; Raincliffe Wood, 1950 (J.R.).
commune Hedw.—Very common near moorland bogs, widely distributed.

FISSIDENTACEAE

FISSIDENS Hedwig

viridulus (Web. et Mohr) Wahl., var. **lylei** Wils.—Rare ; Flamborough (Nat., 1906, p. 248).

pusillus Wils. ex Milde—Robin Hood's Bay (Ing. Herb.) ; Dalby, 1951 (J.R.).

bryoides Hedw.—Fairly frequent in shade ; Cayton Bay (F.B.) ; Wheatcroft (H.I.T.B.), etc.

incurvus Starke ex Web. et Mohr—Cayton Bay on bank side (B.N.Y.).

exilis Hedw.—Not common ; Robin Hood's Bay (C. A. Coop.) ; Newton Dale (B.N.Y.).

osmundoides Hedw.—Saltergate (Ing. Herb.).

taxifolius Hedw.—Frequent ; Cayton Bay (F.B.) ; Wheatcroft Woods (H.I.T.B.) ; Forge Valley (J.R.).

adianthoides Hedw.—Common on boggy land.

cristatus Wils.—On limestone ridge, Forge Valley, 1951 (J.R.).

DICRANACEAE

PLEURIDIUM Bridel

acuminatum Lindb.—Hackness, 1897, Ravenscar, 1903 (Ing. Herb.).

DITRICHUM Hampe

flexicaule (Schleich.) Hampe—Fairly frequent ; Filey (Nat., 1903, p. 248) ; Troutsdale and Saltergate (B.N.Y.) ; Thornton-le-Dale, 1950 (J.R.).

DISTICHIUM Bruch et Schimper

capillaceum (Hedw.) B. et S.—On moist rocks, Saltergate (B.N.Y.).

CERATODON Bridel

purpureus (Hedw.) Brid.—Very common.

var. **conicus** (Hampe) Hag.—Rare ; fruiting on bare ground, Hackness (W.I.) ; Cayton Bay (B.N.Y.).

BRACHYDONTIUM Bruch

trichodes (Web. fil.) Bruch—Not common ; Hayburn Wyke Cliffs (B.N.Y.).

SELIGERIA Bruch et Schimper

pusilla (Hedw.) B. et S.—Not common ; Raincliffe Wood and Forge Valley (B.N.Y.).

paucifolia (Dicks.) Carr.—Rare ; Danes' Dyke (Nat., 1900, p. 237).

calcarea (Hedw.) B. et S.—Danes Dyke (Nat., 1900, p. 237).

recurvata (Hedw.) B. et S.—Not common ; Saltergate Bank top and Troutsdale B.N.Y.).

BLINDIA Bruch et Schimper

acuta (Hedw.) B. et S.—Robin Hood's Bay in moorland marsh (Y.N.U. Excn., 1933).

PSEUDEPHEMERUM (Lindberg) Hagen

nitidum (Hedw.) Jens., C. (=**Pleuridium axillare** (Dicks.) Lindb.)—Uncommon ; Scarborough Racecourse (B.N.Y.).

DICRANELLA Schimper

squarrosa (Starke) Schimp.—Robin Hood's Bay in peaty water (Y.N.U. Excn., 1933) ; Saltergate Beck (B.N.Y., J.R., 1950).

varia (Hedw.) Schimp.—Fairly common ; Forge Valley and Cornelian Bay (C.H.W.).

heteromalla (Hedw.) Schimp.—Very common.

CYNODONTIUM Schimper

bruntonii (Sm.) B. et S.—Uncommon ; in stubble at head of Newton Dale and at Pickering (B.N.Y.).

DICHODONTIUM Schimper

pellucidum (Hedw.) Schimp.—In bed of stream, Robin Hood's Bay (Y.N.U. Excn., 1933); Hackness (B.N.Y.).

var. **flavescens** (Turn.) Jens., C.—Saltergate Beck (B.N.Y.).

DICRANOWEISSIA Lindberg

cirrata (Hedw.) Lindb.—Goathland (B.N.Y.) ; Helwath Beck (E.C.H.).

DICRANUM Hedwig

fuscescens Turn.—Staintondale, Cross Cliff, Pickering (Nat., 1929, p. 279).

majus Turn.—Raincliffe Wood (C.H.W.) ; Harwood Dale, frequent, 1950 (J.R.).

bonjeani de Not.—Goathland (Ing. Herb.).

var. **calcareum** Braithw.—Rare ; Goathland (Ing. Herb.).

var. **rugifolium** Bosw.—Saltergate (M.E.C.Rep., 1912, p. 45).

scoparium Hedw.—Wykeham (W.I.), frequent, 1950 (J.R.).

var. **spadiceum** (Zett.) Boul.—Uncommon ; Raincliffe Wood, 1928 (C.H.W.).

var. **orthophyllum** Brid.—Saltergate (Ing. Herb.)

CAMPYLOPUS Bridel

fragilis (Turn.) B. et S.—Lady Edith's Drive (B.K., 1923, J.R., 1950).

piriformis (Schultz) Brid.—Robin Hood's Bay (C. A. Coop.).

flexuosus (Hedw.) Brid.—Seamer Moor (B.N.Y.).

var. **uliginosus** Ren.—Seamer Moor on marshy ground (B.N.Y.).

atrovirens de Not.—Sleights Moor (B.N.Y.).

LEUCOBRYUM Hampe

glaucum (Hedw.) Schimp.—Common on damp moorland and on leached woodland ; Silpho Moor, fruiting, 1948 (J.R.).

ENCALYPTACEAE

ENCALYPTA Hedwig

streptocarpa Hedw.—Suffield Moor, 1933 (C.H.W.) ; Yedmandale (Nat., 1901, p. 297) ; Givendale, 1950 (J.R.).

POTTIACEAE

TORTULA Hedwig

ruralis (Hedw.) Crome—Silpho on wall, 1948 (J.R.).

intermedia (Brid.) Berk.—Hackness, 1927 (C.H.W.) ; East Ayton, 1951 (J.R.).

laevipila (Brid.) Schwaegr., var. **laevipiliformis** (de Not.) Limpr.—Helwath Beck on trunk of ash, 1949 (J.R.).
papillosa Wils. ex Spruce—Scarborough Mere on thorns (B.N.Y., C.H.W.).
subulata Hedw.—Yedmandale (Nat., 1901, p. 297, J.R., 1950).
muralis Hedw.—Very common on walls and stones.
var. **rupestris** Schultz—Rare ; Scalby on damp rocks (B.N.Y.).
marginata (Bry. Eur.) Spruce—Ebberston (B.N.Y.).

ALOINA Kindberg
rigida (Hedw.) Kindb.—Scalby on mud caps on limestone walls (B.N.Y.).
ambigua (B. et S.) Limpr.—Seamer Moor (B.N.Y., C.H.W.).

PTERYGONEURUM Juratzka
ovatum (Hedw.) Dix.—Pickering and Snainton (B.N.Y.).

POTTIA Fuernrohr
lanceolata (Hedw.) C.M.—Frequent on walls.
heimii (Hedw.) Fuernr.—Scarborough Marine Drive, 1928 (C.H.W.).
truncata (Hedw.) Fuernr.—Wheatcroft Cliff top, 1937 (C.H.W.).
davalliana (Sm.) Jens., C. (= **P. minutula** (Schleich.) Fuernr.)—In a field near Pickering (B.N.Y.).

PHASCUM Hedwig
floerkeanum Web. et Mohr—Rare ; near Pickering (B.N.Y.).
cuspidatum Hedw.—Probably occurs, but no specific records.

ACAULON Mueller, C.
muticum (Brid.) Muell., C.—On bare soil ; Thornton-le-Dale, 1951 (J.R.).

BARBULA Hedwig
convoluta Hedw.—Yedmandale (W.I., Y.N.U., Excn., 1901).
unguiculata Hedw.—Common.
revoluta Brid.—Hackness on limestone wall, 1927 (C.H.W.).
hornschuchiana Schultz—Forge Valley on tree trunk, 1950 (J.R.).
fallax Hedw.—Scarborough Marine Drive, 1928 (C.H.W.).
spadicea Mitt.—Not common ; Robin Hood's Bay (Y.N.U. Excn., 1933).
rigidula (Hedw.) Mitt.—Frequent ; Cumboots (C.H.W.) ; Scalby Mills (B.N.Y.).
trifaria (Hedw.) Mitt.—Flamborough (Nat., 1906, p. 248).
tophacea (Brid.) Mitt.—Common on wet limestone rocks.
cylindrica (Tayl.) Schimp.—Silpho Moor, 1928 (C.H.W.).
recurvirostris (Hedw.) Dix. (=**B. rubella** (Hoffm.) Lindb.)—Robin Hood's Bay (C. A. Coop.) ; Forge Valley, 1950 (J.R.).

GYMNOSTOMUM Hedwig
aeruginosum Sm.—Saltergate Beck on wet limestone rocks (B.N.Y.).
recurvirostrum Hedw.—Newton Dale, east side (B.N.Y.).

GYROWEISSIA Schimper
tenuis (Hedw.) Schimp.—Uncommon ; Hackness (Ing. Herb.).

EUCLADIUM Bruch et Schimper
verticillatum (With.) B. et S.—Hackness on wet rocks (B.N.Y.) ; Forge Valley, 1950 (J.R.).

TORTELLA (Mueller, C.) Limpricht
tortuosa (Hedw.) Limpr.—Newton Dale (B.N.Y.) ; Forge Valley, 1950 (J.R.).
nitida (Lindb.) Broth.—Rare ; near Robin Hood's Bay (B.N.Y.).

TRICHOSTOMUM Bruch
sinuosum (Wils.) Lindb. (= **Barbula sinuosa** Wils.)—Not common ; Hayburn Wyke (B.B.S. Rep. III).
crispulum Bruch—Scalby (B.N.Y.) ; Robin Hood's Bay (Y.N.U. Excn., 1933).
brachydontium Bruch—Goathland Dale (J.G.B., V.C.H., p. 135) ; Forge Valley, 1950 (J.R.).
var. **littorale** (Mitt.) Jens., C.—Goathland (M.E.C. Rep., 1910).

WEISSIA Hedwig
controversa Hedw.—Scarborough North Bay, 1928 (C.H.W.) ; Forge Valley, 1950 (J.R.).
rutilans (Hedw.) Lindb. (= **W. mucronata** Bruch)—Rare ; Hackness (B.N.Y.); Ravenscar (Nat., 1906, p. 187).

LEPTODONTIUM Hampe
flexifolium (Smith) Hampe—Uncommon ; Bickley Moor on peat, 1939 (C.H.W.).

GRIMMIACEAE

GRIMMIA Hedwig
maritima Turn.—Rare ; Scarborough, on rocks near Spa (B.N.Y.).
apocarpa Hedw.—Frequent on stone walls.
pulvinata (Hedw.) Smith—Very common on walls and rocks.
trichophylla Grev.—Wykeham (Y.N.U. Excn., 1925).
decipiens (Schultz) Lindb.—Uncommon ; near Robin Hood's Bay (B.N.Y., G.M.).

RHACOMITRIUM Bridel
aciculare (Hedw.) Brid.—Raincliffe Wood, 1928 (C.H.W.).
canescens (Hedw.) Brid.—On stony ground, Thornton-le-Dale, 1951 (J.R.).
lanuginosum (Hedw.) Brid.—Robin Hood's Bay (C. A. Coop.).

FUNARIACEAE

FUNARIA Hedwig
hygrometrica Hedw.—Common ; especially on dry heaths and banks.
muehlenbergii Turn. (=**F. calcarea** Wahl.)—Rare ; Brocka Beck Bridge, Whitby-Pickering road (B.N.Y.).
attenuata (Dicks.) Lindb. (=**F. templetoni** Smith)—On damp rocks, Scarborough-Whitby road (B.N.Y.).
fascicularis (Hedw.) Schimp.—Uncommon ; Holbeck Gardens, Scarborough (F.B., E.C.H.).

obtusa (Dicks.) Lindb. (= **F. ericetorum** (Bals. et de Not) Dix.)—Saltergate Moor (B.N.Y.) ; Robin Hood's Bay (Y.N.U. Excn., 1933).

PHYSCOMITRIUM Bridel

pyriforme (Hedw.) Brid—Willerby Carrs (T.B.R., F.B.) ; Langdale End, 1952 (J.R.).

SPLACHNACEAE

SPLACHNUM Hedwig

ampullaceum Hedw.—Vale of Pickering (W.I., Y.N.U. Excn., 1902) ; Thornton-le-Dale, 1951 (J.R.).

ovatum Hedw.—Saltergate Moor (B.N.Y.).

TETRAPHIDACEAE

TETRAPHIS Hedwig

pellucida Hedw.—Raincliffe Wood, plentiful (C.H.W.) ; Saltergate Beck (B.N.Y.) ; Cockrah Wood, plentiful, 1950 (J.R.).

browniana (Dicks.) Grev.—Not common ; Goathland (W.I.) ; Robin Hood's Bay (Y.N.U. Excn., 1933).

BRYACEAE

ORTHODONTIUM Schwaegrichen

lineare Schwaegr.—Row Brow, Scarborough, plentiful on peaty soil (Y.N.U. Excn., 1943).

POHLIA Hedwig

cruda Hedw.—Seamer Moor (G.M.).

nutans (Hedw.) Lindb.—Raincliffe Wood, 1927 (C.H.W.) ; Dalby, 1951 (J.R.).

albicans (Wahl.) Lindb.—Scarborough, foot of Racecourse Hill, in water, Flixton Carr, 1938 (B.K.).

delicatula (Hedw.) Grout (= **Webera carnea** Schimp.)—Goathland Beck (Braithw.).

BRYUM Hedwig

inclinatum (Brid.) Bland.—Saltergate (Y.N.U. Excn., 1895).

uliginosum (Bruch ex Brid.) B. et S.—Rare ; mouth of Scalby Beck (B.N.Y.).

pallens (Brid.) Roehl—Frequent ; Flixton Carrs, Saltergate Beck (B.N.Y.) ; Robin Hood's Bay (C. A. Coop.).

pseudotriquetrum (Hedw.) Schwaegr.—Saltergate (Y.N.U. Excn., 1895) ; Filey Cliffs (W.I.).

bimum Brid.—Upper end of Yedmandale, 1901 (W.I.) ; Thornton-le-Dale, 1949 (J.R.).

intermedium (Ludw.) Brid.—Filey (Ing. Herb.).

caespiticium Hedw.—Widespread in the district.

argenteum Hedw.—Abundant on roadsides, roofs, cinders, etc.

bicolor Dicks. (= **B. atropurpureum** Web et Mohr)—Raincliffe Wood (C.H.W.) ; Ravenscar (M.E.C. Rep., 1904).

alpinum With., var. **meridionale** Schimp.—Base of Peck Cliff, Robin Hood's Bay, 1889 (M.S.).

capillare Hedw.—Common.

RHODOBRYUM (Schimper) Limpricht
roseum (Hedw.) Limpr.—Uncommon ; Saltergate Beck (B.N.Y.).

MNIACEAE

MNIUM Hedwig
hornum Hedw.—Common in many and varied habitats.
marginatum (With.) Brid. ex Beauv., P.—Not common ; Goathland (Ing. Herb.).
longirostrum Brid.—Raincliffe Wood (B.K., 1923, C. A. Coop., 1950, J.R.).
affine Bland., var. **elatum** B. et S.—Uncommon ; Saltergate Beck (B.N.Y.).
undulatum Hedw.—Very common, particularly in Raincliffe Wood.
punctatum Hedw.—Hayburn Wyke (F.B.) ; Yedmandale, etc. Frequent.
var. **elatum** Schimp.—Goathland (B.N.Y.).
pseudopunctatum B. et S.—Rare ; Goathland Dale, Foul Syke, on Whitby Moors (Y.N.U. Excn., 1933).

AULACOMNIACEAE

AULACOMNIUM Schwaegrichen
palustre (Hedw.) Schwaegr.—Near Saltergate Beck, abundant (B.N.Y.) ; Seamer Moor, on boggy land, 1928 (C.H.W.) ; Allerston Moor in bog, 1950 (J.R.).
androgynum (Hedw.) Schwaegr.—Cloughton, 1952 (J.R.).

BARTRAMIACEAE

BARTRAMIA Hedwig
pomiformis Hedw.—Near Saltergate Beck (B.N.Y.).
var. **crispa** (Web. et Mohr) B. et S.—Langdale End, 1950 (J.R.).

PHILONOTIS Bridel
fontana (Hedw.) Brid.—Fairly frequent in moorland streams ; Goathland (M.E.C. Rep., 1903) ; Wrench Green, 1949 (J.R.)
caespitosa Wils. ex Milde—Rare ; Saltergate Beck (Nat., 1917, p. 45).
capillaris Lindb.—Rare ; limestone spring, Langdale End, 1949 (J.R.).
calcarea (B. et S.) Schimp.—Troutsdale (B.N.Y.).

BREUTELIA Schimper
chrysocoma (Dicks.) Lindb.—Bloody Beck (Ing. Herb.).

PTYCHOMITRIACEAE

CAMPYLOSTELIUM Bruch et Schimper
saxicola (Web. et Mohr) B. et S.—Merrick's Gill near Hackness, 1842, Falling Foss (B.N.Y.).

ORTHOTRICHACEAE

ZYGODON Hooker et Taylor
viridissimus (Dicks.) Brown, R.—Filey Cliffs (W.I.).

ORTHOTRICHUM Hedwig
anomalum Hedw.—Ayton on limestone (F.B., E.C.H., J.R., 1951) ; Saltergate Moors (B.N.Y.).
affine Brid.—Raincliffe Wood on trees, 1927 (C.H.W.) ; Hackness (Ing. Herb.).
lyellii Hook. et Tayl.—Hackness on trees (B.N.Y.).
pallens Bruch—On stone wall. Hackness, 1950 (J.R.).
pulchellum Brunt.—Harwood Dale (B.N.Y.) ; Robin Hood's Bay (Nat., 1907, p. 252).
diaphanum Brid.—Raincliffe Wood, 1928 (C.H.W.).

ULOTA Bridel
phyllantha Brid.—Forge Valley (B.N.Y.).
crispa (Hedw.) Brid.—Usually on trees ; Hackness (B.N.Y.) ; Forge Valley, 1950 (J.R.).
crispula Bruch—Rare ; Forge Valley (B.N.Y.).
bruchii Hornsch.—Robin Hood's Bay (C. A. Coop.).
drummondii (Hook. et Grev.) Brid.—Rare ; Hackness, 1843 (R. Spruce).

FONTINALACEAE

FONTINALIS Hedwig
antipyretica Hedw.—Bed of R. Derwent, Everley, 1948 (J.R.).
squamosa Hedw.—Saltergate Beck (B.N.Y.).

CLIMACIACEAE

CLIMACIUM Weber et Mohr
dendroides (Hedw.) Web. et Mohr—Hackness, fruiting, rare (B.N.Y.) ; Yedmandale (F.B.) ; Thornton-le-Dale, 1951 (J.R.).

CRYPHAEACEAE

CRYPHAEA Mohr
heteromalla (Hedw.) Mohr—Uncommon ; Flamborough (Y.N.U. Circ., 84).

LEUCODONTACEAE

LEUCODON Schwaegrichen
sciuroides (Hedw.) Schwaegr.—Swang Plantation, Cumboots, 1927 (C.H.W.).

NECKERACEAE

NECKERA Hedwig
complanata (Hedw.) Hueben.—Frequent ; Forge Valley and Seamer Moor (C.H.W., J.R., 1950).
HOMALIA (Bridel) Bruch et Schimper
trichomanoides (Hedw.) B. et S.—Forge Valley on tree trunk, fruiting, and on roadside (C.H.W., 1939, J.R., 1950).
THAMNIUM Bruch et Schimper
alopecurum (Hedw.) B. et S.—Robin Hood's Bay (C. A. Coop.) ; Forge Valley (C.H.W.) ; both on wet rocks.

HOOKERIACEAE

HOOKERIA Smith

lucens (Hedw.) Smith—Frequent ; Forge Valley (C.H.W.) ; Hackness (Y.N.U. Excn., 1937) ; Robin Hood's Bay (C. A. Coop.) ; near Throxenby Mere, 1949 (J.R.).

LESKEACEAE

LESKEA Hedwig

polycarpa Hedw.—Falling Foss, 1924 (W.B.).

THUIDIACEAE

HETEROCLADIUM Bruch et Schimper

heteropterum (Bruch) B. et S.—Robin Hood's Bay in mill stream (Y.N.U. Excn., 1933).

ANOMODON Hooker et Taylor

viticulosus (Hedw.) Hook. et Tayl.—Robin Hood's Bay, Forge Valley (C. A. Coop., 1938, J.R., 1950).

THUIDIUM Bruch et Schimper

tamariscinum (Hedw.) B. et S.—Common, many habitats in the district.

philiberti Limpr.—Very rare ; Rillington (Nat., 1916, p. 44).

HYPNACEAE

CRATONEURON (Sullivant) Roth

filicinum (Hedw.) Roth—Frequent on wet stones, damp ground or near streams.

commutatum (Hedw.) Roth—Frequent ; Wheatcroft Woods and Mere Road, Scarborough (H.I.T.B.) ; Throxenby Mere (B.K.), etc.

var. **falcatum** (Brid.) Moenk.—Saltergate Beck (B.N.Y.) ; Mallyan Spout (W.I.) ; Burniston Cliffs, 1950 (J.R.).

var. **virescens** (Schimp.) Rich. et Wall.—Filey (Nat., 1903, p. 248) ; Ebberston Beck, 1950 (J.R.).

decipiens (de Not.) Loeske—Rare ; Cross Cliff, Langdale End (G.M., B.N.Y.).

CAMPYLIUM (Sullivant) Mitten

stellatum (Hedw.) Lange et Jens., C.—Harwood Dale (W.I.) ; Thornton-la-Dale, 1951 (J.R.).

protensum (Brid.) Kindb.—Not common ; Scarborough Castle Hill (W.I.) ; Newton Dale, Saltergate (B.N.Y., C.H.W., 1928) ; Forge Valley, 1950 (J.R.).

chrysophyllum (Brid.) Bryhn—Hole of Horcum (B.N.Y.) ; Scarborough Castle Hill, 1928 (C.H.W.).

polygamum (B. et S.) Lange et Jens., C.—Not common ; Filey (Nat., 190, p. 248).

LEPTODICTYUM (Schimper) Warnstorf

riparium (Hedw.) Warnst.—Harwood Dale (W.I.) ; Scarborough, 1904 (Ing. Herb.).

AMBLYSTEGIUM Bruch et Schimper

serpens (Hedw.) B. et S.—Cayton Bay, Yedmandale (F.B.) ; Troutsdale, 1950 (J.R.).

juratzkanum Schimp.—Oliver's Mount, Scarborough, 1951 (J.R.).

varium (Hedw.) Lindb.—Near Cayton Bay (B.N.Y.).

AMBLYSTEGIELLA Loeske

sprucei (Bruch) Loeske—Rare ; on stones by Goathland Beck (B.N.Y.).

DREPANOCLADUS (Mueller, C.) Roth

aduncus (Hedw.) Warnst.—Hackness, Saltergate Hills (B.N.Y.) ; Silpho Moor, 1950 (J.R.).

fluitans (Hedw.) Warnst.—Harwood Dale (W.I.) ; Wrench Green, 1950 (J.R.).

var. **jeanbernati** Ren.—Harwood Dale (W.I.).

exannulatus (B. et S.) Warnst.—Bog on Fylingdales Moor (Y.N.U. Excn., 1907) ; Goathland (M.E.C.Rep., 1909).

revolvens (Sm.) Warnst.—Moors near Robin Hood's Bay (Y.N.U. Excn., 1933, J.R., 1949) ; bog in Thornton Dale, 1950 (J.R.).

var. **intermedius** (Lindb.) Rich. et Wall.—In bog near Goathland (M.E.C.Rep., 1905).

uncinatus (Hedw.) Warnst.—Hackness (W.I.).

HYGROHYPNUM Lindberg

ochraceum (Turn. ex Wils.) Loeske—Saltergate Beck (B.N.Y.).

luridum (Hedw.) Jenn.—On damp rocks, Harwood Dale (W.I.) ; Robin Hood's Bay (Y.N.U. Excn., 1907).

eugyrium (B. et S.) Loeske—Goathland (M.E.C.Rep. II).

ACROCLADIUM Mitten

cordifolium (Hedw.) Rich. et Wall.—Not common ; Throxenby Mere (B.K., C. A. Coop., 1923, J.R., 1949) ; Ravenscar, 1951 (J.R.).

cuspidatum (Hedw.) Lindb.—Very common in damp situations.

ISOTHECIUM Bridel

myurum (Brid.) Brid.—Forge Valley, Newton Dale, 1938 (C.H.W.) ; Dalby, 1950 (J.R.).

myosuroides Brid.—Seamer Moor (H.I.T.B.) ; Troutsdale (B.N.Y.).

CAMPTOTHECIUM Bruch et Schimper

sericeum (Hedw.) Kindb.—Throxenby, Hutton Buscel (H.I.T.B., C. A. Coop., 1938) ; frequent on walls (J.R.).

lutescens (Hedw.) Brid.—Givendale (H.I.T.B., C. A. Coop., 1923) ; in quarry, Ayton, 1950 (J.R.).

BRACHYTHECIUM Bruch et Schimper

albicans (Hedw.) B. et S.—Filey Cliffs (W.I.) ; Staxton, 1950 (J.R.).

glareosum (Bruch) B. et S.—Thornton-le-Dale, 1951 (J.R.).

rutabulum (Hedw.) B. et S.—Very common.

var. **robustum** B. et S.—Filey Cliffs (W.I.).

rivulare (Bruch) B. et S.—Filey Cliffs (W.I.) ; Saltergate (M.S.) ; Forge Valley, 1951 (J.R.).

velutinum (Hedw.) B. et S.—Scarborough, Jacob's Ladder and Hay Brow (F.B., C. A. Coop.).
plumosum (Hedw.) B. et S.—Hayburn Wyke (Y.N.U. Excn., 1895).

CIRRIPHYLLUM Grout
piliferum (Hedw.) Grout—Raincliffe Wood (D.W.B.) ; Cornelian Bay, 1939 (C.H.W.) ; Goathland Beck (B.N.Y.).
crassinervium (Tayl.) Loeske et Fleisch.—Uncommon ; Saltergate (M.S., 1895).

EURHYNCHIUM Bruch et Schimper
striatum (Hedw.) Schimp. em. Storm.—Raincliffe Wood (D.W.B., J.R., 1950) ; Hackness (B.N.Y.) ; Robin Hood's Bay (Nat., 188, p. 240).
praelongum (Hedw.) Hobk.—Common on clay soil in hedgerows, grass, etc.
swartzii (Turn.) Curn.—Hackness (B.N.Y.) ; Yedmandale on ground (W.I.) ; Forge Valley, 1950 (J.R.).
schleicheri (Hedw. fil.) Lor. (=**E. abbreviatum** (Turn.) Schimp.)—Rare ; Falling Foss (Ing. Herb.).
riparioides (Hedw.) Jenn.—Robin Hood's Bay, Thornton-le-Dale (C.H.W. et C. A. Coop., 1927) ; Troutsdale, 1950 (J.R.).
murale (Hedw.) Milde—Harwood Dale (W.I., Y.N.U. Excn., 1904) ; Forge Valley, 1950 (J.R.).
confertum (Dicks.) Milde—Frequent ; Scarborough Museum gardens, Raincliffe Wood, etc. (C.H.W.).

RHYNCHOSTEGIELLA Limpricht
pallidirostra (Br. A.) Loeske—Rare ; Goathland Beck (B.N.Y.).

ENTODON Mueller, C.
orthocarpus (La Pyl.) Lindb. (**Cylindrothecium concinnum** (de Not.) Schimp.)—Uncommon ; Newton Dale, Pickering (B.N.Y.).

PSEUDOSCLEROPODIUM (Limpricht) Fleischer
purum (Hedw.) Fleisch.—Frequent.

PLEUROZIUM Mitten
schreberi (Brid.) Mitt.—Common in woods and on moorland.

ISOPTERYGIUM Mitten
depressum (Bruch) Mitt.—Not common ; Wykeham (Y.N.U. Excn., 1945) ; Sawdon Dale (W.I.).
pulchellum (Hedw.) Jaeg. et Sauerb.—Near Saltergate (B.N.Y.).
elegans (Hook.) Lindb.—Raincliffe Wood (C.H.W.) ; Cloughton Bank, 1948 (J.R.).

PLAGIOTHECIUM Bruch et Schimper
latebricola (Wils.) B. et S.—Blueberry Hill, Goathland (B.N.Y).
denticulatum (Hedw.) B. et S.—Frequent ; woods at Hayburn Wyke and Wheatcroft (C. A. Coop.) ; Seamer Moor (H.I.T.B., J.R., 1950).

silvaticum (Brid.) B. et S.—Troutsdale, 1928 (C.H.W.).
undulatum (Hedw.) B. et S.—Frequent ; Raincliffe Wood (H.I.T.B.) ; Silpho Moor (F.B.) ; Troutsdale (J.R.), etc.

HYPNUM Hedwig

cupressiforme Hedw.—Very common.
var. **resupinatum** (Wils.) Schimp.—Staintondale (B.N.Y.) ; Raincliff Wood, 1928 (C.H.W.) ; Throxenby, 1950 (J.R.).
var. **filiforme** Brid.—Harwood Dale (W.I.).
var. **ericetorum** B. et S.—Abundant in heather, Robin Hood's Bay (C.A.Ch., Y.N.U. Excn., 1946).
var. **tectorum** Brid.—Staxton, 1951 (J.R.).
imponens Hedw.—Very rare ; Goathland (W.I., M.E.C.Rep., I.).

CTENIDIUM (Schimper) Mitten

molluscum (Hedw.) Mitt.—Scalby Beck (F.B.) ; Cloughton Cliff (C.H.W.) ; Forge Valley, 1949 (J.R.).

HYOCOMIUM Bruch et Schimper

flagellare B. et S.—Robin Hood's Bay in stream (Y.N.U. Excn., 1933) ; Blueberry Hill, Goathland (B.N.Y.).

RHYTIDIADELPHUS (Lindberg) Warnstorf

triquetrus (Hedw.) Warnst.—Common.
squarrosus (Hedw) Warnst.—Very common.
loreus (Hedw.) Warnst.—Hackness, Saltergate (B.N.Y.) ; Langdale End (C.H.W.) ; Silpho Moor, 1950 (J.R.).

HYLOCOMIUM Bruch et Schimper

splendens (Hedw.) B. et S.—Hackness, 1928 (H.I.T.B.) ; frequent, 1950 (J.R.).

INDEX OF GENERA.

Acaulon 197
Acrocladium 203
Aloina 197
Amblystegiella 203
Amblystegium 203
Anomodon 202
Atrichum 194
Aulacomnium 200
Barbula 197
Bartramia 200
Blindia 195
Brachydontium 195
Brachythecium 203
Breutelia 200
Bryum 199
Camptothecium 203
Campylium 202
Campylopus 196
Campylostelium 200
Ceratodon 195
Cirriphyllum 204
Climacium 201
Cratoneuron 202
Cryphaea 201
Ctenidium 205
Cynodontium 196
Dichodontium 196
Dicranella 196
Dicranoweissia 196
Dicranum 196
Distichium 195
Ditrichum 195
Drepanocladus 203
Encalypta 196
Entodon 204
Eucladium 198
Eurhynchium 204
Fissidens 195
Fontinalis 201
Funaria 198
Grimmia 198
Gymnostomum 197
Gyroweissia 197
Heterocladium 202
Homalia 201
Hookeria 202
Hygrohypnum 203
Hylocomium 205
Hyocomium 205
Hypnum 205
Inophloea 192
Isopterygium 204
Isothecium 203
Leptodictyum 202
Leptodontium 198
Leskea 202
Leucobryum 196
Leucodon 201
Litophloea 192
Mnium 200
Neckera 201
Orthodontium 199
Orthotrichum 201
Phascum 197
Philonotis 200
Physcomitrium 199
Plagiothecium 204
Pleuridium 195
Pleurozium 204
Pohlia 199
Polytrichum 194
Pottia 197
Pseudephemerum 195
Pseudoscleropodium 204
Pterygoneurum 197
Rhacomitrium 198
Rhodobryum 200
Rhynchostegiella 204
Rhytidiadelphus 205
Seligeria 195
Sphagnum 192
Splachnum 199
Tetraphis 199
Thamnium 201
Thuidium 202
Tortella 198
Tortula 196
Trichostomum 198
Ulota 201
Weissia 198
Zygodon 200

VASCULAR PLANTS

Harold Rowntree

INTRODUCTION

W. A. Sledge, Ph.D., B.Sc.

Much of the attraction for visitors to the Scarborough district lies in the wide variety and charm of its scenery. Within easy access excursions may be made to elevated moorlands, richly wooded valleys, alluvial flats, chalk wolds and sea cliffs. The geology is as varied as the topography. Lias clays in the north about Robin Hood's Bay give way to grits, sandstones and shales which underlie most of the area north and north-west of Scarborough. These are succeeded by Oxford clays and calcareous oolitic rocks which constitute the subsoil as far south as Seamer, Pickering and Kirbymoorside. The alluvial pastures of the Derwent plain overlie Kimmeridge Clays, and as the ground rises again further south these are replaced either by the chalk grasslands which form the northern fringe of the East Yorkshire Wolds country or, towards the coast, by superimposed glacial clays. The varied character and geology of the country are reflected in an equally varied vegetation which, both for ecological range and richness in species, is of outstanding interest. Only in its maritime vegetation is the flora poor ; for high cliffs fringe the coast throughout the area and the consequent lack of sand-dunes, shingle-beaches or salt-marshes severely limits the number of maritime species.

A large part of the country to the west and north of Scarborough is covered with moorlands rising on Fylingdales Moor to an altitude of 959 ft. These upland regions and their vegetation are well described in F. Elgee's **The Moorlands of North-Eastern Yorkshire** (1912). The peat formed over the grit and sandstone rocks is mostly heather-covered and over considerable areas of these moors the vegetation consists almost exclusively of **Calluna.** Other moorland plants commonly associated with heather all occur in varying quantity, e.g., bilberry (**Vaccinium myrtillus**), cowberry (**V. vitis-idaea**), bell heather (**Erica cinerea**), cross-leaved heath (**E. tetralix**), crowberry (**Empetrum nigrum**), cotton-sedge (**Eriophorum angustifolium** and **E. vaginatum**), deer-sedge (**Scirpus caespitosus**), purple moor-grass (**Molinia caerulea**) and mat-grass (**Nardus stricta**), and one or other of these may preponderate wherever local conditions are favourable as on the dry gritty outcrops of the Cross Cliff escarpment where bilberry is dominant, or on the wetter peats of May Moss on Allerston High Moor and Harwood Dale Moss where heather becomes subordinate to cross-leaved heath and cotton-sedge.

The streams which flow from the high moorlands have excavated valleys and ravines the slopes of which in the lower reaches are either wooded or have been reclaimed almost to the moor edge ; but in the higher parts of the gills the vegetation is open and treeless. On these slopes heather is usually of minor importance, bracken (**Pteridium aquilinum**) clothing great areas, with bilberry (**Vaccinium myrtillus**) as a secondary dominant. Bog-myrtle (**Myrica gale**) is an abundant and characteristic species in the swampy bottoms of many gills, e.g., Jugger Howe, Bloody Beck and upper Newton Dale.

The rarer plants of the moorlands and gills include several interesting species. Of these the dwarf cornel (**Cornus suecica**) and the few-flowered sedge (**Carex pauciflora**) are the most noteworthy. Both reach their southernmost limit in Britain on the moorlands of North-east Yorkshire. The illustration of the dwarf cornel, dated March 1st, 1796, in the first edition of Sowerby's **English Botany,** was drawn from a specimen which "Mr. William Travis of Scarborough, gathered . . . on the side of a valley in that neighbourhood called the Hole of Horcum, where this alpine plant grows abundantly." It is still plentiful on the north-facing bracken-clad slopes of this imposing locality and also at the upper edge of the Cross Cliff escarpment. In both localities it is associated with chickweed wintergreen (**Trientalis europaea**), which grows in many places on moorlands and wooded slopes between Scarborough and Whitby. **Carex pauciflora** is also still plentiful in bogs near the source of the River Derwent, below Lilla Cross. On Silpho Moor two species of wintergreen (**Pyrola minor** and **P. media**) are to be found, and **Linnaea borealis**—perhaps introduced with planted trees—was once gathered here but has never been refound. Other notable species include the long-leaved sundew (**Drosera anglica**), bog rosemary (**Andromeda polifolia**), dwarf tway-blade (**Listera cordata**) and **Leucorchis albida,** the last-named forming hybrids with the fragrant orchid (**Gymnadenia conopsea**) at the Hole of Horcum.

The numerous dales which intersect the moorlands are well wooded. These woodlands represent remains of the forest which formerly covered all the lower ground and extended over all or nearly all the now treeless slopes of the upper reaches of the dales and gills as is indicated by the remains of trees, principally birch, in the peat, and the occasional occurrence of scrub and solitary trees on these slopes. On the sandstones, grits and non-calcareous soils of the northern and central part of the district, e.g., Goathland, Newton Dale, Cross Cliff and Langdale, birch, oak, mountain ash, holly and hawthorn predominate. The flora on the acidic soils of these woodlands is relatively poor in species ; moorland plants such as heather (**Calluna**), bilberry (**Vaccinium myrtillus**) and wavy hair-grass (**Deschampsia flexuosa**), typical of birch and oak woods on well-leached and shallow soils, are here widespread and abundant. On deeper and damper soils especially with a northern aspect as in Raincliffe Wood, the undergrowth often consists largely of ferns (**Dryopteris filix-mas, D. dilatata, Athyrium filix-foemina** and **Blechnum spicant**) and mosses. In addition to these semi-natural

woodlands there has been extensive afforestation of the drier moorland peat soils with conifer plantations.

The transition from the siliceous soils to the calcareous sandstones and the oolitic limestones of the southern part of the moorlands is reflected in changes in the woodlands, oak, ash and beech prevailing with varying admixture of elm (**Ulmus glabra**) and sycamore (**Acer pseudo-platanus**). The flora of the woodlands on the more basic soils, as at Thornton-le-Dale, Yedmandale and Forge Valley, is far richer in species. Columbine (**Aquilegia vulgaris**), herb christopher (**Actaea spicata**), spindle tree (**Euonymus europaeus**), stone bramble (**Rubus saxatilis**), lily-of-the-valley (**Convallaria majalis**) and herb paris (**Paris quadrifolia**), are all plentiful in several localities. Other uncommon plants include mountain St. John's wort (**Hypericum montanum**), fly orchid (**Ophrys insectifera**) and yellow star-of-Bethlehem (**Gagea lutea**). The beautiful wooded glacial channel of Forge Valley is a particularly interesting area. Here, in addition to most of the species already mentioned, may be found green hellebore (**Helleborus viridis**), wood vetch (**Vicia sylvatica**), **Cephalanthera longifolia** and the sedges **Carex strigosa** and **C. pendula**. Higher up the valley towards Hackness the may lily (**Maianthemum bifolium**) still maintains a somewhat precarious existence in its only indigenous British station on the north-facing rim of the valley; whilst the fern **Dryopteris aemula** grows in one of its very few Yorkshire stations not far away, accompanied by a profusion of chickweed wintergreen (**Trientalis europaea**). Under beeches both at Forge Valley and Thornton-le-Dale the yellow bird's nest (**Monotropa hypopitys**) and the bird's nest orchid (**Neottia nidus-avis**) have been found.

Much of the country between Pickering and Scarborough is grassland and the open, dry limestone slopes furnish many interesting plants in addition to the more widely distributed species typical of calcareous grasslands. Good examples of these pastures may be seen on the treeless slopes of Dalby Warren near Thornton-le-Dale and the hill sides above Hutton Buscel, Ayton and Seamer. Rock-rose (**Helianthemum nummularium**), salad burnet (**Poterium sanguisorba**) and wild thyme (**Thymus serpyllum**) are abundant in such places, sometimes accompanied by burnet rose (**Rosa spinosissima**), ploughman's spikenard (**Inula conyza**), hawkweed oxtongue (**Picris hieracioides**), woolly-headed thistle (**Cirsium eriophorum**), pyramid orchid (**Anacamptis pyramidalis**) and burnt tip orchid (**Orchis ustulata**). On one dry bank near Seamer yellow with rock-rose may be seen in addition, English flax (**Linum anglicum**), purple milk vetch (**Astragalus danicus**), dropwort (**Filipendula hexapetala**), yellow bedstraw (**Galium verum**), clustered bellflower (**Campanula glomerata**), hoary plantain (**Plantago media**) and the grasses **Koeleria gracilis** and **Helictotrichon pratense.** Further variety is given to the flora by the marshes flanking stream sides and the limy flushes on the hill slopes, e.g., at Thornton-le-Dale. Such marly bog soils yield a vegetation in which meadow thistle (**Cirsium dissectum**), grass-of-parnassus (**Parnassia palustris**), marsh helleborine (**Epipactis palustris**), black bog rush (**Schoenus nigricans**), sedges (**Blysmus com-**

pressus, Scirpus pauciflorus, Carex dioica and **C. lepidocarpa**) and club-moss (**Selaginella selaginoides**) occur.

South of a line running from Pickering eastwards to Seamer and Cayton the rich agricultural land of the flat, low-lying, alluvial plain of the Derwent affords fewer areas of interest to the botanist. The swampy carrs which formerly existed here have been drained and the remnants of the marsh flora are now largely confined to the river banks and the dyke sides of the Hertford River and Sherburn Cut. As the ground rises again to the northern edge of the East Yorkshire wolds, beds of sand underlying the chalk are exposed about Flixton and Staxton and the sandy fields and sand pits in this neighbourhood provide a distinctive flora which contrasts markedly with that in any other part of the region. Numerous species, rare or absent elsewhere in the Scarborough district, may be seen here. A perennial segregate of the wild pansy (**Viola lepida**) is abundant about Flixton sand-pits and the rare grass **Apera interrupta** also occurs here with wild alyssum (**Alyssum calycinum**), hare's-foot trefoil (**Trifolium arvense**), soft knotted trefoil (**T. striatum**), bird's foot (**Ornithopus perpusillus**), basil thyme (**Acinos arvensis**) and many other plants characteristic of sandy, well-drained soils. The cornfield weeds also include many species which are rarely, if ever, met with elsewhere in the area. One such field near Staxton yielded small-flowered fumitory (**Fumaria parviflora**), corn cockle (**Agrostemma githago**), sainfoin (**Onobrychis viciifolia**), corn Venus's looking-glass (**Specularia hybrida**) and henbit (**Lamium amplexicaule**).

Chalk grasslands clothe much of the higher ground to the southern boundary of the district with arable cultivation on the overlying glacial clays nearer the coast. The grasslands are for the most part too heavily grazed to furnish ground equal in botanical interest to the limestones north of the Derwent valley though some interesting species such as the broomrape (**Orobanche elatior**) may be found in the scattered chalk pits on the northern edge of the wolds. The withdrawal from cultivation and grazing afforded by the sea cliffs also accounts for the occurrence here of some species, including the bloody cranesbill (**Geranium sanguineum**), rare or absent in other parts of the area.

As regards Scarborough itself and its immediate vicinity, the Castle Hill and Scarborough and Throxenby Meres provide the best ground for the botanist. On the Castle Hill, composed of an outlying mass of the hard calcareous rocks of the middle oolite, alexanders (**Smyrnium olusatrum**) is abundant with clary (**Salvia horminoides**), spotted and toothed medicks (**Medicago arabica** and **M. denticulata**) and a few of the commoner maritime species such as the two sea plantains (**Plantago maritima** and **P. coronopus**). Scarborough Mere is now converted into a pleasure garden and greatly altered from its original sedge-fringed condition though a few of the rarities at one time to be found here still linger. Of these the great spearwort (**Ranunculus lingua**), sea dock (**Rumex maritimus**) and flowering rush (**Butomus umbellatus**) have all been seen in recent years. Throxenby Mere is less spoilt, and about its reedy margin of horsetail (**Equisetum limosum**), yellow flag (**Iris**

pseudacorus), reedmace (**Typha latifolia**) and sedge (**Carex rostrata**), other marsh plants including bog-bean (**Menyanthes trifoliata**), marsh cinquefoil (**Comarum palustre**) and marsh stitchwort (**Stellaria palustris**) may be seen.

FOREWORD

Harold Rowntree

The nomenclature used in this list is that found in the "Check list of British Vascular Plants," compiled by Professor A. R. Clapham (Journal of Ecology, Vol. 33, pp. 308-347, 1946), with synonyms omitted for the sake of brevity. The English names used are taken from the "Index of British Plants according to the London Catalogue" (8th ed.), by Robt. Turnbull, 1889.

The list has been prepared from the records of the Scarborough Field Naturalists' Society (with recent additions by the compiler) : from the records contained in J. G. Baker's "Flora of North Yorkshire," 1906, in F. Arnold Lees' "Supplement to the Yorkshire Floras," and in "The Naturalist" ; from the Horrell Herbarium, through the kindness of Dr. W. A. Sledge, Ph.D., B.Sc., ; from the records of Miss C. M. Rob, F.L.S., W. Foggitt, and from Theakston's "Guide to Scarborough," 1858.

The compiler's grateful thanks are accorded to Dr. Sledge and to Miss Rob, for their help, also to Mr. H. Britten (late of Whitby), Mr. R. D. Meikle, of Kew, Mr. G. W. Temperley and Mr. S. Max Walters of Cambridge.

The Society has been fortunate in the long list of botanists who have contributed to its records ; such names as the following come readily to mind : D. W. Bevan, A. I. Burnley, R. Gilchrist, E. C. Horrell, E. B. Lotherington, T. N. Roberts and T. B. Roe. Others, who have left the district, are G. W. Temperley and H. E. Bentham, and we are glad still to have with us E. R. Cross whose first records appear under the year 1884 and his latest in 1948, and whom we look upon as "The Grand Old Man" of local botany.

When of interest, the date of the first known record of a species is given ; the great majority still occur, except where it is stated that they have not been found recently.

Abbreviations

S/C.A.—Surg./Commdr. Arrathoon
B.E.C.—Botanical Exchange Club
H.B.—H. Britten fil.
W.B.—W. Bean
C.C.B.—C. C. Babington
A.I.B.—A. I. Burnley
J.G.B.—J. G. Baker
D.W.B.—D. W. Bevan
H.E.B.—H. E. Bentham
H.J.B.—H. J. Burkill
J.F.G.C.—J. F. G. Chapple
E.R.C.—E. R. Cross
H.D.—Hilda Drabble
G.C.D.—G. Claridge-Druce
R.J.F.—R. J. Flintoff
W.F.—W. Foggitt
W.J.F.—W. J. Fordham
A.G.—Alan Garton
J.G.—James Green
T.G.—Theakston's Guide to Scarborough, 1854
Hb.—Herbarium
P.M.H.—P. M. Hall
J.C.—J. Cryer
E.C.H.—E. C. Horrell
J.S.H.—J. S. Hicks
E.G.H.—E. G. Highfield
F.A.L.—F. Arnold Lees
Nat.—"Naturalist."
A.M.O.—Miss A. M. Oxlee
M.E.P.—Miss M. E. Pearson
H.W.P.—H. W. Pugsley
B.R.—Rev. Bernard Reynolds
J.F.R.—J. Fraser Robinson
C.M.R.—Miss C. M. Rob
H.R.—Harold Rowntree
S.R.—Sidney Rowntree
T.B.R.—T. B. Roe
A.M.S.—A. Malins Smith
A.S.S.—A. S. Smith
W.A.S.—W. A. Sledge
J.H.S.—J. H. Salter
G.W.T.—G. W. Temperley
E.S.T.—E. S. Todd
G.B.W.—G. B. Walsh
C.W.—C. Waterfall
H.E.W.—H. E. Wroot
Y.N.U.—Yorkshire Naturalists' Union

x—Hybrid xx—Intergeneric Hybrid *—Alien

PHANEROGAMS — FLOWERING PLANTS

DICOTYLEDONES

RANUNCULACEAE

CLEMATIS Linnaeus

***vitalba** L..—TRAVELLER'S JOY, CLEMATIS, OLD MAN'S BEARD. Rare; Sawdon Dale, 1901 (W.F.); Hackness, 1939 (E.R.C.).

THALICTRUM Linnaeus

flavum L.—COMMON MEADOW RUE. Plentiful; Yedingham, Thornton-le-Dale, Seamer Carrs (T.B.R., E.C.H.).

ANEMONE Linnaeus

nemorosa L.—WOOD ANEMONE. Abundant in Forge Valley, etc.

RANUNCULUS Linnaeus

drouetii Schultz, F.—WATER CROWFOOT. Rare; Flamborough (Y.N.U. Excn., 1906).

heterophyllus Web.—WATER CROWFOOT. Uncommon; pond at top of Hay Brow, 1941 (H.R.).

peltatus Schrank (incl. **R. floribundus** Bab. and **R. penicillatus** Bab.) Common in ponds, etc.

baudotii Godr.—Pond at Suffield, 1934 (C.M.R.).

lenormandi Schultz, F.—Rare; Harwood Dale, 1946 (A.G.).

hederaceus L.—IVY-LEAVED WATER CROWFOOT. Uncommon; near Staintondale, 1894 (W.F.); Hagg House Farm, Pickering, 1939 (H.R.); Cloughton, 1898 (E.R.C.).

sceleratus L.—CELERY-LEAFED CROWFOOT. Uncommon; Ganton Carrs, 1915 (E.C.H.); Scarborough Mere and Cayton, 1912 (H.R.); Seamer, 1896 (W.F.).

flammula L.—LESSER SPEARWORT. Scarborough and Throxenby Meres, plentiful, 1913 (E.C.H.); Seamer Moor, 1914 (E.C.H.); Staintondale, 1906 (W.F.).

lingua L.—GREATER SPEARWORT. Rare; Scarborough Mere, 1940 (H.R.); pond near Cayton Station, 1914 (G.W.T.); Filey, 1914 (A.I.B.); Cayton Carrs, 1916 (E.C.H.).

auricomus L.—WOOD CROWFOOT, GOLDILOCKS. Common; Forge Valley, Lady Edith's Drive, etc.

acris L.—COMMON BUTTERCUP. Abundant.

repens L.—CREEPING BUTTERCUP. Abundant.

bulbosus L.—BULBOUS BUTTERCUP. Abundant.

parviflorus L.—SMALL-FLOWERED CROWFOOT. Rare; Thornton-le-Dale, 1922 (R.J.F., J.G.); Filey, 1948 (Miss R. Kilby **teste** W.A.S.).

arvensis L.—CORN CROWFOOT. Uncommon; Cayton Carrs. 1914 (G.W.T.); Thornton-le-Dale and Robin Hood's Bay, 1939 (H.R.).

ficaria L.—LESSER CELANDINE. Abundant.

CALTHA Linnaeus

palustris L.—MARSH MARIGOLD. Common in wet places; Forge Valley, Raincliffe Wood, etc.

TROLLIUS Linnaeus

europaeus L.—GLOBE FLOWER. Local; Levisham, 1912 (A.I.B.).

HELLEBORUS Linnaeus

viridis L.—GREEN HELLEBORE. Uncommon; Goathland, 1869 (A.S.S.); Beck Hole, 1928 (W.A.S.); West Ayton Castle, Lowdales, Ellerburn (H.R.).

*__foetidus__ L.—STINKING HELLEBORE. Rare; West Heslerton, 1884 (W.G.). Now found only in cultivation.

ERANTHIS Salisbury

***hyemalis** (L.) Salisb.—WINTER ACONITE. Uncommon ; naturalised at Brompton, West Flotmanby and Foxholes (H.R.).

AQUILEGIA Linnaeus

vulgaris L.—COLUMBINE. Uncommon ; Forge Valley, 1914 (G.W.T.) ; Dalby Nut Wood, 1912 (A.I.B.) ; between Levisham and Pickering, 1908 (W.F.).

ACONITUM Linnaeus

***anglicum** Stapf.—MONKSHOOD. Rare ; Ellerburn, 1914 (H.R.) ; Newton House, Falling Foss, 1912 (E.R.C.) ; only as a garden escape.

ACTAEA Linnaeus

spicata L.—BANEBERRY, HERB CHRISTOPHER. Rare ; Thornton-le-Dale, 1914 (G.W.T.) ; Yedmandale, 1915 (E.C.H.) ; Forge Valley and Givendale (H.R.).

BERBERIDACEAE

BERBERIS Linnaeus

vulgaris L.—BARBERRY. Rare ; West Ayton Castle and Wilton, 1912 (E.R.C.).

MAHONIA Nuttall

aquifolium (Pursh) Nutt.—HOLLY-LEAVED BARBERRY. Uncommon ; Forge Valley and Cloughton Bank, probably planted as cover for game (H.R.).

NYMPHAEACEAE

NUPHAR Smith, Sir J. E.

lutea (L.) Sm.—YELLOW WATER-LILY. Uncommon ; Scarborough Mere, 1891 (E.R.C.) ; River Derwent at Ayton, 1912 (H.R.).

NYMPHAEA Linnaeus

alba L.—WHITE WATER LILY. Rare ; Scarborough Mere, 1885 (E.R.C.) ; Beastcliff Undercliff, 1904 (E.R.C.).

PAPAVERACEAE

PAPAVER Linnaeus

***somniferum** L.—OPIUM POPPY. Rare ; Scarborough (J.G.B.), probably a garden escape.

rhoeas L.—FIELD POPPY. Plentiful.

dubium L.—LONG SMOOTH-HEADED POPPY. Common in waste places.

lecoqii Lam.—Uncommon ; Yedmandale, 1915 (Hb. E.C.H.) ; Thornton-le-Dale and Seamer Lime Kilns, 1947 (H.R.).

argemone L.—LONG PRICKLY-HEADED or PALE POPPY. Uncommon ; Flixton, 1915 et seq. (G.W.T.) ; Beedale, 1945 (C.M.R.).

MECONOPSIS Viguier

***cambrica** (L.) Vig.—YELLOW WELSH POPPY. Rare ; Fylingdales (J.G.B.) ; Thornton-le-Dale and East Ayton (H.R.) ; probably a garden escape.

CHELIDONIUM Linnaeus

***majus** L.—CELANDINE. Common in hedges near villages ; East Ayton, Snainton, Ebberston, etc.

FUMARIACEAE

CORYDALIS Medikus

***lutea** (L.) DC.—YELLOW CORYDALIS. Plentiful on village walls, particularly at Thornton-le-Dale.

claviculata (L.) DC.—CLIMBING CORYDALIS. Uncommon ; Hayburn Wyke, 1941 (H.R.) ; Cloughton, 1915 et seq. (G.W.T.).

FUMARIA Linnaeus

capreolata L.—RAMPANT FUMITORY. Uncommon ; Everley and Burniston, 1914 et seq. (G.W.T.) ; roadside near Newby, 1914 (T.B.R.) ; Cloughton, 1896 (W.F.).

officinalis L.—COMMON FUMITORY. Abundant in dry fields and on roadsides.

vaillantii Lois.—Rare ; quarry near Seamer Station, plentiful, 1897 (W.F.).

parviflora Lam.—Rare, Staxton (Y.N.U. Excn., 1943) ; Thornton-le-Dale, 1944 (H.R.) ; Forge Valley, 1948 (H.R., **teste** C.M.R.) ; quarry near Seamer Station, plentiful, 1897 (W.F.).

CRUCIFERAE

CHEIRANTHUS Linnaeus

***cheiri** L.—WALLFLOWER. Uncommon ; Scarborough Castle Hill, well established (H.R.).

NASTURTIUM Brown, R.

officinale Brown, R.—COMMON WATER-CRESS. Common in becks.

RORIPPA Scopoli

sylvestris (L.) Bess.—CREEPING YELLOW-CRESS. Rare ; Scarborough Mere, 1940 (H.R.).

islandica (Oeder) Borb.—MARSH YELLOW-CRESS. Uncommon ; Scarborough Mere, 1914 (E.C.H.).

amphibia (L.) Bess.—GREAT YELLOW-CRESS. Rare ; banks of River Derwent at Yedingham, 1947 (H.R.) ; Forge Valley, 1916 (W.F.).

BARBAREA Ehrhart, B.

vulgaris Brown, R.—YELLOW ROCKET. Common ; Cloughton Newlands, Stone Haggs, etc.

***verna** (Mill.) Asch.—AMERICAN CRESS. Uncommon ; Thornton-le-Dale Mill, 1916 (A.I.B.).

ARABIS Linnaeus

hirsuta (L.) Scop.—HAIRY ROCK-CRESS. Uncommon ; Forge Valley, Flixton, Ellerburn (H.R.).

CARDAMINE Linnaeus

amara L.—LARGE-FLOWERED BITTER-CRESS. Rare ; Forge Valley, 1914 (G.W.T.).

pratensis L.—LADY'S SMOCK, CUCKOO-FLOWER. Abundant in meadows. A double-flowered variety grows at Thornton-le-Dale (H.R.).

hirsuta L.—HAIRY BITTER-CRESS. Common.

flexuosa With.—WAVY HAIRY BITTER-CRESS. Commoner than **C. hirsuta** ; Forge Valley, etc.

***latifolia** Vahl.—Church Becks, Scalby, well established, 1949. Native of the Pyrenees ; an addition to the British List (H.R., det. J. E. Lousley).

DENTARIA Linnaeus

***bulbifera** L.—BULBIFEROUS CORALWORT. Rare ; Scalby Churchyard, 1946 et seq. (H.R.).

ALYSSUM Linnaeus

***alyssoides** (L.) L.—ALYSSUM. Rare ; Staxton sandpits, 1942 et seq. (E.R.C., H.R.).

LOBULARIA Desvaux

***maritima** (L.) Desv.—SWEET ALYSSUM. Rare ; Scalby, 1914 (E.C.H.) ; 1915 (A.I.B.) ; probably a garden escape.

EROPHILA De Candolle

verna (L.) Chev.—WHITLOW GRASS. Common on old walls, etc.

COCHLEARIA Linnaeus

officinalis L.—SCURVY-GRASS. Common ; Marine Drive, Castle Hill, Cloughton Wyke, Filey, etc.

danica L.—HASTATE-LEAVED SCURVY-GRASS. Bempton Cliffs, 1947 (Dr. M. Ealing, teste W.A.S.) ; Ravenscar, 1948 (H.R., teste C.M.R.).

ARMORACIA Gilibert

***lapathifolia** Gil.—HORSE RADISH. Common ; probably only as an escape from cultivation.

MALCOLMIA Brown, R.

*__maritima__ (L.) Brown, R.—VIRGINIAN STOCK. Rare; Scarborough Mere, waste ground, 1916 (E.C.H., det. G.C.D.).

HESPERIS Linnaeus

*__matronalis__ L.—DAME'S VIOLET. Uncommon; waste places near habitation, Langdale End, 1915 (E.C.H.); Thornton-le-Dale, Pickering, etc. (H.R.).

ARABIDOPSIS Heynhold

__thaliana__ (L.) Heynh.—THALE CRESS. Rare; Hackness, 1914 (A.I.B.); Thornton-le-Dale, 1944 (H.R.).

SISYMBRIUM Linnaeus

__officinale__ (L.) Scop.—HEDGE MUSTARD. Abundant.

*__altissimum__ L.—Rare and casual; Thornton-le-Dale, 1922 (R.J.F., J.G.).

*__orientale__ L.—Rare and casual; Thornton-le-dale, 1922 (R.J.F., J.G.).

DESCURAINIA Webb et Berthelot

__sophia__ (L.) Prantl—FLIXWEED. Rare; Scarborough, (J.G.B.); not seen in recent years.

ALLIARIA Ehrhart, B.

__petiolata__ (Bieb.) Cav. et Grande—GARLIC MUSTARD, JACK BY THE HEDGE. Abundant.

ERYSIMUM Linnaeus

__cheiranthoides__ L.—TREACLE MUSTARD. Rare; Stepney Road and Seamer Lime Works, 1940 (H.R.); not seen since 1941; waste ground Scarborough Cemetery, 1899 (W.F.); Pickering, 1945 (M.E.P.).

CONRINGIA Adanson

*__orientalis__ (L.) Dum.—HARE'S EAR. Rare and casual; Thornton-le-Dale Mill, 1945 (H.R., __teste__ W.A.S.).

CAMELINA Crantz

*__sativa__ (L.) Crantz—GOLD OF PLEASURE. Occasional; Scalby, 1886 (E.R.C.); Scarborough Mere, 1916 (E.C.H.); Staxton and Thornton-le-Dale, 1941 (H.R.).

*__alyssum__ (Mill.) Thell.—Rare and casual; Thornton-le-Dale, 1946 (H.R., __teste__ W.A.S.).

BRASSICA Linnaeus

__oleracea__ L.—SEA CABBAGE. Robin Hood's Bay, 1884 (E.R.C.).

*__napus__ L.—WILD RAPE. Uncommon; Scarborough Castle Hill, 1912 (A.I.B.).

*campestris L. (inc. B. rapa L.)—FIELD CABBAGE. Common.
nigra (L.) Koch—BLACK MUSTARD. Uncommon ; Robin Hood's Bay (Hb. E.C.H.).

SINAPIS Linnaeus

arvensis L.—WILD MUSTARD, CHARLOCK. Abundant.
alba L.—WHITE MUSTARD. Uncommon ; Thornton-le-Dale, 1915 (A.I.B., G.W.T.) ; Scarborough Mere, waste ground, 1916 (E.C.H.).

DIPLOTAXIS De Candolle

tenuifolia (L.) DC.—WALL ROCKET. Rare ; Scarborough Mere, waste land, 1939 et seq. (H.R.) ; near Seamer Station, 1901 (W.F.).
muralis (L.) DC.—SAND ROCKET, WALL MUSTARD. Rare ; Wykeham Abbey, 1902 (W.F.).

CAPSELLA Medikus

bursa-pastoris (L.) Med.—SHEPHERD'S PURSE. Abundant.

CORONOPUS Boehmer

squamatus (Forsk.) Asch.—WART-CRESS. Rare ; Seamer Carrs, 1915 (T.B.R.) ; Woodlands Farm, 1947 (H.R.).
didymus (L.) Sm.—LESSER WART-CRESS. Rare ; Scarborough (J.G.B.) ; not seen in recent years.

LEPIDIUM Linnaeus

*latifolium L.—BROAD-LEAVED PEPPERWORT or CRESS. Rare ; Robin Hood's Bay (B.R.).
*ruderale L.—NARROW-LEAVED PEPPERWORT. Very rare ; Scarborough Old Pier, 1854 (T.G.).
campestre (L.) Brown, R.—FIELD PEPPERWORT. Rare ; Robin Hood's Bay (B.R.).
smithii Hook.—GREY PEPPERWORT. Rare ; Sleights (B.R.).
None of the above pepperworts has been recorded in recent years.

CARDARIA Desvaux

*draba (L.) Desv.—HOARY CRESS. Uncommon ; Marine Drive, Scarborough Mere, Thornton-le-Dale (H.R.).

THLASPI Linnaeus

*arvense L.—FIELD PENNY CRESS. Uncommon ; Yedmandale, 1914 (E.C.H.) ; Thornton-le-Dale Mill, 1940 (H.R.).

IBERIS Linnaeus

amara L.—CANDYTUFT. Rare ; Scarborough Mere and Yedmandale, 1916 (E.C.H.) ; an outcast from gardens.

BUNIAS Linnaeus

*erucago L.—Rare ; Hutton Buscel, 1945, 1947 (H.R., det. W.A.S.).

CAKILE Miller

maritima Scop.—SEA-ROCKET. Local; Cayton Bay, 1904 (E.R.C.); one plant, 1916 (A.I.B.); none seen in 1940 (E.R.C.); appeared again in 1947 (H.R.); abundant under barbed-wire defences on Foreshore Road, Scarborough, in 1942, declined the following year and has now disappeared.

RAPHANUS Linnaeus

raphanistrum L.—WILD RADISH. Common; Seamer Moor (E.C.H.); Hackness (G.W.T.); Thornton-le-Dale (H.R.).

RESEDACEAE

RESEDA Linnaeus

alba L.—UPRIGHT or WHITE MIGNONETTE. Rare; near Seamer Station, 1894 (W.F.).

lutea L.—WILD MIGNONETTE. Not uncommon; Stone Haggs, 1913 (T.B.R.); Yedmandale Quarry, 1914 (E.C.H.); Pexton Moor, Thornton-le-Dale (H.R.).

stricta Pers.—SPIKE MIGNONETTE. Rare; Grosmont (B.R.).

luteola L.—WELD, DYER'S ROCKET. Local; plentiful on Castle Hill, Scarborough, 1914 (E.C.H.).

CISTACEAE

HELIANTHEMUM Miller

nummularium (L.) Mill.—ROCK-ROSE. Common; Yedmandale, Forge Valley, Thornton-le-Dale, etc.

VIOLACEAE

VIOLA Linnaeus

odorata L.—SWEET VIOLET. Common.

var. **dumetorum** (Jord.) Rouy. et Fouc.—WHITE SWEET VIOLET. Common.

var. **subcarnea** Jord.—FLESH COLOURED SWEET VIOLET. Rare; Thornton-le-Dale, 1949 (H.R., det. S.M.W.).

hirta L.—HAIRY VIOLET. Uncommon; Yedmandale, 1914 (E.C.H.); Forge Valley, 1912 (A.I.B.).

hirta L. x **odorata** L. (x **V. sepincola** Jord.)—Forge Valley (A.I.B., **teste** G.C.D.); Ellerburn, 1915 (A.I.B.).

palustris L.—MARSH VIOLET. Uncommon; Bickley, 1913 (G.W.T.); near Falcon Inn, 1940 (H.R.).

reichenbachiana Bor.—WOOD VIOLET. Occasional.

riviniana Reich.—DOG VIOLET. Common.

segetalis Jord.—Yedmandale Seamer Carrs (E.C.H., **teste** C. Drabble).

ruralis Bor.—Near Scarborough (E.S.T., H.D. in rep. B.E.C., 1936).

deseglisei Bor.—Seamer Moor (E.C.H., **teste** C. Drabble).

tricolor agg.—HEARTSEASE. Abundant.
lejeunii Jord.—Cayton Carrs (E.C.H.,**teste** C. Drabble).
lepida Jord.—Plentiful at Flixton and Staxton (H.R.).
lutea Huds.—YELLOW MOUNTAIN PANSY. Seamer Moor, very rare, 1854 (T.G.).

POLYGALACEAE

POLYGALA Linnaeus

vulgaris L.—MILKWORT. Considerably less common than **P. serpyllifolia,** Whisperdales, 1913 (Hb. E.C.H.).
oxyptera Reich.—Speeton (Y.N.U. Excn., 1910) ; Silpho Moor, a doubtful record, 1914 (T.B.R.).
serpyllifolia Hose—HEATH MILKWORT. Common on heaths.

CARYOPHYLLACEAE

SAPONARIA Linnaeus

***officinalis** L.—SOAPWORT. Rare ; Fylingdales (C. C. Babington) ; Castle Hill, Scarborough (J.G.B.) ; not seen in recent years.

SILENE Linnaeus

cucubalus Wib.—BLADDER CAMPION. Common.
gallica agg.—SMALL-FLOWERED CATCHFLY. Rare ; Cayton Carrs and Thornton-le-Dale, 1940 (H.R.).
anglica L.—ENGLISH CATCHFLY. Rare ; corn-field, Forge Valley, 1915 (E.C.H.) ; Staxton sand-pits, 1940 (E.R.C.).
quinquevulnera L.—Rare ; corn-field, Forge Valley, 1915 (A.I.B., E.C.H.).
***dichotoma** Ehrh.—Rare and casual ; Staxton sand-pits, 1943 (W.A.S.).

MELANDRIUM Roehling

noctiflorum (L.) Fr.—NIGHT-FLOWERING CATCHFLY. Common.
album (Mill.) Garcke—WHITE CAMPION. Common on roadsides, Ganton, Sherburn, Ayton, Seamer, etc.
album x dioicum—Seamer Carrs, 1915 (E.C.H.).
dioicum (L.) Coss. et Germ.—RED CAMPION. Abundant.

LYCHNIS Linnaeus

flos-cuculi L.—RAGGED ROBIN. Common ; Scarborough and Throxenby Meres, Hackness, Ellerburn, etc.

AGROSTEMMA Linnaeus

githago L.—CORN-COCKLE. Rare ; Ayton, 1913 (T.B.R.) ; Flixton and Yedmandale, 1916 (E.C.H.). ; Staxton, 1940 (H.R.).

CERASTIUM Linnaeus

tetrandrum Curt.—SEA MOUSE-EAR CHICKWEED. Rare ; Flamborough (Y.N.U. Excn., 1923).

semidecandrum L.—LESSER MOUSE-EAR CHICKWEED. Uncommon ; Flixton, 1916 (A.I.B.).
viscosum L.—NARROW-LEAVED MOUSE-EAR CHICKWEED. Common in dry places.
vulgatum L.—MOUSE-EAR CHICKWEED. Abundant.
arvense L.—FIELD MOUSE-EAR CHICKWEED. Not uncommon ; Scarborough Castle Hill, 1913 (E.C.H.) ; Flixton, 1916 (A.I.B.).

STELLARIA Linnaeus

media (L.) Vill.—CHICKWEED. Abundant.
holostea L.—GREATER STITCHWORT. Abundant.
palustris Retz.—MARSH STITCHWORT. Uncommon ; Cayton Carrs, 1916 (E.C.H.) ; Throxenby Mere, 1916 (A.I.B.) ; Newtondale (S.C.A.).
graminea L.—LESSER STITCHWORT. Common in damp grassy places ; Throxenby Mere, Raincliffe Wood, etc.
alsine Grimm.—BOG STITCHWORT. Common in wet places ; Forge Valley, Troutsdale, etc.

ARENARIA Linnaeus

trinervia L.—THREE-NERVED SANDWORT. Common ; Langdale End, Hackness, etc.
serpyllifolia L.—THYME-LEAVED SANDWORT. Common in dry places.
var. **macrocarpa** Lloyd—Rare ; Scarborough Castle Hill (J.G.B.) ; not seen in recent years.
leptoclados (Reich.) Guss.—SANDWORT. Rare ; High Fordon, 1946 (E.R.C., H.R. det. C.M.R.).
peploides L.—SEA-PURSLANE. Rare ; Scalby Mills and Cayton Bay, 1914, but not there in 1916 (A.I.B.) ; Scarborough (J.G.B.) ; not seen in recent years.

SAGINA Linnaeus

apetala Ard.—ANNUAL PEARLWORT. Common on dry banks, walls, etc.
ciliata Fr.—CILIATED PEARLWORT. Scarborough (J.G.B.) ; not seen recently.
procumbens L.—PROCUMBENT PEARLWORT. Common in dry places.
nodosa (L.) Fenzl.—KNOTTED SPURREY. Uncommon, in damp places ; Langdale End, 1916 (A.I.B.) ; Flixton, Dalby Dale, 1943 (H.R.).

SPERGULA Linnaeus

arvensis L.—CORN SPURREY. Common in cornfields.
sativa Boenn.—Rare ; Hutton Buscel Moor, 1916 (E.C.H.).

SPERGULARIA Presl., J. et C.

rubra (L.) Presl., J. et C.—SANDWORT SPURREY. Rare ; Cloughton Quarry, 1915 (A.I.B.).

marginata (DC.) Kitt.—GREATER SANDWORT SPURREY. Rare ; Scarborough North Shore (J.G.B.) ; not seen recently.

PORTULACACEAE

CLAYTONIA Linnaeus

***alsinoides** Sims—CLAYTONIA. Introduced in 1947 at Thornton-le-Dale from the Lake District (C. Green).

MONTIA Linnaeus

fontana L.—WATER BLINKS. Uncommon ; Cloughton Hulleys, Hole of Horcum, 1940 (H.R.).

TAMARICACEAE

TAMARIX Linnaeus

***gallica** L.—TAMARISK. Uncommon ; naturalised on the cliffs at Scarborough, 1940 (H.R.).

HYPERICACEAE

HYPERICUM Linnaeus

androsaemum L.—TUTSAN. Rare ; White Nab and cliffs south of Scarborough, 1941 (H.R.).

***calycinum** L.—LARGE-FLOWERED ST. JOHN'S WORT. Uncommon ; naturalised at Scarborough Mere, 1940 (H.R.).

perforatum L.—ST. JOHN'S-WORT. Common ; Scalby Wyke, Thornton-le-Dale, Silpho Moor, etc.

quadrangulum L.—ST. PETER'S-WORT. Common ; Seamer Carrs, Nab Gate Springs, Raincliffe Wood, etc.

humifusum L.—TRAILING ST. JOHN'S-WORT. Uncommon ; Cloughton Bank, 1915 (G.W.T.) ; Langdale End, 1916 (E.C.H.) ; Dalby Dale, 1941 (H.R.) ; Levisham (Y.N.U. Excn., 1929).

pulchrum L.—SLENDER ST. JOHN'S-WORT. Common.

hirsutum L.—HAIRY ST. JOHN'S-WORT. Common ; Forge Valley, Thornton-le-Dale, etc.

montanum L.—MOUNTAIN ST. JOHN'S-WORT. Uncommon ; Forge Valley and Yedmandale, 1915-16 (E.C.H.).

elodes L.—MARSH ST. JOHN'S-WORT. Rare ; near Falcon Inn, 1940 (E.R.C., H.R.).

MALVACEAE

MALVA Linnaeus

moschata L.—MUSK MALLOW. Uncommon ; Pexton Moor, Langdale End, 1915 (E.C.H.) ; pink and white forms occur.

sylvestris L.—COMMON MALLOW. Common ; Scarborough Castle Hill, Yedmandale, etc.

neglecta Wallr.—DWARF MALLOW. Uncommon ; Ayton, 1895 (W.F.) ; Ganton, 1915 (E.C.H.) ; Hutton Buscel, Folkton, Brompton (H.R.).

***verticillata** L.—ERECT MALLOW. Rare ; single plant, Scarborough, 1899 (W.F.).

TILIACEAE

TILIA Linnaeus

***platyphyllos** Scop.—LARGE-LEAVED DOWNY LIME. Forge Valley, 1914, planted (Hb. E.C.H.) ; planted, Wykeham (W.F.).

***vulgaris** Hayne—COMMON LIME. Frequently planted, as in Lady Edith's Drive, etc.

cordata Mill.—SMALL-LEAVED LIME. Rare ; High Langdale End, 1915 (A.I.B.).

LINACEAE

LINUM Linnaeus

catharticum L.—PURGING FLAX. Common in pastures.

anglicum Mill.—PERENNIAL BLUE FLAX. Rare ; Ruston Cow Pasture, 1908 (D.W.B.) ; Harper's Lane, 1898 (E.R.C.).

bienne Mill.—NARROW-LEAVED FLAX. Rare ; Goosedale, Cloughton, 1919 (H.E.W.).

***usitatissimum** L.—COMMON FLAX. Uncommon ; only as an escape ; waste ground, Scarborough Mere, 1915 (E.C.H.) ; during the 1939-45 war it grew plentifully on the roadside when linseed was being carted between Hull and Scarborough.

GERANIACEAE

GERANIUM Linnaeus

sanguineum L.—BLOODY CRANE'S-BILL or GERANIUM. Local ; abundant at Primrose Valley, Filey, 1914 (E.C.H.) ; High Fordon, 1947 (H.R.).

***versicolor** L.—STRIPED CRANE'S-BILL. Rare ; Stepney Road, Scarborough, 1886, 1901, 1912 (E.R.C.).

***phaeum** L.—DUSKY CRANE'S-BILL. Rare ; Hackness, 1907 (E. T. Hardy) ; Ebberston, 1933 (D.W.B.).

*var. **lividum** (l'Hérit.) Pers.—Red Scar Lane, Newby, 1916 (A.I.B.).

pratense L.—BLUE MEADOW CRANE'S-BILL. Abundant in meadows.

pyrenaicum Burm. f.—MOUNTAIN CRANE'S-BILL. Rare ; above Allerston, 1941 (H.R.).

molle L.—DOVE'S-FOOT CRANE'S-BILL. Abundant in waste places.

pusillum L.—SMALL-FLOWERED CRANE'S-BILL. Uncommon ; Yedmandale, Forge Valley, Flixton (E.C.H.).

dissectum L.—CUT-LEAVED CRANE'S-BILL. Common ; Yedmandale, Seamer Carrs (E.C.H.) ; Sawdon Dale, Whisperdales, etc. (H.E.B.).

columbinum L.—LONG-STALKED CRANE'S-BILL. Uncommon ; Yedmandale, 1913, 1916 (E.C.H.) ; Thornton-le-Dale, 1939 (H.R.) ; Forge Valley, 1894 (W.F.).

lucidum L.—SHINING CRANE'S-BILL. Rare ; Holbeck Gardens, Scarborough, 1944 **et seq.** (H.R.).

robertianum L.—HERB ROBERT. Abundant in waste places, etc.

ERODIUM l'Héritier de Brutelle

cicutarium (L.) Ait.—HEMLOCK STORK'S-BILL. Common in waste places.

pimpinellifolium (Cav.) Sibth.—Uncommon ; Ellerburn, 1945 (H.R.).

moschatum (L.) Ait.—MUSKY STORK'S-BILL. Rare ; Falsgrave, 1854 (T.G.) ; not seen in recent years.

OXALIS Linnaeus

acetosella L.—WOOD SORREL. Abundant.

var. **subpurpurascens** DC.—Rare ; Silpho Moor under birch, 1932 (H.E.B.).

***corniculata** L.—YELLOW WOOD SORREL. Rare ; Ellerburn, 1922 (J.G., R.J.F.).

BALSAMINACEAE

IMPATIENS Linnaeus

***glandulifera** Royle—INDIAN BALSAM. Waste ground, Scarborough Mere, 1915 (E.C.H.) ; spreading along the banks of the river Derwent, 1947 (H.R.).

AQUIFOLIACEAE

ILEX Linnaeus

aquifolium L.—HOLLY. Common.

CELASTRACEAE

EUONYMUS Linnaeus

europaeus L.—SPINDLE TREE. Uncommon ; Forge Valley, Dalby Nut Wood, Howldale (H.R.).

RHAMNACEAE

RHAMNUS Linnaeus

catharticus L.—PURGING BUCKTHORN. Uncommon ; Forge Valley, 1914 (Miss E. M. le Tall) ; Ayton, 1914 (T.B.R.) ; Ellerburn, 1912 (G.W.T.).

ACERACEAE

ACER Linnaeus

*pseudo-platanus L.—SYCAMORE. Common.
campestre L.—COMMON MAPLE. Common.

HIPPOCASTANACEAE

AESCULUS Linnaeus

*hippocastanum L.—HORSE-CHESTNUT. Common.

LEGUMINOSAE

GENISTA Linnaeus

anglica L.—PETTY WHIN. Uncommon ; behind Falcon Inn, 1937 (H.E.B.) ; Hipperley Beck, 1916 (G.W.T.).
tinctoria L.—DYER'S GREENWEED. Rare ; Saltwick Nab, 1912 (A.I.B.) ; Cloughton Cliffs, 1947 (S.R.).

ULEX Linnaeus

europaeus L.—FURZE, WHIN, GORSE. Abundant.
minor Roth.—DWARF FURZE. Rare ; Thornton-le-Dale, 1914 (R.J.F.).

SAROTHAMNUS Wimmer

scoparius (L.) Koch.—COMMON BROOM. Common.

ONONIS Linnaeus

repens L.—REST-HARROW. Abundant.
spinosa L.—SPINY REST-HARROW. Uncommon ; Cayton Bay, Filey Brigg, 1916 (A.I.B.).

MEDICAGO Linnaeus

*sativa L.—LUCERNE, PURPLE MEDICK. Uncommon ; Thornton-le-Dale, Scarborough Castle Hill, 1940 (H.R.).
*falcata L.—YELLOW MEDICK. Rare ; Grosmont (B.R.).
lupulina L.—BLACK MEDICK. Common in waste places.
denticulata Willd.—RETICULATED MEDICK. Rare ; Scarborough Castle Hill, 1896 (E.R.C.) ; J. G. Baker says, "This is the most northern indigenous station for the plant known in Britain."
arabica (L.)—Huds.—SPOTTED MEDICK. Uncommon ; Scarborough Castle Hill, 1865 (A. E. Smith).

MELILOTUS Miller

*altissima Thuill.—MELILOT. Rare ; Scalby Beck, 1914 (E.C.H.).
*alba Med.—WHITE MELILOT. Rare ; Staxton sand-pits, 1940 (E.R.C., H.R.).
*officinalis (L.) Lam.—COMMON MELILOT. Common ; Scarborough Mere, Staxton sand-pits, Thornton-le-Dale, etc.

*indica (L.) All.—SMALL MELILOT. Rare ; Thornton-le-Dale Mill, 1916 (A.I.B.) ; 1948 (H.R.) ; waste ground, Scarborough Mere, 1916 (E.C.H.).

TRIFOLIUM Linnaeus

pratense L.—RED CLOVER. Abundant.
*incarnatum L.—CRIMSON CLOVER. Rare and casual ; High Fordon, 1915 (G.W.T., A.I.B.).
medium L.—ZIG-ZAG CLOVER. Common.
arvense L.—HARE'S-FOOT TREFOIL. Uncommon ; Flixton sand-pits, 1916 (E.C.H.).
striatum L.—SOFT-KNOTTED TREFOIL. Uncommon ; Scarborough Castle Hill (J.G.B.) ; Flixton sand-pit, 1916 (E.C.H.).
scabrum L.—HARD-KNOTTED TREFOIL. Rare ; Scarborough Castle Hill (J.G.B.) ; not seen in recent years.
*hybridum L.—ALSIKE CLOVER. Common.
repens L.—WHITE or DUTCH CLOVER. Abundant.
fragiferum L.—STRAWBERRY-LEAVED TREFOIL. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.).
*agrarium L.—LARGE HOP TREFOIL. Uncommon ; Staxton, 1940 (H.R.).
campestre Schreb.—HOP TREFOIL. Common.
dubium Sibth.—LESSER YELLOW TREFOIL. Very common.

ANTHYLLIS Linnaeus

vulneraria L.—KIDNEY VETCH, LADY'S FINGERS. Common in dry pastures.
var. **maritima** Schweigg.—Saltwick Nab, 1901 (F.A.L.).

LOTUS Linnaeus

corniculatus L.—BIRD'-FOOT TREFOIL. Abundant.
tenuis Willd.—SLENDER BIRD'S-FOOT TREFOIL. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.).
uliginosus Schkuhr—NARROW-LEAVED BIRD'S-FOOT TREFOIL. Common in moist meadows ; Throxenby Mere, Raincliffe Wood, Forge Valley, etc.

ASTRAGALUS Linnaeus

danicus Retz.—PURPLE MOUNTAIN MILK-VETCH. Uncommon ; Stone Haggs (T.B.R.) ; Ruston Cow-pasture, 1884 (E.R.C.) ; Harper's Lane, 1941 (H.R.).
glycophyllos L.—SWEET MILK-VETCH. Rare ; Cornelian Bay, 1916 (A.I.B.) ; one plant still there in 1941, which just escaped destruction by incendiary bombs (H.R.).

ORNITHOPUS Linnaeus

perpusillus L.—COMMON BIRD'S-FOOT. Uncommon ; Flixton sand-pits, 1916 (E.C.H.) ; 1915 (G.W.T.).

ONOBRYCHIS Miller

viciifolia Scop.—SAINFOIN. Uncommon ; Flixton and Hutton Buscel, 1916 (E.C.H.) ; Thornton-le-Dale, Staxton, 1939 (H.R.).

VICIA Linnaeus

hirsuta (L.) Gray, S. F.—HAIRY TARE. Common in waste places.
cracca L.—TUFTED VETCH. Abundant.
sylvatica L.—WOOD VETCH. Uncommon ; Cloughton and Hayburn Wyke Cliffs, Forge Valley, 1912 (E.R.C.) ; Wilson's Wood, now part of Peasholm Glen, 1914 (E.C.H.).
sepium L.—BUSH VETCH. Abundant.
f. ochroleuca Bast.—Queen Margaret's Road, Scarborough, 1941 (E.R.C., H.R.).
***lutea** L.—ROUGH-PODDED YELLOW VETCH. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.) ; Ravenscar, 1948 (Miss R. Kilby).
***sativa** L.—COMMON VETCH. Common.
angustifolia L.—NARROW-LEAVED CRIMSON VETCH. Commoner than the last.
lathyroides L.—SPRING VETCH. Uncommon ; Flixton sand-pits, 1916 (E.C.H., A.I.B.)
bithynica (L.) L.—ROUGH-PODDED PURPLE VETCH. Rare ; Hayburn Wyke (G.M.) ; not seen in recent years.

LATHYRUS Linnaeus

***aphaca** L.—YELLOW VETCHLING . Rare ; Ravenscar growing with **Vicia lutea**, 1948 (Miss R. Kilby).
***hirsutus** L.—HAIRY VETCHLING. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.) ; not seen in recent years.
pratensis L.—YELLOW MEADOW VETCHLING. Abundant.
***tuberosus** L.—TUBEROUS VETCHLING, CRIMSON PEA. Rare ; High Fordon, 1947 (E.R.C., H.R., **teste** C.M.R.).
sylvestris L.—NARROW-LEAVED EVERLASTING PEA. Rare ; Wilson's Wood. 1896 (E.R.C.) ; 1914 (Miss Grays) ; 1916 (A.I.B.) ; gone in 1940 (H.R.).
montanus Bernh.—TUBEROUS BITTER VETCH. Common in copses and thickets.
var. **tenuifolius** Garcke—Thornton-le-Dale, 1922 (R.J.F., J.G.).

ROSACEAE

PRUNUS Linnaeus

spinosa L.—BLACKTHORN, SLOE. Abundant.
insititia L.—BULLACE. Common.
***domestica** L.—WILD PLUM. Uncommon ; Allerston, Wilton, 1941 (H.R.).
avium L.—WILD CHERRY, GEAN. Uncommon ; Langdale End, Ebberston, 1939 (H.R.).

padus L.—BIRD CHERRY. Uncommon ; Langdale End, 1915 (E.C.H.) ; Levisham, 1939 (H.R.) ; Hayburn Wyke, 1919 (G.B.W.).

SPIRAEA Linnaeus

*__salicifolia__ L.—WILLOW-LEAVED SPIRAEA. Uncommon ; near Falcon Inn, 1916 (E.C.H.) ; Staintondale, 1906 (W.F.).

FILIPENDULA Ehrhart, B.

ulmaria (L.) Max.—MEADOW-SWEET. Abundant.
hexapetala Gil.—DROPWORT. Uncommon ; Seamer Carrs, 1913 (T.B.R.) ; Ayton, 1915 (T.B.R.) ; Primrose Valley, 1906 (W.J.F.) ; Forge Valley, Fordon, etc. (H.R.).

RUBUS Linnaeus

saxatilis L.—STONE BRAMBLE. Uncommon ; Thornton-le-Dale, Forge Valley, 1940 (H.R.).
idaeus L.—RASPBERRY. Common and widely distributed.
caesius L.—DEWBERRY. Uncommon ; Scalby, 1914 (E.C.H.) ; Brompton, Hayburn Wyke, 1939 (H.R.).
fruticosus L. agg.—COMMON BRAMBLE . Abundant.
fissus Lindl.—Crosscliff ("Nat.", 1935, p. 67).
calvatus Ed. Lees ex Blox.—Levisham Station (J.G.B.).
dasyphyllus Rog.—Fylingdales (J.G.B.).
vestitus W. & N.—Staintondale and Newtondale (W.F.).

GEUM Linnaeus

urbanum L.—HERB BENNET, WOOD AVENS. Abundant.
rivale L.—WATER AVENS. Common in marshy places.
rivale L. **x urbanum** L. (**x intermedium** Ehrh.)—INTERMEDIATE AVENS. Uncommon ; Forge Valley and Lady Edith's Drive, 1942 (H.R.).

FRAGARIA Linnaeus

vesca L.—WILD STRAWBERRY. Common.
*__moschata__ Duch.—HAUTBOY STRAWBERRY. Rare ; Langdale End and Lindhead, 1940 (H.R.).

POTENTILLA Linnaeus

sterilis (L.) Garcke—BARREN STRAWBERRY. Abundant.
erecta (L.) Rausch—TORMENTIL. Abundant.
procumbens Sibth.—CREEPING TORMENTIL. Rare ; Goathland (B.R.).
reptans L.—CREEPING CINQUEFOIL. Common in meadows and waysides.
anserina L.—SILVER-WEED. Abundant.
*__intermedia__ L.—HOARY CINQUEFOIL. Rare ; waste ground, Scarborough Mere, 1914 (A.I.B., E.C.H.).

COMARUM Linnaeus

palustre L.—MARSH CINQUEFOIL. Uncommon ; Throxenby Mere, 1913 (E.C.H.) ; Hilla Green, 1946 (H.R.).

ALCHEMILLA Linnaeus

arvensis (L.) Scop.—PARSLEY PIERT. Abundant.
vulgaris L., sp. agg.—LADY'S MANTLE. Abundant.
vestita (Bus.) Raunk.—Uncommon ; Forge Valley, 1932 (W.A.S.).
xanthochlora Rothm.—Low Horcum (P.M.H., W.A.S. Rep. B.E.C., 1938).

AGRIMONIA Linnaeus

eupatoria L.—COMMON AGRIMONY. Abundant.
odorata (Gouan) Mill.—FRAGRANT AGRIMONY. Rare ; Forge Valley, 1890 (W.W.R.).

POTERIUM Linnaeus

sanguisorba L.—SALAD BURNET. Common ; Cayton Bay, Spital Corner, Cornelian Bay, etc.

SANGUISORBA Linnaeus

officinalis L.—GREAT BURNET. Uncommon ; Langdale End, Dalby Dale, 1939 (H.R.).

ROSA Linnaeus

arvensis Huds.—TRAILING ROSE. Uncommon ; Cloughton Quarries, 1915 (E.R.C.).
var. **gallicoides** (Bak.) Crep.—Uncommon ; Thornton-le-Dale, 1946 (H.R. det. C.M.R.).
spinosissima L.—BURNET ROSE. Uncommon ; Thornton-le-Dale, 1915 (A.I.B.).
canina L. agg.—DOG ROSE. Common in hedges.
var. **lutetiana** (Lem.) Bak.—Rare ; Robin Hood's Bay (J.G.B.).
villosa L., agg. (incl. **R. mollis** Sm.)—DOWNY ROSE. Common ; Seamer Moor, Langdale End, etc.
var. **glandulosa** W., Dod.—Occasional ; Ayton Moor, etc.
sherardi Dav., agg. (incl. **R. omissa** Déségl.)—Filey, 1922 (Y.N.U. Excn.).
rubiginosa L., agg.—SWEET BRIAR. Rare ; High Fordon, 1916 (G.W.T.).

SORBUS Linnaeus

aucuparia L.—MOUNTAIN ASH, ROWAN. Common and widely distributed.
aria (L.) Crantz—COMMON WHITEBEAM. Not uncommon ; generally planted.
***torminalis** (L.) Crantz—SERVICE TREE. Uncommon ; always planted.

MALUS Miller

pumila Mill.—CRAB APPLE. Common.

MESPILUS Linnaeus

*__germanica__ L.—WILD MEDLAR. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.).

CRATAEGUS Linnaeus

oxyacanthoides Thuill.—HAWTHORN. Abundant.

SAXIFRAGACEAE

SAXIFRAGA Linnaeus

*__umbrosa__ L.—LONDON PRIDE. Uncommon ; Hayburn Wyke and Sawdondale, a garden outcast.

tridactylites L.—RUE-LEAVED SAXIFRAGE. Common ; Yedmandale, Flixton, etc.

granulata L.—WHITE MEADOW SAXIFRAGE. Common ; Ruston Cow-pasture, Lady Edith's Drive, etc.

hypnoides L.—CUT-LEAVED SAXIFRAGE. Rare ; Hole of Horcum (Y.N.U. Excn., 1895).

CHRYSOSPLENIUM Linnaeus

oppositifolium L.—OPPOSITE-LEAVED GOLDEN SAXIFRAGE. Common ; Forge Valley, etc.

alternifolium L.—ALTERNATE-LEAVED GOLDEN SAXIFRAGE. Uncommon ; Forge Valley, 1886 (E.R.C.).

PARNASSIACEAE

PARNASSIA Linnaeus

palustris L.—GRASS OF PARNASSUS. Not uncommon ; Cornelian Bay, 1913 (T.B.R.) ; Scalby Wyke, 1914 (E.C.H.) ; Cayton Bay, 1913 (J.G.) ; Filey, South Cliffs (W.A.S.) ; Dalby Dale, Bloody Beck (H.R.).

GROSSULARIACEAE

RIBES Linnaeus

*__uva-crispa__ L. (incl. **R. grossularia** L.)—WILD GOOSEBERRY. Common.

*__alpinum__ L.—MOUNTAIN CURRANT. Uncommon ; planted in Hackness Woods (H.R.).

rubrum L.—RED CURRANT. Common.

nigrum L.—BLACK CURRANT. Uncommon ; Ellerburn, 1940 (H.R.).

CRASSULACEAE

SEDUM Linnaeus

roseum (L.) Scop.—ROSE-ROOT. Rare; Thornton-le-Dale, 1922 (R.J.F., J.G.).

telephium L.—ORPINE, LIVE-LONG. Rare; Langdale End, 1914 (A.I.B.), probably an outcast.

***anglicum** Huds.—ENGLISH STONECROP. Rare; Scarborough Castle Hill (J.G.B.).

acre L.—BITING STONECROP. Common; Scarborough Castle Hill, Flixton, etc.

***sexangulare** L.—TASTELESS STONECROP. Rare; Scarborough (J.G.B.).

***reflexum** L.—CROOKED YELLOW STONECROP. Uncommon; Hutton Buscel and Burniston, 1914 (A.I.B.), probably an outcast.

SEMPERVIVUM Linnaeus

***tectorum** L.—HOUSE-LEEK. Uncommon; Sawdon, Hackness, 1939 (H.E.B.).

DROSERACEAE

DROSERA Linnaeus

rotundifolia L.—ROUND-LEAVED SUNDEW. Common in bogs on the moors.

anglica Huds.—LONG-LEAVED SUNDEW. Rare; Dalby Bog, decreasing rapidly owing to the depredations of collectors; an improvement in 1947 (H.R.).

HALORAGACEAE

HIPPURIS Linnaeus

vulgaris L.—MARE'S-TAIL. Uncommon; Ganton Carrs, 1915 (E.C.H.); Brompton, 1940 (H.R.).

MYRIOPHYLLUM Linnaeus

verticillatum L.—WHORLED WATER MILFOIL. Rare; Hilla Green, Hackness, 1946 (H.R.).

spicatum L.—SPIKED WATER MILFOIL. Uncommon; Langdale End, 1916 (E.C.H.); Forge Valley, Brompton, 1914 (A.I.B.).

alterniflorum DC.—ALTERNATE-FLOWERED WATER MILFOIL. Uncommon; Hilla Green, 1912 (A.I.B.).

CALLITRICHACEAE

CALLITRICHE Linnaeus

stagnalis Scop.—LARGE-FRUITED STAR-WORT. Common in ditches.

intermedia Hoffm.—HOOKED STAR-WORT. Rare; Forge Valley, 1880 (G. Webster); Brompton Mill-pond, 1947 (E.R.C., H.R. teste C.M.R.).

LYTHRACEAE

PEPLIS Linnaeus

portula L.—WATER PURSLANE. Uncommon ; in wet places on the moors, 1940 (E.R.C.).

LYTHRUM Linnaeus

salicaria L.—PURPLE LOOSESTRIFE. Common ; Throxenby Mere, Seamer Carrs, Hilla Green, etc.

ONAGRACEAE

CHAMAENERION Adanson

angustifolium (L.) Scop.—ROSE-BAY WILLOW-HERB. Abundant ; has now become a tiresome weed in the district.

EPILOBIUM Linnaeus

hirsutum L.—GREAT HAIRY WILLOW-HERB. Abundant in watery places.

hirsutum L. **x obscurum** Schreb.—Derwent banks at Ganton, 1948 (H.R. **teste** C.M.R.).

hirsutum L. **x parviflorum** Schreb.—Derwent banks at Ganton, 1948 (H.R. **teste** C.M.R.).

parviflorum Schreb.—HOARY WILLOW-HERB. Common ; Scarborough Mere, etc.

montanum L.—BROAD-LEAVED WILLOW-HERB. Abundant on banks and walls.

roseum Schreb.—PALE SMOOTH-LEAVED WILLOW-HERB. Common ; Cayton, Mowthorpe, etc.

obscurum Schreb.—SHORT-PODDED SQUARE-STALKED WILLOW-HERB. Very common.

palustre L.—NARROW-LEAVED MARSH WILLOW-HERB. Uncommon ; Forge Valley, 1914 (E.C.H.) ; Langdale End and near Falcon Inn, 1940 (H.R.) ; Hayburn Wyke (W.F.).

***pedunculare** Cunn., A.—Rare ; Hackness and Scarborough South Cliff, 1939 (H.R.).

CIRCAEA Linnaeus

lutetiana L.—ENCHANTER'S NIGHTSHADE. Common in damp woods.

CUCURBITACEAE

BRYONIA Linnaeus

dioica Jacq.—WHITE BRYONY. Uncommon ; Ellerburn, Nabgate, 1907 (D.W.B.).

UMBELLIFERAE

HYDROCOTYLE Linnaeus

vulgaris L.—MARSH PENNYWORT Common ; Cloughton Hulleys, Throxenby Mere, Ringing Keld Bog, etc.

SANICULA Linnaeus

europaea L.—WOOD SANICLE. Abundant.

CONIUM Linnaeus

maculatum L.—COMMON HEMLOCK. Common and increasing rapidly, 1947 (H.R.).

SMYRNIUM Linnaeus

***olusatrum** L.—ALEXANDERS. Locally common ; the prevailing plant on Scarborough Castle Hill.

APIUM Linnaeus

nodiflorum (L.) Lag.—PROCUMBENT WATER-PARSNIP. Common ; Scarborough Mere, Brompton, Scalby, Lady Edith's Drive, etc.

inundatum (L.) Reich. f.—LEAST WATER-PARSNIP. Rare ; Filey (Y.N.U. Excn., 1914) ; Cayton Bay, 1948 (H.R. **teste** C.M.R.).

AMMI Linnaeus

***majus** L.—COMMON BISHOP'S-WEED. Rare ; cornfield, Seamer Carrs, 1915 (E.C.H.) ; Thornton-le-Dale, 1948 (H.R. **det.** W.A.S.).

CARUM Linnaeus

***carvi** L.—CARAWAY. Rare ; Yedmandale, 1914 (E.C.H.) ; Thornton-le-Dale, 1945 **et seq.** (H.R. **teste** C.M.R.).

PETROSELINUM Hill

***crispum** (Mill.) Nym.—PARSLEY. Rare ; Scarborough Mere and Yedmandale, 1914 (E.C.H.) ; Cayton Carrs, 1916 (E.C.H.) ; Flamborough (Y.N.U. Excn., 1923).

SIUM Linnaeus

erectum Huds.—NARROW-LEAVED WATER-PARSNIP. Common ; Scarborough Mere, Brompton, Seamer Carrs, Ayton, etc.

AEGOPODIUM Linnaeus

***podagraria** L.—BISHOP-WEED, GOUT-WEED. Abundant and increasing rapidly, 1947.

PIMPINELLA Linnaeus

saxifraga L.—COMMON BURNET SAXIFRAGE. Common in dry pastures.

var. **dissecta** (Retz.) With.—Ayton, 1914 (E.C.H.) ; Thornton-le-Dale, 1922 (R.J.F., J.G.).

major (L.) Huds.—GREATER BURNET SAXIFRAGE. Rare ; Stone Haggs, one plant, 1945 **et seq.** (H.R.).

CONOPODIUM Koch

majus (Gouan) Lor. et Barr.—EARTH or PIG NUT. Abundant.

MYRRHIS Miller

odorata (L.) Scop.—SWEET CICELY. Common ; Silpho, Ellerburn, Ruston, etc.

CHAEROPHYLLUM Linnaeus

temulum L.—ROUGH CHERVIL. Abundant on waysides.

SCANDIX Linnaeus

pecten-veneris L.—SHEPHERD'S NEEDLE. Common ; Seamer Carrs, Cloughton, Thornton-le-Dale, etc.

ANTHRISCUS Persoon

scandicina (Web.) Mansf.—BURR CHERVIL. Occasional ; Flixton and Staxton sand-pits, 1916 (Hb. E.C.H.).

sylvestris (L.) Hoffm.—COW PARSLEY, KECK. Abundant on waysides.

FOENICULUM Miller

***vulgare** Mill.—FENNEL. Rare ; Scarborough Mere 1914 (G.W.T.), a garden escape.

OENANTHE Linnaeus

fistulosa L.—COMMON WATER DROPWORT. Rare ; Thornton Marishes, 1915 (G.W.T., A.I.B.) ; refound, 1947 (E.R.C., H.R.) ; Cayton Carrs, 1916 (E.C.H.).

crocata L.—HEMLOCK WATER DROPWORT. Rare ; Ayton Mill-pond, 1912 (E.R.C.).

aquatica (L.) Poir.—FINE-LEAVED WATER DROP-WORT. Rare ; Scarborough Mere, 1914 (A.I.B.) ; still there, 1947 (H.R.).

AETHUSA Linnaeus

cynapium L.—FOOL'S PARSLEY. Uncommon ; Filey, Ayton, Seamer Carrs, 1916 (E.C.H.) ; Cloughton, 1939 (H.R.).
var. **agrestis** Wallr.—Common in waste places.

SILAUM Miller

silaus (L.) Schinz et Thell.—PEPPER SAXIFRAGE. Uncommon ; Snainton, 1940 (H.R.).

ANGELICA Linnaeus

sylvestris L.—WILD ANGELICA. Common in moist woods ; Forge Valley, etc.

PEUCEDANUM Linnaeus

***ostruthium** (L.) Koch—MASTERWORT. Rare Cloughton Newlands, 1913 (A.I.B.) ; not seen 1940 but appeared again 1942 (H.R.) ; Goathland, 1932 (R.J.F., G.B.W.).

PASTINACA Linnaeus

*sativa L.—WILD PARSNIP. Uncommon, only as a throw-out from cultivation.

HERACLEUM Linnaeus

sphondylium L.—COW PARSNIP. Abundant in waste places.
var. angustifolium Huds.—NARROW-LEAVED COW PARSNIP. Rare; Thornton-le-Dale, 1922 (R.J.F., J.G.).
*mantegazzianum Somm. et Lev.—Uncommon; Scalby, a garden escape, 1901 (E.R.C.).

DAUCUS Linnaeus

carota L.—WILD CARROT. Uncommon; Cayton Bay, Staxton, 1912 (A.I.B.).
gingidium L.—SEA-CARROT. Rare; Speeton, Cloughton Wyke, 1914 (G.W.T.).

TORILIS Adanson

anthriscus (L.) Gmel., C. C.—HEDGE PARSLEY. Common.
nodosa (L.) Gaertn.—KNOTTED HEDGE PARSLEY.—Uncommon; Yedmandale, 1915 (E.C.H.); Brompton, Staxton, 1940 (H.R.); Beedale, Hutton Buscel, 1944 (C.M.R.).

ARALIACEAE

HEDERA Linnaeus

helix L.—IVY. Common.

CORNACEAE

CORNUS Linnaeus

suecica L.—DWARF CORNEL. Rare; Cross Cliff, 1835 (Brown & Williamson); Hole of Horcum, 1795 (William Travis); the former is the most southerly station for this plant in the British Isles.
sanguinea L.—DOG-WOOD. Common; Ellerburn, Forge Valley, Yedmandale, etc.

ADOXACEAE

ADOXA Linnaeus

moschatellina L.—TUBEROUS MOSCHATEL. Common; Forge Valley, Troutsdale, etc.

CAPRIFOLIACEAE

SAMBUCUS Linnaeus

nigra L.—COMMON ELDER. Abundant.
*var. laciniata L.—CUT-LEAVED ELDER. Rare; Scarborough Castle Holmes, 1915 (A.I.B.), probably planted.
*ebulus L.—DANEWORT. Rare; Thornton-le-Dale water-works, 1939 (H.R.); now gone from Castle Dykes, Scarborough.

Plate VI

DWARF CORNEL (*Cornus suecica* L.)

Photograph : J. P. Bu[illegible]

facing page 234

VIBURNUM Linnaeus

opulus L.—GUELDER ROSE. Common in woods, etc.
*__lantana__ L.—WAYFARING TREE. Rare ; one bush, Thornton-le-Dale, 1940 (H.R.) ; planted in Hackness Woods.

SYMPHORICARPOS Duhamel

*__albus__ (L.) Blake, S.F.—SNOWBERRY. Common ; planted and perhaps bird-sown.

LINNAEA Linnaeus

borealis L.—TWO-FLOWERED LINNAEA. Very rare ; Silpho Moor, 1863 (J. Tissiman), specimen in B.M. Herbarium ; not seen since.

LONICERA Linnaeus

periclymenum L.—HONEYSUCKLE. Common in hedges and woods.
*__xylosteum__ L.—UPRIGHT FLY HONEYSUCKLE. Rare ; Filey, 1913 (A.I.B.) ; Sledmere (E.R.C.).

RUBIACEAE

GALIUM Linnaeus

cruciata (L.) Scop.—CROSSWORT. Abundant by waysides.
verum L.—LADY'S BEDSTRAW. Abundant on banks, etc.
mollugo L.—GREAT HEDGE BEDSTRAW. Uncommon ; Wyedale, Thornton-le-Dale, 1912 (H.R.).
saxatile L.—SMOOTH HEATH BEDSTRAW. Common on heaths and upland pastures.
palustre L.—MARSH BEDSTRAW. Common ; Scarborough and Throxenby Meres, Scalby, Cayton Carrs, etc.
uliginosum L.—ROUGH BOG BEDSTRAW. Uncommon ; Jugger Howe Beck, Troutsdale, 1914 (E.R.C.).
*__vaillantii__ DC.—HISPID-FRUITED CORN BEDSTRAW. Rare and casual ; Seamer Junction (W.F.).
aparine L.—GOOSE-GRASS, CLEAVERS. Abundant.

ASPERULA Linnaeus

odorata L.—WOODRUFF. Common in shady woods.

SHERARDIA Linnaeus

arvensis L.—FIELD MADDER. Abundant as a weed of cultivated ground.

VALERIANACEAE

VALERIANA Linnaeus

dioica L.—MARSH VALERIAN. Common in wet meadows, etc.
officinalis L.—WILD VALERIAN. Common in moist woods.

CENTRANTHUS De Candolle

*ruber (L.) DC.—RED VALERIAN. Rare; Scarborough Castle Hill, 1914 (A.I.B.).

VALERIANELLA Miller

locusta L.—CORN SALAD. Common in cornfields.

dentata (L.) Poll.—NARROW-FRUITED CORN SALAD. Uncommon; Thornton-le-Dale, 1915 (A.I.B., G.W.T.); Yedmandale, Ayton, Forge Valley, 1914 (E.C.H.).

DIPSACACEAE

DIPSACUS Linnaeus

fullonum L.—WILD TEASEL. Rare; Hutton Buscel, 1916 (E.C.H.); Yedmandale, 1940 (H.R.).

KNAUTIA Linnaeus

arvensis (L.) Coult.—FIELD SCABIOUS. Common.

SUCCISA Moench

pratensis Moench—DEVIL'S-BIT SCABIOUS. Common; Thornton-le-Dale, Silpho, Forge Valley, etc.

SCABIOSA Linnaeus

columbaria L.—SMALL SCABIOUS. Uncommon; Ayton, 1914 (E.C.H.); Cayton Bay, 1940 (H.R.); Thornton-le-Dale, 1915 (G.W.T.).

COMPOSITAE

EUPATORIUM Linnaeus

cannabinum L.—HEMP AGRIMONY. Common; Cornelian Bay, etc.

SOLIDAGO Linnaeus

virgaurea L.—GOLDEN ROD. Common; Forge Valley, Cloughton Quarries, etc.

BELLIS Linnaeus

perennis L.—DAISY. Abundant Status **discoideus,** a form without ray-florets, Flamborough (J. F. Pickard).

ERIGERON Linnaeus

acris L.—BLUE FLEA-BANE. Rare; Flixton Wold, 1915 (A.I.B., G.W.T.); Thornton-le-Dale, 1922 (R.J.F., J.G.); Grosmont, 1945 (H.R.).

FILAGO Linnaeus

germanica (L.) L.—COMMON CUDWEED. Common on dry pastures and banks.

var. **axillaris** Dr.—Rare; Grosmont (B.R.).

minima (Sm.) Pers.—LEAST CUDWEED. Rare ; Flixton sand-pits, 1940 (E.R.C., H.R.).

apiculata G. E. Sm.—RED TIPPED CUDWEED. Rare ; limestone quarry, Seamer, 1897 (W.F.).

ANTENNARIA Gaertner

dioica (L.) Gaertn.—MOUNTAIN EVERLASTING. Rare ; Cockmoor Hall, 1886, not seen there since 1909 ; High Fordon, 1911-12 (A.I.B.) ; Nab Gate, Dalby Dale, 1944 (H.R.).

ANAPHALIS De Candolle

***margaritacea** (L.) Benth.—PEARLY EVERLASTING. Rare ; coast cliffs, three miles south of Scarborough (J.G.B.) ; not seen in recent years.

GNAPHALIUM Linnaeus

uliginosum L.—MARSH CUDWEED. Uncommon ; Silpho Moor, 1913 (E.C.H.) ; Langdale End, 1916 (E.C.H.) ; Raincliffe Wood and West Ayton (H.R.).

sylvaticum L.—HEATH or WOOD CUDWEED. Uncommon ; Seamer Moor, 1914, Seamer Carrs. 1915, Silpho Moor, 1916 (E.C.H.) ; Hutton Buscel, 1940 (H.R.) ; Dalby Nut Wood, 1932 (R.J.F.).

INULA Linnaeus

***helenium** L.—ELECAMPANE. Rare ; Hayburn Wyke, once abundant, only five plants in 1946 (S.R.).

conyza DC.—PLOUGHMAN'S SPIKENARD. Uncommon ; Pexton Moor, Thornton-le-Dale, Fordon (H.R.).

PULICARIA Gaertner

dysenterica (L.) Bernh.—GREATER FLEA-BANE. Common and increasing, 1947.

BIDENS Linnaeus

cernua L.—NODDING BUR-MARIGOLD. Rare ; Cayton Carr (J.G.B.).

tripartita L.—TRIPARTITE BUR-MARIGOLD. Rare ; Raincliffe Wood (J.G.B.).

Neither of the above has been seen in recent years.

ACHILLEA Linnaeus

millefolium L.—YARROW. Abundant on waysides.

ptarmica L.—SNEEZEWORT. Common in damp places ; Dalby Dale, Mowthorpe Cut, Throxenby Mere, etc.

ANTHEMIS Linnaeus

***tinctoria** L.—YELLOW CHAMOMILE. Rare ; Yedmandale, 1914 (E.C.H.) ; Staxton sand-pits, plentiful, 1942 (E.R.C., H.R.).

arvensis L.—CORN CHAMOMILE. Local; Yedmandale (Hb. E.C.H.).
nobilis L.—COMMON CHAMOMILE. Rare; Scalby Wyke, 1914 (E.C.H.).

CHRYSANTHEMUM Linnaeus

segetum L.—CORN MARIGOLD. Uncommon; Seamer Carrs, 1915 (E.C.H.); plentiful on roadsides between Snainton and Thornton-le-Dale (along with **Calendula**) in 1946; both almost entirely absent in 1947 (H.R.).
leucanthemum L.—WHITE OX-EYE. Abundant.
***parthenium** (L.) Bernh.—FEVERFEW. Common on hedge-banks, etc.

MATRICARIA Linnaeus

maritima L.—Rare; Flamborough (Y.N.U Excn., 1906); Scarborough North Side, 1914 (E.C.H.).
inodora L.—SCENTLESS MAYWEED, CORN FEVERFEW. Common in fields, etc.
chamomilla L.—WILD CHAMOMILE. Common in fields.
***matricarioides** (Less.) Port.—RAYLESS MAYWEED. Abundant in waste places.

TANACETUM Linnaeus

vulgare L.—TANSY. Uncommon; banks of river Derwent, Scalby Cut, Cloughton, Yedingham.

ARTEMISIA Linnaeus

absinthium L.—WORMWOOD, ABSINTHE. Uncommon; Troutsdale, Seamer Limeworks (H.R.).
vulgaris L.—MUGWORT. Common in waste places.

TUSSILAGO Linnaeus

farfara L.—COLTSFOOT. Abundant.

PETASITES Miller

***fragrans** (Vill.) Presl., C.—SWEET-SCENTED BUTTER-BUR, WINTER HELIOTROPE. Local; very abundant on the cliffs of Holbeck Gardens.
hybridus (L.) Gaertn., Mey. & Scherb.—BUTTER-BUR. Common in damp places; Forge Valley, Hackness, etc.
***albus** (L.) Gaertn.—WHITE COLTSFOOT. Londesborough Lodge, Scarborough, planted.

DORONICUM Linnaeus

***pardalianches** L.—GREAT LEOPARD'S-BANE. Uncommon; Ebberston, West Flotmanby, probably a garden escape.

SENECIO Linnaeus

vulgaris L.—GROUNDSEL. Abundant

sylvaticus L.—HEATH GROUNDSEL. Uncommon ; Raincliffe Wood, 1914, Silpho Moor, 1916 (E.C.H.) ; Cloughton Quarries, 1941 (H.R.).

viscosus L.—STINKING GROUNDSEL. Uncommon ; waste ground, Scarborough Mere, 1915 (E.C.H.) ; Staintondale (W.F.).

var. **lividus** Sml.—Scarborough Mere, 1939 (E.R.C.).

***squalidus** L.—OXFORD RAGWORT. Rare ; one plant, Folkton on wall, 1947 (H.R. **det.** C.M.R.); greatly increased, 1948 (H.R.).

erucifolius L.—HOARY RAGWORT. Common ; cliffs north and south of Scarborough (A.I.B.).

jacobaea L.—RAGWORT. Abundant.

aquaticus Hill—MARSH RAGWORT. Common in wet places.

CARLINA Linnaeus

vulgaris L.—CARLINE THISTLE. Common in dry places ; Dalby Dale, Forge Valley, cliffs north of Scarborough.

CALENDULA Linnaeus

***officinalis** L.—MARIGOLD. Uncommon ; waste ground, Scarborough Mere, 1916 (E.C.H.) ; roadside Snainton to Allerston, 1946 (H.R.).

ARCTIUM Linnaeus

vulgare (Hill) Evans, A. H.—INTERMEDIATE BURDOCK. Commoner than **A. minus.**

minus (Hill) Bernh.—LESSER BURDOCK. Common in waste places.

CARDUUS Linnaeus

tenuiflorus Curt.—SLENDER-HEADED THISTLE. Rare ; Robin Hood's Bay (B.R.).

nutans L.—MUSK THISTLE. Abundant.

crispus L.—WELTED THISTLE. Common ; Seamer Carrs, Marishes, etc.

acanthoides L.—Commoner than **C. crispus.**

CIRSIUM Miller

vulgare (Savi) Ten.—SPEAR THISTLE. Abundant.

eriophorum (L.) Scop.—WOOLLY-HEADED THISTLE. Uncommon ; Ayton, 1914 (E.C.H.) ; Ellerburn, Cayton Bay (H.R.) ; Yedmandale, Newtondale, 1899 (W.F.).

palustre (L.) Scop.—MARSH THISTLE. Abundant.

dissectum (L.) Hill—MEADOW PLUME THISTLE. Uncommon ; Eller's Wood and Throxenby Mere (H.R.).

heterophyllum (L.) Hill.—MELANCHOLY THISTLE. Rare ; Harwood Dale, 1947 (H.R.).

arvense (L.) Scop.—CREEPING THISTLE Abundant.

ONOPORDUM Linnaeus

*__acanthium__ L.—COTTON or SCOTCH THISTLE. Rare ; Thornton-le-Dale, 1939 (H.R.), an escape.

SILYBUM Adanson

*__marianum__ (L.) Gaertn.—MILK THISTLE. Rare ; Scarborough Castle Hill (Hb. E.C.H., 1856 and E.C.H., 1914, one plant) ; East Ayton, 1941 (H.R.).

SERRATULA Linnaeus

__tinctoria__ L.—SAW-WORT. Local ; cliffs south of Filey, plentiful (W.A.S.) ; Newton Dale, 1915 (A.I.B.) ; Dalby Dale and High Fordon (H.R.).

var. __integrifolia__ Koch—Rare ; Levisham, 1915 (A.I.B.).

CENTAUREA Linnaeus

__nigra__ L.—BLACK KNAPWEED. Abundant.

__nemoralis__ Jord.—Rare ; High Fordon, 1947 (A.G.).

__scabiosa__ L.—GREATER KNAPWEED. Common ; Racecourse Hill and Staxton, etc.

__cyanus__ L.—CORN FLOWER. Rare ; waste ground Scarborough Mere, 1916 (E.C.H.).

CARTHAMUS Linnaeus

__lanatus__ L.—Rare and casual ; Thornton-le-Dale, 1949 (H.R., det. W.A.S.).

CICHORIUM Linnaeus

__intybus__ L.—CHICORY. Uncommon; Snainton, 1914 (E. B. Cramp); Staxton sand-pits, 1940 (H.R.).

LAPSANA Linnaeus

__communis__ L.—NIPPLEWORT. Common in waste places ; Forge Valley, etc.

PICRIS Linnaeus

__hieracioides__ L.—HAWKWEED OX-TONGUE. Common in waste places on calcareous soils.

var. __umbellata__ Schultz.—Rare ; Thornton-le-Dale, 1922 (J.R.F., J.G.).

__echioides__ L.—OX-TONGUE. Rare ; Hayburn Wyke, Cornelian Bay and Thornton-le-Dale (H.R.).

CREPIS Linnaeus

*__taraxacifolia__ Thuill.—BEAKED HAWK'S-BEARD. Uncommon ; limestone quarry, Hutton Buscel (J.G.B.).

__capillaris__ (L.) Wallr.—SMOOTH HAWK'S-BEARD. Common in fields and waste places.

*__biennis__ L.—ROUGH HAWK'S-BEARD. Rare ; Allerston, one plant, 1936 (R.J.F.).

paludosa (L.) Moench—MARSH HAWK'S-BEARD. Uncommon ; Raincliffe Wood, 1914 (E.C.H.) ; Cayton Bay, 1915 (G.W.T.) ; Forge Valley (E.R.C.) ; Eller's Wood, Thornton-le-Dale (H.R.).

HIERACIUM Linnaeus

pilosella L.—MOUSE-EAR HAWKWEED. Abundant.
murorum L.—WALL HAWKWEED. Common ; Hackness, Oliver's Mount, etc.
umbellatum L.—UMBELLATE HAWKWEED. Uncommon : Thornton-le-Dale, 1939 (H.R.).
sabaudum L.—SAVOY HAWKWEED. Common ; Oliver's Mount, etc.
vulgatum (Fr.) Almq.—WOOD HAWKWEED. Uncommon ; Raincliffe Wood, 1917 (G.W.T.).
In this critical genus the following microspecies have been recorded :—**caesium** Fr., Forge Valley (F. Reynolds) ; **orarium** Lindb., **teste** Ley ; **cacuminatum** Dahlet. ; **sciphilum** var. **transiens** Ley ; **diaphanoides** Lindb. ; **scanicum** Dahlst. ; **rigidum** var. **trichocaulon** Dahlst. See "Supplement to the Yorkshire Floras," pp. 69-70.

HYPOCHOERIS Linnaeus

glabra L.—SMOOTH CAT'S-EAR. Rare ; Rillington, 1888 (J.G.B.).
radicata L.—LONG-ROOTED CAT'S-EAR. Abundant.

LEONTODON Linnaeus

leysseri (Wallr.) Beck—LESSER HAWKBIT. Uncommon ; Cumboots, Ganton, Seamer Carrs (Hb. E.C.H.).
hispidus L.—COMMON HAWKBIT. Common in pastures.
autumnalis L.—AUTUMNAL HAWKBIT. Common in waste places.

TARAXACUM Wiggers

officinale Web.—DANDELION. Abundant.
palustre (Lyons) DC.—MARSH DANDELION. Uncommon ; Bickley, 1916 (G.W.T.).
laevigatum (Willd.) DC.—Uncommon ; Staintondale, 1942 (H.R.).

LACTUCA Linnaeus

virosa L.—WILD LETTUCE. Rare ; Wilton Carrs, 1945 (H.R.).
muralis (L.) Fres.—WALL LETTUCE. Common on old walls, etc.
***macrophylla** (Willd.) Gray, A.—Rare ; Thornton-le-Dale, well established (H.R.).

SONCHUS Linnaeus

oleraceus L.—COMMON SOW-THISTLE. Abundant.
asper (L.) Hill—ROUGH SOW-THISTLE. Common ; Thornton-le-Dale, etc.
arvensis L.—CORN SOW-THISTLE. Common on arable land and on the Marine Drive.

TRAGOPOGON Linnaeus

pratensis L.—YELLOW GOAT'S-BEARD. Common in waste places.

*__porrifolius__ L.—SALSIFY. Rare; Cloughton Bank, in neglected garden, 1916 (E.C.H.); Scarborough (J.G.B.), probably now extinct.

CAMPANULACEAE

CAMPANULA Linnaeus

glomerata L.—CLUSTERED BELL-FLOWER. Common; Forge Valley, The Wolds, etc.

latifolia L.—GIANT BELL-FLOWER. Uncommon; Raincliffe Wood, 1914 (E.C.H.); Forge Valley, 1939 (H.R.); Hackness, (Y.N.U. Excn., 1936).

*__rapunculoides__ L.—CREEPING BELL-FLOWER. Rare; Forge Valley in mangold field, 1944 **et seq.** (H.R.); one plant only in 1947, none in 1948.

rotundifolia L.—HAREBELL. Abundant.

SPECULARIA Fabricius, P. C.

hybrida (L.) A. DC.—VENUS'S LOOKING-GLASS. Rare; Forge Valley and Yedmandale, 1914 (E.C.H.); Ellerburn, 1914 (G.W.T.); 1942 **et seq.** (H.R.).

VACCINIACEAE

VACCINIUM Linnaeus

vitis-idaea L.—COW-BERRY. Common; Barns Cliff, Wykeham Moor, Hole of Horcum, etc.

myrtillus L.—BILBERRY, WHORTLEBERRY. Abundant on the moors.

OXYCOCCUS Hill

quadripetalus Gil.—CRANBERRY. Uncommon; May Moss, Foulsyke, etc.

ERICACEAE

ARBUTUS Linnaeus

*__unedo__ L.—STRAWBERRY TREE. Planted at Londesborough Lodge and in Scarborough Cemetery, where it ripens its fruit.

ANDROMEDA Linnaeus

polifolia L.—MARSH ANDROMEDA. Rare; May Moss, 1938 and 1947 (Mrs. R. A. Leefe).

CALLUNA Salisbury

vulgaris (L.) Hull—LING. Abundant.

var. **pubescens** Hull—Occurs sparingly with the type, Langdale End, 1915 (E.C.H.).

ERICA Linnaeus

tetralix L.—CROSS-LEAVED HEATH. Common.
cinerea L.—FINE-LEAVED HEATH, BELL HEATHER. Common.

PYROLACEAE

PYROLA Linnaeus

rotundifolia L.—ROUND-LEAVED WINTERGREEN. Rare; Hutton Buscel (J.G.B.), not seen in recent years.
media Sw.—INTERMEDIATE WINTERGREEN. Rare; Silpho Moor, 1914-15 (E.C.H.), 1941 **et seq.** (H.R.); Lockton (S/C. A.).
minor L.—LESSER WINTERGREEN. Uncommon; Silpho Moor, 1913-16 (E.C.H.); Raincliffe Wood, Forge Valley, 1914 (G.W.T.).

MONOTROPACEAE

MONOTROPA Linnaeus

hypopithys L.—YELLOW BIRD'S-NEST. Rare; Thornton-le-Dale under **Fagus**, 1914-15 (G.W.T.), 1946 (W.A.S.); Forge Valley, 1946 (W.A.S.), 1948 (H.R.).

PLUMBAGINACEAE

ARMERIA Willdenow

maritima Willd.—THRIFT, SEA PINK. Rare; Flamborough Head, 1884 (E.R.C.), 1914 (A.I.B.).

PRIMULACEAE

HOTTONIA Linnaeus

palustris L.—WATER VIOLET. Seamer Moor pond, 1884 (E.R.C.), 1912-14 (G.W.T.); has disappeared from the Carrs owing to drainage.

PRIMULA Linnaeus

vulgaris Huds.—PRIMROSE. Abundant.
veris L.—COWSLIP. Common in meadows.
veris L. x **vulgaris** Huds. (**P. variabilis** Gouf.)—FALSE OXLIP. Common.

LYSIMACHIA Linnaeus

vulgaris L.—YELLOW LOOSESTRIFE. Rare; near railway between Staintondale and Ravenscar, 1938 (H.R.).
nummularia L.—MONEYWORT. Rare; Hackness, 1912-16, but not in recent years (A.I.B.); Thornton-le-Dale, 1947 (E.R.C., H.R.).
nemorum L.—YELLOW PIMPERNEL. Common in shady places.

TRIENTALIS Linnaeus

europaea L.—CHICKWEED WINTERGREEN. Uncommon; Raincliffe Wood, Cross Cliff (G.W.T.); above Wrench Green, 1914 (T.B.R.); Hole of Horcum (W.A.S.).

GLAUX Linnaeus

maritima L.—SEA MILKWORT. Uncommon ; Filey, 1946 (E.R.C., H.R.) ; Cayton Bay (E.R.C.), but not in recent years.

ANAGALLIS Linnaeus

arvensis L.—SCARLET PIMPERNEL. Common in waste places.
foemina Mill.—Rare ; Grosmont (B.R.).
tenella (L.) Murr.—BOG PIMPERNEL. Uncommon ; Cumboots, 1913 (T.B.R.) ; Langdale End, 1916 (E.C.H.) ; Hole of Horcum, Jugger Howe Beck, etc. (H.R.).

SAMOLUS Linnaeus

valerandi L.—BROOKWEED. Rare ; Seamer Carrs, 1912 (E.R.C.) ; Scarborough Mere, 1914 (E.C.H.), station now flooded to increase water area ; sea-banks at Scarborough (J.G.B.) ; not seen recently in any of these stations.

OLEACEAE

FRAXINUS Linnaeus

excelsior L.—ASH. Common.

LIGUSTRUM Linnaeus

vulgare L.—PRIVET. Uncommon ; Ellerburn Woods (H.R.) ; Cayton Bay, 1914 (E.C.H.).

APOCYNACEAE

VINCA Linnaeus

***minor** L.—LESSER PERIWINKLE. Rare ; Staintondale Woods, 1916 (G.W.T.) ; probably an outcast.

GENTIANACEAE

BLACKSTONIA Hudson

perfoliata (L.) Huds.—PERFOLIATE YELLOW-WORT. Rare-; Burniston Cliffs, 1884 (E.R.C.), last seen 1940 ; Cloughton, 1914 (A.I.B.).

CENTAURIUM Hill

umbellatum Gil.—CENTAURY. Common in dry pastures ; Silpho Moor, Cayton Bay, Scalby Wyke, Cumboots.
littorale (Turn., D.) Gilm.—TUFTED CENTAURY. Uncommon ; Filey Brigg, 1945 (E.R.C., H.R.).

GENTIANA Linnaeus

campestris L.—FIELD GENTIAN. Rare ; Silpho Moor, 1884 and up to 1916, found again 1945 (E.R.C.) ; Hole of Horcum, 1945 *et seq.* (H.R.) ; Langdale End, 1916 (E.C.H.).
amarella L.—FELWORT, AUTUMNAL GENTIAN. Common ; Thornton-le-Dale, Silpho Moor, Ayton Quarry.

MENYANTHACEAE

MENYANTHES Linnaeus

trifoliata L.—BOGBEAN, BUCKBEAN. Common ; nearly covers Throxenby Mere ; Filey (E.C.H.).

POLEMONIACEAE

POLEMONIUM Linnaeus

***caeruleum** L.—JACOB'S LADDER. Rare ; Silpho Moor, Thornton-le-Dale, Pexton Moor, but not seen for some years, 1939 (H.R.).

BORAGINACEAE

OMPHALODES Miller

***verna** Moench—BLUE NAVELWORT. Rare ; banks of river Derwent, Forge Valley, 1945 (E.R.C., H.R.) ; Pickering (A.I.B.).

CYNOGLOSSUM Linnaeus

officinale L.—HOUND'S TONGUE. Rare ; Ellerburn (A.G. on Y.N.U. Excn.).

ASPERUGO Linnaeus

***procumbens** L.—MADWORT. Rare ; Thornton-le-Dale rubbish-tip, 1940 (H.R.).

SYMPHYTUM Linnaeus

officinale L.—COMMON COMFREY. Common ; increasing along roadsides in the district.

tuberosum L.—TUBEROUS COMFREY. Rare ; Yedingham, Red Scar Lane, Newby, 1940 (H.R.).

ANCHUSA Linnaeus

***sempervirens** L.—EVERGREEN ALKANET. Uncommon ; Forge Valley, 1910 (G.W.T.) ; Ebberston, Hutton Buscel, 1935 (D.W.B.).

LYCOPSIS Linnaeus

arvensis L.—SMALL BUGLOSS. Common ; Ellerburn, Flixton, etc.

MYOSOTIS Linnaeus

caespitosa Schultz, K. F.—TUFTED WATER FORGET-ME-NOT. Common in wet places.

scorpioides L.—FORGET-ME-NOT. Common in wet places.

secunda Murr., A.—CREEPING WATER FORGET-ME-NOT. Rare ; Ringing Keld Bog, 1912, disappeared by 1940 (E.R.C.) ; Beedale, 1945 (C.M.R.).

brevifolia Salmon, C. E.—Rare ; Hole of Horcum, 1945 (H.R. det. C.M.R.).

sylvatica (Ehrh.) Hoffm.—WOOD FORGET-ME-NOT. Common.

arvensis (L.) Hill—FIELD FORGET-ME-NOT. Common in fields and waste places.
collina Hoffm.—EARLY FORGET-ME-NOT. Common on dry banks.
versicolor Sm.—CHANGEABLE FORGET-ME-NOT. Common.

LITHOSPERMUM Linnaeus

officinale L.—GROMWELL. Uncommon; Forge Valley, Newton Dale (H.R.).
arvense L.—CORN GROMWELL. Rare; Ellerburn, 1914 (G.W.T., D.W.B.); Seamer Carrs, 1914 (E.C.H.); Thornton-le-Dale as a casual, 1945 (H.R.); Scarborough Museum Garden, 1946 (H.R.).

ECHIUM Linnaeus

vulgare L.—VIPER'S BUGLOSS. Uncommon; Ellerburn, Pexton Moor, Flixton sand-pits (E.R.C., A.I.B.); Ayton, 1914 (E.C.H.).

CONVOLVULACEAE

CALYSTEGIA Brown, R.

sepium (L.) Br., D.—LARGE BINDWEED. Common in hedges.
***sylvestris** (Willd.) Roem. et Schult.—Everley and Langdale End.

CONVOLVULUS Linnaeus

arvensis L.—CORN BINDWEED. Abundant.

CUSCUTA Linnaeus

epithymum (L.) Murr.—LESSER DODDER. Rare; Pickering (E.C.H.); High Fordon (J.S.H.); Thornton-le-Dale (E.R.C., H.R.).
trifolii Bab.—CLOVER DODDER. Rare; quarry at Hunmanby, 1916 (T.B.R.).

SOLANACEAE

SOLANUM Linnaeus

dulcamara L.—WOODY NIGHTSHADE, BITTERSWEET. Common in hedges.
***nigrum** L.—BLACK NIGHTSHADE. Waste ground, Scarborough Mere, 1914 (E.C.H.); Thornton-le-Dale, 1949 (H.R.).

LYCIUM Linnaeus

chinense Mill.—TEA-PLANT. Uncommon; Cloughton Newlands, 1914 (E.C.H.); Seamer Carrs, 1915 (E.C.H.); Langdale End, 1940 (H.R.); Spital Corner (G.B.W.).

ATROPA Linnaeus

bella-donna L.—DEADLY NIGHTSHADE Rare; Dark Arch, Scarborough, 1946 (E.R.C.); Motor-coach Park, 1947 (H.R.); probably escapes from one-time herb-garden near by.

DATURA Linnaeus

*__stramonium__ L.—THORN-APPLE. Rare ; Corporation Allotments, 1911-12 (E.R.C.).

*__tatula__ L.—Rare ; High Fordon, 1946 (J.S.H. **teste** C.M.R.), specimen now in British Museum Herbarium.

HYOSCYAMUS Linnaeus

__niger__ L.—HENBANE. Rare ; Stone Haggs, 1910 (E.R.C.) ; Thornton-le-Dale, 1939, gone in 1940, reappeared in 1947 (H.R.).

SCROPHULARIACEAE

VERBASCUM Linnaeus

__thapsus__ L.—GREAT MULLEIN. Uncommon ; Dalby Dale, 1912 (A.I.B.).

__nigrum__ L.—DARK MULLEIN. Rare ; Hutton Buscel, 1916 (E.C.H.) ; Grosmont slag-heaps, 1934 (W.A.S.) ; occasionally on roadsides (H.R.).

*__virgatum__ Stokes—TWIGGY MULLEIN. Rare ; Thornton-le-Dale, 1947-8 (H.R., **teste** W.A.S.).

LINARIA Miller

*__cymbalaria__ (L.) Mill.—IVY-LEAVED TOAD-FLAX. Common on old walls ; a white variety grows at Wykeham (H.R.).

__elatine__ (L.) Mill.—SHARP-LEAVED FLUELLEN. Rare ; "Like the following, a plant of cultivated fields and very rare ; was reported from Scarborough by J. Williamson." (J.G.B.).

__spuria__ (L.) Mill.—ROUND-HEADED FLUELLEN. Rare ; Scarborough (J.G.B.).

__vulgaris__ Mill.—YELLOW TOAD-FLAX. Common along waysides.
var.__latifolia__ Bab.—BROAD-LEAVED TOAD-FLAX. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.).

__minor__ (L.) Desf.—LESSER TOAD-FLAX. Common in chalky cornfields and on railway ballast.

SCROPHULARIA Linnaeus

__aquatica__ L.—WATER BETONY, WATER FIGWORT. Common in marshes, Scalby Beck, Forge Valley, etc.

__nodosa__ L.—FIGWORT. Common in moist places, Forge Valley, etc.

MIMULUS Linnaeus

*__guttatus__ DC.—MONKEY FLOWER. Uncommon ; Thornton Beck, Mowthorpe (H.R.).

DIGITALIS Linnaeus

__purpurea__ L.—FOXGLOVE. Common on banks and in open woods.

VERONICA Linnaeus

hederifolia L.—IVY-LEAVED SPEEDWELL. Common on cultivated ground.
polita Fr.—GREY FIELD SPEEDWELL. Uncommon ; waste places.
agrestis L.—FIELD SPEEDWELL. Common in waste places.
persica Poir.—LARGE FIELD SPEEDWELL. Very common.
*__filiformis__ Sm.—Rare ; Hackness, 1947 (H.R.).
arvensis L.—WALL SPEEDWELL. Uncommon ; Hay Brow, 1914 (E.C.H.) ; Everley, Troutsdale (H.R.).
serpyllifolia L.—THYME-LEAVED SPEEDWELL. Common in moist waste places.
officinalis L.—COMMON SPEEDWELL. Common in dry places.
chamaedrys L.—GERMANDER SPEEDWELL. Abundant.
montana L.—MOUNTAIN SPEEDWELL. Common ; Hackness, Forge Valley, Cloughton Quarries, etc.
scutellata L.—MARSH SPEEDWELL. Uncommon ; Throxenby Mere, 1916 (G.W.T.) ; Cloughton Hulleys, 1940 (H.R.).
anagallis-aquatica L.—WATER SPEEDWELL. Uncommon ; Seamer Carrs, 1914 (E.C.H.) ; Spital Corner, 1940 (H.R.).
beccabunga L.—BROOKLIME. Common in ditches.
forma **submersa** Glueck—Rare ; Brompton (Nat., Jan., 1933).

EUPHRASIA Linnaeus

officinalis agg.—EYEBRIGHT.
nemorosa (Pers.) Loehr.—The commonest Eyebright in the district.
confusa Pugsl., f. **albida** Pugsl.—Goathland (G. Fisher).
occidentalis Wettst., var. **calvescens** Pugsl.—Flamborough (E. Dees).
pseudo-kerneri Pugsl.—Silpho Moor, 1912 (T.B.R.) ; Hayburn Wyke (Nat., 1909, p. 79).
micrantha Rchb.—Silpho Moor, 1912 (T.B.R.) ; Bloody Beck, Langdale End (Hb. E.C.H.).
brevipila Burn. et Gremli—Silpho Moor, 1912 (T.B.R.).
borealis (Towns.) Wettst.—Fylingdales (H.W.P.).

ODONTITES Gilibert

rubra Gil.—RED BARTSIA. Common in waste places.
var. **verna** Rchb.—Rare ; the Carrs, 1914 (G.W.T.).

PEDICULARIS Linnaeus

palustris L.—MARSH LOUSEWORT. Common in marshes.
sylvatica L.—FIELD LOUSEWORT. Common in moist meadows.

RHINANTHUS Linnaeus

minor L.—COMMON YELLOW RATTLE. Common in damp pastures.

MELAMPYRUM Linnaeus

pratense L.—YELLOW COW-WHEAT. Uncommon ; Ravenscar, 1948 (Miss P. M. Donson).

var. **montanum** Johnst.—Cross Cliff, 1915 (G.W.T.) ; Forge Valley, 1914 (E.C.H.) ; Hackness Hairpins, Wrench Green (H.R.).

OROBANCHACEAE

OROBANCHE Linnaeus

elatior Sutt.—TALL BROOM-RAPE. Local ; fairly plentiful at Staxton (H.R.) ; abundant, Stone Haggs, 1920 (G.B.W.).

apiculata Wallr.—LESSER BROOM-RAPE. Rare ; High Fordon, dried plant shown to E.R.C. and H.R., 1946 ; Staxton one plant, 1947 (E.R.C., H.R.).

LATHRAEA Linnaeus

squamaria L.—TOOTHWORT. Common on roots of **Corylus,** Forge Valley, etc.

LENTIBULARIACEAE

UTRICULARIA Linnaeus

vulgaris L.—BLADDERWORT. Rare ; Scarborough Mere (J.G.B.), not seen in recent years.

PINGUICULA Linnaeus

vulgaris L.—COMMON BUTTERWORT. Common ; Ringing Keld Bog, Levisham, Nab Gate Springs, cliffs south of Scarborough.

VERBENACEAE

VERBENA Linnaeus

officinalis L.—VERVAIN. Rare ; Brompton, Thornton-le-Dale, 1896 (D.W.B.) ; Hutton Buscel, 1916 (E.C.H.).

LABIATAE

MENTHA Linnaeus

rotundifolia (L.) Huds.—ROUND-LEAVED MINT. Rare ; roadside from Ganton station to Wykeham, 1914 (A.I.B.), 1915 (E.C.H.) ; Levisham, Forge Valley (W.F.).

***spicata** L.—SPEARMINT. Uncommon ; Troutsdale, 1940 (H.R.) ; Forge Valley (W.F.).

piperita L.—PEPPERMINT. Uncommon ; Harwood Dale, 1914 (A.I.B.) ; Thornton-le-Dale, 1916 (A.I.B., G.W.T.) ; Ruston, 1941 (H.R.) ; Ellerburn, 1937 (C.M.R.).

aquatica L.—WATER MINT. Common in marshes, Scarborough and Throxenby Meres, etc.

verticillata L.—WHORLED MINT. Common ; Mowthorpe Cut, 1913 (E.C.H.).

arvensis L.—CORN MINT. Abundant in cornfields.

***requienii** Benth.—Rare ; Holbeck Gardens, 1945 (H.R. **teste** W.A.S.).

LYCOPUS Linnaeus

europaeus L.—GIPSYWORT. Uncommon ; Hilla Green, 1946 (E.R.C., H.R.) ; Langdale End, 1915-16 (G.W.T.).

ORIGANUM Linnaeus

vulgare L.—WILD MARJORAM. Common on dry uplands ; Scarborough Castle Hill, Forge Valley, etc.

THYMUS Linnaeus

serpyllum L.—WILD THYME. Common on dry heaths.

glaber Mill.—Plentiful on limestone embankment, north end Cayton Bay (W.F.).

CLINOPODIUM Linnaeus

vulgare L.—WILD BASIL. Uncommon ; Langdale End and Forge Valley (Hb. E.C.H.) ; Thornton-le-Dale, 1940 (H.R.) ; Allerston sand-pit, 1908 (R.J.F.).

ACINOS Miller

arvensis (Lam.) Dandy—BASIL THYME. Uncommon ; Ayton, 1914, Staxton sand-pits, 1916 (E.C.H.) ; Thornton-le-Dale, 1940 (H.R.) ; Dalby Nut Wood, 1908 (R.J.F.).

CALAMINTHA Miller

ascendens Jord.—COMMON CALAMINT. Uncommon ; Scarborough Castle Hill, Hayburn Wyke, 1914 (E.C.H.) ; Brompton, 1915 (A.I.B., G.W.T.).

SALVIA Linnaeus

horminoides Pourr.—CLARY. Rare ; Scarborough Castle Hill, 1914 (E.C.H.).

***verticillata** L.—WHORLED CLARY. Rare ; Grosmont, 1939 (E.R.C.).

NEPETA Linnaeus

cataria L.—CATMINT. Rare ; Stone Haggs, 1912-15 (A.I.B.), 1914 (E.C.H.) ; not seen in recent years.

GLECHOMA Linnaeus

hederacea L.—GROUND IVY. Abundant.

SCUTELLARIA Linnaeus

galericulata L.—COMMON SKULL-CAP. Uncommon ; Throxenby Mere, 1914, Forge Valley, 1916 (E.C.H.) ; Wrench Green, 1947 (H.R.).

minor Huds.—LESSER SKULL-CAP. Rare ; Scarborough Mere (W.B.) ; not seen in recent years.

PRUNELLA Linnaeus

vulgaris L.—SELF-HEAL. Abundant ; a white variety is occasionally found.

MARRUBIUM Linnaeus

vulgare L.—WHITE HOREHOUND. Rare ; Pexton Moor, one plant 1942-46. In the winter of 1946-7, a wall fell on this plant and it has not been seen in summers of 1947 or 1948 (H.R.) ; old quarry, Thornton-le-Dale (A.M.O.).

STACHYS Linnaeus

officinalis (L.) Trev.—WOOD BETONY. Common in copses ; Langdale End, Dalby Dale, etc.

palustris L.—MARSH WOUND-WORT. Uncommon ; Hay Brow, Cayton Carrs, Scarborough Mere, Flixton Carrs, 1914-16 (E.C.H.) ; Seamer Carrs (A.I.B., E.R.C.).

x ambigua Sm.—Rare ; Langdale End, 1915 (G.W.T., E.C.H.) ; Everley,, 1916 (E.C.H.).

sylvatica L.—HEDGE WOUND-WORT. Abundant.

arvensis (L.) L.—CORN WOUND-WORT. Common in cornfields and waste places.

***annua** (L.) L.—WOUND-WORT. Rare ; Thornton-le-Dale (J.G.. Nat., 1932, p. 19).

GALEOPSIS Linnaeus

angustifolia Hoffm.—RED HEMP NETTLE. Common in cornfields and waste places.

speciosa Mill.—BEE HEMP NETTLE. Local ; Cayton Carrs, fairly plentiful (A.I.B.) ; Seamer Carrs, 1914, Ganton Carrs, 1915 (E.C.H.).

tetrahit L.—COMMON HEMP NETTLE. Common in cornfields and waste places.

var **bifida** (Boenn.) Lej. et Court.—High Flixton, near Fordon, 1913 (A.I.B.).

LAMIUM Linnaeus

amplexicaule L.—HENBIT DEAD NETTLE. Common in waste sandy places.

moluccellifolium Fr.—INTERMEDIATE DEAD NETTLE. Rare ; Cayton Village, 1946 (E.R.C., H.R.).

hybridum Vill.—CUT-LEAVED DEAD NETTLE. Rare ; Staxton sand-pits, 1942 (H.R.).

purpureum L.—RED DEAD NETTLE. Abundant.

***maculatum** L.—SPOTTED DEAD NETTLE. Rare ; Osgodby Bank Top, 1939 (H.R.), only as an escape ; a white variety flourishes at Broxa.

album L.—WHITE DEAD NETTLE. Abundant.

BALLOTA Linnaeus

nigra L.—BLACK HOREHOUND. Common; plentiful on Scarborough Castle Hill and around Staxton.

TEUCRIUM Linnaeus

scorodonia L.—WOOD SAGE. Common in woods and on heaths; Oliver's Mount, Whisperdales, etc.

AJUGA Linnaeus

reptans L.—COMMON BUGLE. Abundant.

PLANTAGINACEAE

PLANTAGO Linnaeus

coronopus L.—BUCK'S-HORN PLANTAIN. Local; plentiful on Scarborough Castle Hill; and Scarborough North Cliff, (E.C.H.).

maritima L.—SEA PLANTAIN. Common near the sea.

lanceolata L.—RIBWORT PLANTAIN. Abundant.

media L.—HOARY PLANTAIN. Not uncommon on calcareous soil; Hackness, Snainton.

major L.—GREAT PLANTAIN Common in pastures

LITTORELLA Bergius

uniflora (L.) Asch.—SHORE-WEED. Rare; Scarborough Mere, 1914 (A.I.B.); not seen in recent years.

ILLECEBRACEAE

SCLERANTHUS Linnaeus

annuus L.—ANNUAL KNAWEL. Rare; field adjoining Flixton sand-pit, 1915 (G.W.T., A.I.B.), and still there.

CHENOPODIACEAE

CHENOPODIUM Linnaeus

album L.—WHITE GOOSE-FOOT, FAT HEN. Abundant.

viride L. sec Aell.—GREEN GOOSE-FOOT. Rare; Thornton-le-Dale, 1922 (R.J.F., J.G.).

murale L.—NETTLE-LEAVED GOOSE-FOOT. Rare; waste ground, Scarborough Mere, 1915 (E.C.H. **det.** G. C. Druce); Seamer, 1940 (A.G., D.W.B.).

rubrum L.—RED GOOSE-FOOT. Scarborough Mere, 1915 (E.C.H., G.W.T.); Pickering, 1945 (M.E.P.).

***glaucum** L.—GLAUCOUS GOOSE-FOOT. Rare; waste ground, Scarborough Mere, 1914 (E.C.H.).

***bonus-henricus** L.—GOOD KING HENRY. Common; West Ayton, Ellerburn, etc.

BETA Linnaeus

***maritima** L.—SEA BEET Uncommon; Scarborough Castle Hill, 1884 (E.R.C.).

ATRIPLEX Linnaeus

littoralis L.—GRASS-LEAVED SEA ORACHE. Rare ; Scarborough North-sands (J.G.B.) ; not seen in recent years ; north end Cayton Bay, 1891 (W.F.).

patula L.—NARROW-LEAVED ORACHE. Common in waste places.

hastata L.—HALBERD-LEAVED ORACHE. Rare ; waste ground, Scarborough Mere, 1914 (E.C.H., G.W.T.).

glabriuscula Edm.—Scarborough North-side, 1914 (E.C.H.) ; Cornelian Bay, 1939 (H.R.) ; Cayton Bay, 1891 (W.F.).

SUAEDA Forskal

maritima (L.) Dum.—ANNUAL SEA-BLITE. Rare ; Holbeck Gardens, Scarborough, 1942 (H.R.) ; decreasing yearly, none in 1948.

SALSOLA Linnaeus

kali L.—PRICKLY SALTWORT. Rare ; one plant under barbed-wire defences on Scarborough foreshore, 1942 (H.R.) ; Cayton Bay, 1912 (A.I.B.) ; not seen there in recent years.

POLYGONACEAE

POLYGONUM Linnaeus

convolvulus L.—BLACK BINDWEED. Common as a weed of arable land.

var. **subalatum** Lej. & Court—Hutton Buscel, 1916 (E.C.H.) ; Seamer Moor, 1940 (D.W.B.).

aviculare agg.—KNOTGRASS. Abundant.

var. **arenastrum** Bor.—Sandy road-way, Scalby Wyke, 1914 (E.C.H.).

var. **rurivagum** Bor.—Seamer Carrs, 1914 (E.C.H.).

hydropiper L.—BITING PERSICARIA . Uncommon ; banks of River Derwent, Ayton, Hertford River near Ganton, Raincliffe Wood, 1914-15 (E.C.H.) ; Hilla Green, 1948 (H.R.).

mite Schrank—LAX-FLOWERED PERSICARIA. Rare ; Hilla Green, 1948 (H.R. **teste** C.M.R.).

persicaria L.—SPOTTED PERSICARIA. Abundant.

lapathifolium L.—PALE PERSICARIA. Uncommon ; Seamer Carrs, 1940 (H.R.).

var. **incanum** Lej. et Court—Scarborough Mere, 1914 ; Ganton, Seamer Carrs, 1915 (E.C.H.).

amphibium L.—WATER PERSICARIA. Common ; Scarborough and Throxenby Meres.

var. **terrestre** Leers.—Rare ; Thornton-le-Dale,1922 (R.J.F., J.G.) ; waste ground, Scarborough Mere, 1917 (E.C.H.).

bistorta L.—COMMON BISTORT. Uncommon ; Ellerburn, Lowdales, Staintondale Woods (H.R.).

FAGOPYRUM Moench

***tataricum** Gaertn.—BUCKWHEAT. Rubbish heap near Throxenby Mere, 1915 (E.C.H.).

RUMEX Linnaeus

conglomeratus Murr.—SHARP DOCK. Common in wet meadows and waste places.

nemorosus Willd.—Abundant in woods, thickets and hedge-banks.

maritimus L.—GOLDEN DOCK. Rare ; Scarborough Mere, abundant in 1853 (W.B.), now rare, but recorded in 1914 (E.C.H.), and 1940 to 1945 (H.R.) ; pond at top of Hay Brow, 1945 (H.R. **det.** C.M.R.).

pulcher L.—FIDDLE DOCK. Rare ; Fylingdales, 1882 (C.C.B.).

obtusifolius L.—BROAD-LEAVED DOCK. Common in waste places.

crispus L.—CURLED DOCK . Common in waste places.

hydrolapathum Huds.—GREAT WATER DOCK. Rare ; Seamer Carrs, 1912 (A.I.B.).

acetosa L.—COMMON SORREL. Common in meadows.

acetosella L.—SHEEP'S SORREL. Common in dry pastures.

ARISTOLOCHIACEAE

ARISTOLOCHIA Linnaeus

***clematitis** L.—COMMON BIRTHWORT. Rare ; Wykeham Abbey (J.G.B.) ; not seen in recent years.

THYMELAEACEAE

DAPHNE Linnaeus

laureola L.—SPURGE LAUREL. Uncommon ; Forge Valley, Ebberston (H.R.) ; near Seamer, 1937 (E.R.C.).

ELAEAGNACEAE

HIPPOPHAE Linnaeus

***rhamnoides** L.—SEA BUCKTHORN. Uncommon; Cayton Bay, 1914 (E.C.H.) ; Holbeck Gardens, Cornelian Bay (H.R.) ; solitary tree in hedge on the Marishes near Wilton, 1937 (C.M.R.).

LORANTHACEAE

VISCUM Linnaeus

***album** L.—MISTLETOE. Rare ; Ebberston Vicarage garden on apple (H.R.).

EUPHORBIACEAE

EUPHORBIA Linnaeus

helioscopia L.—SUN SPURGE. Common in waste places.

platyphyllos L.—BROAD-LEAVED WARTED SPURGE. Rare ; Thornton-le-Dale, as a garden weed (Nat., 1930, p. 30).

*dulcis L.—Rare; Brompton, 1945 (H.R. teste W.A.S.).
*virgata Waldst et Kit.—Rare ; Thornton-le-Dale, 1949 (H.R., det. C.M.R.).
peplus L.—PETTY SPURGE. Common in waste places.
exigua L.—DWARF SPURGE. Common in fields, etc.
*lathyrus L.—CAPER SPURGE. Rare ; High Fordon in garden, 1911 (A.I.B.).
*characias L.—RED SHRUBBY SPURGE. Garden, Scarborough, 1949 (S.R. det. C.M.R.).

MERCURIALIS Linnaeus

perennis L.—DOG'S MERCURY. Abundant.

BUXACEAE

BUXUS Linnaeus

*sempervirens L.—BOX TREE. Common ; planted at Ebberston, Hackness, etc.

ULMACEAE

ULMUS Linnaeus

glabra Huds.—WYCH ELM. The commonest elm in the district.
procera Salisb—COMMON ELM. Common, but not so frequent as the former.

CANNABINACEAE

HUMULUS Linnaeus

lupulus L.—COMMON HOP. Rare ; roadside near Ebberston, Wilton and Thornton-le-Dale, 1915 (A.I.B., G.W.T.) ; Holbeck Gardens, 1940 (H.R.) ; Pexton Moor (Y.N.U., Naturalist, 1941).

URTICACEAE

URTICA Linnaeus

dioica L.—COMMON NETTLE. Abundant.
urens L.—SMALL NETTLE. Common in waste places.

PARIETARIA Linnaeus

diffusa Mert. et Koch.—PELLITORY OF THE WALL. Uncommon ; Scarborough Castle Hill, Thornton-le-Dale, Brompton (H.R.).

MYRICACEAE

MYRICA Linnaeus

gale L.—BOG MYRTLE, SWEET GALE. Common in bogs and on wet moors ; Goathland, Jugger Howe Beck, Langdale End, Helwath Beck, etc.

BETULACEAE

BETULA Linnaeus

pendula Roth—BIRCH. Common in open woods and heaths.
pubescens Ehrh.—Probably widespread, but the only definite records are Dalby Dale (Y.N.U. Excn., 1922), and Levisham (Y.N.U. Excn., 1929).

ALNUS Miller

glutinosa (L.) Gaertn.—ALDER. Common in wet places; Forge Valley, Dalby Dale, etc.
***incana** (L.) Moench.—Rare; Beckhole (H.B.).

CORYLACEAE

CARPINUS Linnaeus

***betulus** L.—HORNBEAM. Rare; Hackness, about three trees, 1914 (A.I.B.).

CORYLUS Linnaeus

avellana L.—HAZEL. Common.

FAGACEAE

QUERCUS Linnaeus

robur L.—COMMON OAK. Common.
petraea (Matt.) Liebl.—SESSILE-FRUITED OAK. Probably widespread, but there is no definite record.

CASTANEA Miller

***sativa** Mill.—SWEET CHESTNUT. Occasional; Hackness, Thornton-le-Dale, etc.

FAGUS Linnaeus

sylvatica L.—COMMON BEECH. Common; Forge Valley, Thornton-le-Dale, etc.

SALICACEAE

SALIX Linnaeus

pentandra L.—BAY-LEAVED WILLOW. Uncommon; Throxenby Mere, Spital Corner (H.R.); head of Troutsdale (G.B.W.).
triandra L.—SMOOTH WILLOW. Not uncommon on stream sides; Scarborough Mere (W.F.).
fragilis L.—CRACK WILLOW. Uncommon; Oliver's Mount, 1941 (H.R.).
alba L.—WHITE WILLOW. Common on marshy ground.
purpurea L.—PURPLE WILLOW. Uncommon; near Falcon Inn, 1940 (H.R.).
viminalis L.—OSIER. Common in wet places; Forge Valley, etc.

caprea L.—GOAT WILLOW. Common in woods ; Hayburn Wyke, Hay Brow, etc.

atrocinerea Brot.—COMMON WILLOW. Common.

var. **ferruginea** And.—FERRUGINOUS OSIER. Uncommon ; Scarborough Mere, 1941 (H.R.).

atrocinerea Brot. x **viminalis** L. (x **smithiana** Willd.)—SILKY-LEAVED OSIER. Uncommon ; Scarborough Mere, 1941 (H.R.).

repens L.—DWARF or CREEPING WILLOW. Common ; Langdale End, Dalby Dale, Jugger Howe Beck, etc.

POPULUS Linnaeus

***alba** L.—WHITE POPLAR. Uncommon ; Langdale End, 1913 (A.I.B.).

tremula L.—ASPEN. Uncommon ; Langdale End, 1915 (E.C.H.) ; Ebberston (H.R.) ; Sawdon Dale (A.I.B.) ; High Bridestones, 1948 (A.G.) ; Seamer Moor (G.B.W.).

***serotina** Hart.—BLACK POPLAR. Not uncommon ; Brompton, Hackness, East Ayton. **P. nigra** L. may occur.

***candicans** Ait.—BALSAM POPLAR. Uncommon ; Lady Edith's Drive, planted (H.R.) ; Sawdon Dale and Staintondale, planted (W.F.).

EMPETRACEAE

EMPETRUM Linnaeus

nigrum L.—BLACK CROWBERRY. Uncommon ; Silpho Moor, 1913 (E.C.H.) ; Saltwick Nab and moors near Falcon Inn (H.R.).

MONOCOTYLEDONES

HYDROCHARITACEAE

ELODEA Michaux

***canadensis** Michx.—WATER THYME. Common in ditches and slow streams, Scarborough Mere, Mowthorpe Cut, River Derwent, etc.

HYDROCHARIS Linnaeus

morsus-ranae L.—FROGBIT. Rare ; River Derwent above Malton (J.G.B.) ; not seen recently.

ORCHIDACEAE

NEOTTIA Richard, L. C.

nidus-avis (L.) Rich., L. C.—BIRD'S-NEST ORCHIS. Rare ; Forge Valley, Thornton-le-Dale, 1913 (A.I.B.).

LISTERA Brown, R.

cordata (L.) Br., R.—LESSER TWAYBLADE. Rare ; plentiful on Silpho Moor in 1912 and 1913 (E.R.C., A.I.B., E.C.H.), but not seen there in recent years. Hole of Horcum, 1939 (E.R.C.).

ovata (L.) Br., R.—TWAYBLADE. Common in woods, etc. ; Forge Valley, Ellerburn, Silpho Moor roadside (H.R.).

SPIRANTHES Richard, L. C.

spiralis (L.) Chev.—AUTUMN LADY'S TRESSES. Rare ; Forge Valley (J.G.B.) ; Scalby Nabs, 1942 (H.R.).

CEPHALANTHERA Richard, L. C.

longifolia (L.) Fritsch—NARROW-LEAVED HELLEBORINE. Rare ; Forge Valley and Beast Cliff, 1914 (A.I.B.).

EPIPACTIS Swartz

helleborine (L.) Crantz—BROAD-LEAVED HELLEBORINE. Rare ; Cloughton Bank, 1940 (H.R.) ; Raincliffe Wood, 1915 (E.C.H.).

var. **purpurea** (Cel.)—Rare ; Forge Valley, 1915 (H.R.).

palustris (L.) Crantz.—MARSH HELLEBORINE. Rare ; Scarborough South Cliff, 1894 (E.R.C.) ; Dalby Dale, 1939 (E.G.H.).

ANACAMPTIS Richard, L. C.

pyramidalis (L.) Rich., L. C.—PYRAMIDAL ORCHIS. Locally common ; cliffs north of Scarborough, Ayton Road quarry, Hutton Buscel, Langdale End (Hb. E.C.H.).

ORCHIS Linnaeus

ustulata L.—DWARF or BURNT-TIP ORCHIS. Rare ; Brompton, Snainton, Ruston Cow-pasture (H.R.).

morio L.—GREEN-WINGED ORCHIS. Common in meadows ; Langdale End, Snainton, etc.

mascula (L.) L.—EARLY PURPLE ORCHIS. Common in pastures and woods.

latifolia L. sec Pugsl.—MARSH ORCHIS. Common in marshy ground.

purpurella Steph., T. & T. A.—Rare ; Ringing Keld Bog, 1914 (T.B.R.), not seen recently ; Cumboots, 1914 (E.C.H.).

ericetorum (Lint.) Marsh.—Not uncommon, predominantly on acid soils.

fuchsii Druce—SPOTTED ORCHIS. Common in meadows and on roadsides.

fuchsii Dr. x **latifolia** L. sec. Pugsl.—Rare ; Helwath Beck (H.B.).

ericetorum (Lint.) Marsh. x **fuchsii** Dr. (x **transiens** Dr.)—Rare ; Saltergate (H.B.).

OPHRYS Linnaeus

apifera Huds.—BEE ORCHIS. Uncommon ; Betton Farm, Givendale Plantation, Allerston (H.R.) ; Forge Valley, 1884 (E.R.C.) ; cliffs south of Primrose Valley, Filey (G.B.W.).

insectifera L.—FLY ORCHIS. Uncommon ; Forge Valley, Thornton-le-Dale (H.R.) ; Newton Dale (W.F.).

GYMNADENIA Brown, R.

conopsea (L.) Br., R.—FRAGRANT ORCHIS. Common ; cliffs north and south of Scarborough, Langdale End, Ayton, etc.

G. conopsea x L. **albida** (xx **Leucadenia schweinfurthii** Schlect.)—Rare ; Hole of Horcum, 1937 (H.B.). H.B. writes :—" My record is the only English locality, all previous records being Scottish. I have deposited photographs in the Yorkshire Museum." See also special report by P. M. Hall in " The South-Western Naturalist," Vol. XLIV, p. 28, " Hybrid Orchids of Great Britain."

G. conopsea x **O. fuchsii** (xx **Orchigymnadenia legrandii** Cam., G.) Rare ; six miles up Thornton Dale (J.G.B., Nat., 1909, p. 342).

LEUCORCHIS Meyer, E.

albida (L.) Schur.—SMALL WHITE ORCHIS. Rare ; Hole of Horcum, 1922 (R.J.F.).

COELOGLOSSUM Hartman

viride (L.) Hartm.—FROG ORCHIS. Not uncommon in dry hilly pastures ; Cumboots, Cornelian Bay, Highdales, Dalby Dale, etc.

PLATANTHERA Richard, L. C.

bifolia (L.) Rich., L. C.—LESSER BUTTERFLY ORCHIS. Uncommon ; Cumboots, 1914 (E.C.H.) ; Langdale End, Hayburn Wyke, 1912 (A.I.B.).

chlorantha (Cust.) Rchb.—GREATER BUTTERFLY ORCHIS. Uncommon ; Langdale End, 1913 (E.C.H.) ; Pickering Castle banks ; Cross Cliff (H.R.).

IRIDACEAE

IRIS Linnaeus

pseudacorus L.—YELLOW IRIS, FLAG. Common ; Forge Valley, Scarborough and Throxenby Meres.

AMARYLLIDACEAE

NARCISSUS Linnaeus

pseudo-narcissus L.—DAFFODIL, LENT LILY. Uncommon ; Yedmandale, Helwath Beck, Cloughton (H.R.).

***majalis** Curt.—PHEASANT'S EYE. " Is, or has been, subspontaneous in the castle yard at Pickering."—W. Foggitt (J.G.B.).

GALANTHUS Linnaeus

*nivalis L.—SNOWDROP. Uncommon ; Brompton, Lindhead, West Flotmanby, Staintondale ; only as an escape from cultivation.

ALLIUM Linnaeus

vineale L.—CROW GARLIC. Rare ; Hackness (B.R.).
ursinum L.—GARLIC, RAMSONS. Abundant in woods.

DIOSCOREACEAE

TAMUS Linnaeus

communis L.—BLACK BRYONY. Common in hedges.

LILIACEAE

RUSCUS Linnaeus

*aculeatus L.—BUTCHER'S BROOM. Rare ; only where planted, e.g., South Cliff Gardens.

POLYGONATUM Miller

*multiflorum (L.) All.—SOLOMON'S SEAL. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.) ; probably a garden escape.

MAIANTHEMUM Weber

bifolium (L.) Schmidt—MAY LILY. Rare ; Wrench Green, where since the conifers have been felled, the plants are flowering again abundantly, 1947 (H.R.). Found in 1857 by Messrs. Reynolds and Braby, this is the only British station where the plant is clearly indigenous (J.G.B.).

CONVALLARIA Linnaeus

majalis L.—LILY OF THE VALLEY. Uncommon ; Dalby Nut Wood, Thornton-le-Dale ; Forge Valley (H.R.).

SCILLA Linnaeus

non-scripta (L.) Hoffmgg.et Link—BLUEBELL. Abundant.

ORNITHOGALUM Linnaeus

*umbellatum L.—STAR OF BETHLEHEM. Rare ; Forge Valley (J.G.B.) ; not seen in recent years.

LILIUM Linnaeus

*martagon L.—MARTAGON LILY. Rare ; Lowdales (W.A.S., Nat., 1936, p. 221).

FRITILLARIA Linnaeus

*meleagris L.—FRITILLARY. Rare ; Flamborough Head (Y.N.U. Excn., June, 1886).

MAY LILY (*Maianthemum bifolium* (L.) Schmidt)

Photograph : J. P. Best

facing page 361

GAGEA Salisbury

lutea (L.) Ker-Gawl.—YELLOW STAR OF BETHLEHEM. Rare ; Yedmandale, 1894 (E.R.C.).

NARTHECIUM (L.) Hudson

ossifragum (L.) Huds.—LANCASHIRE BOG ASPHODEL. Common on moors near Falcon Inn, Ringing Keld Bog.

PARIS Linnaeus

quadrifolia L.—HERB PARIS. Uncommon ; Yedmandale, 1913, Forge Valley, 1914 (E.C.H.) ; Ellerburn, 1940 (H.R.) ; Sawdondale, 1914 (G.W.T.) ; Newtondale (W.F.).

JUNCACEAE

JUNCUS Linnaeus

bufonius L.—TOAD RUSH. Common.
squarrosus L.—HEATH RUSH. Common on moorlands.
compressus Jacq.—ROUND-FRUITED RUSH. Rare ; Cayton Bay, 1943 (H.R.).
gerardii Lois.—MUD RUSH. Uncommon ; cliffs north of Scarborough, 1945 (H.R.).
inflexus L.—HARD RUSH. Common in wet places ; Scalby, Ayton, Brompton, etc.
effusus L.—SOFT RUSH. Abundant in wet places.
conglomeratus L.—COMMON RUSH. Common in wet places.
bulbosus L.—LESSER BOG JOINTED RUSH. Common.
subnodulosus Schrank.—BLUNT-FLOWERED JOINTED RUSH. Rare ; Thornton-le-Dale, 1938 (A.M.S.).
articulatus L.—SHARP-FLOWERED JOINTED RUSH. Common in bogs.
var. **nigritellus** Don.—Rare ; Goathland (B.R.).
acutiflorus Hoffm.—SHORT-FLOWERED RUSH. Common in marshy meadows.

LUZULA De Candolle

pilosa (L.) Willd.—BROAD-LEAVED HAIRY WOOD-RUSH. Abundant in Forge Valley.
sylvatica (Huds.) Gaud.—GREAT HAIRY WOOD-RUSH. Common in woods.
campestris (L.) DC.—FIELD WOOD-RUSH. Abundant.
multiflora (Retz.) Lej.—MANY-HEADED WOOD-RUSH. Almost as common as **L. campestris.**
var. **congesta** (DC.) Reg.—Silpho Moor, 1946 (H.R., **det.** C.M.R.).

TYPHACEAE

TYPHA Linnaeus

latifolia L.—REEDMACE. Uncommon ; Cayton Carrs, 1916 (E.C.H.) ; Scarborough Mere, Crossgates (H.R.).

angustifolia L.—NARROW-LEAVED REEDMACE. Rare ; Beast Cliff (Y.N.U. Excn., 1924).

SPARGANIACEAE

SPARGANIUM Linnaeus

erectum L.—BRANCHED BUR-REED. Common in ditches.
neglectum Beeby—Rare ; Scalby Beck (Nat., 1895, p. 307).
simplex Huds.—UPRIGHT BUR-REED. Uncommon ; Seamer Carrs, Mowthorpe Cut (E.R.C., H.R.).
minimum (Hartm.) Fr.—SMALL BUR-REED. Rare ; Thornton-le-Dale, 1922 (R.J.F., J.G.).

ARACEAE

ARUM Linnaeus

maculatum L.—LORDS and LADIES, CUCKOO-PINT, WAKE-ROBIN. Common in hedge-rows, etc.

LEMNACEAE

LEMNA Linnaeus

trisulca L.—IVY-LEAVED DUCKWEED. Uncommon ; Filey, 1947 (H.R. **det.** C.M.R.) ; pond near Cayton Station, 1914 (G.W.T.).
minor L.—LESSER DUCKWEED. Common in stagnant water.
polyrhiza L.—GREATER DUCKWEED. Rare ; pond near Cayton Station, 1947 (H.R. **det.** C.M.R.).

ALISMATACEAE

ALISMA Linnaeus

plantago-aquatica L.—GREATER WATER-PLANTAIN. Common in ditches, etc. ; Seamer Carrs, Scarborough and Throxenby Meres.

BALDELLIA Parlatorre

ranunculoides (L.) Parl.—LESSER WATER-PLANTAIN. Rare ; Cayton Carrs, 1916 (E.C.H.) ; Seamer Carr (E.R.C., A.I.B.).

BUTOMACEAE

BUTOMUS Linnaeus

umbellatus L.—COMMON FLOWERING RUSH. Scarborough Mere, abundant in 1893-94, rare in 1896 and 1940 (E.R.C.) ; fifteen flowering spikes in 1947 (H.R.) ; Hertford River near Flixton. 1914 (E.C.H.).

JUNCAGINACEAE

TRIGLOCHIN Linnaeus

palustris L.—MARSH ARROW-GRASS. Uncommon ; Cayton Bay, Cornelian Bay, Hole of Horcum (E.R.C.) ; Beast Cliff (W.F.).

maritima L.—SEA-SIDE ARROW-GRASS. Rare ; "sparingly at Scarborough" (J.G.B.) ; said to grow at Cayton Bay, but this needs confirmation (E.R.C.).

POTAMOGETONACEAE

POTAMOGETON Linnaeus

natans L.—BROAD-LEAVED PONDWEED. Common.
polygonifolius Pourr.—OBLONG-LEAVED PONDWEED. Common.
lucens L.—SHINING PONDWEED. Scarborough Mere, 1914 (A.I.B.) ; now very rare and possibly extinct.
x **zizii** Roth.—Very rare and probably extinct ; Scarborough Mere (J. A. Wheldon and H. T. Soppitt, 1881 ; T. E. Cotton, 1884).
gramineus L.—VARIOUS-LEAVED PONDWEED. Very rare and probably extinct ; Scarborough Mere (H. Trimen, 1870).
alpinus Balb.—REDDISH PONDWEED. Local ; pond near Scarborough (W.B.) ; Scarborough Mere (H. Moseley, 1840). Abundant in Newtondale Beck from the upper part of the dale as far as Levisham (J.G.B.).
obtusifolius Mert. et Koch—GRASSY PONDWEED. Rare ; Scarborough Mere (H. Moseley, c. 1840) ; Valley Pond, Scarborough, 1914 (T.B.R. **teste** Dandy and Taylor).
berchtoldii Fieb.—SMALL PONDWEED. Not uncommon ; Scalby, Forge Valley, Thornton-le-Dale, Cayton Bay, Cornelian Bay.
crispus L.—CURLED PONDWEED. Common ; Cornelian Bay, Langdale End, Seamer Carrs, Forge Valley.
pectinatus L.—FENNEL-LEAVED PONDWEED. Rare ; Scarborough Mere (G.W.T.).
densus L.—OPPOSITE-LEAVED PONDWEED. Common ; Seamer Carrs, River Derwent (H.R.) ; Costa Beck, Pickering (G.B.W.).

ZANNICHELLIACEAE

ZANNICHELLIA Linnaeus

palustris L.—HORNED PONDWEED. Rare ; River Derwent at Ayton, 1914 (T.B.R.) ; Brompton (E.R.C., A.G., H.R.).

CYPERACEAE

ELEOCHARIS Brown R.

acicularis (L.) Roem. et Schult.—SLENDER CLUB-RUSH. Rare : pond between Filey and Muston, 1947 (H.R. **det.** C.M.R.).
palustris (L.) Roem. et Schult.—MARSH CLUB-RUSH. Common : Scalby Beck, Scarborough and Throxenby Meres.
multicaulis (Sm.) Sm.—MANY-STEMMED CLUB-RUSH. Rare : Ellerburn Marsh (Y.N.U. Excn., 1922).

SCIRPUS Linnaeus

pauciflorus Lightf.—FEW-FLOWERED CLUB-RUSH. Rare : Sleights Moor (J.G.B.).

caespitosus L.—TUFTED CLUB-RUSH. Common on the moors.
fluitans L.—FLOATING CLUB-RUSH. Rare; Cayton Carrs, 1916 (E.C.H.); Flixton Carrs (Y.N.U. Excn., 1945).
setaceus L.—BRISTLE-STALKED CLUB-RUSH. Uncommon; Langdale End, 1914 (E.C.H.).
lacustris L.—LAKE CLUB-RUSH. Uncommon; Scarborough Mere, 1914 (E.C.H.); pond on Beast Cliff (W.F.).
sylvaticus L.—WOOD CLUB-RUSH. Uncommon; Langdale End, Forge Valley (G.W.T., Hb. E.C.H.).

BLYSMUS Schultes

compressus (L.) Link—BROAD-LEAVED BLYSMUS. Rare; Sand-dale and Eller's Bog, Thornton-le-Dale, 1916 (A.I.B.).

ERIOPHORUM Linnaeus

vaginatum L.—SHEATHING COTTON-GRASS. Common on boggy moors.
angustifolium Honck.—NARROW-LEAVED COTTON-GRASS. Abundant on wet moors.
latifolium Hoppe—DOWNY-STALKED BROAD-LEAVED COTTON-GRASS. Uncommon; Filey Undercliff (J.F.R.).

RHYNCHOSPORA Vahl

alba (L.) Vahl—WHITE-BEAK SEDGE. Rare; Lilla Cross (Nat., 1933, p. 44); Fen Bog, May Moss (S/G.A.).

SCHOENUS Linnaeus

nigricans L.—BOG-RUSH. Rare; Langdale End, 1915 (E.C.H.); Nab Gate Springs, 1940 (H.R.); Hipperley Beck, 1915 (G.W.T.).

CAREX Linnaeus

dioica L.—DIOECIOUS SEDGE. Frequent in bogs and on moorlands; Langdale Rigg, Mowthorpe, etc.
pulicaris L.—FLEA SEDGE. Common in bogs; Langdale End, Mowthorpe, etc.
pauciflora Lightf.—FEW-FLOWERED SEDGE. Rare; long known at Lilla Cross, and still there (W.A.S.).
disticha Huds.—SOFT BROWN SEDGE. Rare; Cayton Carrs, 1916 (A.I.B., E.C.H.).
paniculata L.—GREATER PANICLED SEDGE. Uncommon; west side of Forge Valley, 1916 (A.I.B.).
otrubae Podp.—FOX SEDGE. Uncommon; Yedingham Bridge, 1916 (A.I.B., Hb. E.C.H.)
echinata Murr.—STAR-HEADED SEDGE. Common in marshes.
remota L.—REMOTE-FLOWERED SEDGE. Common in shady places; Langdale End, Hayburn Wyke, etc.
leporina L.—OVAL or HARE'S-FOOT SEDGE. Common in wet places.

canescens L. sec. Nelmes—WHITE SEDGE. Common in bogs and marshes.

elata All.—TUFTED SEDGE. Rare ; Scarborough Mere (Baines' "Flora of Yorkshire," 1840).

acuta L.—SLENDER-SPIKED SEDGE. Uncommon ; banks of River Derwent below Ayton, 1915 (A.I.B.).

nigra (L.) Reich.—COMMON SEDGE. Common in marshes and wet meadows.

var. **juncella** (Fr.) Fr.—Rare ; Langdale End, 1915 (A.I.B.).

flacca Schreb.—GLAUCOUS HEATH SEDGE. Common on the moors.

digitata L.—FINGERED SEDGE. Rare ; "found by Mr. Reynolds at Hackness" (J.G.B.).

pilulifera L.—PILL-HEADED SEDGE. Uncommon ; Hipper Beck, 1916, one specimen (A.I.B.) ; Hole of Horcum, 1947 (H.R. **det.** C.M.R.), but doubtless in many other places.

caryophyllea Lat.—VERNAL SEDGE. Common in dry pastures.

pallescens L.—PALE SEDGE. Uncommon ; two localities near Langdale End, 1915-16 (A.I.B.) ; Bickley, 1916 (G.W.T.) ; Staintondale (W.F.) ; Forge Valley (C.M.R.).

panicea L.—CARNATION SEDGE. Abundant in marshes and damp meadows.

pendula L.—GREAT PENDULOUS SEDGE. Locally common ; Forge Valley.

strigosa Huds.—LOOSE PENDULOUS SEDGE. Rare ; Forge Valley (W. W. Reeves and M. B. Slater, 1889 ; Y.N.U. Excn., 1932).

sylvatica Huds.—PENDULOUS WOOD SEDGE. Common in damp woods, Forge Valley, etc.

laevigata Sm.—SMOOTH-STALKED SEDGE. Uncommon ; Raincliffe Wood and wood near Jugger Howe, 1916 (A.I.B.) ; Hayburn Wyke, 1898 (W.F.).

binervis Sm.—GREEN-RIBBED SEDGE. Common on heaths and moors.

hostiana DC.—TAWNY SEDGE. Uncommon ; Langdale End, Jugger Howe, 1915 (A.I.B.).

lepidocarpa Tausch—Uncommon ; Jugger Howe, 1946 (H.R.) ; Dalby Dale, 1944 (C.M.R.).

hirta L.—HAIRY SEDGE. Common in damp woods.

pseudocyperus L. CYPERUS-LIKE SEDGE. Uncommon ; Hertford River (Y.N.U. Excn., 1943).

acutiformis Ehrh.—COMMON SEDGE. Common on river banks and in ditches.

var. **spadicea** Roth.—Forge Valley, 1915 (A.I.B.).

riparia Curt.—GREAT SEDGE. Rare ; Forge Valley, one specimen, 1915 (A.I.B.).

rostrata Stokes—SLENDER-BEAKED SEDGE. Common in marshes and bogs.

vesicaria L.—SHORT-SPIKED BLADDER SEDGE. Uncommon; Dog Bark Farm, Raincliffe Wood, 1916 (A.I.B.).

GRAMINEAE

PANICUM Linnaeus

***miliaceum** L.—Rare; waste ground, Scarborough Mere, 1914 (E.C.H.).

SETARIA de Beauvais

***viridis** (L.) Beauv.—GREEN BRITTLE-GRASS. Rare; waste ground, Scarborough Mere, 1914 (E.C.H.).

PHALARIS Linnaeus

* **canariensis** L.—CULTIVATED CANARY GRASS. Rare; waste ground, Scarborough Mere, 1914 (E.C.H.).

arundinacea L.—SEA-SIDE CAT'S-TAIL GRASS. Common; Throxenby Mere, Forge Valley, Scalby.

ANTHOXANTHUM Linnaeus

odoratum L.—SWEET-SCENTED VERNAL GRASS. Abundant.

ALOPECURUS Linnaeus

myosuroides Huds.—SLENDER FOX-TAIL GRASS. Uncommon; Great Wold Valley (J.G.B.); waste ground, Scarborough Mere, 1914 (A.I.B. **det.** G.C.D.); Pickering, 1944 (M.E.P.).

geniculatus L.—FLOATING FOX-TAIL GRASS. Common; Cayton, Cumboots, Sawdon, Hayburn Wyke.

pratensis L.—MEADOW FOX-TAIL GRASS. Abundant.

MILIUM Linnaeus

effusum L.—WOOD MILLET GRASS. Common; Raincliffe Wood, Hackness, etc.

PHLEUM Linnaeus

pratense L.—COMMON TIMOTHY GRASS. Abundant.

nodosum L.—Rare; Flixton sand-pit, 1916 (E.C.H.).

arenarium L.—SEA-SIDE CAT'S-TAIL GRASS. Limestone pasture near Ayton Road, 1896 (W.F.).

AGROSTIS Linnaeus

canina L.—BROWN BENT GRASS. Common.

tenuis Sibth.—COMMON BENT GRASS. Very common.

stolonifera L. (incl. **A. alba** auct.)—MARSH BENT GRASS. Common.

CALAMAGROSTIS Roth (non Adanson)

epigejos (L.) Roth—WOOD SMALL-REED. Uncommon; Ellerburn Church, 1916 (D.W.B., A.I.B.).

canescens (Web.) Gmel.—PURPLE FLOWERED SMALL-REED. Rare; Raincliffe Wood (J.C. Rep. B.E.C., 1900).

APERA Adanson

interrupta (L.) Beauv.—DENSE-FLOWERED SILKY BENT GRASS. Rare ; Flixton sand-pit, apparently native, 1916 (A.I.B., E.C.H.) ; and still there.

AMMOPHILA Host

arenaria (L.) Link—MARRAM GRASS. Rare ; Saltwick Nab, 1912 (A.I.B.).

AIRA Linnaeus

caryophyllea L.—SILVERY HAIR GRASS. Common.
praecox L.—EARLY HAIR GRASS. Common.

DESCHAMPSIA de Beauvais

caespitosa (L.) Beauv.—TUFTED HAIR GRASS. Common.
setacea (Huds.) Hack.—BOG HAIR GRASS. Very rare ; North Burton, Wold Valley, 1909 (J.G.B.).
flexuosa (L.) Trin.—HEATH or WAVED HAIR GRASS. Common.

HOLCUS Linnaeus

mollis L.—CREEPING SOFT GRASS. Common.
lanatus L.—MEADOW SOFT GRASS, YORKSHIRE FOG. Abundant.

TRISETUM Persoon

flavescens (L.) Beauv.—YELLOW OAT GRASS. Common at Flixton and Seamer.

AVENA Linnaeus

***fatua** L.—WILD OAT. A common colonist.

HELICTOTRICHON Besser

pubescens (Huds.) Pil.—DOWNY OAT GRASS. Not uncommon ; Flixton and Seamer.
pratense (L.) Pil.—PERENNIAL OAT. Common on limey soils.

ARRHENATHERUM de Beauvais

elatius (L.) Presl., J. et C.—FALSE OAT GRASS. Common.

SIEGLINGIA Bernhardi

decumbens (L.) Bernh.—DECUMBENT HEATH GRASS. Common at Hilla Green and Langdale End.

PHRAGMITES Adanson

communis Trin.—DITCH REED. Common at Scarborough Mere, Ganton, Folkton, Seamer Carrs, Cornelian Bay, etc.

CYNOSURUS Linnaeus

*__echinatus__ L.—ROUGH DOG'S-TAIL GRASS. Rare; Flixton sand-pit, 1947 (H.R. **teste** C.M.R.).

cristatus L.—CRESTED DOG'S-TAIL GRASS. Abundant.

KOELERIA Persoon

gracilis Pers.—CRESTED HAIR GRASS. Uncommon; Flixton, Spital Corner, 1916 (A.I.B.).

britannica (Dom.) Druce—Rare; Forge Valley (J.F.G.C. Rep. B.E.C., 1933); North Cliff, Scarborough, 1913 (E.C.H.).

MOLINIA Schrank

caerulea (L.) Moench—PURPLE or BLUE MELIC GRASS. Common on wet moors, etc.

CATABROSA de Beauvais

aquatica (L.) Beauv.—WATER WHORL GRASS. Uncommon; Seamer Carrs, 1916 (E.C.H.); Pickering (Y.N.U. Excn., 1938); Saltwick Nab, Forge Valley, carr near Folkton (H.R.); pond above Scalby Beck (W.F.).

MELICA Linnaeus

nutans L.—MOUNTAIN MELIC GRASS. Uncommon; Forge Valley, 1913 (A.I.B.); between Levisham and Pickering (W.F.).

uniflora Retz,—WOOD MELIC GRASS. Common in Forge Valley, at Hackness, etc.

DACTYLIS Linnaeus

glomerata L.—ROUGH COCK'S-FOOT GRASS. Abundant; a viviparous state from Seamer Carrs (Hb. E.C.H.).

BRIZA Linnaeus

media L.—QUAKING GRASS. Common at Langdale End, etc.
var. **albida** Lej.—Rare; Sand-dale near Ellerburn, 1916 (A.I.B.).

POA Linnaeus

annua L.—ANNUAL MEADOW GRASS. Abundant.

nemoralis L.—WOOD MEADOW GRASS. Locally common in woods.

compressa L.—FLAT-STEMMED MEADOW GRASS. Not uncommon on dry banks and walls; Scalby, Yedmandale (W.F.); Ruston, Wykeham, 1945 (C.M.R.).

pratensis L.—SMOOTH MEADOW GRASS. Common.

trivialis L.—ROUGH MEADOW GRASS. Common.

GLYCERIA Brown, R.

fluitans (L.) Br., R.—FLOATING MEADOW GRASS. Common in watery places; Forge Valley, Cayton Carr, etc.

plicata Fr.—Flixton Carrs (Y.N.U. Excn., 1943).
maxima (Hartm.) Holmb.—REED MEADOW GRASS. Common in watery places ; Hertford River, Brompton, Snainton, Cayton Carr, etc.

PUCCINELLIA Parlatorre

maritima (Huds.) Parl.—SEA MEADOW GRASS. Rare ; Scarborough old pier (T.G., J.G.B.).
distans (L.) Parl.—REFLEXED MEADOW GRASS. Rare ; Scarborough north shore (J.G.B.).
rupestris (With.) Fern. et Weath.—PROCUMBENT MEADOW GRASS. Very rare ; Robin Hood's Bay, 1935 (C.M.R.).

SCLEROPOA Grisebach

rigida (L.) Gris.—HARD MEADOW GRASS. Not uncommon ; Forge Valley, Cloughton, Yedmandale, 1913-16 (E.C.H.) ; Stone Haggs (T.B.R.) ; Pexton Moor, Thornton-le-Dale (E.R.C.) ; Wykeham, 1945 (C.M.R.).

VULPIA Gmelin

bromoides (L.) Gray, S. F.—BARREN FESCUE-GRASS. Rare ; Forest, Beedale, 1945 (C.M.R.).

FESTUCA Linnaeus

ovina L.—SHEEP'S FESCUE GRASS. Common in dry hilly pastures.
rubra L.—CREEPING FESCUE GRASS. Rare ; Scarborough Castle Walls (T.G.).
var. **dumetorum** How.—Scarborough, 1914 (E.C.H.) ; Robin Hood's Bay (W. J. Fordham, Hb. E.C.H.).
var. **glaucescens** Heg. et Heer.—Scarborough, 1914 (E.C.H.).
pratensis Huds.—TALL FESCUE GRASS. Common in wet places.
gigantea (L.) Vill.—GIANT BROME GRASS. Common in shady places.

BROMUS Linnaeus

ramosus Huds.—WOOD BROME GRASS. Common in damp woods.
erectus Huds.—PERENNIAL BROME GRASS. Uncommon ; Hackness Hairpins, 1916 (A.I.B.) ; Yedmandale, 1945 (C.M.R.).
sterilis L.—BARREN BROME GRASS. Common in fields and waste places.
mollis L. sec Holmbg.—SOFT BROME GRASS. Common by roadsides and in waste places.

BRACHYPODIUM de Beauvais

sylvaticum (Huds.) Beauv.—WOOD FALSE BROME GRASS. Common in thickets and hedgerows.
pinnatum (L.) Beauv.—BARREN FALSE BROME GRASS. Uncommon ; east side of Wydale, 1916 (A.I.B.).
var. **pubescens** Gray—Wydale, 1916 (A.I.B.).

LOLIUM Linnaeus

perenne L.—PERENNIAL RYE GRASS. Abundant.
multiflorum Lam. ITALIAN RYE GRASS. Common.

AGROPYRON Gaertner

caninum (L.) Beauv.—WOOD COUCH GRASS. Common.
repens (L.) Beauv.—COUCH GRASS. Abundant.

NARDUS Linnaeus

stricta L.—MAT GRASS. Common on moors and heaths.

HORDEUM Linnaeus

nodosum L.—MEADOW BARLEY. Rare ; Pickering, 1944 (M.E.P.).
murinum L.—WALL BARLEY. Common in dry places.

CONIFERAE

TAXACEAE

TAXUS Linnaeus

*__baccata__ L.—COMMON YEW. Common.

PINACEAE

PINUS Linnaeus

*__sylvestris__ L.—SCOTS PINE. Common.

LARIX Miller

*__decidua__ Mill.—EUROPEAN LARCH. Common.

The following conifers, in addition to the above, have been planted in the area by H.M. Forestry Commission, the Duchy of Lancaster and others.

Chamaecyparis lawsoniana Parl. (Lawson Cypress), **Cupressus macrocarpa** (Hart.) Gord. (Monterey Cypress), **Pseudotsuga taxifolia** (Poir.) Britt. (Green or Coastal Douglas Fir), **Tsuga heterophylla** Sarg. (Western Hemlock), **Larix eurolepis** Hen. A. (Hybrid Larch), **L. leptolepis** (Murr.) Gord. (Japanese Larch), **Pinus austriaca** Hoess. (Austrian Pine), **P. laricio** Poir. (Corsican Pine and its variety Ursuline Pine), **P. contorta** Dougl. (Lodgepole Pine), **P. pinaster** Ait. (Maritime Pine), **P. montana** Mill. (Mountain Pine), **P. ponderosa** Dougl. (Western Yellow Pine).

Abies alba Mill. (European Silver Fir), **A. grandis** Lind., **A. nobilis** Lind., **A. veitchii** Lind., **Picea abies** (L.) Karst. (Norway Spruce), **P. omorika** Bolle (Serbian Spruce), **P. sitchensis** Carr. (Sitka Spruce), **P. asperata** Mast., **P. jezoensis** Carr. (Hondo Spruce), **Cryptomeria japonica** Don., D., (Japanese Cedar), **Thuya plicata** Don., D. (Western Red Cedar).

FILICES - FERNS

OPHIOGLOSSACEAE

BOTRYCHIUM Swartz

lunaria (L.) Sw.—MOONWORT. Uncommon; near Hayburn Wyke, 1911 (A.I.B.); Langdale End, 1935 (G.B.W.).

OPHIOGLOSSUM Linnaeus

vulgatum L.—ADDER'S TONGUE. Common; Hayburn Wyke, Cloughton Newlands, Thornton-le-Dale (H.R.); Langdale End, 1935 (G.B.W.).

OSMUNDACEAE

OSMUNDA Linnaeus

regalis L.—ROYAL FERN. Rare; Harwood Dale, 1915-16 (G.W.T.); has now disappeared from the area owing to the depredations of collectors.

MARSILEACEAE

PILULARIA Linnaeus

globulifera L.—CREEPING PILLWORT. Rare; Scarborough Mere (J.G.B.); not seen in recent years.

HYMENOPHYLLACEAE

HYMENOPHYLLUM Smith, Sir J. E.

tunbrigense (L.) Sm.—TUNBRIDGE FILMY FERN. Rare; Baker says, "Said to have been found by Mr. Peterkin on the banks of the stream which falls into the sea at Hayburn Wyke." This record is vouched for by Dr. Richard Spruce.

POLYPODIACEAE

PTERIDIUM Scopoli

aquilinum (L.) Kuhn—BRACKEN. Abundant.

BLECHNUM Linnaeus

spicant (L.) Roth—NORTHERN HARD FERN. Common at Hayburn Wyke, Hackness, etc.

PHYLLITIS Hill

scolopendrium (L.) Newm.—HART'S-TONGUE FERN. Common in shady places.

ASPLENIUM Linnaeus

marinum L.—SEA SPLEENWORT. Rare; Burniston Wyke ("Nat. Hist. Journ.," 1885, p. 77).

trichomanes L.—COMMON WALL SPLEENWORT. Common on walls and rocks.

obovatum Viv.—GREEN LANCEOLATE SPLEENWORT. Rare; Beast Cliff, 1909 (H.J.B.); Goathland, 1933 (F. Druce).
adiantum-nigrum L.—BLACK-STALKED SPLEENWORT. Rare; Ravenscar Undercliff (E.G.H.); Bridestones, 1940 (E.R.C.); near Goathland (W.A.S.).
ruta-muraria L.—WALL-RUE SPLEENWORT. Common at Hackness, Ayton, Brompton, etc.

ATHYRIUM Roth

filix-femina (L.) Roth—LADY FERN. Abundant in moist and shady places.

CYSTOPTERIS Bernhardi

fragilis (L.) Bernh.—BRITTLE BLADDER-FERN. Rare; Newtondale (Y.N.U. Excn., 1941).

DRYOPTERIS Adanson

filix-mas (L.) Schott—MALE FERN. Abundant.
dilatata (Hoffm.) Gray, A.—BROAD SHIELD FERN. Common in moist woods and shady and rocky places.
spinulosa (Muell.) Warr—NARROW PRICKLY-TOOTHED SHIELD FERN. Common in boggy woods and thickets.
aemula (Ait.) Kuntze, O.—HAY-SCENTED FERN. Rare; Hackness (E.R.C., Dr. Rowlands).

POLYSTICHUM Roth

setiferum (Forsk.) Woynar—ANGULAR-LEAVED SHIELD FERN. Rare; Newtondale (Y.N.U. Excn., 1941).
aculeatum (L.) Roth—PRICKLY SHIELD FERN. Common in woods and moist shady places.

THELYPTERIS Schmidel

oreopteris (Ehrh.) Chr., C.—SWEET MOUNTAIN BUCKLER FERN. Uncommon; Hackness, 1939 (E.R.C.).
phegopteris (L.) Sloss.—BEECH FERN. Rare; Whisperdales (E.G.H.); not seen recently.

GYMNOCARPIUM Newman

dryopteris (L.) Newm.—OAK FERN. Rare; at one time in Raincliffe Wood, Beedale, Yedmandale, now disappearing from the district.
robertianum (Hoffm.) Newm.—LIMESTONE POLYPODY. Rare; Newtondale, 1940 (E.G.H.).

POLYPODIUM Linnaeus

vulgare L.—COMMON POLYPODY. Abundant on walls and banks.

EQUISETACEAE — HORSE-TAILS

EQUISETUM Linnaeus

telmateia Ehrh. GREAT WATER HORSE-TAIL. Common in Forge Valley and cliffs north of Scarborough.

arvense L.—CORN or FIELD HORSE-TAIL. Abundant.

sylvaticum L.—BRANCHED WOOD HORSE-TAIL. Uncommon ; Ringing Keld Bog, 1914 (T.B.R.) ; Raincliffe Wood, Forge Valley (E.R.C.).

palustre L.—MARSH HORSE-TAIL. Common in bogs.
var. **polystachyum** (Weig.) Duv. Jouve—Rare ; Ringing Keld, 1903 (C.W.).

fluviatile L.—SMOOTH NAKED HORSETAIL. Not uncommon.

hyemale L.—DUTCH RUSH. Rare ; Scarborough (T.G.).

LYCOPODIACEAE — CLUB-MOSSES

LYCOPODIUM Linnaeus

selago L.—FIR CLUB-MOSS. Rare ; Seamer Moor (T.G.).

clavatum L.—COMMON CLUB-MOSS. Rare ; Ramsdale Beck near Foul Syke, 1915 (G.W.T.) ; Dalby Dale, 1944 (C.M.R.) ; near the Falcon Inn, 1924 (G.B.W., A.I.B.).

alpinum L.—ALPINE CLUB-MOSS. Rare ; Hutton Buscel Moor (J.G.B.).

SELAGINELLACEAE

SELAGINELLA de Beauvais

selaginoides (L.) Link—LESSER ALPINE CLUB-MOSS. Rare ; Langdale End, 1915 (E.C.H.) ; near Bloody Beck (Hb. E.C.H.) ; Dalby Bog, (A.G.).

CHAROPHYTA — STONEWORTS

CHARA Linnaeus

delicatula Agardh.—FRAGILE CHARA.—Uncommon ; Thornton-le-Dale, 1922 (J.R.F., J.G.) ; Grosmont, 1946 (E.R.C.).

fragilis Desv. var. **hedwigii** Kuetz.—Rare ; Filey, 1946 (E.R.C., H.R. **det.** C.M.R.).

INDEX OF FAMILIES AND GENERA

Acer 224
Aceraceae 224
Achillea 237
Acinos 250
Aconitum 213
Actaea 213
Adoxa 234
Adoxaceae 234
Aegopodium 232
Aesculus 224
Aethusa 233
Agrimonia 228
Agropyron 270
Agrostemma 219
Agrostis 266
Aira 267
Ajuga 252
Alchemilla 228
Alisma 262
Alismataceae 262
Alliaria 216
Allium 260
Alnus 256
Alopecurus 266
Alyssum 215
Amaryllidaceae 259
Ammi 232
Ammophila 267
Anacamptis 258
Anagallis 244
Anaphalis 237
Anchusa 245
Andromeda 242
Anemone 211
Angelica 233
Antennaria 237
Anthemis 237
Anthoxanthum 266
Anthriscus 233
Anthyllis 225
Apera 267
Apium 232
Apocynaceae 244
Aquifoliaceae 223
Aquilegia 213
Arabidopsis 216
Arabis 215
Araceae 262
Araliaceae 234
Arbutus 242
Arctium 239
Arenaria 220
Aristolochia 254
Aristolochiaceae 254
Armeria 243
Armoracia 215
Arrhenatherum 267
Artemisia 238
Arum 262
Asperugo 245
Asperula 235
Asplenium 271
Astragalus 225
Athyrium 272
Atriplex 253
Atropa 246
Avena 267
Baldellia 262
Ballota 252
Balsaminaceae 223
Barbarea 215
Bellis 236
Berberidaceae 213
Berberis 213
Beta 252
Betula 256
Betulaceae 256
Bidens 237
Blackstonia 244
Blechnum 271
Blysmus 264
Boraginaceae 245
Botrychium 271
Brachypodium 269
Brassica 216
Briza 268
Bromus 269
Bryonia 231
Bunias 217
Butomaceae 262
Butomus 262
Buxaceae 255
Buxus 255
Cakile 218
Calamagrostis 266
Calamintha 250
Calendula 239
Callitrichaceae 230
Callitriche 230
Calluna 242
Caltha 212
Calystegia 246
Camelina 216
Campanula 242
Campanulaceae 242
Cannabinaceae 255
Caprifoliaceae 234
Capsella 217
Cardamine 215
Cardaria 217
Carduus 239
Carex 264
Carlina 239
Carpinus 256
Carthamus 240
Carum 232
Caryophyllaceae 219
Castanea 256
Catabrosa 268
Celastraceae 223
Centaurea 240
Centaurium 244
Centranthus 236
Cephalanthera 258
Cerastium 219
Chaerophyllum 233
Chamaenerion 231
Chara 273
Charophyta 273
Cheiranthus 214
Chelidonium 214
Chenopodiaceae 252
Chenopodium 252
Chrysanthemum 238
Chrysosplenium 229
Cichorium 240
Circaea 231
Cirsium 239
Cistaceae 218
Claytonia 221
Clematis 211
Clinopodium 250
Cochlearia 215
Coeloglossum 259
Comarum 228
Compositae 236
Conium 232
Conopodium 232
Conringia 216
Convallaria 260
Convolvulaceae 246
Convolvulus 246
Cornaceae 234
Cornus 234
Coronopus 217
Corydalis 214
Corylaceae 256
Corylus 256
Crassulaceae 230
Crataegus 229
Crepis 240
Cruciferae 214
Cucurbitaceae 231
Cuscuta 246
Cynoglossum 245

Cynosurus 268
Cyperaceae 263
Cystopteris 272
Dactylis 268
Daphne 254
Datura 247
Daucus 234
Dentaria 215
Deschampsia 267
Descurainia 216
Digitalis 247
Dioscoreaceae 260
Diplotaxis 217
Dipsacaceae 236
Dipsacus 236
Doronicum 238
Drosera 230
Droseraceae 230
Dryopteris 272
Echium 246
Elaeagnaceae 254
Eleocharis 263
Elodea 257
Empetraceae 257
Empetrum 257
Epilobium 231
Epipactis 258
Equisetaceae 273
Equisetum 273
Eranthis 213
Erica 243
Ericaceae 242
Erigeron 236
Eriophorum 264
Erodium 223
Erophila 215
Erysimum 216
Euonymus 223
Eupatorium 236
Euphorbia 254
Euphorbiaceae 254
Euphrasia 248
Fagopyrum 254
Fagaceae 256
Fagus 256
Festuca 269
Filago 236
Filipendula 227
Foeniculum 233
Fragaria 227
Fraxinus 244
Fritillaria 260
Fumaria 214
Fumariaceae 214
Gagea 261
Galanthus 260
Galeopsis 251
Galium 235
Genista 224
Gentiana 244
Gentianaceae 244
Geraniaceae 222
Geranium 222
Geum 227
Glaux 244
Glechoma 250
Glyceria 268
Gnaphalium 237
Gramineae 266
Grossulariaceae 229
Gymnadenia 259
Gymnocarpium 272
Haloragaceae 230
Hedera 234
Helianthemum 218
Helictotrichon 267
Helleborus 212
Heracleum 234
Hesperis 216
Hieracium 241
Hippocastanaceae 224
Hippophae 254
Hippuris 230
Holcus 267
Hordeum 270
Hottonia 243
Humulus 255
Hydrocharis 257
Hydrocharitaceae 257
Hydrocotyle 231
Hymenophyllaceae 271
Hymenophyllum 271
Hyoscyamus 247
Hypericaceae 221
Hypericum 221
Hypochoeris 241
Iberis 217
Ilex 223
Illecebraceae 252
Impatiens 223
Inula 237
Iridaceae 259
Iris 259
Juncaceae 261
Juncaginaceae 262
Juncus 261
Knautia 236
Koeleria 268
Labiatae 249
Lactuca 241
Lamium 251
Lapsana 240
Larix 270
Lathraea 249
Lathyrus 226
Leguminosae 224
Lemna 262
Lemnaceae 262
Lentibulariaceae 249
Leontodon 241
Lepidium 217
Leucorchis 259
Ligustrum 244
Liliaceae 260
Lilium 260
Linaceae 222
Linaria 247
Linnaea 235
Linum 222
Listera 258
Lithospermum 246
Littorella 252
Lobularia 215
Lolium 270
Lonicera 235
Loranthaceae 254
Lotus 225
Luzula 261
Lychnis 219
Lycium 246
Lycopodiaceae 273
Lycopodium 273
Lycopsis 245
Lycopus 250
Lysimachia 243
Lythraceae 231
Lythrum 231
Mahonia 213
Maianthemum 260
Malcolmia 216
Malus 229
Malva 221
Malvaceae 221
Marrubium 251
Marsileaceae 271
Matricaria 238
Meconopsis 214
Medicago 224
Melampyrum 249
Melandrium 219
Melica 268
Melilotus 224
Mentha 249
Menyanthaceae 245
Menyanthes 245
Mercurialis 255
Mespilus 229
Milium 266
Mimulus 247
Molinia 268
Monotropa 243
Montropaceae 243
Montia 221

Myosotis 245
Myrica 255
Myricaceae 255
Myriophyllum 230
Myrrhis 233
Narcissus 259
Nardus 270
Narthecium 261
Nasturtium 214
Neottia 257
Nepeta 250
Nuphar 213
Nymphaea 213
Nymphaeaceae 213
Odontites 248
Oenanthe 233
Oleaceae 244
Omphalodes 245
Onagraceae 231
Onobrychis 226
Ononis 224
Onopordum 240
Ophioglossaceae 271
Ophioglossum 271
Ophrys 259
Orchidaceae 257
Orchis 258
Origanum 250
Ornithogalum 260
Ornithopus 225
Orobanchaceae 249
Orobanche 249
Osmunda 271
Osmundaceae 271
Oxalis 223
Oxycoccus 242
Panicum 266
Papaver 213
Papaveraceae 213
Parietaria 255
Paris 261
Parnassia 229
Parnassiaceae 229
Pastinaca 234
Pedicularis 248
Peplis 231
Petasites 238
Petroselinum 232
Peucedanum 233
Phalaris 266
Phleum 266
Phragmites 267
Phyllitis 271
Picris 240
Pilularia 271
Pimpinella 232
Pinaceae 270
Pinguicula 249
Pinus 270
Plantaginaceae 252
Plantago 252
Platanthera 259
Plumbaginaceae 243
Poa 268
Polemoniaceae 245
Polemonium 245
Polygala 219
Polygalaceae 219
Polygonaceae 253
Polygonatum 260
Polygonum 253
Polypodiaceae 271
Polypodium 272
Polystichum 272
Populus 257
Portulaceae 221
Potamogeton 263
Potamogetonaceae 263
Potentilla 227
Poterium 228
Primula 243
Primulaceae 243
Prunella 251
Prunus 226
Pteridium 271
Puccinellia 269
Pulicaria 237
Pyrola 243
Pyrolaceae 243
Quercus 256
Ranunculaceae 211
Ranunculus 212
Raphanus 218
Reseda 218
Resedaceae 218
Rhamnaceae 223
Rhamnus 223
Rhinanthus 248
Rhynchospora 264
Ribes 229
Rorippa 214
Rosa 228
Rosaceae 226
Rubiaceae 235
Rubus 227
Rumex 254
Ruscus 260
Sagina 220
Salicaceae 256
Salix 256
Salsola 253
Salvia 250
Sambucus 234
Samolus 244
Sanguisorba 228
Sanicula 232
Saponaria 219
Sarothamnus 224
Saxifraga 229
Saxifragaceae 229
Scabiosa 236
Scandix 233
Schoenus 264
Scilla 260
Scirpus 263
Scleranthus 252
Scleropoa 269
Scrophularia 247
Scrophulariaceae 247
Scutellaria 250
Sedum 230
Selaginella 273
Selaginellaceae 273
Sempervivum 230
Senecio 239
Serratula 240
Setaria 266
Sherardia 235
Sieglingia 267
Silaum 233
Silybum 240
Silene 219
Sinapis 217
Sisymbrium 216
Sium 232
Smyrnium 232
Solanaceae 246
Solanum 246
Solidago 236
Sonchus 241
Sorbus 228
Sparganiaceae 262
Sparganium 262
Specularia 242
Spergula 220
Spergularia 221
Spiraea 227
Spiranthes 258
Stachys 251
Stellaria 220
Suaeda 253
Succisa 236
Symphoricarpos 235
Symphytum 245
Tamaricaceae 221
Tamarix 221
Tamus 260
Tanacetum 238
Taraxacum 241
Taxaceae 270
Taxus 270
Teucrium 252
Thalictrum 211
Thelypteris 272
Thlaspi 217

Thymelaeaceae 254
Thymus 250
Tilia 222
Tiliaceae 222
Torilis 234
Tragopogon 242
Trientalis 243
Trifolium 225
Triglochin 262
Trisetum 267
Trollius 212
Tussilago 238
Typha 261
Typhaceae 261
Ulex 224
Ulmaceae 255
Ulmus 255
Umbelliferae 231
Urtica 255
Urticaceae 255
Utricularia 249
Vacciniaceae 242
Vaccinium 242
Valeriana 235
Valerianaceae 235
Valerianella 236
Verbascum 247
Verbena 249
Verbenaceae 249
Veronica 248
Viburnum 235
Vicia 226
Vinca 244
Viola 218
Violaceae 218
Viscum 254
Vulpia 269
Zannichellia 263
Zannichelliaceae 263

INDEX OF ENGLISH NAMES

A

Absinthe 238
Aconite, Winter 212
Adder's Tongue 271
Agrimony,
  Common 228
  Fragrant 228
  Hemp 236
Alder 256
Alexanders 232
Alkanet,
  Evergreen 245
Alyssum 215
  Sweet 215
American Cress 215
Andromeda,
  Marsh 242
Anemone, Wood 211
Angelica, Wild 233
Apple, Crab 229
Arrow-grass,
  Marsh 262
  Seaside 263
Ash, Common 244
  Mountain 228
Aspen 257
Asphodel,
  Lancashire Bog 261
Avens,
  Intermediate 227
  Water 227
  Wood 227

B

Balsam, Indian 223
Baneberry 213
Barberry 213
  Holly-leaved 213
Barley,
  Meadow 270
  Wall 270
Bartsia, Red 248
Basil Thyme 250
Basil, Wild 250
Bedstraw,
  Great Hedge 235
  Hispid-fruited 235
  Lady's 235
  Marsh 235
  Rough Bog 235
  Smooth Heath 235
Beech 256
Beet, Sea 252
Bell Flower,
  Clustered 242
  Creeping 242
  Giant 242
Bell Heather 243
Bent-grass,
  Brown 266
  Common 266
  Marsh 266
Betony,
  Water 247
  Wood 251
Bilberry 242
Bind-weed,
  Black 253
  Corn 246
  Larger 246
Birch 256
Bird's-foot,
  Common 225
  Trefoil 225
Bird's-nest, Yellow 243
Birthwort 254
Bishop-weed 232
Bishop's-Weed 232
Bistort 253
Bittercress,
  Hairy 215
  Large-flowered 215
  Wavy-hairy 215
Bittersweet 246
Blackberry 227
Black Crowberry 257
Black Currant 229
Blackthorn 226
Bladder Campion 219
Bladderwort 249
Blinks, Water 221
Bluebell 260
Blysmus, Broad -leaved 264
Bog Asphodel 261
  Bean 245
  Myrtle 255
  Pimpernel 244
  Rush 264
Box 255
Bracken 276
Bramble 227
  Stone 227
Briar, Sweet 228
Brooklime, 248

Brookweed 244
Broom,
Butcher's 260
Common 224
Broomrape,
Lesser 249
Tall 249
Bryony, Black 260
White 231
Buckbean 245
Buckthorn,
Purging 223
Sea 254
Buckwheat 254
Bugle 252
Bugloss, Small 245
Viper's 246
Bullace 226
Burdock,
Intermediate 239
Lesser 239
Bur-marigold,
Nodding 237
Tripartite 237
Bur-reed,
Branched 262
Small 262
Upright 262
Burnet, Great 228
Salad 228
Burr Chervil 233
Butcher's Broom 260
Butterbur 238
Sweet-scented 238
Buttercup,
Bulbous 212
Common 212
Creeping 212
Butterwort 249

C

Cabbage,
Field 217
Sea 216
Calamint 250
Campion,
Bladder 219
Red 219
White 219
Candytuft 217
Caraway 232
Carline Thistle 239
Carrot, Sea 234
Wild 234
Catchfly,
English 219
Night-Flowering 219
Small-flowered 219
Catmint 250
Cat's-ear,
Long-rooted 241
Smooth 241
Cedar,
Japanese 270
Western Red 270
Celandine, 214
Lesser 212
Centaury 244
Tufted 244
Chamomile,
Common 238
Corn 238
Wild 238
Yellow 237
Chara, Fragile 273
Charlock 217
Cherry, Bird 227
Wild 226
Chervil, Burr 233
Rough 233
Chestnut,
Horse 224
Sweet 256
Chickweed 220
Mouse-ear 220
Field Mouse-ear 220
Lesser Mouse-ear 220
Narrow-leaved Mouse-ear 220
Sea Mouse-ear 219
Wintergreen 243
Chicory
Cicely, Sweet 233
Cinquefoil,
Creeping 227
Hoary 227
Marsh 228
Clary, 250
Whorled 250
Claytonia 221
Cleavers 235
Clematis 211
Clover, Alsike 225
Crimson 225
Dutch 225
Red 225
White 225
Zigzag 225
Clubmoss,
Alpine 273
Common 273
Fir 273
Lesser Alpine 273
Clubrush, Bristle-stalked 264
Few-flowered 263
Floating 264
Lake 264
Many-stemmed 263
Marsh 263
Slender 263
Tufted 264
Wood 264
Coltsfoot, 238
White 238
Columbine 213
Comfrey,
Common 245
Tuberous 245
Coralwort 215
Corn Cockle 219
Feverfew 238
Flower 240
Marigold 238
Salad 236
Cornel, Dwarf 234
Corydalis,
Climbing 214
Yellow 214
Cotton-grass,
Downy-stalked 264
Narrow-leaved 264
Sheathing 264
Cowberry 242
Cow Parsley 233
Cow Parsnip 234
Cowslip 242
Cow-wheat 249
Crab-apple 229
Cranberry 242
Crane's-bill,
Bloody 222
Blue Meadow 222
Cut-leaved 223
Dove's-foot 222
Dusky 222
Long-stalked 223
Mountain 222
Shining 223
Small-flowered 223
Striped 222
Cress, American 215
Hairy Rock 215

Hoary 217
Large-flowered Bitter-cress 215
Penny 217
Thale 216
Wart 217
Water 214
Yellow 214
Crosswort 235
Crowberry 257
Crow-foot, Celery-leaved Water 212
Corn 212
Ivy-leaved Water 212
Small-flowered 212
Water 212
Wood 212
Cuckoo-flower 215
Pint 262
Cudweed,
Common 236
Heath 237
Least 237
Marsh 237
Red-tipped 237
Wood 237
Currant, Black 229
Mountain 229
Red 229
Cypress 270

D

Daffodil 259
Daisy,
Common 236
Ox-eye 238
Dame's Violet 216
Dandelion 241
Marsh 241
Danewort 234
Deadly Nightshade 246
Dead-nettle,
Cut-leaved 251
Henbit 251
Intermediate 251
Red 251
Spotted 251
White 251
Devil's-bit 236
Dewberry 227
Dock,
Broadleaved 254
Curled 254
Fiddle 254
Golden 254
Great Water 254
Sharp 254
Dodder, Lesser 246
Clover 246
Dog's Mercury 255
Dog-rose 228
Dogwood 234
Douglas Fir 270
Dropwort 227
Fine-leaved Water 233
Hemlock Water 233
Water 233
Duckweed,
Greater 262
Ivy-leaved 262
Lesser 262
Dutch Rush 272
Dwarf Cornel 234
Dyer's Rocket 218
Greenweed 224

E

Earthnut 232
Elder 234
Cut-leaved 234
Elecampane 237
Elm, Common 255
Wych 255
Enchanter's Nightshade 231
Everlasting,
Mountain 237
Pearly 237
Eyebright 248

F

Fat Hen 252
Felwort 244
Fennel 233
Fern, Angular-leaved Shield 272
Beech 272
Brittle Bladder 272
Broad Shield 272
Filmy, Tunbridge 271
Hart's-tongue 271
Hay-scented 272
Lady 272
Male 272
Narrow Prickly-toothed 272
Northern Hard 271
Oak 272
Prickly Shield 272
Royal 271
Sweet Mountain Buckler 272
Fever-few 238
Corn 238
Field Madder 235
Figwort 247
Water 247
Flag 259
Flax, Common 222
Narrow-leaved 222
Perennial Blue 222
Purging 222
Fleabane, Blue 236
Greater 237
Flixweed 216
Fluellen, Round-headed 247
Sharp-leaved 247
Fool's Parsley 233
Forget-me-not 245
Changeable 246
Creeping Water 245
Early 246
Field 246
Tufted Water 245
Wood 245
Foxglove 247
Fritillary 260
Frogbit 257
Fumitory,
Common 214
Rampant 214
Furze, Common 224
Dwarf 224

G

Gale, Sweet 255
Garlic 260
Crow 260
Mustard 216
Gean 226
Gentian,
Autumn 244
Field 244
Gipsywort 250
Globeflower 212
Goat's-beard,
Yellow 242
Golden Rod 236
Goldilock 212
Gold of Pleasure 216
Good King Henry 252
Gooseberry,
Wild 229

Goose-foot,
Glaucous 252
Green 252
Nettle-leaved 252
Red 252
White 252
Goosegrass 235
Gorse 224
Goutweed 232
Grass of Parnassus 229
Grass :
Bent, Brown 266
Common 266
Dense-flowered
Silky 266
Marsh 266
Brome, Barren 269
Barren,
False 269
Giant 269
Perennial 269
Soft 269
Wood 269
Canary,
Cultivated 266
Cat's-tail,
Seaside 266
Cock's-foot
Rough 268
Couch 270
Wood 270
Decumbent
Heath 267
Dog's-tail,
Crested 268
Rough 268
Fescue, Barren 269
Creeping 269
Sheep's 269
Tall 269
Foxtail,
Floating 266
Meadow 266
Slender 266
Green Brittle 266
Hair, Bog 267
Crested 268
Early 267
Heath 267
Silvery 267
Tufted 267
Waved 267
Heath 267
Decumbent 267
Marram 267
Mat 270
Grass—contd.
Meadow,
Annual 268
Flat-stemmed 268
Floating 268
Hard 269
Procumbent 269
Reed 269
Rough 268
Reflexed 269
Sea 269
Smooth 268
Wood 268
Melic, Blue 268
Mountain 268
Purple 268
Wood 268
Millet,
Wood 266
Oat, Downy 267
False 267
Perennial 267
Wild 267
Yellow 267
Quaking 268
Rye, Italian 270
Perennial 270
Scurvy 215
Soft, Creeping 267
Meadow 267
Timothy 266
Vernal, sweet-scented 266
Water Whorl 268
Whitlow 215
Yorkshire Fog 267
Greenweed,
Dyer's 224
Gromwell 246
Corn 246
Ground-ivy 250
Groundsel 239
Heath 239
Stinking 268
Guelder Rose 235

H

Hairy
Rock-Cress 215
Harebell 242
Hare's-ear 216
Hart's-tongue 271
Hawkbit,
Autumnal 241
Common 241
Lesser 241
Hawk's-beard,
Beaked 240
Marsh 241
Rough 240
Smooth 240
Hawkweed,
Mouse-ear 241
Savoy 241
Umbellate 241
Wall 241
Wood 241
Hawthorn 229
Hazel 256
Heartsease 219
Heath, Cross-leaved 243
Fine-leaved 243
Heather, Bell 243
Hedge Mustard 216
Parsley 234
Heliotrope,
Winter 238
Hellebore, Green 212
Stinking 212
Helleborine,
Broad-leaved 258
Marsh 258
Narrow-leaved 258
Hemlock,
Common 235
Western 270
Hemp Agrimony 236
Nettle 251
Bee 251
Red 251
Henbane 247
Herb-Bennet 227
Christopher 213
Paris 261
Robert 223
Hoary Cress 217
Ragwort 239
Holly 223
Honeysuckle,
Common 235
Upright Fly 235
Hop 255
Horehound,
Black 252
White 251
Horse Chestnut 224

Hornbeam 256
Horseradish 215
Horsetail,
Branched Wood 273
Corn 273
Great Water 273
Marsh 273
Smooth Naked 273
Hound's Tongue 245
Houseleek 230

I

Indian Balsam 223
Iris, Yellow 259
Ivy, Common 234
Ground 250

J

Jack-by-the-Hedge 216
Jacob's Ladder 245

K

Keck 233
Kidney Vetch 225
Knapweed,
Black 240
Greater 240
Knawel, Annual 252
Knotgrass 253

L

Lady's Bedstraw 239
Fingers 225
Mantle 228
Smock 215
Tresses 258
Larch, European 270
Hybrid 270
Japanese 270
Laurel, Spurge 254
Lent Lily 259
Leopard's Bane 238
Lettuce, Wall 241
Wild 241
Lily, Lent 259
Martagon 260
May 260
of the Valley 260
Water 213
Lime, Common 222
Large-leaved 222
Small-leaved 222
Ling 242
Linnaea,
Two-flowered 235
Livelong 230
London Pride 229
Loosestrife,
Purple 231
Yellow 243
Lords and Ladies 262
Lousewort,
Field 248
Marsh 248
Lucerne 224

M

Madder, Field 235
Madwort 245
Mallow,
Common 222
Dwarf 222
Erect 222
Musk 221
Maple, Common 224
Mare's-tail 230
Marigold 239
Bur 237
Corn 238
Marsh 212
Marsh Andromeda 242
Arrow-grass 262
Lousewort 248
Marigold 212
Pennywort 231
Ragwort 239
Thistle 239
Woundwort 251
Marjoram, Wild 250
Martagon Lily 260
Masterwort 233
May-lily 260
Mayweed,
Rayless 238
Scentless 238
Meadow Rue 211
Sweet 227
Medick, Black 224
Purple 224
Reticulated 224
Spotted 224
Yellow 224
Medlar 229
Melilot 224
Common 224
Small 225
White 224
Mercury, Dog's 255
Mignonette, Spike 218
Upright 218
White 218
Wild 218
Milfoil, Alternate-flowered 230
Spiked Water 230
Whorled Water 230
Milkwort 219
Heath 219
Sea 244
Mint, Corn 250
Pepper 249
Round-leaved 249
Spear 249
Water 249
Whorled 250
Mistletoe 254
Moneywort 243
Monkey-flower 247
Monkshood 213
Moonwort 271
Moschatel,
Tuberous 234
Mountain-ash 228
Currant 229
Everlasting 237
Mugwort 238
Mullein, Dark 247
Great 247
Twiggy 247
Musk Thistle 239
Mustard, Black 217
Garlic 216
Hedge 216
Treacle 216
Wall 217
White 217
Wild 217
Myrtle, Bog 255

N

Navelwort, Blue 245
Nettle,
Common 255
Cut-leaved Dead 256
Hemp 251

Nettle—contd.
Henbit Dead 251
Intermediate Dead 251
Red Dead 251
Red Hemp 251
Small 255
Spotted Dead 251
White Dead 251
Nightshade, Black 246
Deadly 246
Enchanter's 231
Woody 246
Nipplewort 240

O

Oak, Common 256
Sessile-fruited 256
Oat,
Perennial 267
Wild 267
Old Man's Beard 211
Orache, Grass-leaved Sea 253
Halberd-leaved 253
Narrow leaved 253
Orchis, Bee 259
Bird's Nest 257
Burnt-tip 258
Butterfly,
Greater 259
Lesser 259
Dwarf 258
Early Purple 258
Fly 259
Fragrant 259
Frog 259
Green-winged 258
Marsh 258
Pyramidal 258
Small White 259
Spotted 258
Orpine 230
Osier 256
Ferruginous 257
Silky-leaved 257
Oxlip, False 243
Oxeye, White 238
Oxford Ragwort 239
Oxtongue 240
Hawkweed 240

P

Pansy, Yellow Mountain 219
Parsley,
Common 232
Cow 233
Fool's 233
Hedge 234
Knotted, Hedge 234
Piert 228
Parsnip, Cow 234
Narrow-leaved Cow 234
Water 232
Wild 234
Pea, Crimson 226
Narrow-leaved Everlasting 226
Pearlwort,
Annual 220
Ciliated 220
Procumbent 220
Pearly Everlasting 237
Pellitory, Wall 255
Pennycress 217
Pennywort,
Marsh 231
Peppermint 249
Pepper Saxifrage 233
Pepperwort,
Broadleaved 217
Field 217
Grey 217
Narrow-leaved 217
Perfoliate Yellow wort 244
Periwinkle, Lesser 244
Persicaria,
Biting 253
Lax-flowered 253
Pale 253
Spotted 253
Water 253
Petty Whin 224
Pheasant's Eye 259
Pignut 232
Pillwort,
Creeping 271
Pimpernel,
Bog 244
Scarlet 244
Yellow 243
Pine,
Austrian 270
Corsican 270
Lodgepole 270
Pine—contd.
Maritime 270
Mountain 270
Scots 270
Ursuline 270
Western Yellow 270
Plantain,
Buck's-horn 252
Great 252
Hoary 252
Ribwort 252
Sea 252
Water, Greater 262
Lesser 262
Ploughman's Spikenard 237
Plum, Wild 226
Polypody,
Common 272
Limestone 272
Pondweed,
Broadleaved 263
Curled 263
Fennel-leaved 263
Grassy 263
Horned 263
Oblong-leaved 263
Opposite-leaved 263
Reddish 263
Shining 263
Small 263
Various-leaved 263
Poplar, Balsam 257
Black 257
White 257
Poppy, Field 213
Long Prickly-headed 213
Long Smooth-headed 213
Opium 213
Pale 213
Yellow Welsh 214
Primrose 243
Privet 244
Purple Loose-strife 231
Purslane, Sea 220
Water 231

R

Radish, Wild 218
Ragged Robin 219

Ragwort,
Common 239
Hoary 239
Marsh 239
Oxford 239
Ramsons 260
Rape 216
Raspberry 227
Rattle, Yellow 248
Red Bartsia 248
Campion 219
Currant 229
Reed, Ditch 267
Reedmace 261
Narrow-leaved 262
Rest-harrow 224
Spiny 224
Rockcress,
Hairy 215
Rocket, Dyer's 218
Sand 217
Sea 218
Wall 217
Yellow 215
Rock-rose 218
Rose-bay 231
Rose, Burnet 228
Dog 228
Downy 228
Guelder 235
Trailing 228
Rose-Root 230
Rowan 228
Rue, Meadow 211
Rush.
Blunt-flowered
Jointed 261
Bog 264
Common 261
Dutch 272
Flowering 262
Hard 261
Heath 261
Lesser Bog
Jointed 261
Mud 261
Round-fruited 261
Sharp-flowered
Jointed 261
Short-flowered 261
Soft 261
Toad 261

S

Sage, Wood 252
Sainfoin 226
St. John's-wort 221
Hairy 221
Large-flowered 221
Marsh 221
Mountain 221
Slender 221
Trailing 221
St. Peter's-wort 221
Salad Burnet 228
Salsify 242
Saltwort, Prickly 253
Sandwort 220
Three-nerved 220
Thyme-leaved 220
Sanicle, Wood 232
Saw-wort 240
Saxifrage,
Burnet 232
Cut-leaved 229
Golden,
Alternate-leaved 229
Golden,
Opposite-leaved 229
Greater Burnet 232
Meadow 229
Pepper 233
Rue-leaved 229
Scabious,
Devil's Bit 236
Field 236
Small 236
Scarlet Pimpernel 244
Scurvy-Grass 215
Hastate-leaved 215
Sea Beet 252
Blite 253
Buckthorn 254
Cabbage 216
Milkwort 244
Mouse-ear Chickweed 219
Pink 243
Purslane 220
Rocket 218
Sedge,
Carnation 265
Common 265
Cyperus-like 265
Dioecious 264
Few-flowered 264
Fingered 265
Flea 264
Sedge—contd.
Fox 264
Glaucous 265
Heath 265
Great 265
Greater Panicled 264
Great Pendulous 265
Green-ribbed 265
Hairy 265
Hare's-foot 264
Loose Pendulous 265
Oval 264
Pale 265
Pendulous Wood 265
Pill-headed 265
Remote-flowered 264
Short-spiked Bladder 265
Slender-beaked 265
Slender-spiked 265
Smooth-stalked 265
Soft Brown 264
Star-headed 264
Tawny 265
Tufted 265
Vernal 265
White 265
White-beak 264
Self-heal 251
Service-tree 228
Shepherd's Needle 233
Purse 217
Shore-weed 252
Silver Fir,
European 270
Grand 270
Noble 270
Silver-weed 227
Skull-cap,
Common 250
Lesser 251
Sloe 226
Smallreed,
Wood 266
Purple-flowered 266
Sneezewort 237
Snowberry 235
Snowdrop 260
Soapwort 219
Solomon's Seal 260

Sorrel,
Common 254
Sheep's 254
Wood 223
Yellow Wood 223
Sowthistle,
Common 241
Corn 241
Rough 241
Spearmint 249
Spearwort,
Great 212
Lesser 212
Speedwell,
Common 248
Field 248
Germander 248
Grey Field 248
Ivy-leaved 248
Large Field 248
Marsh 248
Mountain 248
Thyme-leaved 248
Wall 248
Water 248
Spikenard,
Ploughman's 237
Spindle-tree 223
Spiraea, Willow-leaved 227
Spleenwort, Black-stalked 272
Common Wall 271
Green-lanceolate 272
Sea 271
Wall Rue 272
Spurge,
Broadleaved Warted 254
Caper 255
Dwarf 255
Laurel 254
Petty 255
Red Shrubby 255
Sun 254
Spurrey, Corn 220
Knotted 220
Sandwort 221
Sandwort, Greater 221
Spruce, Hondo 270
Norway 270
Serbian 270
Sitka 270
Star of Bethlehem 260
Yellow 261
Star-wort,
Hooked 230
Large-fruited 230
Stitch-wort,
Bog 220
Greater 220
Lesser 220
Marsh 220
Stock, Virginian 216
Stonecrop,
Biting 230
Crooked Yellow 230
English 230
Tasteless 230
Stork's-bill,
Hemlock 223
Musky 223
Strawberry,
Barren 227
Hautboy 227
Tree 242
Wild 227
Sundew, Long-leaved 230
Round-leaved 230
Sweet-briar 228
Chestnut 256
Cicely 233
Gale 255
Sycamore 224

T

Tamarisk 221
Tansy 238
Tare, Hairy 226
Tea-plant 246
Teasel, Wild 236
Thale Cress 216
Thistle,
Carline 239
Cotton 240
Creeping 239
Marsh 239
Meadow Plume 239
Melancholy 239
Milk 240
Musk 239
Scotch 240
Slender-headed 239
Spear 239
Welted 239
Woolly-headed 239
Thorn-apple 247
Thrift 243
Thyme, Basil 250
Water 257
Wild 250
Toadflax,
Broadleaved 247
Ivy-leaved 247
Lesser 247
Yellow 247
Toothwort 249
Tormentil 227
Creeping 227
Traveller's Joy 211
Treacle Mustard 216
Trefoil,
Bird's-foot 225
Hard Knotted 225
Hare's-foot 225
Hop 225
Large Hop 225
Lesser Yellow 225
Narrow-leaved Bird's-foot 225
Slender Bird's-foot 225
Soft Knotted 225
Strawberry-leaved 225
Tutsan 221
Twayblade,
Common 258
Lesser 258

V

Valerian,
Marsh 235
Red 236
Wild 235
Venus's Looking-glass 242
Vervain 249
Vetch, Bush 226
Common 226
Kidney 225
Milk, Purple Mountain 225
Milk, Sweet 225
Narrow-leaved Crimson 226
Rough-podded, Purple 226
Spring 226
Tuberous Bitter 226
Tufted 226
Wood 226
Yellow Rough Podded 226

Vetchling,
Hairy 226
Tuberous 226
Yellow 226
Yellow Meadow 226
Violet, Dame's 216
Dog 218
Flesh-coloured Sweet 218
Hairy 218
Marsh 218
Sweet 218
Water 243
White Sweet 218
Wood 218
Viper's Bugloss 246
Virginian Stock 216

W

Wake Robin 262
Wallflower 214
Wall Mustard 217
Pellitory 255
Rocket 217
Wartcress 217
Lesser 217
Watercress 214
Water Betony 247
Blinks 221
Crowfoot 212
Dropwort 233
Figwort 247
Lily, White 213
Lily, Yellow 213
Parsnip, Least 232
Parsnip, Narrow-leaved 232
Parsnip, Procumbent 232
Persicaria 253
Water —contd.
Plantain, Greater 262
Plantain, Lesser 262
Purslane 231
Thyme 257
Violet 243
Wayfaring Tree 235
Weld 218
Whin 224
Petty 224
Whitebeam 228
White Bryony 231
White Campion 219
Whitlow-grass 215
Whortleberry 242
Willow, Bay-leaved 256
Common 257
Crack 256
Creeping 257
Dwarf 257
Goat 257
Osier 257
Purple 256
Smooth 256
White 256
Willowherb,
Broadleaved 231
Great Hairy 231
Hoary 231
Narrow-leaved Marsh 231
Pale Smooth-leaved 231
Rosebay 231
Short-podded Square-stalked 231
Winter Aconite 212
Wintergreen, Chickweed 243
Wintergreen—contd
Intermediate 243
Lesser 243
Round-leaved 243
Winter Heliotrope 235
Wood Anemone 211
Wood Betony 251
Woodruff 235
Woodrush,
Broad-leaved Hairy 261
Field 261
Great Hairy 261
Many-headed 261
Wood-Sage 252
Wood Sanicle 231
Wood-Sorrel 223
Yellow 223
Wormwood 238
Woundwort 251
Corn 251
Hedge 251
Marsh 251
Wych Elm 255

Y

Yarrow 237
Yellow-Cress,
Creeping 214
Great 214
Marsh 214
Loose-strife 243
Pimpernel 243
Rattle 248
Rocket 215
Yellow-wort, Perfoliate 244
Yew 270
Yorkshire Fog 267

HEATHLAND AFFORESTATION IN THE SCARBOROUGH DISTRICT

J. Weatherell

By kind permission of Her Majesty's Forestry Commission.

INTRODUCTION

Afforestation involves an ecological change wherein land not normally supporting trees is converted into forest-land. Such a change is inevitably followed by a sequence of others, each of which is a reflection of changed conditions in the soil and the life within and above it. An understanding of these changes helps the forester to assess the wellbeing of his woods, and to determine necessary management.

A wood may need sixty to a hundred or more years to mature according to tree species and site conditions. In an ecological study of a woodland area, periodic recordings are thus essential for the benefit of future foresters and ecologists. For this purpose two local areas are described as they were before afforestation, together with observations on methods of afforestation and difficulties encountered. The calcareous grit plateaux of Wykeham and Broxa Forests are examples of state afforestation ; on the Ordnance Survey map these sites are marked Wykeham Low Moor and Hackness Moor respectively. Planting began at Wykeham in 1928, at Broxa in 1941. Both areas have been subjected to intensive research into methods of afforestation.

PHYSIOGRAPHY.

The areas under review are slightly convex plateaux dipping gently to the south. Their elevation is 600-700 feet above mean sea-level, and they are fully exposed to great force of wind, chiefly from the north-west, but with low-temperature winter winds from the north-east. The rainfall is estimated to be 25 inches per annum. Geologically the surface stratum is the lower calcareous grit of the middle oolite. The small amount of calcareous matter originally present has long been washed away, and there is now an acid reaction.

The soil is a podzol, that is a soil where downward washing or leaching of fine soil particles and mineral salts from an upper layer has occurred. Such washed-out materials are usually deposited at a lower level. The following soil profile is representative though the A2 horizon varies in thickness and the depth of the pan varies accordingly.

Horizon	Depth in cms.	Description
A0	0-6	Brown and black matted peat.
A1	6-12	As A2 but stained by A0. Not always present.
A2	6/12-19	Leached grey sandy soil with small rock fragments ; compact.
A3	19-19·5/20	Black peat from dead roots.
B1	19·5-20	Precipitated humus in sand and around stones ; dark in colour. Not always present.
B2	20-20·3	Brown hard pan, black on upper surface.
B3	20·3-35	Red-orange-brown sandy soil with small rock fragments ; slightly less compact than A2 and with a higher clay content.
C	35-	Yellow-buff sandy soil, with rock fragments varying in quantity but tending to increase in size as the depth becomes greater ; clay content rather less than in B2.

A0 is usually almost structureless and is capable of absorbing large quantities of water, but when dry it is slow to do so, and after a period of drought acts as a waterproof cover which encourages surface flooding.

A1 when present is peat-stained A2 and is the layer most densely occupied by the roots of the heath plants and those of the occasional trees.

A2 is a zone of leached mineral soil with some root humus remains. Its grey or even white appearance gave rise to the word podzol, a Russian term meaning ash-like soil.

A3 is a thin underground humus layer consequent on the inability of the roots of the natural vegetation to penetrate B2. Such roots travel horizontally over the pan, and when they die add to the humus layer.

B1 when present, is stained by humus infiltration from A3 and other humic layers nearer the surface.

B2 is a concentrated collection of substances leached from A1, one of the most important being iron. The break-up of this pan allows the downward and upward passage of water ; normally it is a barrier to both roots and moisture.

B3 is a zone of deposition containing clay and other materials moved from the A horizons by leaching, merging gradually into

C—the parent material, a stony sand weathered from the sandstone rock.

PREVIOUS HISTORY.

Contrary to the belief of some, there is no doubt that these plateaux have not always been covered with a moorland vegetation. Fossilised pollen preserved in the soil can be identified with certainty, and proves that such trees as oak, lime and alder, accompanied by hazel, at one time formed the dominant vegetation type. Such forest species could have existed only under warm and wet climatic conditions such as we believe predominated between 4000 and 7000 years ago. The occurrence of a drier climatic phase following this probably eliminated some species, but there seems little doubt that oak, birch and pine persisted. It seems likely that these were in turn ousted by Bronze Age man when he was driven to exploit these relatively poor soils with his primitive shifting cultivation, his grazing animals and the use of fire. The disappearance of the dense forest cover, coupled with soil depletion by unscientific cultivation, would give ready access to the heather, which, once established, would consolidate its dominance by its tremendous vigour in competition with other vegetation. Doubtless relics of old forest persisted and provided scattered regeneration over the area as a whole, but this would periodically be burnt off, thus preventing the re-establishment of broad-leaved forest even though the climate became appreciably moister again some 2000 years ago. In the course of time the heather brings about such soil deterioration, in particular the formation of a hard pan, that colonisation by trees is achieved only with difficulty and if they do survive, their growth is stunted.

Such a historical account may seem to be of merely academic interest, but it is well for the forester to know that these plateaux have once borne a good forest soil, and if it is realised how long soil deterioration has been at work it gives some idea of how feasible it is to restore such a soil. This reversal of soil deterioration constitutes a major problem for the silviculturist, and a most important factor in the solution will be the correct choice of species for re-afforestation.

NATURAL VEGETATION PRIOR TO AFFORESTATION.

A.—SHRUBS.

1. **Calluna vulgaris** (heather or ling). This is the dominant species ; its average yearly growth rarely exceeds two inches and may be less than one inch ; it is highly inflammable in dry weather.
2. **Erica tetralix** (cross-leaved heath). Associated with fairly wet sites.
3. **Erica cinerea** (fine-leaved heath). Generally less common than **E. tetralix** and restricted to drier sites, the sides of tracks, etc.
4. **Empetrum nigrum** (crowberry). Rare.
5. **Ulex europaeus** (gorse). Associated with old depressed tracks.

B.—SEDGES, RUSHES and GRASSES.

1. **Juncus squarrosus** (heath rush). Closely associated with **Scirpus,** but rather more common, especially where the peat has been burned off.
2. **Juncus bufonius** (toad rush). Rare.
3. **Scirpus caespitosus** (deer grass). Occurs on wetter sites where **Calluna** is least vigorous.
4. **Carex flacca** (glaucous sedge). Rare.
5. **Eriophorum vaginatum** (hare's tail cotton-grass). Patchy, but very frequent on wetter sites, and best noticed when in fruit.
6. **Eriophorum angustifolium** (narrow-leaved cotton-grass). Rare to patchy and always confined to wet depressions.
7. **Molinia caerulea** (purple moor-grass). Rare.
8. **Nardus stricta** (matweed). Of rare occurrence. Associated with old tracks where peat is thin enough to expose mineral soil.

C.—TREES.

1. **Pinus sylvestris** (Scots pine). Rare and always in scrub form.
2. **Betula spp.** (birch). Rare and never taller than 3 feet.

To the east of Hackness Moor and within easy reach of the highway much better examples of Scots pine and birch may be found together with other tree species. These are almost certainly examples of natural regeneration, but may have descended from earlier plantings nearby.

GENERAL FORESTRY PRACTICE.

FOREST NURSERIES.

All conifers are raised from seeds. Cuttings are sometimes possible but a high degree of skill is needed for success and the method is not yet economic. When the seedlings are one or two years old, they are transplanted within the nursery and left for another year. Transplanting discourages the formation of long roots, encourages short root formation and gives the tree an opportunity to build up a reserve of energy before it is transferred to its forest site.

Two types of nursery are in use locally. The older type is on agricultural soil, the recently developed type is on heathland soil. The latter produces trees more fitted to heathland planting, the explanation for which may be connected with mycorrhizal equipment of coniferous roots. A tree produced in one soil type tends to go into partial check when transferred to the other soil type, though normal growth is resumed after a year or so, provided other deleterious factors are not present. This check occurs possibly because the mycorrhizal equipment developed in one soil is useless to the tree in the other soil. A further valuable feature of the heathland nursery is its relative freedom from troublesome weeds, at least during early years.

PLANTATIONS.

About seventeen hundred plants are needed to afforest one acre. For an equally proportioned pine-spruce mixture these can be obtained from one ounce of Scots pine seed and one quarter-ounce Sitka spruce seed. Seventy per cent. or more of the trees will be eliminated partly by natural competition, but mainly by deliberate thinning before the final crop is left to mature. The initial heavy stocking of the trees and subsequent removal in stages of so many stems is the forester's method of providing straight stems, free from large branches. Thinnings allow removal of weaklings, deformed trees and "wolves." The last are so called because of inherent vigor for branch production which, if uncontrolled, would suppress rather smaller but better quality stems.

At the original stocking per acre a dense canopy of branches is formed in ten to fifteen years. The upper branches absorb light at the expense of the lower branches and ground vegetation. These latter die, which is what the forester wants. The dominant trees continue their upward growth and also expand laterally ; consequently an annual increase in the amount of foliage is essential if stability between the foliage food-factory and timber production is to be maintained. Thinning or removal of stems allows increased development of foliage on the remaining trees. Each thinning allows further branch development, but there is always some degree of shade at an ever-increasing height which is sufficient to discourage vigorous branch development below. When the forest crop has nearly reached its height limit the final thinning takes place which allows further increase of stem diameter.

FOREST DEMARCATION.

Forests, under management, are divided into compartments or blocks, usually of about 25 acres and each is given a number. Easy reference to any part of the forest is thus obtained. Demarcation is effected by unplanted rides which vary in width from twenty-five to sixty-six feet, or even wider according to their various uses. Rides give access to the forest and serve the all-important feature of providing fire-proof lines. In recent years the wider rides have been used as nurseries where seedling conifers are raised. When timber extraction begins in earnest, the rides will become highways of activity.

Rides may be straight or curved. The former provide numerous viewpoints through the forest, especially useful in periods of fire danger ; the latter lend themselves to extraction routes in undulating country.

FIRE

Fire is the great enemy of all forests. A single match or cigarette end can cause the loss of thousands of pounds worth of valuable timber, besides endangering human and other life. On no account should fires or stoves be lit anywhere near plantations or inflammable vegetation.

Steps are taken to minimise the spread of any fire which may occur in spite of all possible preventive measures. During danger periods such as public holidays and week-ends, the more accessible areas are patrolled. In addition field telephones are installed for rapid communica-

tion. Rides are cleared of inflammable vegetation, and fire-proof belts of Japanese larch are established. Fire-beaters made of young birch trees are installed at strategic points.

In the event of an actual outbreak everyone can be of assistance by beating out the flames. One person at least should inform the local forester or police from the nearest telephone. "Forestry Commission" will be found in the directory, and the fire may be reported on a reversed charge.

PESTS.

Rabbits and hares can do much damage, especially in nurseries, and are excluded by suitable fences. Deer have occasionally been reported in the vicinity, but seed-eating squirrels have not yet appeared.

Woodlands abound with insects, many of which are either harmless or useful; others are detrimental in various ways and degrees of importance. Among the latter the following have been observed locally.

Chafer beetles. **Melolontha melolontha, Serica brunnea.** Have on occasions been troublesome in nurseries where, as larvae, they feed on tree roots.

Cutworm. **Agrotis** spp. The larvae cut off nursery seedlings at ground level, and pull the tops underground as food.

Pine weevil. **Hylobius abietis.** This and related species can be very troublesome following felling of coniferous woods. The bark and outer cambium of newly planted and young conifers are ruthlessly eaten, often with disastrous results, unless trapping is resorted to.

Pine shoot moth. **Evetria** spp. Attacks 3-15-year old pine, particularly **Pinus sylvestris.** Damage in done to buds, resulting in dead or deformed shoots including the all-important leading shoot.

Pine shoot beetle. **Myelophilus** spp. These troublesome pests usually follow the pine shoot moth, and do twofold damage, **Pinus sylvestris** being the favourite tree. Tunnels are cut in main stem cambium by mature beetles in which eggs are laid; the larvae cut new tunnels as they feed on the cambium. Much more serious is the damage done by mature beetles which move from the main stem and feed on the pith of young shoots. The tunnelled shoots die, so ruining normal development, especially when the leading shoot is attacked. Tunnelled shoots on the forest floor indicate that **Myelophilus** has been at work.

Larch shoot moth. **Argyresthia** spp. Larvae feed within and usually kill young shoots of larch. Reputed to prefer unhealthy trees.

Larch leaf-miner. **Coleophora laricella.** Larvae feed on larch needles, trees of 6 to 30 years of age being preferred.

Pine sawfly. **Diprion pini.** Larvae, always in colonies, defoliate pines, and if attack is heavy, other conifers.

Spruce aphis. **Neomyzaphis abietina.** Causes severe defoliation of Sitka spruce by feeding on needle sap. Immune to freezing temperatures, and under such a combination of enemies the host may die.

Chermes. **Adelges** spp. Responsible for galls on spruces.

WEATHER

Adequate drainage and efficient thinning are essential if uprooting of trees during occasional severe gales is to be avoided. Wind will break young leading shoots, especially Sitka spruce, in exposed sites.

Spring frosts retard development of young trees of many species, though some, such as larches and spruces, open their buds in relatively long term sequence beginning at the basal branches, and so minimise the damage. Frosted lower buds give the tree a check, so that by the time the all-important terminal bud opens further frosts are less likely.

Frost lift is a serious nursery problem affecting small seedlings. Expanding ice between soil particles gives a mechanical lift to the upper layers within which the seedling root collars are firmly held by surface ice. The succeeding thaw allows the soil to subside away from the lifted seedlings, whereupon the latter frequently fall and perish.

Frost-crack in plantations occurs during a prolonged period of low temperature, and is due to a sudden rupture of the bark consequent on the expansion of freezing moisture within the stem. The rupture is accompanied by a readily audible report.

Glazed frost is a condition where rain coming from relatively warm layers meets with frozen vegetation. The result is an ever increasing collection of ice on stems, branches and twigs. which can, through sheer weight, maim and destroy plantations.

Snow break, that is mechanical damage due to weight of snow, can be serious, especially with Scots pine. Drought can have a marked effect in woods of shallow rooting species, usually in the form of reduced growth in the year following the drought. Lightning damage is rare.

LOCAL AFFORESTATION.

TREE SPECIES.

Coniferous trees are in general much less exacting in soil requirements than are the broad-leaved timber trees, and in the afforestation of low quality podzolised heath conifers offer the only chance of success. Some of the broad-leaved trees such as oak, alder, willow, and birch might grow as scrub, but would not produce marketable timber in the initial rotation. Such broad-leaved species may, however, prove to be valuable soil-improvers and would therefore be in place as admixture species in a coniferous wood ; investigations into the effects on the soil of various such species are being made.

The following trees have been used in the afforestation of the upland plateaux of Wykeham and Broxa :—

SCOTS PINE (**Pinus sylvestris**). This is the only coniferous timber producer indigenous to Britain. Many trees are deformed due to pine-shoot moth, and pine-shoot beetle.

CORSICAN PINE (**Pinus laricio** var. **corsicana**). This is a native of Corsica and is less liable to insect attack than **P. sylvestris**. It is liable to frosting and attack by the fungus **Brunchorstia destruens** at high altitudes, and is difficult to establish because of high death rate following planting.

DEEP-PLOUGHED MOORLAND FOR TREE-PLANTING

By kind permission of H.M. Forestry Commission

facing page 292

LODGEPOLE PINE (**Pinus contorta**). This is a native of the Western States and Canada. It is easy to establish, is a rapid grower and very suitable for really difficult areas.

EUROPEAN LARCH (**Larix decidua**). This is an exacting conifer used in small-scale trials at Wykeham ; it is heavily attacked by larch shoot moth.

JAPANESE LARCH (**Larix leptolepis**). This is less exacting than **L. decidua,** and is extensively used for fireproof lines across plantations. The non-inflammable nature of this species was discovered when advancing forest fires died out on reaching it.

The larches, by reason of their pale young shoots, reveal each year after leaf fall a deposit of soot which is most obvious on the south west side, that is, on the side facing the industrial areas of South and West Yorkshire. Soot adhering to other species is much less discernible because of their darker stem colour. It is largely removed by snow.

SITKA SPRUCE (**Picea sitchensis**). This is capable of producing a high yield of timber on relatively poor ground. In its native habitat along the Pacific coast of North America it produces trees of magnificent form and size.

In addition a number of less common conifers and several broad-leaved species have been tried experimentally. Of such conifers, western hemlock, **Tsuga heterophylla,** Douglas fir, **Pseudotsuga taxifolia** and silver fir spp., **Abies grandis** and **A. nobilis,** show some promise. Among the broad-leaved trees, birch, **Betula** spp., is reasonably vigorous ; beech, **Fagus sylvatica,** and sweet chestnut, **Castanea sativa,** have made progress when nursed by pines.

DIFFICULTIES OF ESTABLISHMENT.

The early plantings were not wholly successful, and it was soon realised that the soil would have to be improved if satisfactory tree growth was to be obtained. Direct planting into the natural heath resulted in the death of many trees and the poor stunted growth of the survivors.

Cultivation was the line of approach, but there was no available plough or other tool capable of working in such a compacted soil. Special ploughs were accordingly constructed and improved from time to time. The first workable model reached a maximum depth of six inches and in places ruptured the pan. A revised model reached a depth of eight to nine inches, and the latest operates at a depth of twelve to sixteen inches ; this single-furrow plough weighs nearly two tons and is drawn by a 40 H.P. caterpillar tractor. Each development in ploughing resulted in improved growth in the plantings which followed. Ploughing, when deep enough to break the pan, allows water to be absorbed, and gives roots access to lower soil levels besides inproving aeration and smothering the natural vegetation.

A second line of approach was the use of artificial fertilisers applied at planting. Results were variable and the subject is still being studied. Manures applied to individual trees at planting exert little effect on growth during the first growing season, but may produce very vigorous growth in the second year after application. Such effects sometimes wear out within a few years and secondary applications have but little effect.

Ten years after the initial planting of ploughed heath at Wykeham, it was found that where pines and spruces were grown in intimate mixture the growth of spruce was better than in adjoining pure plots. This assistance which same species can give to others is of aid to the forester, and is discussed more fully below.

INTERACTIONS BETWEEN SPECIES.

As just noted, the beneficial effects of one tree species upon another are used by the forester. This leads him to form mixed woods rather than pure stands, and thus large areas have been planted with a mixture of Scots pine and Sitka spruce. Early mixtures consisted of single rows or plants of one species alternating with single rows or plants of the other species. The current method of mixing is a strip of several rows of the nursing species alternating with a strip of several rows of the nursed species. This is done because the former mixing leads to maintenance difficulties due to the unequal growth of the two species.

Broom has been outstandingly successful in nursing Sitka spruce during the early life of the plantation. Corsican pine and Japanese larch are also useful nurses, generally similar to Scots pine in effect, but less dramatic than broom.

When nursing effects were observed in Wykeham Forest in 1938 a series of experiments designed to uncover some of the factors involved were begun. The following pointers emerged on ploughed areas :—

1. When pines were not more than four feet distant from spruces, the latter showed a small growth increase when the pines were about five feet high.
2. When strips of Japanese larch or Scots or Corsican pines had suppressed the **Calluna** vegetation immediately below, adjoining Sitka spruce began to grow vigorously.
3. When **Calluna** in stands of pure Sitka spruce was killed by mulching or hoeing, growth of the spruce improved considerably.
4. The presence of **Calluna** does not appear to matter very much to spruce when broom is present.

1.—Indicates a possible inter-root effect and possibly a bringing up of the bases by a deeper-rooted nurse. 2 and 3—Indicate a harmful association between **Calluna** and spruce, while broom appears to counteract this. Nitrogen undoubtedly plays a major part in the life of trees, and is is possible that **Calluna,** with its underground fungal association, renders normally available nitrogen unavailable to the trees either by changing its form or by somehow exerting priority on its uptake.

Broom is expensive to establish and maintain. Pines offer the best practical method for nursing spruce. In multiple rows they soon suppress natural vegetation, and until better methods are devised, it is likely that such strip mixtures will be employed on **Calluna** podzols where spruce is the intended major species.

TREE ROOTING.

The roots of naturally regenerated trees on the undisturbed heath are all moulded into very similar form by the soil stratification. Whilst such trees as pine, oak, birch and rowan normally have diverse and characteristic systems, here they all confine their main roots to the shallow A1 horizon. A few roots in each case may exploit the humus layer above the pan, but these are never vigorous. The surface roots frequently show the long unbranched form typical of roots growing in an unfavourable medium. Birch, however, is unique in sending down sinkers which are often able to penetrate the pan, even when it is indurated, and it is almost safe to say that every well-growing birch has one or more roots in the subsoil. Pine can do this only in places where the pan is soft or ruptured. On land which has previously carried scrub pine, birch roots frequently enter the rotten wood of old stumps and produce vigorous fibrous rooting within it.

As regards planted trees, excavations have revealed useful data on the behaviour of tree-roots relative to cultivation. Scots pine roots do not develop very well in undisturbed leached soil, and do not penetrate the unweathered or unbroken pan. When they reach B3 via furrows or disturbed soil they develop and branch freely.

The roots of Sitka spruce remain at or within an inch of the surface in unploughed land, but will go down at least twelve inches into ploughed soil. If stands of larch or pine without living **Calluna** are at hand, the spruce roots develop vigorously in the layer of larch and pine needle litter.

One root of a planted alder ceased sixty-seven and a half inches below the surface. At this depth the soil was compact, but with no evidence of gleying. It is of interest that ancient root channels now occupied by living **Calluna** roots have been found at more than seven feet below the surface.

ECOLOGICAL CHANGES.

Perhaps the most interesting ecological changes to date following planting are mycological. In 1946 more than forty species of agarics and boleti were observed in sixteen year old coniferous plantations at Wykeham. A study of mycology is vitally important in coniferous woodland since there is some connection between toadstools and the mycorrhizal root equipment of trees, as well as in the breakdown of needle and branch litter in the forest floor and dead roots in the soil. Some fungi are beneficial, others are harmful or even deadly to the crop.

Grasses such as **Deschampsia flexuosa, Poa annua, Holcus** spp. and **Agrostis** spp. have appeared, and in areas sown with broom, **Vaccinium myrtillus, Rubus** spp., grasses, ferns, mosses and liverworts are to be found.

Broad-leaved species such as birch, willow and oak regenerate fairly frequently following deep ploughing, and birch develops rapidly particularly in areas sown with broom.

When blocks of European larch adjoin Japanese larch there is cross-pollination with the former as the male parent, and hybrid larches appear in the forest rides from self-sown seeds. There is also regeneration of lodge-pole pine at Wykeham, but very little of Scots pine, and none of Corsican pine.

Application of phosphate to newly planted trees almost always produces patches of the mosses **Funaria hygrometrica** and **Ceratodon purpureum** with the rose-bay willowherb **Chamaenerion (Epilobium) angustifolium.** A similar ecological change follows the burning of heaped brushwood in woodland.

The ecological changes recorded to date deal only with what happens as trees are established up to the point where they close canopy. Whilst it is too early in most cases to say that new communities have been formed, at least the old one, the heath, has been destroyed and is now unrecognisable. This is due mainly to one factor—shading, and differences in the vegetation under the various species can so far be correlated only with differences in the degree of shading, but the increase in ferns, mosses and liverworts indicates that a second factor—shelter—is becoming operative. These plants demand a humid atmosphere, now provided by protection from drying wind.

Such is the first stage of ecological change. The oldest plantations are now entering the second stage of development, the formation of a mature stand. Doubtless this will also be beset with surprises and difficulties for the forester, but it must remain for the present another story.

The author is indebted to Dr. G. W. Dimbleby for his help in the section on Previous History, which has been written in the light of Dr. Dimbleby's own work on this area.

2 0 MAR 1954

MAP SHOWING

The Area Recorded by the Scarborough Field Naturalists' Society

Scale Half-Inch to the Mile

0 1 2 3 4 5 Miles

NATIONAL GRID incorporated by permission of H.M. Ordnance Survey

Copyright John Bartholomew & Son Ltd Edinburgh

BRITISH MUSEUM
NATURAL HISTORY
20 MAR 1954

Scarborough Field Nats. Soc.
20/3/54 21/- A 341